McMURDO STATION

Charrette Report

September 4, 2015

ANTARCTIC SUPPORT CONTRACT

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EXECUTIVE SUMMARY

During July and August 2015, the National Science Foundation engaged several groups of representatives from the McMurdo Station community in a series of intense information-gathering sessions called "charrettes". The purpose of these charrettes was to vet McMurdo Master Plan 2.0 with a more diverse and larger set of end users than had been involved to date with the Plan's development. Primary objectives included confirming the viability of version 2.0 of the Plan as well as to gain any additional information that could further optimize the layouts and other aspects prior to proceeding with additional design work. This report provides summary information and supporting documentation generated from these meetings.

The charrettes occurred July 13 – August 6, 2015. Participants included grantees, allied and ancillary support agencies, Antarctic Support Contract personnel and members of the National Science Foundation. Each week focused upon verifying or clarifying specific end-user requirements to ensure the Master Plan appropriately addresses current and future needs for McMurdo Station. In order to accomplish this goal, participants were encouraged to envision logistical and other support components required to execute science over a time frame extending from now to 50 years into the future.

The meetings were highly productive. Attendees were very well prepared, allowing discussions to focus on challenging in depth both the Plan and its assumptions. Discussions focused not only on addressing ideas to optimize work flows and related physical infrastructure requirements of those at the meetings but also of the larger community not in attendance. Throughout the sessions, attendees routinely expressed gratitude for the opportunity to participate in the process and conveyed that they understood how their input was being incorporated into changes.

Significant results of the meetings are listed below.

1. Confirmed the Master Plan 2.0 guiding principles, and primary facilities siting and configuration.
2. Potential Master Plan adjustments include:
   - The combination of the Vehicle Maintenance Facility and Traverse Operations in one structure, as opposed to two separate facilities as indicated in the Master Plan.
   - The remodel of the existing Vehicle Maintenance Facility building to house the Mechanical Equipment Center, Air National Guard, Air Ground Equipment, and the Field Safety Training Program.
   - Revisions to the Sea Ice Support structure to house dive support, balloon launching, and covered staging space for Grantees to load and unload sea-ice science vehicles.
   - The addition of a sky bridge to connect the Information Technology Operations facility to the Field Science Support facility.
3. Programming elements and conceptual building layouts were developed for Information Technology Operations, Crary Lab, Contingency Operations (Fire and Medical), Central Services (multiple areas), Sea Ice Support, and Lodging.
4. Grantees identified research community trends which may impact the Plan, including:
   - Identification of the potential need for a future boathouse, due to the potential of increased open water in future years.
   - Potential use of "shoulder seasons" made possible by the introduction of winter flights. This may reduce traditional summer population spikes if science is allocated across a larger portion of the calendar year.
5. Airfield planning will be for 2 separate fields: wheeled and ski-equipped.
6. Expanding bandwidth off-continent could possibly result in:
   - Shift of selected additional activities off-continent, reducing staff on station
   - Expanded situational awareness in the Continental United States (CONUS).
7. Allied agencies and others need an understanding of the project schedule (particularly construction activities) to allow for budget process and transition planning.

EXECUTIVE SUMMARY

Once this charrette report is formally submitted to National Science Foundation, it will then be submitted to the broader scientific community that uses McMurdo Station to ensure holistic and accurate representation of requirements. Users will be requested to review the document, provide comments which will then be annotated, or answered, and have those comments, once vetted, included in the Basis of Design document that will feed into the eventual design drawings.

Once the charrette design review is complete and design of the facilities has begun in earnest, the scientific community will be offered an additional chance to comment on the early design drawings and have those comments become a part of the overall design. Once this stage of the process is complete, comments will be much more difficult and expensive to incorporate as the design will focus much more on engineering thus making later changes costly and cumbersome. There will be a formal design change process in place for items of critical importance that had thus far been overlooked or omitted but it will only be used sparingly and under a high measure of scrutiny. The earlier design requirements are identified and incorporated the better and more accurate the overall design documents will be.

Charrette Report

This charrette report chronicles the 4 weeks of requirements gathering. It is organized into three sections:
Section 1 contains summaries of salient requirements by both week and by day.

Section 2 contains both descriptive and numeric tabulation of space program areas resulting from Section 1's description of requirements.

Section 3 contains graphic adjacency diagrams that describe the internal organization of all building components.

The *Appendix* contains full transcripts of all discussions, attendee list of each day's discussion. The appendix also contains follow-up questionnaires by each of the participating stakeholders.

SECTION 1
Summary of Stakeholder Requirements

WEEK 1 - GRANTEES' REQUIREMENTS

INTRODUCTION TO WEEK 1

This first week focused on the engagement of the Grantee community, with key representatives of all major Science activities, from *Deep Field, Town/Long Duration Balloon, Sea Ice, Dry Valleys and Traverse-based* investigations. Earth Sciences was under represented due to an international conference scheduling conflict so review of the following pages will be critical from that discipline to ensure requirements are met.

WEEK 1 SUMMARY

- Broad and consistent understanding, review and comment from Grantees and peers. Grantees approached the week's session with a global approach to incorporate not only their specific needs but also the known needs of the larger grantee community who could not be physically present at the charrettes.
- Confirmation of Master Plan 2.0 guiding principles and facilities configuration was a major goal of the charrettes. If there were any fatal flaws in the logic of the Master Plan it was the intent of the charrette to discover those flaws and find a workable solution.
- Additional input to consider for master planning was discussed heavily to identify potential future needs that the Grantees saw trending in the research community. Three specific items came of this discussion:
  - Identification of a future potential boathouse.
  - Identification of an alternate balloon inflation area.
  - Potential use of "shoulder seasons" made possible by the introduction of winter flights.
- Understanding of Grantee internal process flows and ideal adjacencies of sub-functions was critical to the success of the charrettes. Questions were asked regarding movement of people and materials and the constraints that make those process flows less efficient and also regarding ideal flow and adjacencies.
- Understanding of Grantee lifestyles and priorities. This was a quality of life discussion that helped inform Grantee schedules from eating to sleeping to recreation and other off-duty activities.
- Grantees had a true appreciation for the opportunity to participate and see their information incorporated into the charrette process.

WEEK 1 - GRANTEES' REQUIREMENTS

WEEK 1 - DAY 1

The week began with an introduction to the grantee community of the Master Plan's basis, guiding principles and organization.

MONDAY JULY 13 (1.1)

1.1.2	1:00-1:30	(ASC)	Introductions and Objectives, Rules of Engagement
1.1.3	1:30-2:00	(ASC)	Review and Confirmation of MP 2.0: Goals, Assumptions, Parameters, Building Siting
1.1.4	2:00-3:00	(OZ)	Material and Personnel Work Flows and Adjacencies
1.1.5	3:15-5:00	(OZ)	Science Operations Overview

- DC1.1.5.1 Role of science within McMurdo
- DC1.1.5.2 Current operations/Challenges
- DC1.1.5.3 Scalability of Spaces
- DC1.1.5.4 Anticipated science

SUMMARY OF DAY

This day was devoted to providing the Grantees an introduction to the charrette process, its goals, objectives and schedule. In addition, Grantees were provided an overview of the McMurdo Master Plan, with explanation of the logic of the building siting and proposed phasing sequence. Because improved operational efficiency is one of the capstones of the McMurdo redevelopment, the logic of the proposed work flow, material and personnel adjacencies were described.

Major discussion items included:

- The McMurdo redevelopment is first and foremost an efficiency project that allows the National Science Foundation to spend less on infrastructure and support personnel and more on scientific research.
- The resultant facility design should project prominence, but not at the expense of function, safety and efficiency.
- The current fuel storage capacity of 2.5 years should be increased to 3 years in order to reduce the frequency of the fuel vessel to every other year, resulting in significant transportation and personnel savings.
- There needs to be a heavy focus on safety while occupying the site during construction.
- The amount of winter science may increase with additional winter flights.
- Access to Arrival Heights operations is critical, whether by vehicle or through remote sensing.
- An analysis of electromagnetic interference should be conducted as part of the design process.
- A flexible staging area is required for the staging of field science gear.

WEEK 1 - GRANTEES' REQUIREMENTS

WEEK 1 - DAY 2

Day 2 focused on an understanding of the processes by which the various grantee groups conduct their operations, what aspects of McMurdo are successful in supporting the work, which aspects of McMurdo pose challenges to their work, and the changing nature of their work.

TUESDAY JULY 14 (1.2)

1.2.0	8:30-9:30	(OZ)	Review previous day's work
1.2.1	9:30-12:00		Break-out Sessions - Science
	1.2.1.1	(OZ)	Track 1: Deep Field Science
	1.2.1.2	(FC/OZ)	Track 2: Local Science: Sea Ice
	1.2.1.3	(OZ)	Track 3: Local Science: Dry Valleys & Helicopter Supported Science
	1.2.1.4	(FC/OZ)	Track 4: Local Science: Long Duration Balloon/Town Science
1.2.2	1:00-5:00	(FC/OZ)	Debrief of Break-out Sessions and Confirmation of Requirements

SUMMARY OF DAY

- Minimize touch points of supporting material.
- Minimize preparation time before deployment to the field.
- Streamline Science Support Staging in two ways:
  a. Geographically (e.g. improved adjacency and reduced distance between work areas).
  b. Operationally (e.g. optimized scheduling of work).
- Design for ease of movement of both goods and people between Crary Lab and the Field Science Support Facility.
- Clear and intuitive way finding within facilities is required.
- Design will facilitate a clear orientation and access to support staff.
- There is a desire for dedicated storage space for multi-year projects.
- Continue the adaptability within the Crary Lab to foster interdisciplinary work.
- Salvaged building elements and historical material can be incorporated into new facilities.

BREAKOUT SESSIONS

Grantees were split into breakout sessions to discuss their scientific research and the process and methods they use at McMurdo. Each group was asked the same questions and the following summarizes the information gathered.

1.2.1.1 TRACK 1: DEEP FIELD SCIENCE

What is the specific nature of your scientific research?

- Geology - Studies volcanoes, cryosphere, and tectonics.
- Ice change research.
- Seismic operations.

WEEK 1 - GRANTEES' REQUIREMENTS

- Telemetry.
- Iridium or satellite to get data out.
- Boat-based research and activity.
- Longer season will allow more work.
- Fewer smaller groups and more larger groups.
- More ice drilling and submarines.

How does McMurdo Currently assist you to do good science?
- Collaboration with other grantees.
- Great support and ability to deal with changing needs due to the weather.
- Good inventory.
- 24 hour access.
- Food availability 24/7.

What impedes you from doing good science at McMurdo?
- Lack of easy communication.
- Receiving and staging access.
- Lack of scientific collaborative space to promote learning and sharing of ideas.
- On-ice training time could be done virtually before getting to the ice (for returning grantees).
- Lack of storage/dedicated storage.
- Too many cargo touches and inability to track it.
- Lack of staging space – too many people/functions all happening in the same space at the same time.

1.2.1.2 TRACK 2: LOCAL SCIENCE: SEA ICE
What is the specific nature of your scientific research?
- Field operation on the sea ice.
- Water sampling.
- Research involving animals.
- Monitor impacts of science on the environment.

Where do you see your science going in the future?
- Open water science research from McMurdo.
- Field schedule reflecting science not logistics.
- Longer term experiments in the aquarium.
- Higher frequency of staff transitions.
- Greater collaboration efforts between different researchers.

WEEK 1 - GRANTEES' REQUIREMENTS

How does McMurdo currently assist you to do good science?

- Support capacity and personnel are phenomenal.
- Collaboration spaces between Grantees.
- Research lab.
- Ability to adapt lab space to meet their needs.

What impedes you from doing good science at McMurdo?

- Access to open water at McMurdo.
- Frequency of sample deliveries leaving McMurdo.
- Extending aquariums operating time.
- Increase need for meeting space.
- Many touch points for frequently used items.
- No adequate tracking of stored items.
- Need more flexible meeting spaces especially for groups or 12 or more.
- No areas to work during weather delays.
- Bandwidth constraints.
- Mud room to ease daily movement of people/things/equipment/samples.

1.2.1.3 TRACK 3: LOCAL SCIENCE: DRY VALLEYS & HELICOPTER SUPPORTED SCIENCE

What is the specific nature of your scientific research?

- Study of the existing soils, atmosphere, glaciers, streams, lakes etc. through sampling, scanning, measuring, & monitoring.
- Long and short term studies in the field.
- The Grantees called themselves "vagabonds on the move" expressing their lack of a permanent location for many of them.
- Get to remote sites via heliport.
- Move a lot of gear to the field, back to Crary, and back to the field.

WEEK 1 - GRANTEES' REQUIREMENTS

Where do you see your science going in the future?

- More offseason work.
- Use of drones.
- Better use of telemetry.
- Helicopter mounted sensors.
- More access to higher places and more antennae.

How does McMurdo Currently assist you to do good science?

- Support Information Package (SIP) process ensures things are prepared upon arrival.
- Support is comprehensive; having parts and experts on location allows more research.
- Labs being mixed up and versatile creates good cross pollination.
- Informal collaborations with other grantees in Crary.

What impedes you from doing good science at McMurdo?

- It takes at least 5 days upon arrival to get to field and 5 to 7 days to leave.
- Storage space is limited.
- Lack of storage at Heliport.
- Long term storage can take days to access.
- Many touch points for frequently used items.
- No adequate tracking of stored items.
- Need more flexible meeting spaces especially for groups or 12 or more.
- No areas to work during weather delays.

WEEK 1 - GRANTEES' REQUIREMENTS

1.2.1.4 TRACK 4: LOCAL SCIENCE: LONG DURATION BALLOON/TOWN SCIENCE

What is the specific nature of your scientific research?

- Light Detection and Ranging (LIDAR) at Arrival Heights.
- Long Term Ecological Research (LTER).
- Ice Bridge.

Where do you see your science going in the future?

- Ultra long duration ballooning.
- Geospace at McMurdo due to its unique location.
- Year round capacity.
- Increased use of drones.

How does McMurdo Currently assist you to do good science?

- ASC Support.
- Labs.

What impedes you from doing good science at McMurdo?

- Proximity of Helicopter to Crary to Arrival Height.
- Bandwidth.
- Transportation to Long Duration Balloon (LDB).
- Lack of staging.
- Lack of office/work space.
- Vibration in Crary lab.
- Food service for arrival heights.

WEEK 1 - GRANTEES' REQUIREMENTS

WEEK 1 - DAY 3

This day focused on the understanding of the Grantee requirements with respect to a remodeled Crary Lab, and a new Field Science Support facility.

WEDNESDAY JULY 15 (1.3)

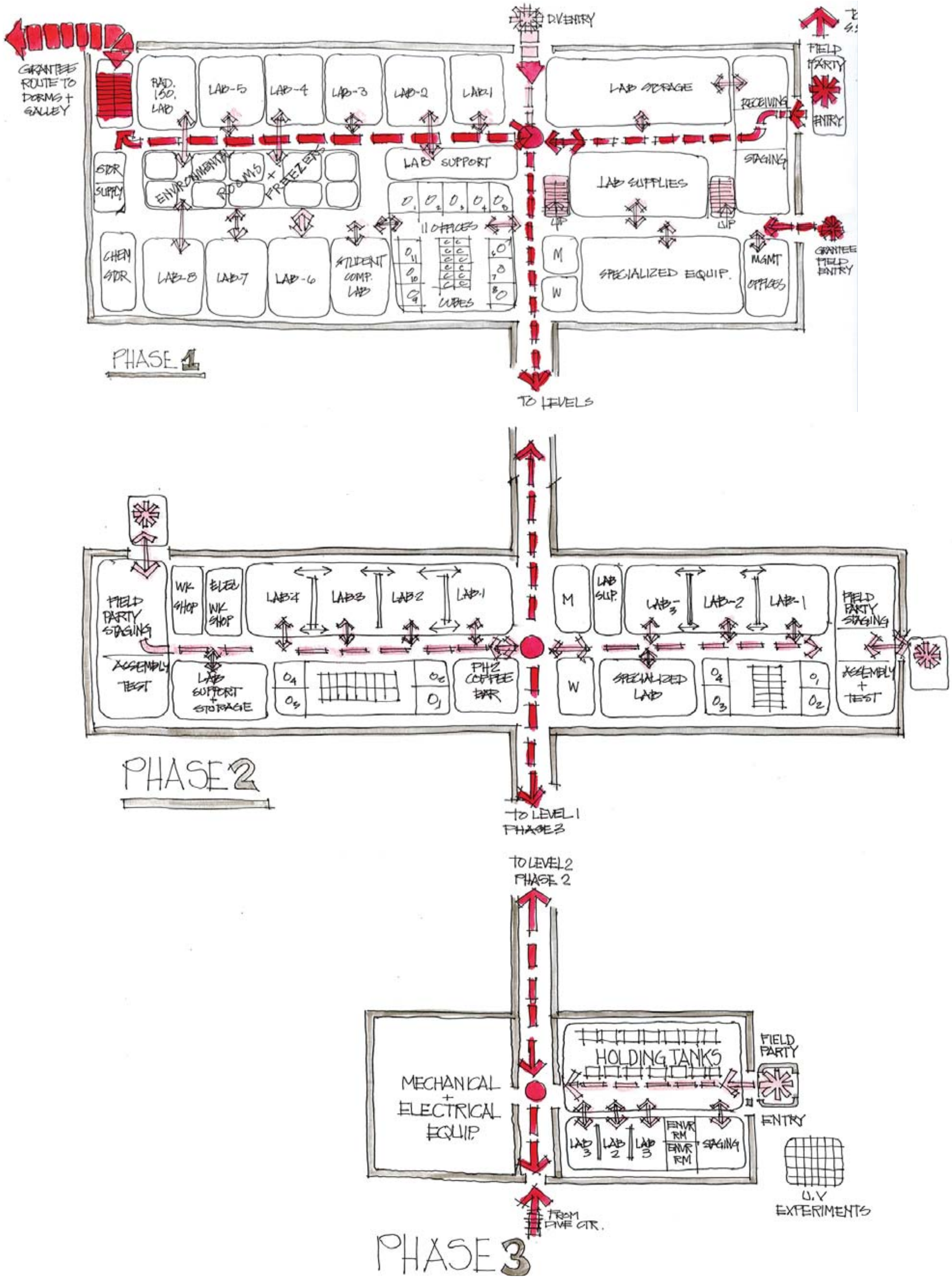
1.3.0	8:30-9:30	(OZ)	Review previous day's work
1.3.1	9:30-10:00	(FC/OZ)	Briefing on Crary Constraints
1.3.2	10:15-12:00		Break-out Sessions
	1.3.2.1	(FC/OZ)	Track 1: Crary Lab Programming, Part 1
	1.3.2.2	(OZ)	Track 2: New Field Science Support Facility Programming, Part 1
	1.3.2.3	(OZ)	Track 3: Dive Services Programming
1.3.3	1:00-4:00		Break-out Sessions (Cont.)
	1.3.3.1	(FC/OZ)	Track 1: Crary Lab Programming, Part 2
	1.3.3.2	(OZ)	Track 2: New Field Science Support Facility Programming, Part 2
1.3.4	4:00-5:00	(FC/OZ)	Brief results of break-out sessions

BREAKOUT SESSIONS

1.3.2.1 TRACK 1: CRARY LAB PROGRAMMING

- Peer institutions' lab and research methods were reviewed.
- An aspect of visibility and openness in building design using natural light was discussed, including using interior glazing between labs.
- Looked at traditional lab design and discussed trends to locate that out of labs in communal areas and with Principal Investigator (PI) offices.
- The metrics of the existing building were reviewed.
- Moving the mechanical system out of Crary opens up additional lab space.
- The design approach is mainly to look at Phase 2.
- Challenges with the existing building are recognized.
- Service access and conditioned holding spaces need to be better aligned. The loading dock on the left could be removed or shifted to the other side of the building.
- More wet labs by Aquarium are needed.
- Phase 1 has access to freezer and controlled environment.
- Space to accommodate daily activities (including frequent trips in and out of Crary, staging and temporary storage) is required.
- Grantees return to Crary with a high volume of gear. Design will incorporate ways to keep movement of gear out of the traffic flow in the corridors.
- There is a functional need for office space with relationship to labs. More than one office for each Principal Investigator (PI), lab managers, students, technicians, etc. is required.
- Informal meeting spaces are required .
- Design will facilitate collaboration between different work centers.

WEEK 1 - GRANTEES' REQUIREMENTS

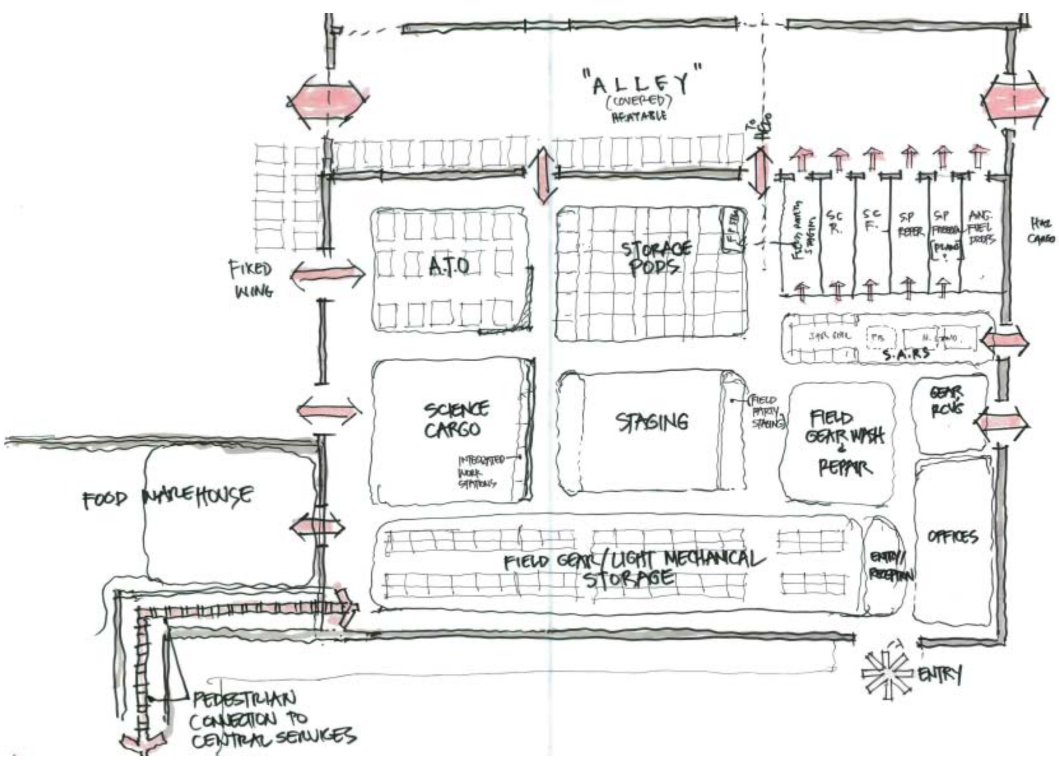


CRARY SCIENCE AND ENGINEERING CENTER ADJACENCY DIAGRAMS

WEEK 1 - GRANTEES' REQUIREMENTS

1.3.2.2 TRACK 2: NEW FIELD SCIENCE SUPPORT FACILITY PROGRAMMING

- Concourse space will be covered but not heated, with large doors on both sides to protect the support area from the weather.
- Antarctic Terminal Operations (ATO) palletization has many trucks going in and out with little pedestrian traffic. There will be room for 15 pallets with overflow space available in the Concourse.
- "Storage pods" replaces the term "cages." Thirty shared storage pods will be tall enough to accommodate high tents. These could be dedicated storage pods.
- Staging will be an open area for short term gear and equipment layout. A Grantee can use this space to remove gear from their pod to test, calibrate and confirm that it is what they need. Grantees can lock the items not going to field camp in storage pods. This space can also act as a temporary holding place and drop location for Grantees that come in late at night from the field.
- A physical barrier around the cargo area is required to keep cargo separate from people.
- Field gear wash and repair will be located near where it enters the building from the field, which is near the Search and Rescue (SAR) entrance.
- Freezer space for sample storage is required.
- Control rooms off alley will be present for sample storage, including 1 for South Pole, 1 refrigerator, frozen storage area, 1 for Air National Guard (ANG) for supplies and fuel.
- Dedicated location for hazardous materials will to be defined.
- Space to test stoves, generators and other flammable equipment is required.
- Additional door entrance lines up with loading dock to Crary.



FIELD SCIENCE SUPPORT FACILITY ADJACENCY DIAGRAMS

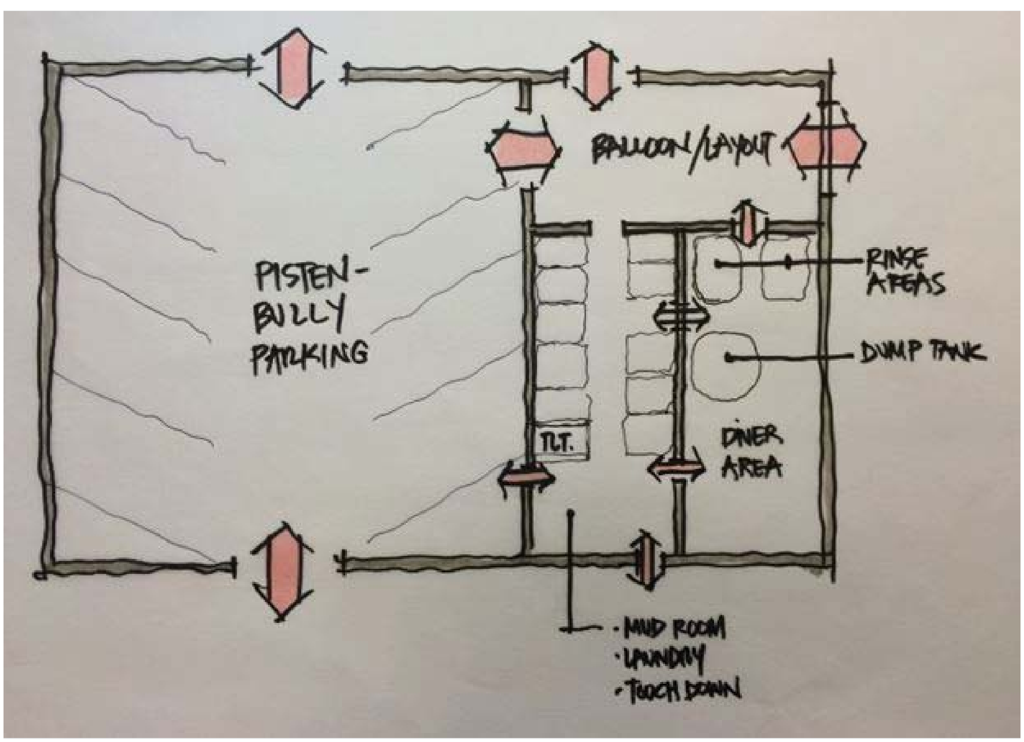
WEEK 1 - GRANTEES' REQUIREMENTS

- Support staff will have offices where Grantees can find them that isn't far from staging/cargo area.
- There will be an opportunity for touch down work spaces.
- Circulation space need to be wide enough to accommodate forklifts that move around the facility.
- Light mechanical equipment (not snow machines) can be stored in racks.
- Storing sleds on a mezzanine in the Concourse might be tough because they are occasionally needed in the middle of the night, which would require someone there 24/7 to help get them down.
- The Mechanical Equipment Supervisor will have an office and some equipment present here; however, repair and maintenance will occur in a central maintenance facility.
- Sea Ice usage of this space has not been determined.
- A potential mezzanine would house offices/workstations/conference rooms/electronics work shop. This area is for Deep Field Grantees that don't need wet or dry lab space in Crary but need desk space and places for their team to meet. This will open up additional lab and desk space in Crary.
- Reduced need for trucks that move items from Science Cargo.
- The Concourse has ample room for storage.
- Design allows for consolidation of work centers includes Mechanical Equipment Center/Berg Field Center/Hazardous Waste processor. Hours will be expanded as there will be 24/7 staff available.
- Communications Shop will be in the new IT&C building but the field radios may come over to Field Science Support Center.
- There could be a rail crane that would originate from trades shop and cross the alley.
- A robust walkway is ideal to move gear back and forth from Crary to Field Science Support Center. This reduces the need for using tucks to transport equipment.
- Stair location needs to be determined.
- Mass cargo location needs to be determined.
- Space for 20' containers is required.
- Stacking storage pods might be beneficial.
- Natural light options include skylights and clerestory lighting.
- The group feels that the layout captures many needs and represents flow and adjacencies correctly.

WEEK 1 - GRANTEES' REQUIREMENTS

1.3.2.3 TRACK 3: DIVE SERVICES PROGRAMMING

- Improved dive locker that includes a place to clean, rinse, hang, and store gear, with an administration office is required. Space is required for sea ice staging, mud room, pod space, storage for traps and nets, and a dedicated laundry.
- A tank for supporting remote operated vehicles (ROV) use is required.
- PistenBully parking area does not have to be heated but it can not be in a frozen area. This would relieve the need for a plug line and it eliminates down time.
- Idling vehicles cannot safely be near the compressor and tank filling area.
- A place to store Zodiacs will be required if they are used in the future.
- Balloon layout for short term and long term launching is required. Launch locations need to be protected from the wind. Balloon needs are being reviewed.
- 6 -12 groups would use this facility on annual basis, with a maximum of 8 max at one time. Daily weather balloons are launched two times per day.
- Sea Ice user storage would eliminate the need to move non-essential equipment back to lab and offices.
- Nearby fueling reduces travel time and wear & tear on equipment.
- Grantees desire a team "storage locker" for equipment that does not go back to the lab
- Safe loading of vehicles will be accommodated.
- New Dive Services would have direct access to Crary.



SEA ICE SUPPORT FACILITY ADJACENCY DIAGRAMS

WEEK 1 - GRANTEES' REQUIREMENTS

WEEK 1 - DAY 4

This day focused on the Grantee experience with respect to quality of life and collaboration. The day concluded with a third review and refinement of Grantee requirements with respect to the Field Science Support facility.

THURSDAY JULY 16 (1.4)

1.4.0	8:30-9:00	(OZ)	Review previous day's work
1.4.1	9:00-10:00	(OZ)	Central Services: General Overview
1.4.2	10:15-12:00	(OZ)	Central Services: Recreation and Quality of Life
			• DC4.4.1 Physical Recreation
			• DC4.4.2 Skills Development
			• DC4.4.3 Collaboration/Social Spaces
1.4.2	1:00-2:00	(OZ)	Central Services: Entry Experience & Orientation
1.4.3	2:00-3:15	(OZ)	Central Services: Food Services and Dining
1.4.4	3:30-5:00	(OZ)	Field Science Support Programming, Part 3

WEEK 1 - GRANTEES' REQUIREMENTS

BREAKOUT SESSIONS

1.4.1 CENTRAL SERVICES: GENERAL OVERVIEW

- Eating, socializing and meetings will occur in Central Services.
- The building capitalizes on the views of the sea ice and beyond. This provides a link to the outdoors throughout the day.
- A new entry between both buildings presents a clear sense of arrival.
- A place to shed extreme cold weather (ECW) gear when entering the building is required.
- Multi-purpose exhibit and orientation space will allow views of the sea ice. This space can be used for orientation, lectures, group meetings and social events.
- Daily food service activities including hand wash, dining, and kitchen flow will be determined.
- Dining area might sit at a higher elevation for better access to views.
- There is a potential for a growth chamber.
- Overhead bridges carry people and utilities from each lodge building and connect to central services which prevents people from intersecting with utilities.
- Bag drag will occur in Central Services, adjacent to lodging.
- An area to pick up linens will to be determined.
- Laundry is adjacent but intentionally not present in the main orientation area.

1.4.2 CENTRAL SERVICES: RECREATION AND QUALITY OF LIFE

- Recreation space located on the second floor of the contingency wing provides recreation and social spaces.
- Gymnasium can be used for a variety of events such as plays, theatrical presentations, party space, mountaineering training and climbing wall (having an area to the side with mattresses would allow people to climb by themselves since self belay systems are problematic), bouldering, basketball, volleyball, all-hands meeting space.
- Building the weight room above the lounge might be noisy with weights dropping on the floor.
- Sunday night science lecture has more than 100 people and could have up to 200 hundred if there was more space.
- Wine bar/Coffee house is an important part of informal spaces but also a place for collaboration. This space should be more quiet than the lounge/bar space.

WEEK 1 - GRANTEES' REQUIREMENTS

- Coffee house currently has a variety of activities such as open-mic night, board games and cribbage.
- Ideally this quiet space is isolated from a more social, active, and loud space.
- Chapel area requires privacy. The current staff is located in an office outside of the chapel. The new location of the chapel will be determined and consider elements within the current structure that are of historic significance.
- The store should connect to warehouse. Buying alcohol for personal consumption differs from getting alcohol to the field and these methods of sales and distribution will be reviewed.
- Gym areas for open area workouts like yoga, need to understand the range of activities we need to accommodate. Group workout class accommodation.
- Private radio room is a great way for people to express themselves. It is likely that this feature will stay.

There are 6 dimensions of Well Being. The ones that most apply to McMurdo are:

- Mindfulness – being fully engaged.
- Belonging – connected to others.
- Meaning – sense of purpose.

There are 4 day-to-day things that translate into a positive or negative experience. Our goal is to design these new spaces to ensure we create positive experiences when at McMurdo:

1. How much people can express themselves.
2. How much they feel a sense of control.
3. How much they feel a sense of progressing.
4. Being autonomous.

- Positive outcomes of designing for Well Being are uplifted mood, reduction in stress, being more stimulated.
- Group responded to some of the interior concept images on the screen. OZ will set standards for finishes and materials that are durable, easy to maintain, warm. Interiors will have access to daylight and views.
- Concrete is too cold. Warmth, natural light, create something else that is not Antarctica – like New Zealand does – something that reminds them of where they come from (lot of green at New Zealand station).
- South Pole's wood panel in galley is nice. Wood is not as durable and doesn't do well in really dry climates. Can use other materials that give the warmth of wood but are better suited for this environment.
- Don't want to build in too many walls or doors. Will use furniture to help define space and provide privacy. Felted furniture arrangements are durable and provide good acoustic control.

WEEK 1 - GRANTEES' REQUIREMENTS

A Hut 10 type of space is needed as a place that is away from everyone else on station for smaller social events.

The new station will offer alternate venues for gathering. It is important to design private but visible spaces so that people will be accountable for their behavior.

Interior Space General Take-Aways:

- Color is good as Antarctica is white/brown/gray. Don't use blue.
- Warm materials are important after being out on the ice.
- Comfort is key, especially after being out on ice where they are sitting on hard benches, sleeping poorly, etc.
- Bedrooms are designed for sleeping.
- Introverts and extroverts will have differing opinions on how they use the dorm. Some will use as a retreat space to get away. Some want daylight. Some want dark. Variety would be good.
- Concrete feels too cold.
- Don't make spaces feel institutional.
- Concept images are good for corporate environment but not for working and living in all the time.
- Think of ways people can personalize their space.
- Cork walls might be good for pinning up personal items and they are warm and soft.

CRARY LAB DEVELOPMENT REVIEW SESSION (extra session)

Phase I

- There is currently a deficit in office space and meeting areas.
- The field party staging area turned into a lab.
- There is a large mud room with lockers off the spine. This space may shrink or move and could possible be a Distinguished Visitor (DV) entrance.
- Adjacent to the mud room is a large conference room (meeting room).
- Needed storage space will be available by getting rid of mechanical rooms.
- A larger receiving and staging area is required.
- Currently storage is divided into two areas with a staging area adjacent.
- Additional hallway offices are required.
- Phase 1 currently has 1 lab, 4 offices, mud room, locker room, storage area, and a conference room.
- Stairs to link to main building will be next to the lab.
- A larger student area is needed.
- More tables are required.
- Space is opened with daylighting.
- More cubes or tables with adjacent offices and lab is required.

Phase 2

- Phase 2 has an even distribution of labs, including an electronics shop and basic duty shop.

WEEK 1 - GRANTEES' REQUIREMENTS

- Between Phase 1 and 2 there could be an open area with tables and chairs and windows.
- 4 labs are in the back area.
- IT that is physically wired to equipment in the lab stays.
- The number of wet and dry labs has not been determined.
- Electronics that link to antennae on roof space (Grantee Test Space – not observation space on Central Services) will stay.
- Phase 2 will remain as flexible as possible. Phase 2 has been able to accommodate large groups because of its flexibility. Making it a dedicated space may remove some of the flexibility.
- Aquarium location needs additional lab space.
- Storage sizes and locations are being considered.
- Flexibility of space is a priority.
- By using flexible walls and cabinetry, the configuration can be changed.
- Large open spaces will be used for testing equipment.
- Offices were originally designed for one person.
- Dry lab users use offices inside the lab.
- The need for offices in phase 2 will likely decrease.
- Instead of having an office in the lab, an option would be to go through the lab to get to the office.
- Would like a way to move things up and down the spine. A of trolley system is an option.
- Floor surface needs to be smooth to accommodate the frequent moving of equipment for individual projects.
- Field party staging is removed and all staging coming in from opposite side of building.

Phase 3

- There is a potential for 2 environmental rooms. There is room for more flexible since mechanical moves out.
- It is easy to move the electrical room.
- Modular design could accommodate specific uses.
- Labs could be narrower.
- One large supply and filtration tank is currently in use and could possibly be used in the new building.
- Enclosing the area near loading dock with a floor and another overhead door is a possibility.
- Every pod will have fans.
- There is a need for working outside of lab so experiments need daylight. Ideally this happens close to the lab, however there are issues with shadows.

WEEK 1 - GRANTEES' REQUIREMENTS

- An open grated deck would allow access to the sun. The Aquarium might have a similar need.
- Building is structurally sound; however there is a concern about exterior panels, which has to do with the original installation.
- Building has multiple mechanical and fan rooms. Constructing a pod adjacent to house mechanical is an option.
- Circuitry will be evaluated.
- Storage areas will be reclaimed.
- Glass washing system is no longer needed.
- Better polishers are required.
- Within aquarium there could be instrumentation to measure water coming out of water line – so you can tell back at university what is going on
- Design will ensure that chemicals can not go down the drain.
- Universities require labs be certified to some sort of standard. NSF will provide the appropriate standard.
- A water supply consultant is looking at the current water supply and requirements.
- Catwalk will stay in Phase 2. Antennae locations will be determined and line of site requirements will be considered.
- Walk-out access to the roof equipment from the stairs is required.
- An interactive distance classroom ability may be incorporated into Crary.

WEEK 1 - GRANTEES' REQUIREMENTS

WEEK 1 - DAY 5

This final day of the week consisted of reporting and review of the Grantee requirements to leadership within the National Science Foundation.

FRIDAY JULY 17 (1.5)

1.5.1	8:30-10:00	(ASC/A-E Firms)	Overview of MP 2.0, MREFC process, and current status
1.5.2	10:15-12:00	(ASC/A-E Firms)	NSF Review/Validation of Requirements
1.5.3	1:00-3:15	(ASC/A-E Firms)	NSF Review/Validation of Requirements (Cont.)

SUMMARY OF DAY

The weeks' findings were presented to the National Science Foundation.

WEEK 1 SUMMARY

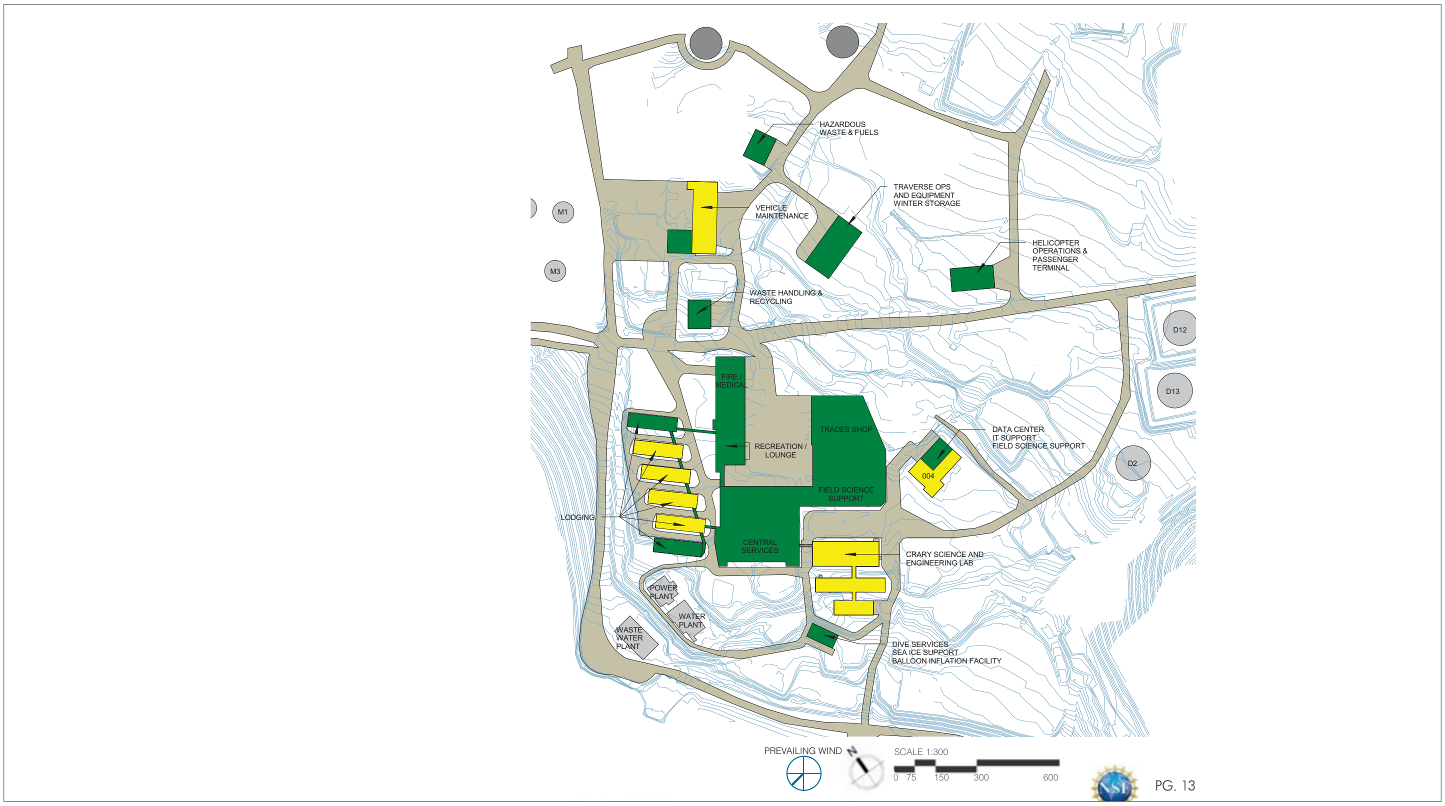
Overview

- Broad and consistent understanding, review and comment from Grantees and peers. Grantees approached the week's session with a global approach to incorporate not only their specific needs but also the known needs of the larger grantee community who could not be physically present at the charrettes.
- Confirmation of Master Plan 2.0 guiding principles and facilities configuration was a major goal of the charrettes. If there were any fatal flaws in the logic of the Master Plan it was the intent of the charrette to discover those flaws and find a workable solution.
- Additional input to consider for master planning was discussed heavily to identify potential future needs that the Grantees saw trending in the research community. Three specific items came of this discussion:
  - Identification of a future potential boathouse.
  - Identification of an alternate balloon inflation area.
  - Potential use of "shoulder seasons" made possible by the introduction of winter flights.
- Understanding of Grantee internal process flows and ideal adjacencies of sub-functions was critical to the success of the charrettes. Questions were asked regarding movement of people and materials and the constraints that make those process flows less efficient and also regarding ideal flow and adjacencies.
- Understanding of Grantee lifestyles and priorities. This was a quality of life discussion that helped inform Grantee schedules from eating to sleeping to recreation and other off-duty activities.
- Grantees had a true appreciation for the opportunity to participate and see their information incorporated into the charrette process.

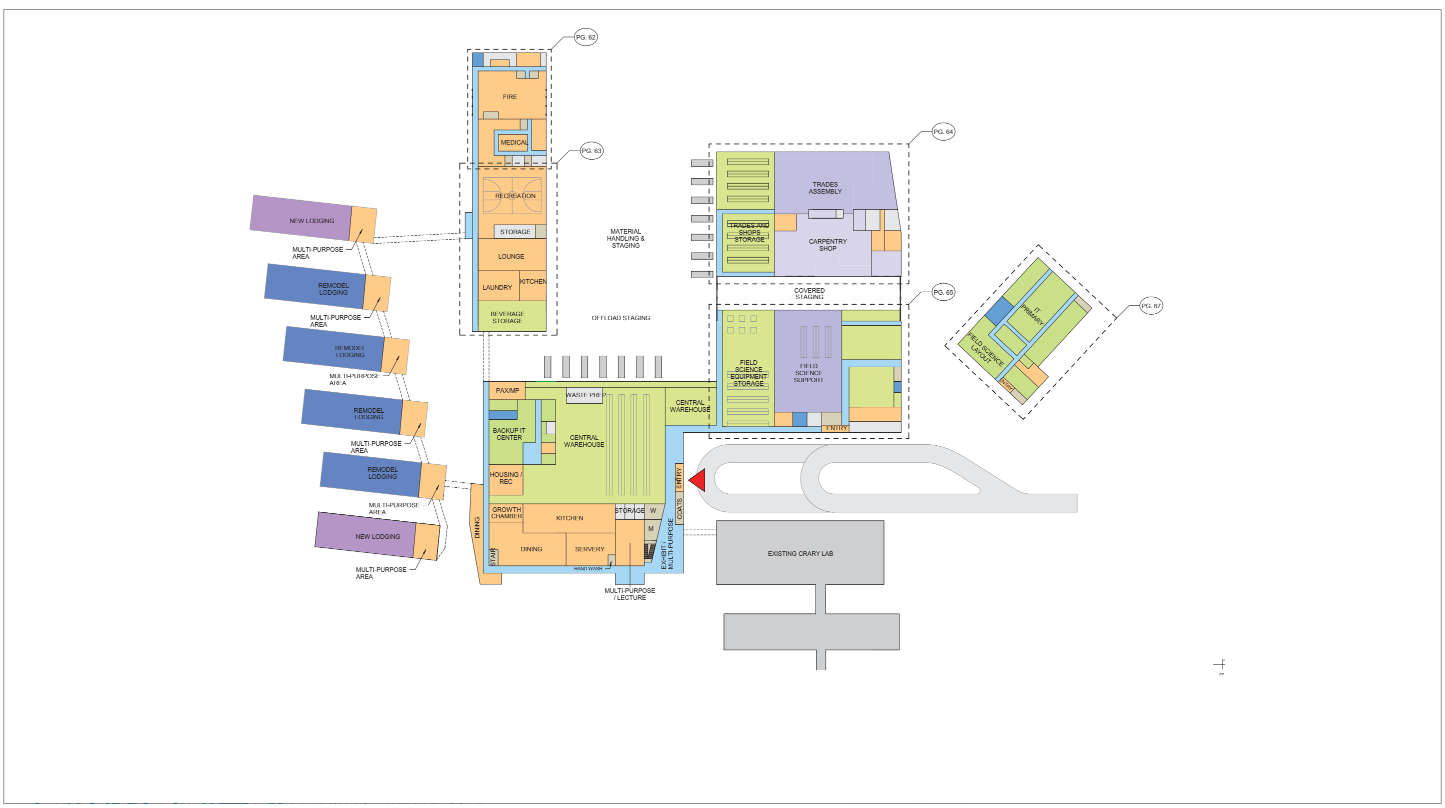
COMMON THEMES OF GRANTEE REQUIREMENTS

1. Reduced touch points.
2. Reduced time to field.
3. Streamline science support staging:

WEEK 1 - GRANTEES' REQUIREMENTS

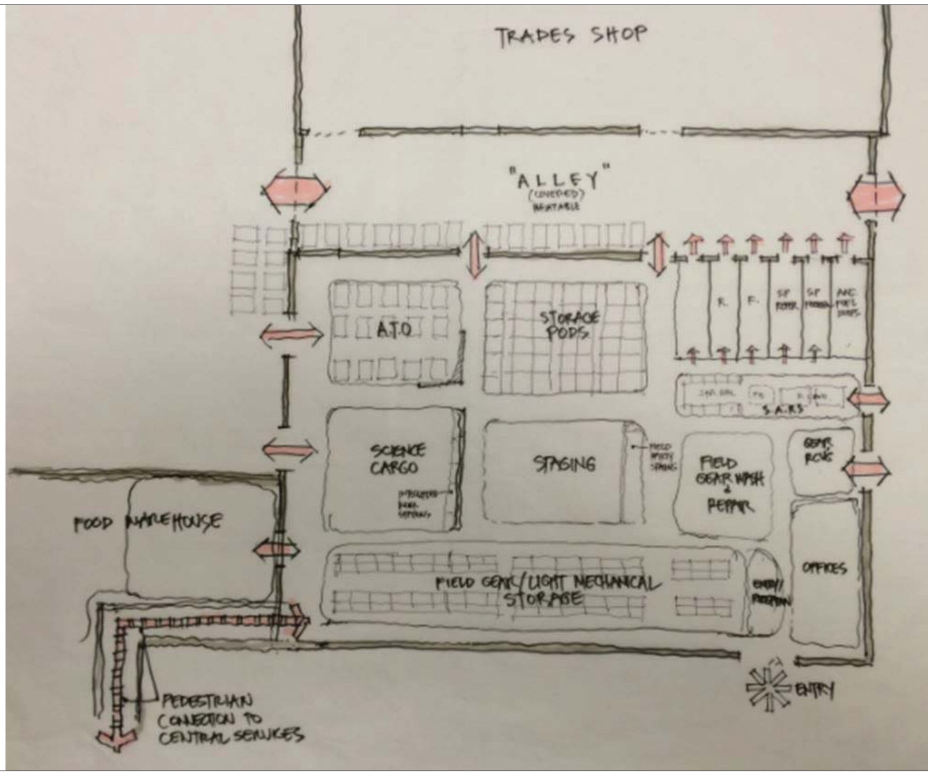


MCMURDO MASTER PLAN 2.0 - MCMURDO SITE PLAN

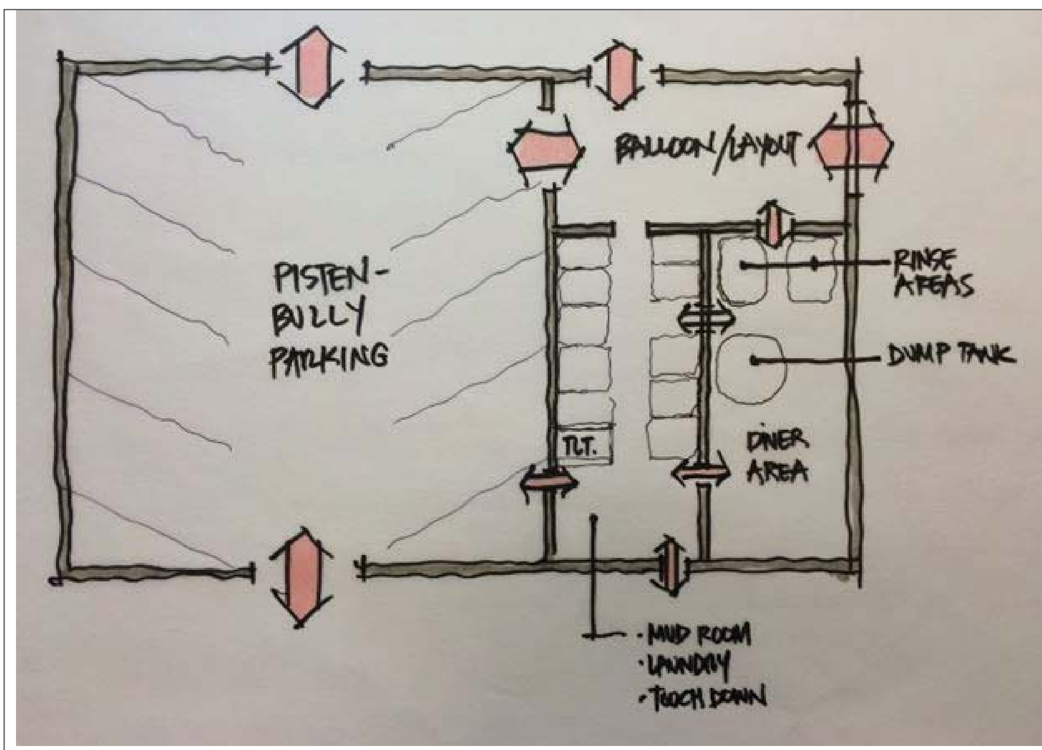


MCMURDO MASTER PLAN 2.0 - MCMURDO CORE BLOCKING DIAGRAM

WEEK 1 - GRANTEES' REQUIREMENTS



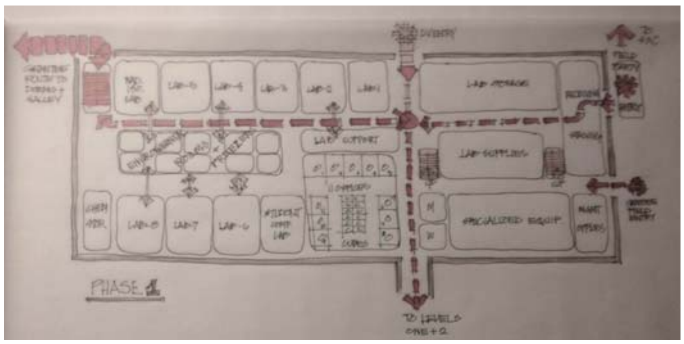
FIELD SCIENCE SUPPORT FACILITY ADJACENCY DIAGRAM



SEA ICE SUPPORT FACILITY ADJACENCY DIAGRAM

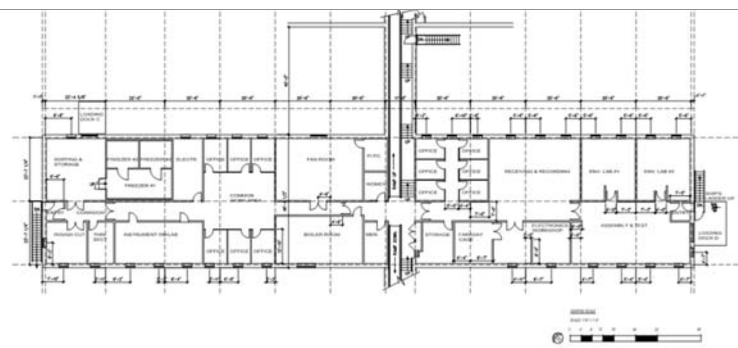
WEEK 1 - GRANTEES' REQUIREMENTS

EXISTING FLOOR PLAN - PHASE 1

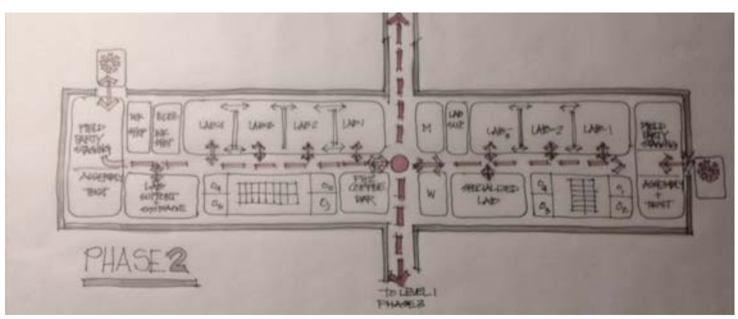


PROPOSED FUNCTIONAL DIAGRAM - PHASE 1

CRARY SCIENCE AND ENGINEERING CENTER ADJACENCY DIAGRAM



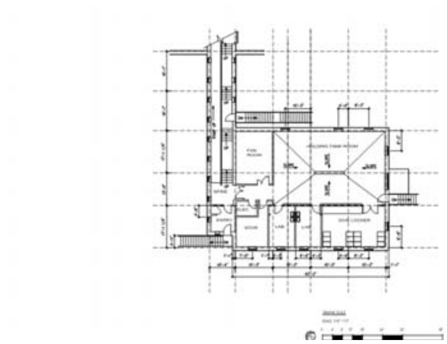
EXISTING FLOOR PLAN - PHASE 2



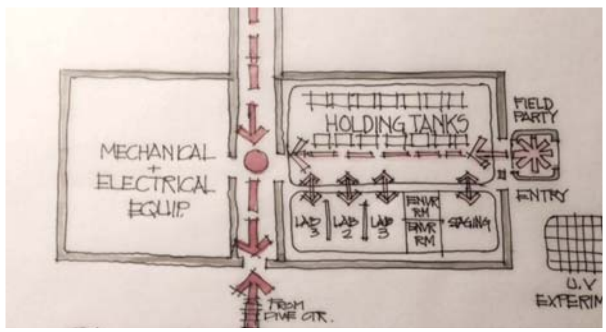
PROPOSED FUNCTIONAL DIAGRAM -PHASE 2

CRARY SCIENCE AND ENGINEERING CENTER ADJACENCY DIAGRAM

WEEK 1 - GRANTEES' REQUIREMENTS



EXISTING FLOOR PLAN - PHASE 3



PROPOSED FUNCTIONAL DIAGRAM - PHASE 3

CRARY SCIENCE AND ENGINEERING CENTER ADJACENCY DIAGRAM

WEEK 1 - GRANTEES' REQUIREMENTS

WEEK 1 PARTICIPANT GROUP PHOTO

WEEK 2 - ALLIED AGENCY REQUIREMENTS

INTRODUCTION TO WEEK 2

This second week focused on the engagement of the Allied Agencies doing work at McMurdo. They include both *supporting agencies* like Air National Guard, and *tenants*, like NASA.

WEEK 2 SUMMARY

1. Broad and consistent understanding, review and comment from allied agencies.
2. Confirmation of Master Plan 2.0 guiding principles, and facilities configuration.
3. Understanding of Agency internal process flow and ideal adjacencies of sub-functions.
4. True appreciation from agencies that they:
   - Were given the opportunity to participate.
   - Saw real evidence how their input may be considered.
5. Airfield planning will be for 2 separate fields, wheeled and ski-equipped.
   - Buildings need to be designed to be quickly relocated.
   - Need to retain capability of a Sea Ice Runway.
6. Allied agencies need an understanding of construction schedule to allow for budget process and transition planning.
7. Expanded bandwidth off-continent will result in:
   - Reduced staffing, increased “reach back” activities.
   - Expanded situational awareness in the Continental United States.

DECISIONS NEEDED

1. Location for helicopter operations.
2. Description of building for runway science at airfield.
3. Determination of sea water intake replacement.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

WEEK 2 - DAY 1

The week began with an introduction to the allied agencies of the Master Plan's basis, guiding principles and organization. Also discussed were the quality of life components of the station including food service, dining, common areas, social spaces and lodging.

MONDAY JULY 20 (2.1)

2.1.1	8:30-9:30	(ASC)	Introductions and Objectives, Rules of Engagement
2.1.2	9:30-10:45	(ASC)	Review and Confirmation of MP 2.0: Goals, Assumptions, Parameters and Building Siting
2.1.2	11:00-12:00	(OZ)	Material and Personnel Work Flows and Adjacencies
2.1.3	1:00-2:30	(OZ)	Central Services: Review Most Current Concepts • 2.1.3.1 Entry Experience & Orientation • 2.1.3.2 Food Services and Dining • 2.1.3.3 Recreation and Quality of Life
2.1.4	2:45-5:00	(Baker)	IT&C Morale Services: Present Concepts and Solicit Feedback • 2.1.4.1 Common areas • 2.1.4.2 Residential • 2.1.4.3 Service spectrum (VOD, radio station, etc.)

SUMMARY OF DAY

1. Budget Cycles are critical to allied agencies.
2. Skyway connection was requested between Field Science Support Building and IT Operations Building.
3. Extend Crary spine to new Sea Ice Support Building.
4. Increased technology will be incorporated based on the level that this facility can accommodate.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

BREAKOUT SESSIONS

2.1.0 INTRODUCTIONS AND OBJECTIVES

Project Overview

- Basis: An Efficiency Project.

2.1.1 REVIEW AND CONFIRMATION OF MP 2.0

Primary Goal: To design and build an energy and operationally-efficient campus.

Guiding Principles

- Reflect the United States Antarctic Mission.
- Promote environmental stewardship.
- Promote wellness.
- Project an Image of stature, permanence, and durability.
- Project an architectural design that reflects its local environment.

CRARY LAB FERRARO CHOI MEETING W/ BEV WALKER AND CARA SUCHER

Staff deploy at Winfly (mid August)

Current Core Crary Lab Staffing

7 core staff:

- 1 supervisor.
- 2 lab assistants.
- 1 instrument tech.
- 1 hazardous material specialist.
- 1 administrative.
- 1 research associate that works directly with Grantees.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

Additional staff:

- +2-3 supply personnel.
- +3 IT (possibly an assignable office in IT Ops?
- +1 facilities person sometimes with helper.
- +1 refrigeration tech who spends a lot of time at Crary.

Needs

- Open stock space is needed for non-inventoried supplies.
- Room 174 is currently for shared instrumentation.
- Copy/print space in library copy room is required.
- Location of liquid nitrogen is to be determined.
- Storage for ice cores and occasionally for meteorites is required.
- Hazardous waste staging is located at current field party staging where end-of-season sample packing occurs.
- Field party staging space is held for 48 hours. Cages here are used by 1-2 groups.
- Longer term staging is required for receiving and storage.
- Sea ice staging will alleviate some field party staging pressure for daily in and out activity.
- Loading bays at Phase 2 are for longer term staging.
- Sensitive equipment typically will be staged at Crary where there is less dust.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

WEEK 2 - DAY 2

This day focused on airfield operations, with an emphasis on information technology / communications, passenger and cargo movement. In addition, the infrastructure requirements for the primary information technology / communications operations were developed.

TUESDAY JULY 21 (2.2)

2.2.0	8:30-9:00	(OZ)	Review previous day's work
2.2.1A	9:00-12:00	(Merrick)	Track 1: Review/Confirm Single Airfield Requirements (size, quantity, arrangement, etc.)
2.2.1B	9:00-12:00	(Baker)	Track 2: Information Technology/Communications Programming
2.2.2	1:00-2:00	(Merrick)	Review Results, Crossflow Information, and Finalize Requirements
2.2.3A	2:00-5:00	(Merrick)	Track 1: Single Airfield Programming • 2.2.3.1 Agency Requirements • 2.2.3.2 Utilities, Information Technology/Communications • 2.2.3.3 Passenger and Cargo & Transportation
2.2.3B	1:00-5:00	(Baker)	Track 2: BL004 Programming

SUMMARY OF DAY

Airfield

- Planning for 2 Airfields.
- 2013 report is sufficient for town layout.
- Schedule needs to be reviewed.
- Retain Sea Ice runway capability and consider size of buildings.
- Include a building for Runway Science.
- New propeller building replaces Air National Guard shop.

IT&C

- Re-name the building "IT Operations Facility".
- Transitional planning and continuing collaboration is critical.
- Co-located data center was confirmed by group.
- Group consensus of revised blocking diagrams.
- Confirmation of back up data center requirements.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

BREAKOUT SESSIONS

2.2.1A, 2.2.3A - REVIEW / CONFIRM SINGLE AIRFIELD REQUIREMENTS

AIRFIELD

- The basis of discussion was the Single Airfield report from 2013; however, the current concept is to continue using two runways: Wheeled (Pegasus) and Ski Equipped (Williams).
- Wheeled runway is a "small town" with a small amount of ground crew.
- Skied runway is "big town" that sees heavy passenger traffic.
- 2013 report is good for town layout.
- Flight schedules will be reviewed.
- Directive to retain Sea Ice airfield capability. Scale of structures will be studied in design to accommodate this.
- Include a building for Runway Science.
- New Propeller Building replaces Air National Guard Shop building identified in 2013 report.
- Storage space location is to be determined.

SKI EQUIPPED RUNWAY FACILITIES

- Air National Guard Building 1 requires office/conference space for meetings and debrief sessions.
- Aircraft Ground Equipment, Cargo and Ken Borek Air has access doors direct from exterior.

Fire Station

- Office and briefing spaces are desired downstairs and 8 micro-single lodging rooms will be upstairs.
- Living space/office space combination accommodates shifts of 24 hours on and 24 hours off.
- A small break station with a coffee pot, microwave and refrigerator is desired.
- Incorporate space for fitness.

HEAD MODULE

- Passenger loads are 40 or less.
- General work force at ski airfield is close to 60 overall (flight crews, staff).

WHEELED RUNWAY FACILITIES

- 126 people arrive on a flight in the early season with the same number outbound at the end of the season. During the mid-season, that number drops to 50-70. A 50-60 person facility would be appropriate.
- Do Not Freeze storage is required; however, it doesn't need to be as big as storage at the ski-equipped runway.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

2.2.1B, 2.2.3B - BL004 PROGRAMMING

Internet Technology Operations Facility (formerly Building 004)

- Transitional planning and continuing collaboration is critical.
- Co-located data center was confirmed by group that this is acceptable.
- Group consensus of revised blocking diagrams.
- Confirmation of back up data center requirements.

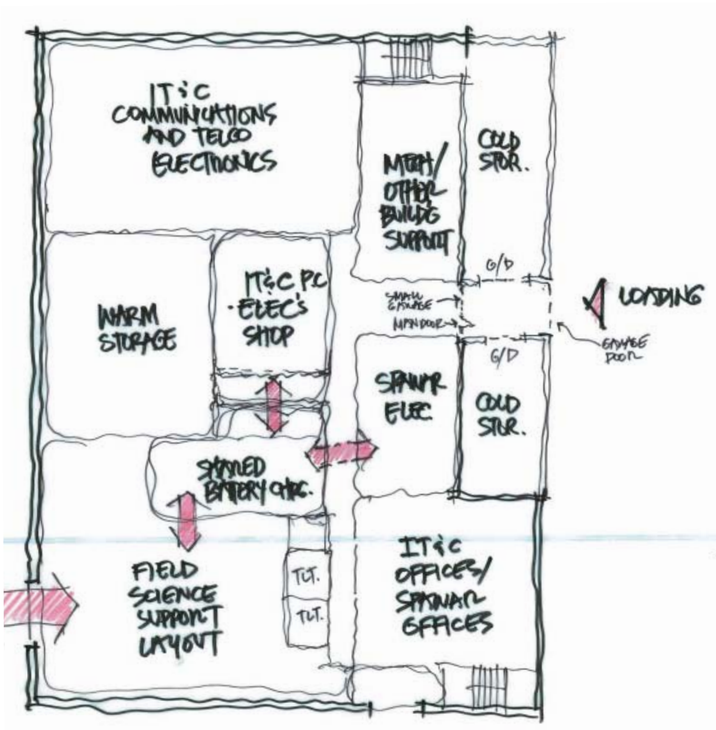
Scheduling and Dependencies to Occupy this Building

- Coordination with the demolition of Building 189 is required.
- Current time frame is September 2020 for occupancy with movement in the summer of 2021 (9 months to transition).

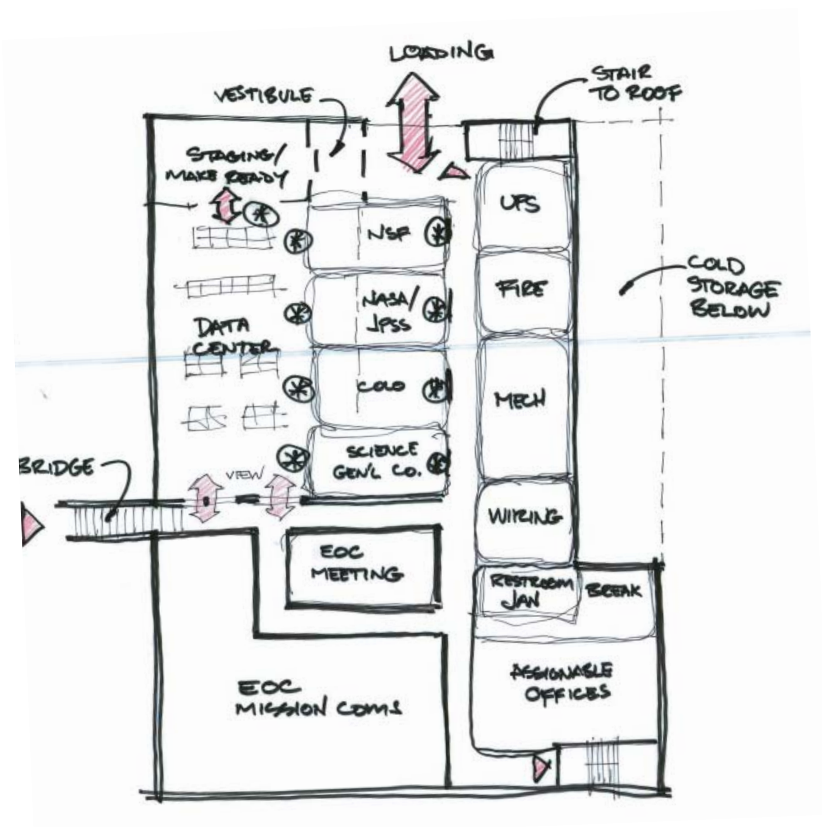
Setting Up Working Group to Develop Inter-Agency Transition Plan

- Discussion on reorganizing the building by having all industrial functions on floor with access to loading dock areas, and data centers and tech on second floor. Gained consensus; comment to have roof access to antennas via stairway to roof (not ladder and hatch).
- NASA/Joint Polar Satellite System (JPSS)/NOC Network Operating Console (NOC) and Data Center prefer to see a hallway down a side of the building rather than the currently divided spaces. Offices and data center should be collocated.
- Separation in Master Plan was based on 2 thoughts: Separation from noise of data center, and HVAC issues—heat recovery not working as anticipated, problems with louvers. Would like key card into control area. Want double door (6’-0”) opening from data center to hallway.
- NSF Office has 6 people, should be in an open office layout; no enclosed office required. There should be space for wall monitors; no meeting or layout area required. Provide 7-8 work stations and a space for a tech library. There is a “test bed” requirement. Meeting space would make use of the common Emergency Operations Center meeting room during routine conditions.
- Locks requirements are the same as data center.
- Acoustics: no special acoustic reduction requirements for office suites—fabric on system furniture walls will be adequate for office noise. Painted gypsum board walls adequate. Provide visibility into office and data centers for VIP tours and other tours—wall glazing and vision glass for doors. Floors: raised floor for both office and data center (Note: consensus is to have all functions on 2nd floor on a raised floor system) Ceiling—typical suspended acoustic tile for office space; data center to be open to structure. Finishes for NSF seemed adequate to standardize throughout facility.
- Separate discussion on roof access: requirement for stairway roof access for ease of technician access to roof w/toolbox. Request also for vertical chase for raceway to access roof. Roof to have landing at top of stairs; requirement for a 10 foot wide catwalk and two 30ft X 30ft platforms for radomes/antennas.

WEEK 2 - ALLIED AGENCY REQUIREMENTS



INTERNET TECHNOLOGY OPERATIONS FACILITY ADJACENCY DIAGRAM LEVEL 1



INTERNET TECHNOLOGY OPERATIONS FACILITY ADJACENCY DIAGRAM LEVEL 2

WEEK 2 - ALLIED AGENCY REQUIREMENTS

WEEK 2 - DAY 3

This day focused on an understanding of the operations requirements for Allied Agencies with respect to Security, Command and Control, Helicopter Operations, and Communications.

TUESDAY JULY 21 (2.2)

2.3.0	8:30-9:00	(OZ)	Review previous day's work
2.3.1	9:00-12:00	(Baker)	Physical Security
2.3.2	10:15-12:00	(Baker)	Track 1: Command and Control
2.3.4	1:00-2:30	(OZ/ASC)	Track 1: Helicopter Operations
2.3.5	1:00-2:30	(Baker)	Track 2: Communications, Computer Systems and Station Notifications
2.3.6	2:45-4:30	(Baker)	Remote Operations

BREAKOUT SESSIONS

2.3.1 PHYSICAL SECURITY

Video Camera Locations:

- Alcohol warehouse, store, bars.
- ATM.
- Pharmacy.
- Antennas (possibly video monitoring).
- Radomes. IT currently use point and tilt zoom cameras to make sure doors are closed and that they are OK (interior cameras) during a storm and for remote troubleshooting.
- Video monitoring at Marble Point for PHI, Inc. is required.
- Helicopter pad requires a real time video.

Which areas need to have recording ability?

- ATM.
- Pharmacy.
- Select storage areas.
- Video cameras consume a lot of bandwidth. Campus network would suffer greatly if a lot of cameras are installed. Some cameras have loops built into them to see a certain amount of footage.
- Door Locking Systems.
- The entire station will move towards key carded doors. This is easier to keep track of and maintain. The station will use lockable doors where specified and have back up hardware sets for key carded doors in case of an emergency.
- Medical (lock safe for substances for animals that need to be kept separate from other medicine) Lock safe on medicine and cameras.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

2.3.2 COMMAND AND CONTROL

Command and Controls consists of:

- Emergency Operations Center (EOC).
- Mission Operations.
- Station Operations.
- Flexibility exists for staff to utilize any available station for communications use.
- Video wall display would show a feed of weather and flight information.
- Emergency Operations Center is adjacent to Command and Control with a dedicated EOC terminal.
- Assignable Emergency Operations Center conference room with video wall display is required.
- One dispatcher and one supervisor are on staff during the day shift in the summer. Nighttime pace is slower and a second person is not necessary at night in the summer.
- Reduced staffing model exists in the winter. Full time dispatchers are on staff; however, no additional person is available to cover. They call on fire fighters for coverage.
- There is an opportunity to consolidate staffing and function. Five people are on staff for Fire and McMurdo Operations has 7. This total number could be reduced to 7 total in summer and fewer in winter.

2.3.3 COMMUNICATIONS AND STATION NOTIFICATION

Mass notification is more than just for emergencies. It is also for day to day communications.

- As-is is a multitude of systems that require a person to control.
- Current communication system uses email, radio, pagers, TV displays and intranet.
- During the day most of the population is outside so they don't see mass notifications.
- When you need to account for everyone you do a muster the entire station to find out who is where and how they are operating.
- Flight report and update notifications are required.
- Look at other examples and utilize media outlets that we will use.
- Mass notifications would be provided from Command and Control and would tie into emergency systems.

WEEK 2 - ALLIED AGENCY REQUIREMENTS

2.3.4 HELICOPTER OPERATIONS

Location is yet to be defined.
Design will be for a facility that can be built anywhere.

Current Schedule

- Pilots arrive on October 1 and fly 10 days later. They finish flying around Feb 12th and leave February 15th.
- 3 mechanics arrive at winfly to get helicopters ready.
- 5 helicopters are currently at McMurdo.
- Additional helicopters are a possibility in the future. Design will consider expansion opportunities.
- Low temperatures restrict helicopter flight ability in the winter.
- Pilots fly both aircraft.

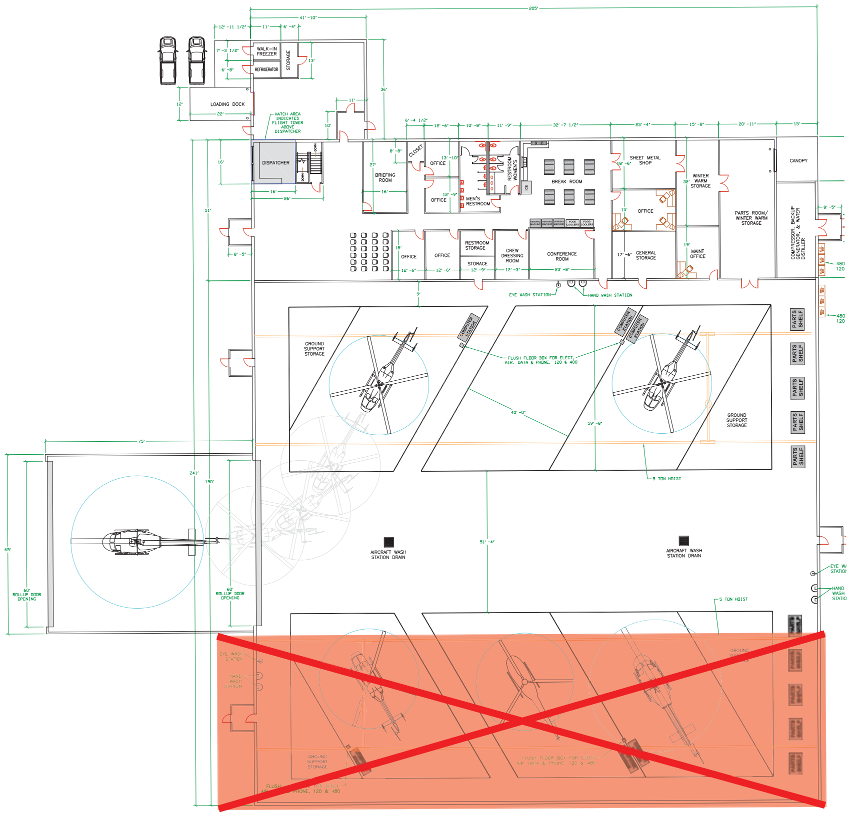
Hangar Design

- It was agreed that only one bay is necessary with the current level of equipment.
- Double door system allows a helicopter to be pulled into an airlock type of environment.

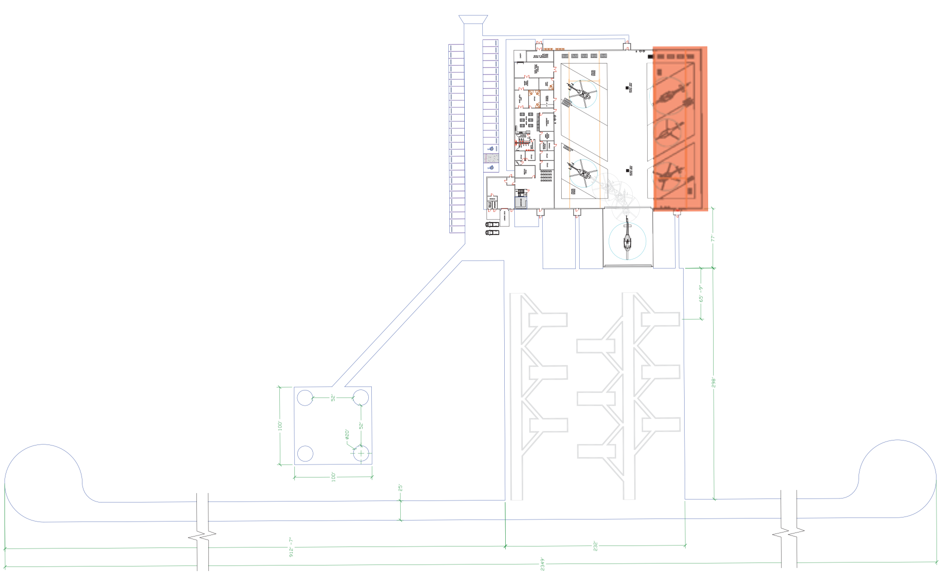
Daily Schedule

- 20 people work at the hanger, including mechanics, operator and coordinator.
- Daily meeting with scheduler has 12 – 14 people. Meeting space is required.
- Pilots are not in scheduling meeting because they are doing pre flight activities.
- Science cargo is picked up from around town, packaged and staged the morning of the scheduled flight. Staff receives assignments and they physically load the aircraft.
- Do Not Freeze items are stored in passenger storage on the cargo line or on carts if it can be frozen.
- Maximum occupancy is 12 passengers.

WEEK 2 - ALLIED AGENCY REQUIREMENTS



PROPOSED HELICOPTER OPERATIONS ADJACENCY DIAGRAM



PROPOSED HELICOPTER OPERATIONS SITE PLAN

WEEK 2 - ALLIED AGENCY REQUIREMENTS

WEEK 2 - DAY 4

THURSDAY JULY 23 (2.4)

2.4.1	8:30-12:00	(OZ)	NSF Review/Validation of Requirements
2.4.2	1:00-3:00	(OZ)	NSF Review/Validation of Requirements

SUMMARY OF DAY

The week's findings were presented to the National Science Foundation.

CHARRETTE SUMMARY WEEK 2

1. Broad and consistent understanding, review and comment from Agencies.
2. Confirmation of Master Plan 2.0 guiding principles, and facilities configuration.
3. Understanding of Agency internal process flow and ideal adjacencies of sub-functions.
4. True appreciation from Agencies that they:
    - Were given the opportunity to participate.
    - Saw real evidence how their input may be considered.
5. Airfield planning will be for 2 separate fields, wheeled and ski equipped.
    - Building need to be designed to be moved quickly .
    - Need to retain capability of a Sea Ice Runway.
6. Agencies need an understanding of construction schedule to allow for budget process and transition planning.
7. Expanded bandwidth off continent was discussed frequently.
    - Reduced staffing, increased reach back.
    - Expanded situational awareness in CONUS.

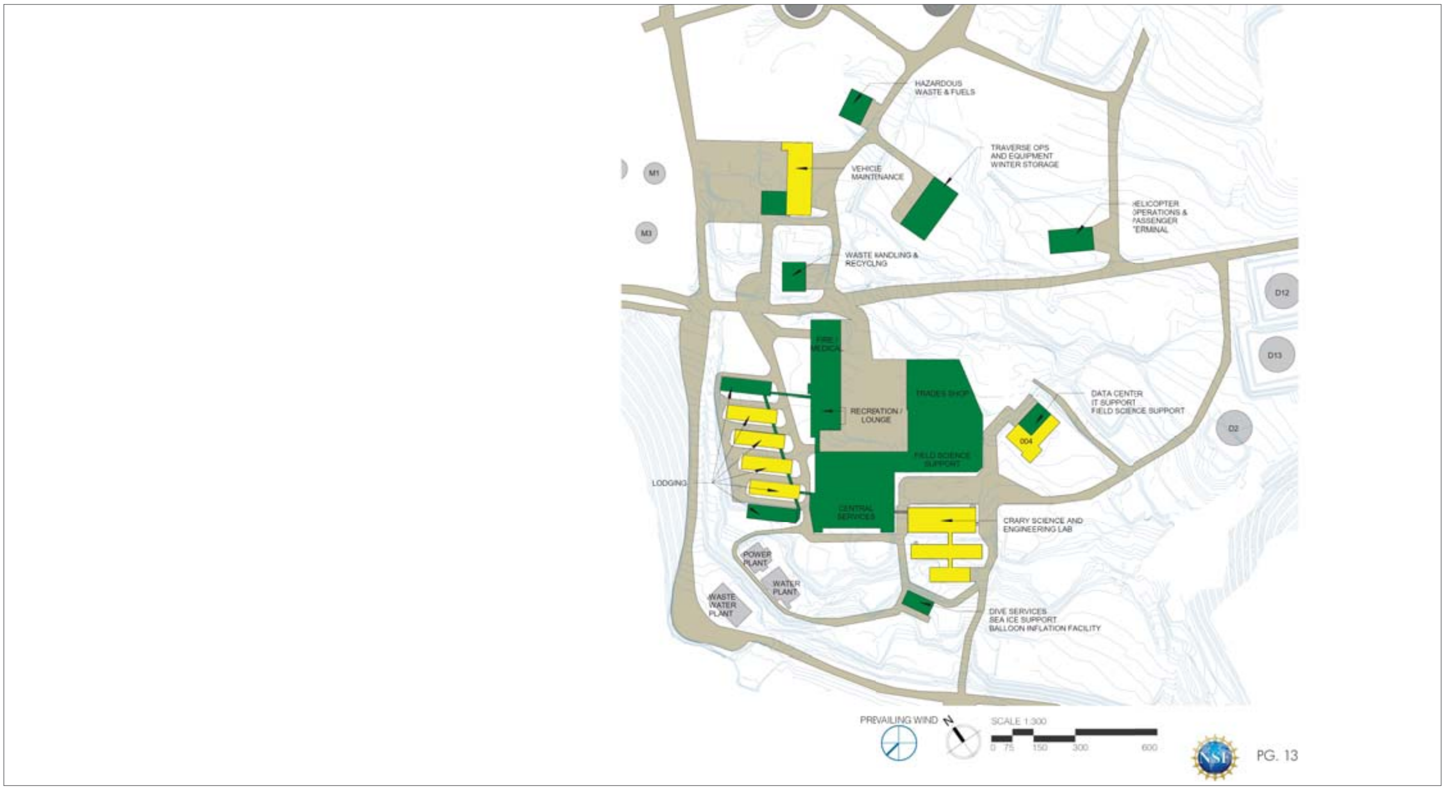
ITEMS NOT INCLUDED IN MASTER PLAN 2.0 / ESTIMATE

1. Enclosed connection between Crary and Sea Ice Support building.
2. Enclosed connection between IT Operations Building and Field Science Support.
3. Airfield IT Operations building.
4. Additional facilities and infrastructure for wheeled runway.

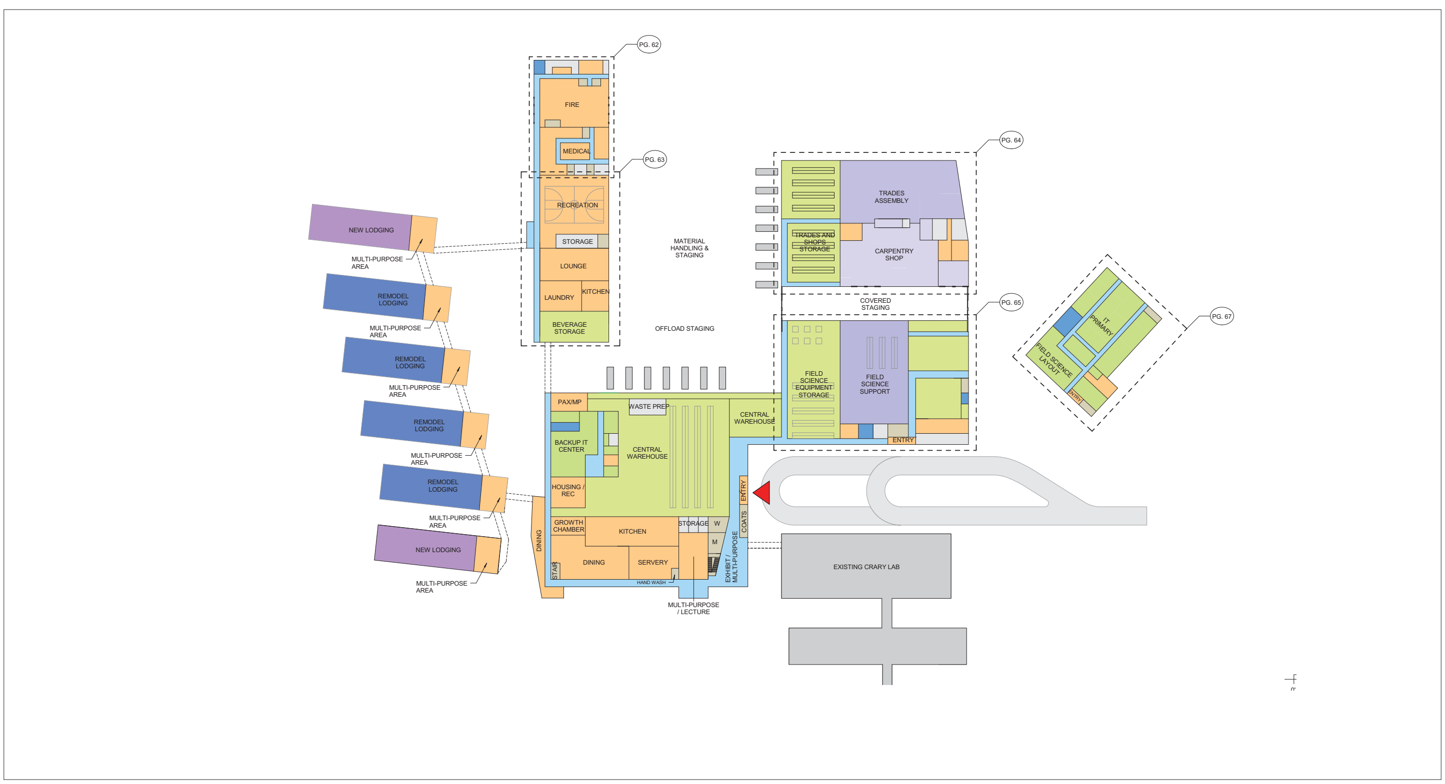
DECISIONS NEEDED

1. Site location for Helicopter Operations.
2. Building for Runway Science at airfield.
3. Sea Ice Airfield capability.
4. Sea water intake replacement.

WEEK 2- ALLIED AGENCY REQUIREMENTS

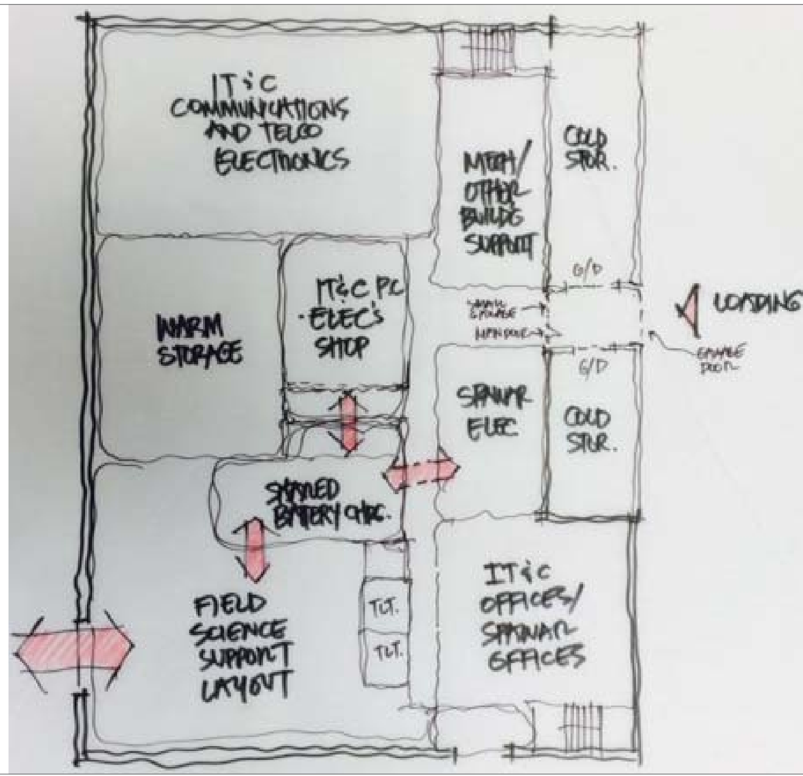


MCMURDO MASTER PLAN 2.0 - MCMURDO SITE PLAN

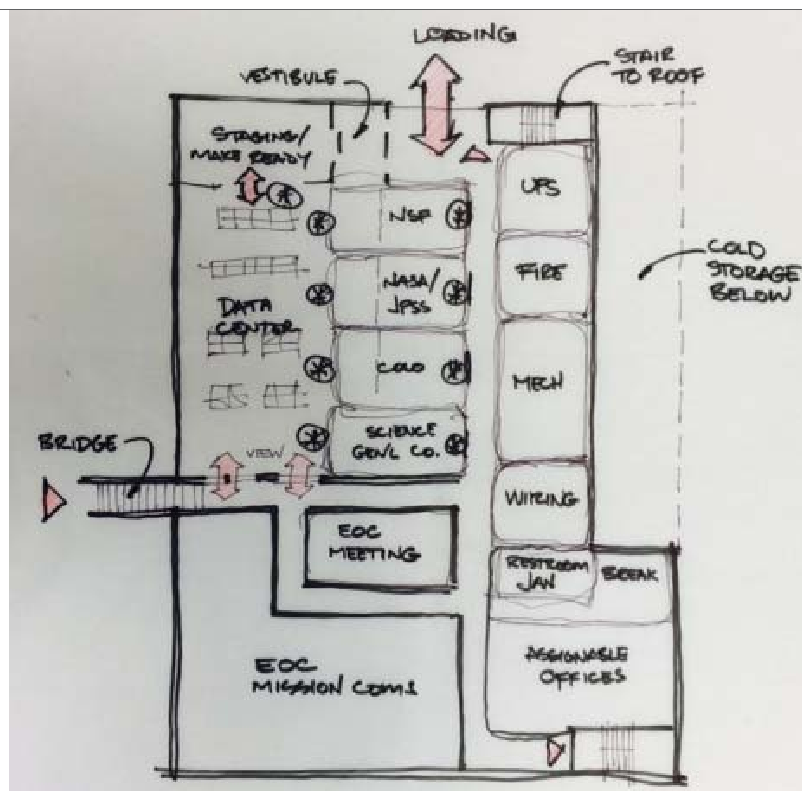


MCMURDO MASTER PLAN 2.0 - MCMURDO CORE BLOCKING DIAGRAM

WEEK 2- ALLIED AGENCY REQUIREMENTS

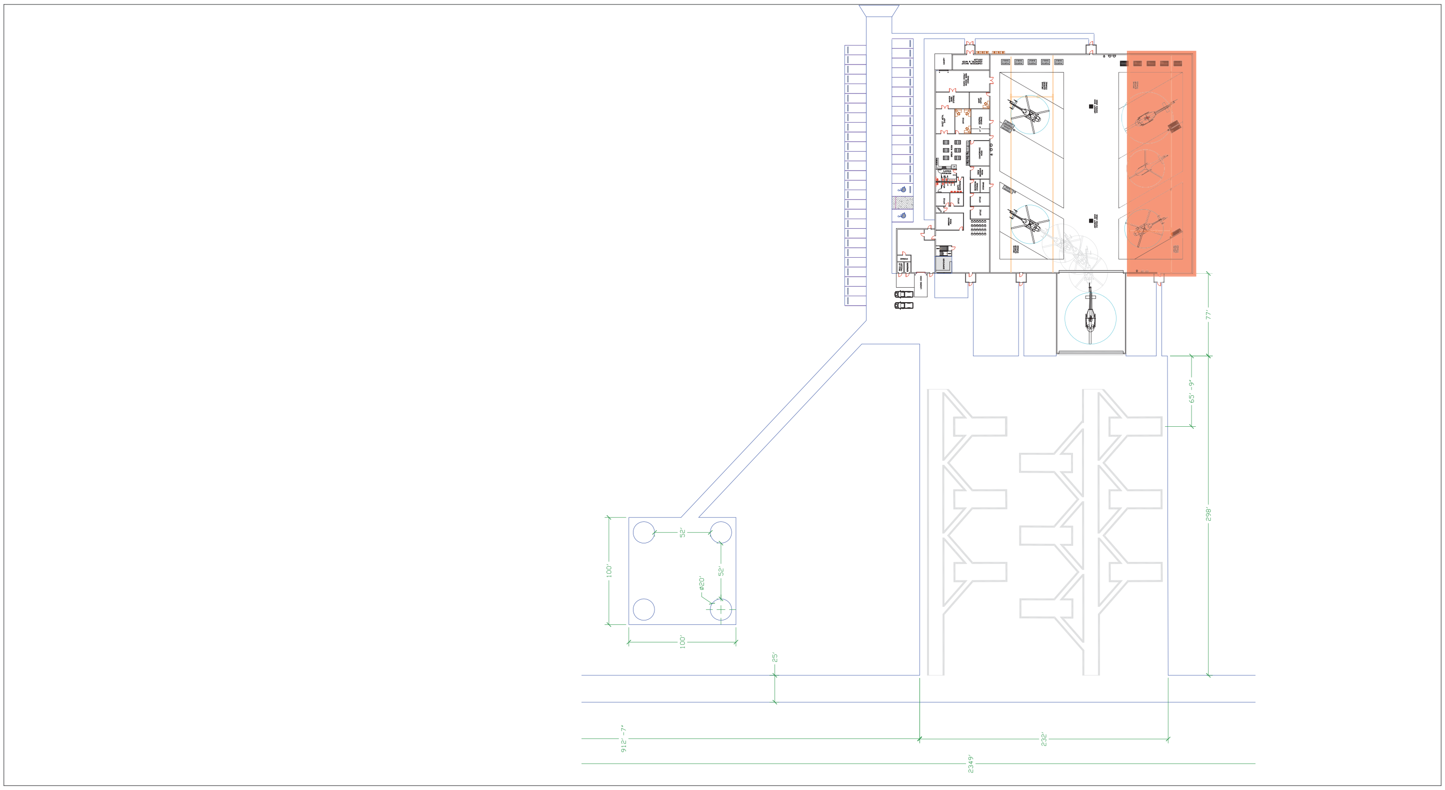


INTERNET TECHNOLOGY OPERATIONS FACILITY ADJACENCY DIAGRAM LEVEL 1

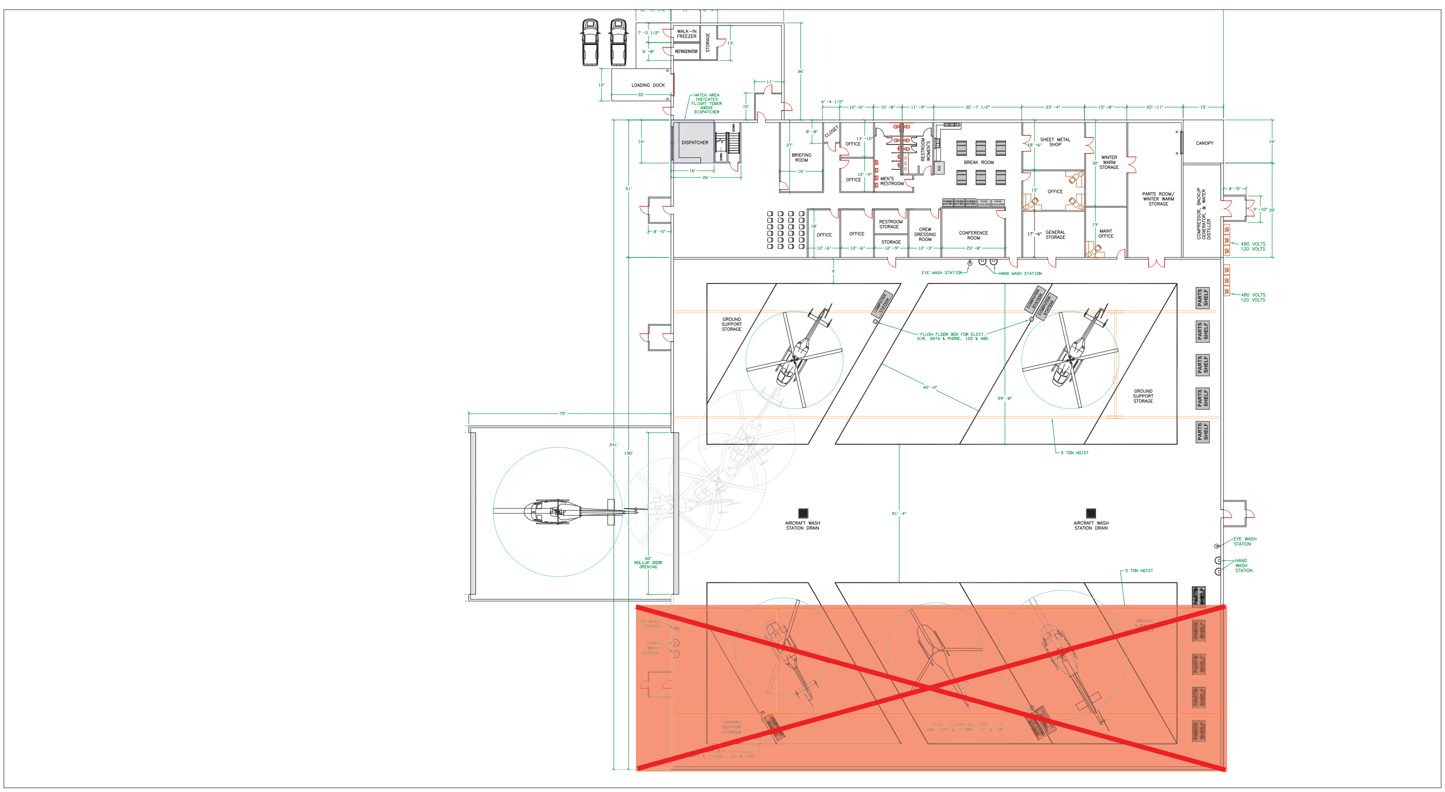


INTERNET TECHNOLOGY OPERATIONS FACILITY ADJACENCY DIAGRAM LEVEL 2

WEEK 2 - ALLIED AGENCY REQUIREMENTS



PROPOSED HELICOPTER OPERATIONS SITE PLAN



PROPOSED HELICOPTER OPERATIONS ADJACENCY DIAGRAM

WEEK 3 - ASC LEADERSHIP

INTRODUCTION TO WEEK 3

This second week focused on the engagement of ASC leadership in the understanding and validation of the Grantee and Allied Agency requirements as developed in weeks 1 and 2.

WEEK 3 SUMMARY

1. Broad and consistent understanding, review and comment from ASC attendees.
2. Confirmation of Master Plan 2.0 guiding principles, and facilities configuration.
3. Understanding of Departmental internal process flow and ideal adjacencies of sub-functions.
4. True appreciation from Departments that they:
   - Were given the opportunity to participate.
   - Saw real evidence how their input may be considered.
5. Central Services, general: Entry, way-finding and circulation pathways were clarified.
6. Central Services, Dining: Master Plan-proposed strategy and variations were explored for future evaluation.
7. Central Services, Community support: Confirmation of the range of spaces included in the Master Plan.
8. Central Services, Administration: Departmental office space requirements described.
9. Central Services, Food Service Warehousing: Confirmation of adjacency to kitchen per the Master Plan.
10. Lodging: concept of predominantly single room occupancy was confirmed, along with supporting lounge spaces of varying character, located at the East end of each building, along the primary circulation route.
11. Security and monitoring reached similar conclusions as Week 2 discussion.
12. Contingency Operations, Fire Station: Adjacency to Medical confirmed; Program elements and adjacencies described and developed; Inclusion of a true hose tower was discussed.
13. Contingency Operations, Medical: layout options were developed. Design team to investigate further. Direct connection to gymnasium is desired for mass casualty response.
14. Vehicle Maintenance Facility (VMF) & Traverse Operations: Multiple site strategies developed and evaluated, with preferred alternative identified, consisting of one combined facility for VMF and Traverse Operations.
15. Mechanical Equipment Center (MEC)/Air National Guard (ANG)/ Air Ground Equipment (AGE) and Field Safety Training Program (FSTP): Resolution of combined location within the existing VMF. Adjacency diagrams of internal components were developed for MEC, ANG, AGE, and FSTP.

WEEK 3 - ASC LEADERSHIP

WEEK 3 - DAY 1

The day focused on reviewing information gathered in weeks 1 & 2 regarding the scope of scientific research, the requirements of individual facilities, the needs for the individual airfield complexes and information technologies & communications.

MONDAY JULY 27 (3.1)

3.1.3	8:30-9:30	(ASC)	Introductions and Objectives
3.1.2	9:30-10:45	(ASC)	Overview of MP 2.0 including revisions from the DC charrettes
3.1.3	11:00-12:00	(OZ)	Material and Personnel Work Flows and Adjacencies
3.1.4	1:00-3:00	(ASC)	Science Operations Overview (DC Results)

- 3.1.4.2 Deep Field
- 3.1.4.3 Local Science: Sea Ice
- 3.1.4.4 Dry Valleys and Helo Supported Science
- 3.1.4.5 Local Science: LDB/Town Science
- 3.1.4.6 Crary Lab
- 3.1.4.7 Field Science Facility
- 3.1.4.8 Diver Services

3.1.5	3:15-4:00	(OZ)	Airfield Redevelopment Overview (DC Results)
3.1.6	4:00-5:00	(ASC)	IT&C Overview (DC Results)

WEEK 3 - ASC LEADERSHIP

WEEK 3 - DAY 2

The day focused on the Central Services building in order to achieve input regarding the entry experience, food service & dining, physical recreation, social space and lounge needs. Kitchen and Food Service Warehousing was reviewed and requirements gathered.

TUESDAY JULY 28 (3.2)

3.2.0	8:30-9:00	(OZ)	Review previous day's work
3.2.1	9:00-10:15	(OZ)	Central Services: Entry Experience & Orientation
3.2.2	10:30-12:00	(OZ)	Central Services: Food Service & Dining
3.2.3	1:00-5:00	(OZ)	Track 1 McMurdo Community Support • 3.2.3.2 Physical Recreation • 3.2.3.3 Skills Development • 3.2.3.4 Social Spaces • 3.2.3.5 Lounge
3.2.4	1:00-5:00	(OZ)	Track 2: Kitchen and Food Service Warehousing Programming

WEEK 3 - ASC LEADERSHIP

BREAKOUT SESSIONS

3.2.1 CENTRAL SERVICES: ENTRY EXPERIENCE & ORIENTATION

- General flow as indicated in MP 2.0 was confirmed.
- Restrooms at main entry should not be front & center.
- Exterior routes are needed that don't conflict with utilities.
- Coat storage at both 'ends' of Central Services will be considered.
- Having a dedicated point of contact is a very important aspect to orientation. It is practical but also symbolically important as this could be the first time a supervisor is meeting an employee, which happens after orientation.
- Lecture space needs to hold up to 126, which is the maximum number of people on a flight.
- The design will consider the total experience – not just the experience of first time arrivals.
- Proper walk off areas are required.
- Vestibules are needed at every exterior entrance.
- Walk off space can be extended beyond 10 feet. Benches are required inside vestibules.

3.2.2 CENTRAL SERVICES: FOOD SERVICE & DINING

Summary

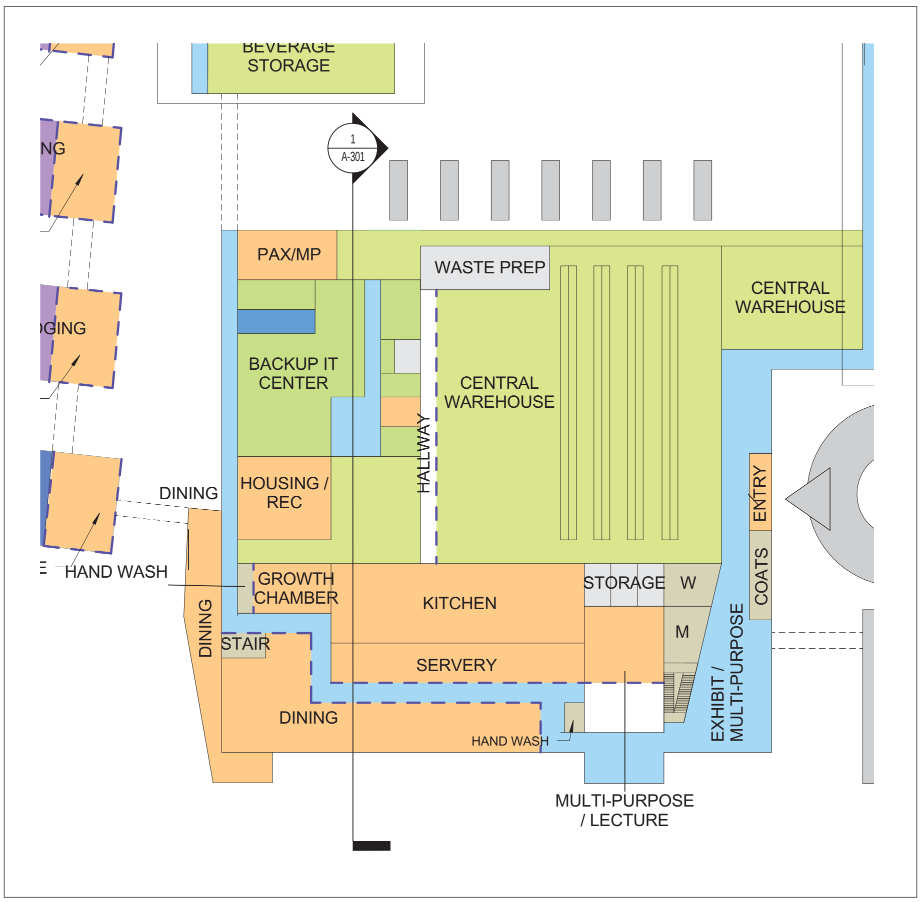
- 230 dining seats work for a population of 1,000 currently. This can decrease by 15% to accommodate a population of 850.
- Want a variety of furniture that is both square and round to accommodate flexibility in dining options.
- Current modes of eating:
    - Proceed through servery followed by dining at tables.
    - "Grab and go".
    - Proceed through servery followed by taking meal to room or office to eat alone.

Comments

- NSF is providing a new model of food service and dining.
- NSF wants to accommodate dynamic dining environments that make people feel comfortable in food service delivery area.
- Trays will be required to stay in the cafeteria.
- Some eat in private so people don't approach them.
- Customer service people like to eat in private.
- Design has to accommodate for a variety of ages that live at the station.
- Provide more private dining options.
- It is important to look at vision of project as well as balance.
- Capacity will have to be revisited if you restrict room eating.
- Design cues will give more privacy during dining.
- Goals are to capitalize on the proximity of warehousing and use of food.
- Daylight and views will be taken advantage of.
- Walkway to lower elevations could move or can stay at same level and put dining against the wall.

WEEK 3 - ASC LEADERSHIP

- Crossing main circulation with food in hand could be a concern.
- The new diagram shows elongated servery adjacent to kitchen with circulation through the middle with active stations that contain 2 hot stations and a salad station - This provides a food court type of feel.
- Note that the walkway is not just a food corridor and potential collisions could happen as people are often stopping in the hallway and having conversations - there is a lot of traffic in this hallway.
- The new dining design is envisioned as having multiple venues/zones. People tend to hang out in the dining hall for longer periods at dinner. The dining space will be designed to accommodate a variety of functions.
- Interaction will be encouraged since rooms are going to single rooms.



CENTRAL SERVICES PATHWAY OPTION

WEEK 3 - ASC LEADERSHIP

3.2.3 TRACK 1: MCMURDO COMMUNITY SUPPORT

The group discussed the different community support space needs.

- Question to the group was how to be more physically fit and mentally healthy while in Antarctica, so you leave feeling better than when you came.

Needs

- Common spaces provide opportunities for social connectivity between the Grantees and ASC staff. These interactions help build community.
- Spaces for camaraderie and for quiet down time are desired.
- Smaller quieter areas for groups to do a puzzle/play a game/watch a movie are needed.
- Multi-functional and flexible spaces are critical. Activities need to be able to shift in minutes (for example, yoga space becomes a dance studio).
- Work centers should be designed to be recreation centers in the morning and in the evening when possible.
- All work center staff are required to do stretching/yoga each day to prevent injuries. Some of this can occur in their work center, but some groups need a larger space to do this in.
- The group felt one multi-purpose space isn't enough. They currently have three spaces now and they are always booked.
- Monitors are desired in common spaces to show events that are happening, with an interface that is easy to update with messages (flight cancellations, weather conditions etc.).

WEEK 3 - ASC LEADERSHIP

3.2.3.2 PHYSICAL RECREATION

SPACE TYPES/ACTIVITIES

Yoga

- Most popular activity currently.
- Need to accommodate groups up to 70 with mat layout space- Class interest is larger than 70 but this gets too large and not ideal for yoga. Group would prefer to add a class than have them get over this max number.
- The gymnasium is not the right environment for yoga.
- Acoustic isolation from loud activities (band/weights…) is desired.
- This space can also be used for dance, cross fit, P90X, dodge ball or a non-alcohol dance party.
- Weight Room and Cardio Room could be combined. Weight equipment is sufficient but more cardio equipment is needed.

Gym

- Add toilet rooms and showers off of the gym. Good for redundancy and people who get stranded in Antarctica.
- Climbing wall is very popular and there was a big request to add a bouldering cave (allows people to climb without a partner).
- Continue to be a large multi-purpose space for the Halloween party/dodge ball/basketball/volleyball.

3.2.3.3 SKILLS DEVELOPMENT

Craft Room

- 4 industrial sewing machines currently – would like to add more.
- Screen printing station.
- Provide area for easels to be set up.
- Work counter and craft storage space needed.

Ceramics Studio

- Group would like a space to use the existing kiln.
- Studio would need water supply and venting.

Band Room

- Design for acoustic and vibration isolation due to being a loud space, or locate where it won't be disruptive to other activities.
- Create smaller individual band practice rooms that are soundproof. These can also be study or focus rooms when not used for band practice.

Gear Issue

- Need space around 240 sf. to house equipment that can be checked out.

WEEK 3 - ASC LEADERSHIP

- Board games/snowboards/gaming/kindles/climbing shoes/skis and ski boots/music equipment etc.. are all checked out at this location.
- Bike check out needs will likely change. Many using them to get to work centers. Now with work centers being centrally located, this need will decrease.
- Look into bike share programs.
- Space is needed for bike maintenance.

Library

- Room needs to incorporation library shelving, tables and chairs for quiet activities and a check out zone.

Radio Station

- Very popular at McMurdo - huge desire to maintain this.
- Location is flexible - can be located anywhere, but locate it where guest DJ's won't be on view.
- Confirm they will continue agreement with the Navy. They provide all the equipment, and they feed from one of their ships.
- DVD/records/TV and movie are delivered here.

3.2.3.4 SOCIAL SPACES

Group looked at concept images and gave comments of what they liked or didn't like to help the design team understand what is desired for these spaces.

Group was asked five words that describe how the social spaces should feel:

- Warm.
- Comfortable.
- Fresh.

WEEK 3 - ASC LEADERSHIP

Wood is not a viable material to use, especially on the floor due to maintenance and the humidity factor of the environment. Maintenance is their number 1 concern followed by life-cycle of the material as the materials will be down there for 50+ years.

The natural light and expansive views were very well received. The group also saw the white board as a great feature for certain groups and social spaces.

The group liked the use of color, but think it should be limited to recreations areas like the gymnasium.

The group liked the sense of transparency between the two rooms while also providing a more heads down room you can retreat into. Warmth in materials is desired and the wood provides that in this image. While the carpet isn't their favorite, they like what the visual texture does for the space.

The group was drawn to the change in ceiling height, materials and color and the way it created a unique space underneath it. The team also liked how the floor grabbed your attention.

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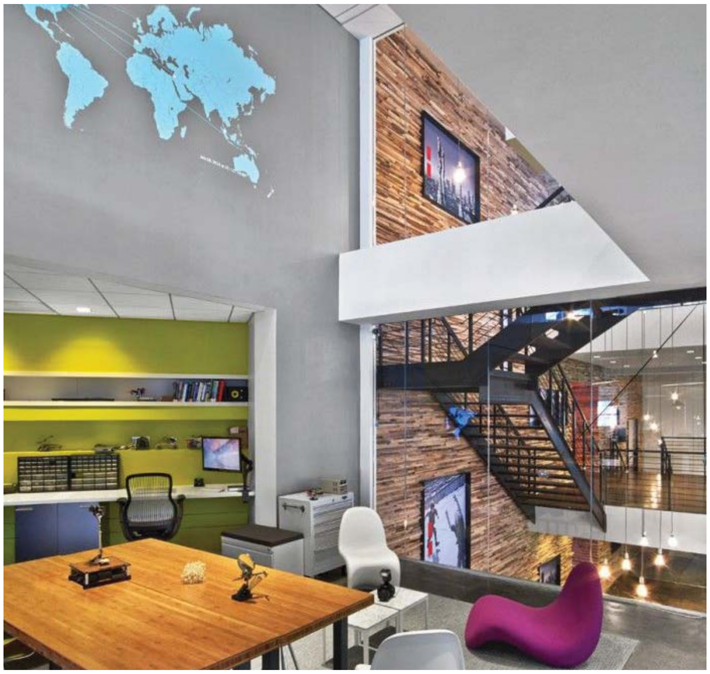
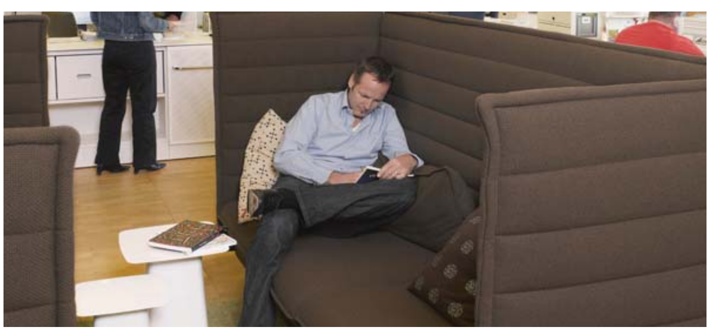


The warmth of the material behind the stairs, the small pop of color in the paint and the furniture and the use of digital media as artwork were all well received. They like the idea of using technology as art as it is very flexible and cost effective. They said this space would be a magnet for people looking for down time.

Casual, impromptu seating spaces are currently very sparse and valuable. Cushions and benches would be a great solution.



This furniture solution would be heavily used as it is a great combination of relaxing seating with some visual and acoustic privacy. This needs to be a durable and easily cleanable material.

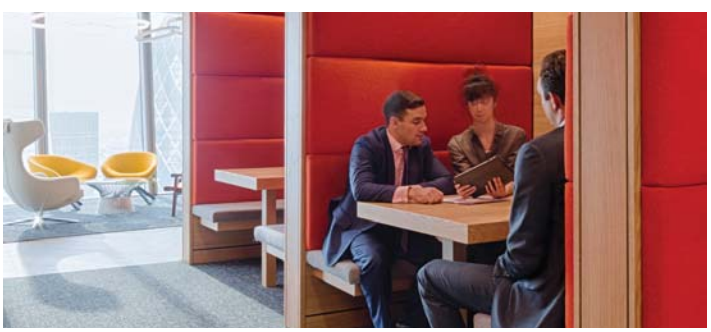
The wood screen provides a room boundary and a warm material. The group was also drawn to how the floor and ceiling changes in material and texture to delineate the semi-open room.

WEEK 3 - ASC LEADERSHIP

The private dining in the back would be heavily used and could double as a teaming room or an impromptu conference room. They also liked the pop of color. Create different zones within large spaces like the cafeteria as people are drawn to different seating types and areas.

The group liked the idea of having a lounge zone off the café – especially for off dining hours for a quiet time or impromptu meeting zone or coffee shop feel. Upholstered furniture would be great, but it has to really hold up. It would be great to be able to easily remove the upholstery to wash and/or re-upholster when needed. Create different zones with the used of different ceiling materials and/or light fixtures.

Creating a space with different seating varieties as this image shows is preferred. The group liked the graphic image in the background and OZ described that this could be achieved in a flexible way so as the image grew tired, it could be switched out.



They see this in lounge areas more than in dining areas, but like the breakdown of scale that it provides, along with the acoustics. If we move forward with a solution similar to this, they would like to see access from both sides for ease of use and feel it could be a successful divider in a large open space.

The kitchen bar area is a good idea. Having an external kitchen that is easily accessible would be nice for people who want to make their own food. They loved how the wood ceiling broke up the ceiling plane. The small pops of color in the furniture and the back wall were well received.

WEEK 3 - ASC LEADERSHIP

- Clean.
- Uplifting.

Group was asked five words that describe how social spaces should feel when a delegate comes through:
- Professional.
- Efficient.
- Durable.
- Timeless.
- Permanence.

Comments
- This facility should feel of its place. It should be indicative of Antarctica. It is the send-off place to get to South Pole. This should be the reoccurring theme throughout the facility. This could be with use of the history and artifacts that reinforce its sense of place. When you arrive and first walk into the facility – we should take our architectural and interiors cue from the environment we are in. Wildlife, glaciers, always changing water, coupled with the science that has been accomplished there and science that is currently happening, but also recognize we should have some fun with it too.
- A residential feel with warmth - A fireplace (gas) would create this and provide a gathering spot.
- Connection to something living (Greenhouse) is fundamental. Desire to see/look at/smell/feel humidity.
- A light room to help with seasonal depression – specialized lighting that changes how the sun would change.
- More stimulus and tie to view beyond. Maybe something is highlighted in the view like a geographic icon.
- The end of a hallway should end with an event – could be a window or a lounge zone.
- It was discussed if the front of house and back of house have a different look and feel. Yes - they can, but not too drastic.

3.2.3.5 Lounge
- Bars reach capacity currently - there can be up to 300 people on any given night.
- The group would like to see two bars to serve different types of activities - One for music/pool/game tables, and the other for drinking.
- Maximize space by building in the DJ mixing board/A/V equipment which this is bulky and difficult to move in and out.
- Build in appropriate lighting for a multi-functional space. For example, the bars could be used as a training space during the day.
- Locate a smoking shelter not too far away from the bar.
- Could a collapsible stage be incorporated into the design?

WEEK 3 - ASC LEADERSHIP

NEXT STEPS

- Need equipment list, sizes and electrical requirements for cardio and weight and any athletic equipment.
- Bike sharing programs will be investigated.
- Get sizes and requirements for all recreation/craft equipment (kiln, sewing machines…).
- Look into technology options for band practice.
- Quantify how many books library wants to accommodate.
- Determine where Sunday night science lectures will be held to ideally accommodate up to 150 people. Need to determine what type of seating is best for this.

WEEK 3 - ASC LEADERSHIP

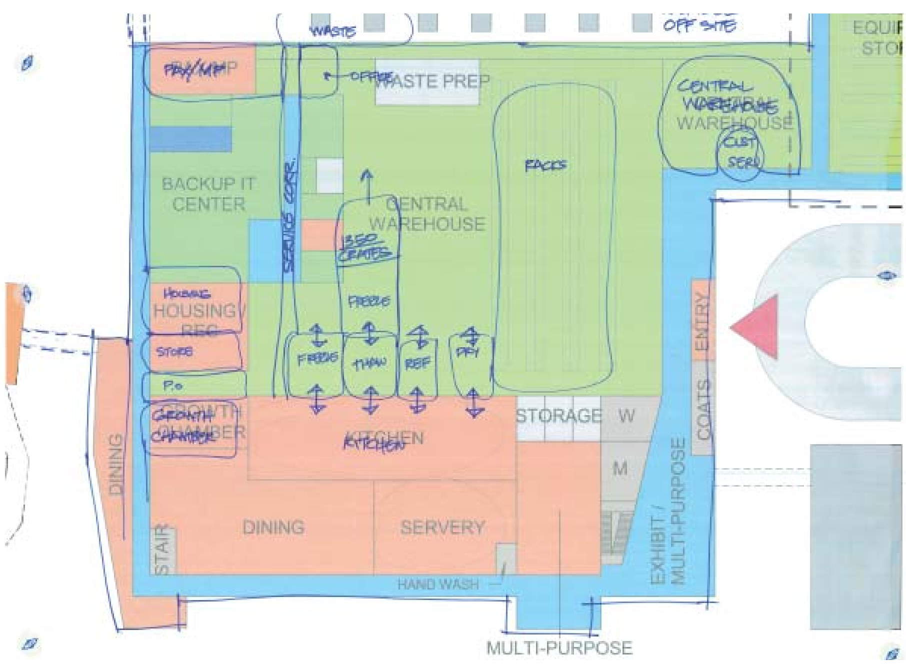
3.2.4 KITCHEN AND FOOD SERVICE WAREHOUSING

Back of House Summary

- Kitchen storage that is directly connected to warehouse will provide greater efficiency for Kitchen and Supply staff.
- Current operations have 1350 sf. for frozen food storage (42x42x42 or 40x40x40). Dry storage also needs to be incorporated.
- Waste collection operations needs to be determined as this will impact design.
- Hazardous material bulk storage method and location is to be determined.
- Central Supply warehouse requires a customer service counter.
- Store and Post Office will be located adjacent to warehouse.
- Beverage sales should be direct from warehouse.
- Efficient technology and appropriate racking layout will lead to increase efficiency for supply.
- A warehouse consultant will give input on ideal warehousing.
- A virtual store and cashless Antarctica will lead to greater staffing efficiency. Labor can be decreased by not making food by scratch - air force store not manned – just swipe your card
- A Food service questionnaire tied to forecasting may/will lead to reduced waste.

Kitchen Storage Needs

- Refrigerated space for: produce, dairy, etc.
- Protein thaw box for meats.
- Freezer space for: frozen veggies, etc.
- Dry Goods space with room for 1 week supply.



FOOD SERVICE WAREHOUSE ADJACENCY DIAGRAM

WEEK 3 - ASC LEADERSHIP

Protein Thaw-box

- Thaw-box is the same temperature as the refrigerator but is required to be separate from produce.
- There is a 5-7 day thaw time on proteins.
- 12 days of storage capacity is needed.

Process

- Produce arrives on the plane and goes directly to the warehouse from the dock.
- Supply personnel enters inventory in Maximo system.
- Frozen food goes to freezer.
- The Culinary Manager places the order.
- The Supply Manager orders once a week and this order goes to Supply.
- Separation from kitchen and supply.
- Kitchen staff can put away food on their time (doesn't have to be coordinated anymore). Items can be dropped off and they start the thaw process.

Possibility of moving to a "kit" format where each day/week are separate boxes is a possibility for frozen and dry food.

Field food requires a separate storage location.

COMMENTS

- A new station means new methods of storage and maintenance.
- Design team will standardize, especially for big components so extra stock will be easier to maintain (i.e. minimal window types).
- The central services desk should not be front and center off the main corridor.
- Post Office should be located near Passenger area.
- A main role of the store is to sell alcohol. Ideally it could be located off the beverage warehouse. A retail cage for other miscellaneous items (i.e. t-shirts) could be located separately.

Design Team Engineers Were Asked to Comment on Requests They Have Heard and if They Have Any Concerns

- Be judicious in quantity and location of expansive glass and skylights due to R value loss.
- Occupancy sensors are recommended, especially in the warehouse spaces.
- Areas that have multiple functions pose a challenge from the mechanical side due to variation in heating and ventilation needs.
- Artificial coolant needs could be decreased due to our location in Antarctica.
- 5-6 hurricane force storms occur each year so design will keep this in mind.

WEEK 3 - ASC LEADERSHIP

NEXT STEPS

- Team will reach out to a storage consultant to determine the most efficient storage solution and ideal layout.
- ASC will see if suppliers can shrink wrap certain items before sending to the ice.
- Determine which big bulk items they will have bench stock for. Frequency will be reviewed when determining needs.

WEEK 3 - ASC LEADERSHIP

WEEK 3 - DAY 3

The day focused on the administrative office requirements of Central Services along with collateral space needs for retail, multi-purpose spaces along with the chapel. Crary programming was also included along with security and monitoring needs.

WEDNESDAY JULY 29 (3.3)

3.3.0	8:30-9:00	(OZ)	Review previous day's work
3.3.1	9:00-12:00	(OZ)	Track 1: Central Services
			• 3.3.1.1 Administration (includes HR, Finance, Command & Control, Retail Store)
			• 3.3.1.2 Chapel & Multi-purpose Spaces
3.3.2	9:00-12:00	(OZ)	Track 2: Crary Session
3.3.4	1:00-3:15	(OZ/Baker)	Lodging and Associated Social Spaces
3.3.5	3:30-5:00	(Baker)	Security & Monitoring
			• 3.3.5.1 Departmental requirements
			• 3.3.5.2 Utilities or other specialized areas
			• 3.3.5.3 Restricted areas such as helipad, Roof access

WEEK 3 - ASC LEADERSHIP

BREAKOUT SESSIONS

3.3.1 CENTRAL SERVICES

4 Types of Kitchen Storage

1. Frozen.
2. Large Freezer that goes to thaw pull.
3. Refrigerator (produce/leftovers).
4. Dry Goods Area.

3.3.1.1 TRACK 1: CENTRAL SERVICES - ADMINISTRATION (INCLUDES HR, FINANCE, COMMAND & CONTROL, RETAIL STORE)

Group discussed different types of workers (resident, flex, mobile workers, group work) and ways of working.

- Managers spend a good part of their day on the phone and likely need a private office due to the frequency and privacy needed while on the phone.
- Offices could be smaller but it would be ideal to have walls and doors (80 sf.).
- Look at station overall to determine how many flex/touch down spaces are spread throughout the station.

Work Space

A variety of workstations is preferred.

- Flex workers – assigned resident workstation for entire duration of their stay.
- Transient workers – smaller touch down space with less privacy.
- Provide other options located throughout the station (desk in room, library, lounge space in the café, etc.).
- Current transient workspace is roughly 48 seats. 25% of these workers could get by with a small work-surface.
- Need to determine needs of other transient workers (equipment/storage…).
- Internet kiosk usage is down since most have their own laptop. Need to study how many are needed/desired and where they are best located.
- Provide collaboration spaces that are mixed in with workstations. Quantity and sizes to be determined based on needs of adjacent groups.
- Provide flexible floor plan with different neighborhoods or work styles (collaborative zone/heads down zone…) that everyone have access to.
- Corridors should be double loaded for efficiency.
- Study placement of restrooms for visibility and acoustic separation from work areas.
- Provide storage area for hard copy of all manuals. When power is out they need to be able to access a hard copy in order to fix things.

NSF

- Need 2 assigned private offices (NSF Rep office and Site Manager Office).
- Need 1 flex office that they will use when on site, but when not on-site, anyone can use it.

WEEK 3 - ASC LEADERSHIP

- Need NSF conference room to hold 8 people. Level of finish should be executive level. When not in use it can be used by others.
- Dedicated NSF administrative space will be reviewed.

ASC
- In general, work center managers and supervisors will be located in the administrative area of Central Services.
- Work center staff will be located with their work centers (mix of offices and workstations).
- OZ and ASC working together to refine this.

Engineers and Construction Project Management
- Design team to work with ASC to determine where they will be in the new station and what their needs are.

Finance
- Need space for 2 ATM's unless a cashless program is figured out.
- Lockable room to hold safe, count checks, talk to employees about their checks or expense reports.

3.3.2 CRARY SESSION

Crary Review
- Central spine with wings off central spine allowed flexibility in original concept.
- MP shows Science Support Building at one end but still allows for flexibility.
- Strengths of Crary and aquarium opportunities were revisited.

Phase I comments:
- Vibration is an ongoing concern – could be made worse by new road way.
- Additional storage for lab supplies and grantee equipment needed.
- More chemical storage space is needed.
- Possibly enclose loading dock – if not enclosed it could affect indoor temperatures.
- Area for packing science cargo is needed.
- Consider moving fire suppression to second floor storage.
- Could possibly have more storage at location of tank on the 2nd floor.
- Exterior deck off of conference area has a view of the sound. This could replace the chalet deck.

Phase II Comments:
- Concern with grading for loading dock areas.
- Extend roof catwalk and more roof ports for cables.

Aquarium – Phase III
- Add storage for mechanical parts and supplies.

3.3.4 LODGING AND ASSOCIATED SOCIAL SPACES

Group discussed the lodging and associated social space needs for the remodel of the existing buildings, and the design for the two new lodging buildings.

Comments

- Keeping the sleeping rooms quiet is a top priority.
- Lounges should be used as semi-private public spaces that are a buffer to the rooms.
- Allow for mixing and mingling between the different buildings.
- Study length of the long corridor and look for opportunities to interrupt the long run with views to the exterior, or create something interesting at the end.
- Janitorial services should be more centrally located, like the bathrooms and showers.
- Determine if it is more efficient to provide a room with stalls for the water closets so quantity can increase. Water closets have higher usage than the showers. Usually showers are just used once per day.
- Stair landing need to be large enough to carry someone out on a stretcher from the top to the bottom floor.
- Add a single user bathroom with direct access off of the lounge so there is less disruption to people sleeping.
- Lodging spaces should transition from loud to reserved to quiet.
- Antarctica doesn't need to meet ADA requirements. International codes have been adopted by the NSF.
- Saunas should be located near the gym bathrooms and showers instead of in the dorms. This will make cleaning and maintenance much easier.
- Design in a tack strip or tackable area for people to put up posters and photos in their rooms.

Next Steps

- Design could potentially allow for all buildings to go cold at some point. Cold buildings could potentially rotate each year. Electronics such as phones, TV monitors, digital thermometers etc. would need to be pulled out if they go cold to prevent damage.
- A plan for how the buildings will be winterized needs to be developed.
- A cost analysis needs to be done to compare cost for each department to winterize the building and then to compare this to the energy cost to keep the buildings warm over the winter season.
- Team to carefully craft a survey of what is needed in a dorm room and the amount of space needed to maneuver. Survey should recognize the differences between transient vs. full timers.
- Team to study the survey responses and to asses the area needed and the volume of space.

3.3.5 SECURITY & MONITORING

Existing –

- Most facilities are not locked.
- Standard keys and locks are used for secure areas, which are difficult and costly to maintain.

WEEK 3 - ASC LEADERSHIP

- Limited key card access is present currently.
- Security Cameras.
- IP cameras are present for video monitoring of equipment, IT racks, Space and Naval Warfare Systems. Command (SPAWAR) and Situational awareness.

Proposed

- Not all areas require security.
- Technology is leaning towards key card access.

Areas that require secure access:

- Data Center – Each Agency could have individual caged space.
- Crary Lab, including areas with controlled substances is currently accessed by key cards.
- Pharmacy.
- Dispatch Center/EOC.
- Dorm Rooms.
- Store.
- Utilities (in each building).
- Support Forces Antarctica (SFA)/ANG Classified Documents.
- Cargo.
- Trade Shops.
- Any supply area.
- Finance area.
- Management offices.
- Tools.
- Lock shop.

Input of key card vs keys

- Key cards should be sturdy to prevent breaking.
- The ability to mass program locks rapidly is a plus.
- Brass keys are required by the Air National Guard.
- Card key units are typically 2.5 the price of a standard lock/key unit. The cost of card products differ. Some keys gives full level of programmability. In future, Radio frequency identification (RFID) cards could be used for system wide-use, i.e. Cashless Antarctica, check out gear, access to printer, etc.
- Key cards could be tied into mechanical system of dorm room similar to hotel "master switch".
- Vestibules are ideal so the card reader can be indoors.

Cameras

Areas that require security cameras:

- ATM.
- Alcohol – where sold and consumed.
- Pharmacy/Crary – for controlled substances.

WEEK 3 - ASC LEADERSHIP

WEEK 3 - DAY 4

The day focused on the requirements for the new fire and medical facilities along with vehicle maintenance and traverse operations.

THURSDAY JULY 30 (3.4)

3.4.0	8:30-9:00	(OZ)	Review previous day's work
3.4.1	9:00-12:00	(OZ/Merrick)	Fire & Medical
3.4.2	1:00-3:15	(FC/Baker)	VMF/Traverse Ops
	3:30-5:00	(AE Firms)	Debrief, plan for next week, identify follow-ups, meeting minutes

BREAKOUT SESSIONS

3.4.1 FIRE & MEDICAL

FIRE STATION PROGRAM REQUIREMENTS

Bunker Gear

- Gear is required to be locked.
- Bunker gear for 48 active-ready staff is required.
- One storage area for inventory control is required.
- One changing area for active –ready personnel is required.
- Inactive gear doesn't necessarily have to be stored right there. It is convenient but not necessary.
- It is better to have back-up in another location (100 off site).

Other Gear

- Self Contained Breathing Apparatus (SCBA) Gear is in the storage room off main bay.

Tools

- A space where spare tools are stored and readily available is required.
- Some repair work is done in the fire house, and some is done in other shops.
- A work bench is required.

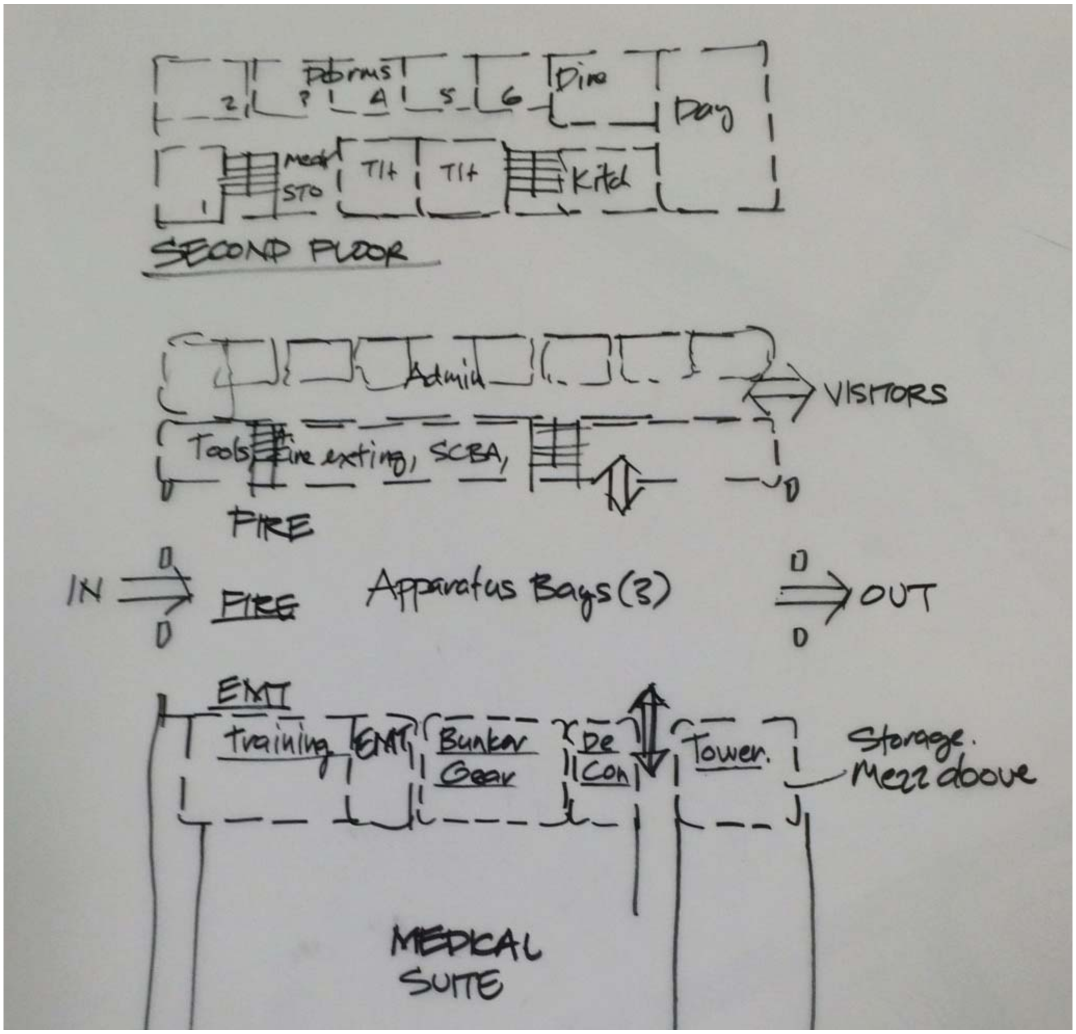
Fire Extinguisher Room

- Filling and servicing fire extinguishers is messy so it needs to be kept separate from breathing areas.
- A ready-access inventory of fire extinguishers is required.
- Needs could change with the new building being sprinklered. Fewer buildings means fewer extinguishers.

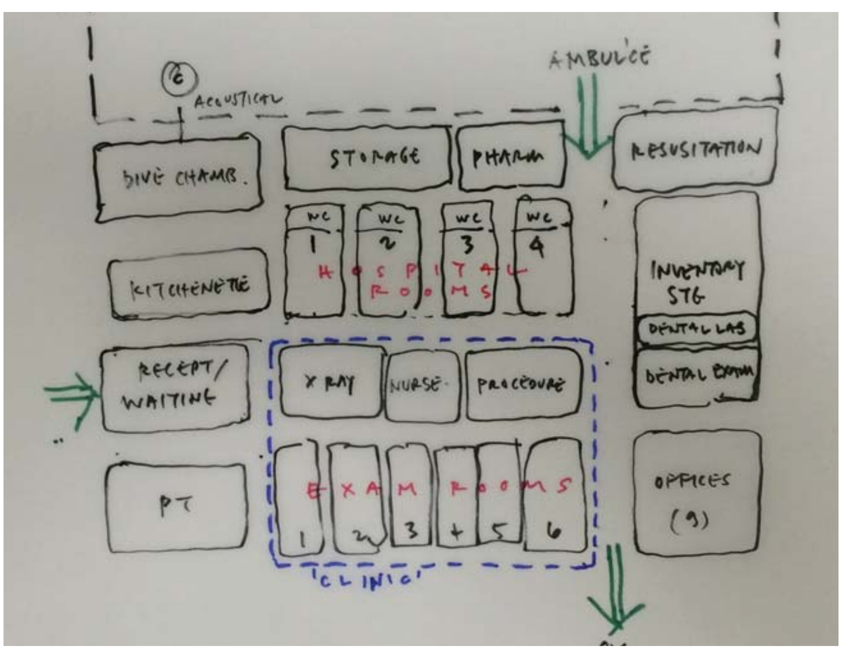
Decontamination Room

- A hazardous shower is required.
- Outdoor wet decontamination is not feasible in current situation.

WEEK 3 - ASC LEADERSHIP



FIRE STATION FACILITY ADJACENCY DIAGRAM



MEDICAL FACILITY ADJACENCY DIAGRAM

WEEK 3 - ASC LEADERSHIP

- 2 decontamination areas are ideal.
- Not everyone comes via ambulance when they are contaminated. Walking through certain areas needs to be prevented.

Laundry

- Separate laundry is required for bunker gear.
- Bunker gear is required to be cleaned before reissued.
- Gear is required to be cleaned immediately after an incident.

Hose Drying Space

- A hose drying tower and space for hose maintenance is required.
- The tower can also be used for training; ideal height is 53 feet. Wind loads will be considered.
- An effective horizontal system for drying is an option.

Apparatus Bay

- Ladder truck clearance is substantial for maintenance function.
- Light maintenance is performed in the Fire Station and heavy maintenance is performed in VMF.
- A warm environment is required to keep water from freezing.
- All 3 bay spaces are required and co-locating them with medical is necessary.
- Current fire engines are 4 years old, automated equipment tends to fail in Antarctica.
- Floor drains are required.
- Having a vehicle washing station in town would be optimal for fire equipment.
- Pull through bays are required.
- A Breathing air compressor is required for a clean air source.
- Storage for cylinders is required.

Administration

- Locating all personnel at the Fire Station is efficient for the Fire operation.
- The Fire Chief and Assistant Chief need space for private conversations.
- Shift Officer (in charge of main engine) needs a workstation with a door.
- Administrative people are not on 24 hour day shifts.
- The Captain runs the scheduling function for Fire and for runway.
- Fire prevention and record keeping offices don't need a closed door.
- Staff includes 6 people for each 24 hour period, + 5 others for day time.
- 5 day staff plus the Lieutenant needs a desk.
- Privacy is needed for meetings and employee relations. This can possibly be a separate shared room.

WEEK 3 - ASC LEADERSHIP

Training Room

- Training is intense at start of season and decreases to monthly training during to the middle and end of season.
- Weekly officer's meeting space is required.
- Crews train daily, in practical setting and/or classroom setting.
- A classroom setting is required to train for fire extinguisher usage and for fire prevention for community.
- The 3 minute response time dictates placement of training rooms (others could use this space when its not in use, but fire personnel can't be far from apparatus).

Dorm Rooms (Call Rooms)

- Eight dorm rooms are required to accommodate fire staff, including those from the airfield.
- Each room has a bed and storage locker and possibly a desk.
- Replicate South Pole operation.
- Lieutenants required additional space that includes a phone and a radio.

Bathrooms

- Currently bathrooms are a shared facility located down the hall.
- 2 separate shower stalls in both men's and women's (not gang showers) are required.
- Private bathrooms in office space (downstairs) can be unisex.

Kitchen

- Kitchen space is required to be within the station.
- The current kitchen space is used as meeting room/break room.
- Basic requirements don't require a full kitchen, but require the ability to heat food.
- At night they like to cook as a group for morale.
- "The Kitchen is the heart of the fire house".

Day Room

- Space currently serves as a living room, a place to relax, and as impromptu meeting space.
- Design will accommodate for 8 people.
- Kitchen table will accommodate crew on duty.

WEEK 3 - ASC LEADERSHIP

MEDICAL CENTER PROGRAMMING REQUIREMENTS

Process and Flow

- Patient comes in through front entrance or by ambulance.
- Paperwork is filled out.
- Vitals are taken.
- Taken to a room.
- Doctor sees patient.
- Discharge to outside, unless patient needs a procedure. If procedure is needed, they would then go to a procedure room.
- Administration area functions like a nursing station in the center providing a clear site of all the rooms.
- Ideally, all functions are done in exam rooms, such as completing paperwork, vitals, etc.
- A waiting room with a front desk is required.
- Privacy is needed for charting and storing records.

Need 8 office/staffing positions

- Physician.
- Nurse Manager.
- Triage Nurse.
- Air Force Flight Surgeon.
- Air Force Tech.
- Air Force Nurse.
- Pharmacy Tech.
- Resident Physician.

WEEK 3 - ASC LEADERSHIP

General

- Hospitalization involves moving patient out of centralized area to a quiet area. This requires designated space.
- Design should plan for event size, like a vehicle accident, rather than population.
- Have 2 beds for resuscitation area where equipment fits around the bed. These are best located close to the ambulance entrance.
- Have one combo gyn/procedure room; casting table.
- 6 is ideal for number of exam rooms.
- A minimum of 4 hospital bed rooms is required.
- Sick Bay designed as hospital beds.
- Sick Bays for mass illness require minimal transport and increased isolation.
- Each hospital room needs a private bathroom.
- X-ray requires lab space, radiology space, equipment storage, pharmacy, hospital, linen storage, special laundry, medical inventory, PT treatment, bio-med-tech, supply storage (central supply and day-to-day supply), field kit storage, Oxygen storage, Hazardous material treatment/storage, tele-medicine.
- Locate kitchenette away from patient area to minimize disease transmission.
- Acoustic privacy is critical.
- Hospital beds require oversight by nurse where they can see all rooms.
- Variety of specialties come down to the ice including psychologists, and OB-Gyn.
- One dedicated sink for casting is required.
- Exam rooms can share a bathroom if necessary.
- Hand washing sinks are to be located in every room and alcohol station outside of every door.
- Special needs: Field camp medical kits (40 small kits in 5 x 12 ammo boxes)
- 4-5 major medical kits in large pelican cases. Space is needed to build these kits; a large table is sufficient.
- Access to the gym for a mass casualty is required. A bay door into the gym is required.
- Space is needed to walk beside gurneys.
- Laundry space is required.

Morgue

- Secure space is required. Will use refrigerated shipping containers and ice core transfer facility.

Pharmacy

- Ideally tech stays in the pharmacy room with double locked room with safe.
- Pharmacy should be located away from waiting room – isolated but still accessible to physicians and adjacent to resuscitation bay.
- 3 levels of security at pharmacy.
- A designated space for pharmacy back up in a different building is required.
- Many medicines are temperature sensitive – ie. EpiPens.

WEEK 3 - ASC LEADERSHIP

Dentist

- One exam room required.
- Adjacent Dental lab is required with autoclave, materials, etc.
- Compressor location to be remote.
- No specialized x-ray requirement.

Physical Therapy

- Equipment needs are nominal.
- Working with consultants to do tele-medicine is wise.
- Table and accessory storage is required.
- Could use an exam room and move equipment out when not in use.

3.4.2 VMF / TRAVERSE OPS

Background

- Currently occupy a couple bays for traverse at VMF.
- Considering combining VMF & Traverse Operations facility.
- Design will accommodate AGE and ANG.
- Floor design has to accommodate heavy equipment.

Traverse Operations Equipment

- 16 tractors.
- 2 radar.
- Traverse modules.
- 2 platforms – 2 traverses, 1 goes, 2nd goes, 3rd goes and comes back.
- Get 1st traverse out by end October, 2-3 week gap before second traverse leaves .
- 3rd traverse leaves early January.

Personnel Needs

- Office with 4 desks with conference room for morning meetings.
- 15-16 people at morning meetings 20 Aug to mid-November.
- Storage for personal gear is desired.
- Space for storing, sorting and dividing food for the 3 separate traverse operations is required.
- Items arrive in bulk.

Shop Needs

- 2 bays for tractor repair & maintenance.
- Shared tools with VMF.
- Bladder repair & construction space.
- Spare parts storage.
- Optimum layout / construction space is 2x the size of incinerator building.

WEEK 3 - ASC LEADERSHIP

Vehicle maintenance Facility (VMF)

- Services 250 vehicles, 52 pick ups (25 stay in town – service older buildings and delivery from 22 different warehouses which will be consolidated in the future, 27 go to airfields for support), 24 passenger vans, rest made up of bulldozers, passenger vehicles, 2 flat beads.
- 2 pull-through bays are required.
- Terra Buss requires pull-through space.
- Kress tractor-trailer combination does not fit currently.
- Anticipate the number of vehicles will decrease.
- Right-size the fleet for current needs and for future needs (future might include electric vehicles).
- Weather protection will be considered.

Facility Program Needs

- Machine Shop.
- Hose build bench.
- Storage.
- Administrative space – VMF:
  - Locate Technical library near mechanics in bay area.
  - Put computer kiosks near technical library.
  - Staff: VMF Supervisor.
  - VMF foreman.
  - Traverse office has 2 desks.
  - Service writer.
- Tool Room:
  - All Field tools are in here (NASA tools are kept separate).
  - Tool Room Attendant can be co-locate with hose build/test area.

Welding

- 2 welders support Grantees.
- Battery charging area is required.
- Locker room with showers is required.
- Industrial laundry is required.
- 15 employees on day shift, 10 at night.
- Modern vehicle exhaust systems need to be accommodated.
- Bridge cranes space is needed.
- Space for dispensing and evacuation of fluids– (oil, hydraulic fluid) is required.
- Space for vehicle wash is needed. The melt season creates a lot of dirt that is corrosive.
- A water/oil separator is required.
- Pull through bays are required.

WEEK 3 - ASC LEADERSHIP

- Higher doors to allow generators into the building (16′ – 18′ wide) are required.
- Fuel & air station is required.
- Fleet ops admin/break-room need to be close to mechanics (up to 40 people).
- Space is needed to accommodate up to 30 people in daily safety meetings.

WEEK 4 - ASC LEADERSHIP

INTRODUCTION TO WEEK 4

The fourth and final week focused upon station and facility operations impacts to the program requirements of the various facilities. In addition, architectural design standards were addressed. Finally, energy sources, building performance and utility requirements were addressed through a presentation by representatives of the Rocky Mountain Institute.

WEEK 4 SUMMARY

Review and confirmation of Master Plan 2.0 Architectural Design Guidelines.

A detailed review of Supply operations and requirements confirmed the Master Plan strategies of central outside staging areas and the storage of material adjacent to its point of use.

Definition of Waste Operations and Hazardous Materials/Fuels facility requirements.

Confirmation of requirements for facilities at the Wheeled Runway.

Definition of Dive Facility requirements.

Development and evaluation of Vehicle Maintenance Facility & Traverse Operations site layout alternatives, with Option B, a combined Vehicle Maintenace and Traverse Operations Facility, identified as the preferred alternative.

Definition of Trades Facility requirements, including shared Trades Assembly space.

Refinement of Field Science Support Facility requirements.

Confirmation of a looped utility network strategy.

Confirmation of building-integrated utility runs.

Acknowledgment that optimal buidling performance results from integrated systems approach to design.

Inspiration to achieve agressive enegry performance goals, such as Net Zero.

WEEK 4 - ASC LEADERSHIP

WEEK 4 - DAY 1

The day focused on architectural design standards, requirements for important shared spaces, including the Chapel and Cafe/Coffee area, and supply operations. The day concluded with a focus on Facility Operations.

MONDAY AUGUST 3 (4.1)

4.1.0.1 8:30-10:00 (NSF/ASC/OZ) Architectural Design Standards

4.1.0.2 10:15-12:00 (NSF/ASC/OZ) Shared Spaces: Chapel, Cafe/Coffee & Gallery

4.1.1 1:00 – 3:00 (ASC/OZ) Supply Operations

- 4.1.1.1 Warehouses
- 4.1.1.2 Roads /Airfield Support
- 4.1.1.3 Outside Storage Areas

4.1.2 3:15-5:00 (ASC/OZ) Facility Operations

WEEK 4 - ASC LEADERSHIP

BREAKOUT SESSIONS

4.1.0.1 ARCHITECTURAL DESIGN STANDARDS

Master Plan 2.0 Design Guidelines suggest that, through its design, McMurdo Station should:

1. Reflect the United States Antarctic Program Mission, including:
   - Representation of the investment resulting from the Presidential Mandate for an active and influential presence on the continent.
   - Representation of Advanced and dynamic Science.

2. Promote Environmental Stewardship, through:
   - Resource Efficiency.
   - Use of Renewable Resources.

3. Promote Wellness.

4. Be "Of its Place," by being responsive to the climate, topography, geology, and scale of its site.

NEXT STEPS:

- Complete Building Program to finalize massing.
- Complete topographical survey analysis to site buildings.
- Complete Building Program to finalize massing.
- Conduct wind analysis to mitigate snow drifting with building massing profile.
- Determine campus-wide energy performance criteria.
- Determine building envelope performance criteria.
- Investigate constructibility issues, especially with respect to prefabrication / panelization.
- Investigate logistics of shipping such components.
- Determine optimal building envelope.
- Explore alternative building cladding materials.

WEEK 4 - ASC LEADERSHIP

4.1.0.1 SHARED SOCIAL SPACES

Station Entry Gallery

- An opportunity for an inspiring first impression that showcases the history, current inquiry and physical surroundings of McMurdo Station.
- Support spaces like coat storage and restrooms to be located so as to not conflict either visually or acoustically with the gallery space.
- Flooring finishes should manage and mask incoming debris.
- Area could include historical photos, artifacts and displays of current scientific inquiry.

Chapel:

- Fundamentally a space that supports--and inspires--reflection.
- Multi-Denominational and with adequate storage space for various religious artifacts.
- Adaptable to serve as a quiet reading room.
- Sized to accommodate approximately 20 people.
- Include chaplain's office for private counseling.
- Location that is convenient while experientially remote, to enhance the space's reflective nature.

Cafe/Coffee:

- Multi-purpose space that can support both individual and group activities.
- Ideally centrally located, with commanding views.
- Reservable space for receptions.

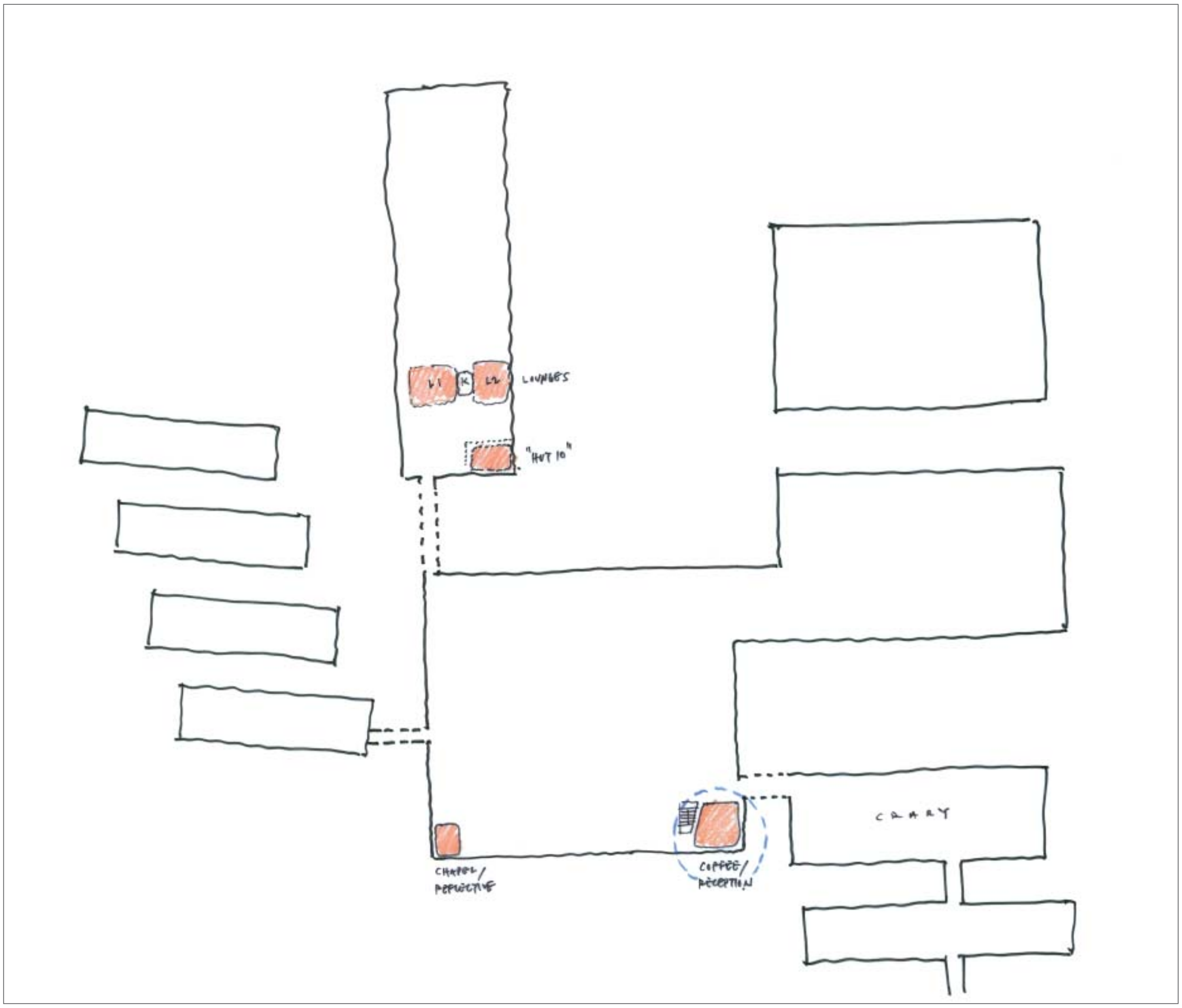
Lounges:

- 2 different spaces, located within Contingency Operations wing of the station.
- Different characteristics to support a range of activity levels.
- Both lounges should flank a kitchen, food and beverage storage.
- Integrate hut-10 entity – off the beaten path "speakeasy" feel.

"Hut-10 Space"

- A reserveable place for groups to prepare and eat their own meals.
- Located within Contingency Operations Facility, adjacent the infrastructure serving the lounges.
- An access path that promotes the feeling of separation from the main activities of the station.

WEEK 4 - ASC LEADERSHIP



SHARED SOCIAL SPACES

WEEK 4 - ASC LEADERSHIP

4.1.1 SUPPLY

Offload Operation:

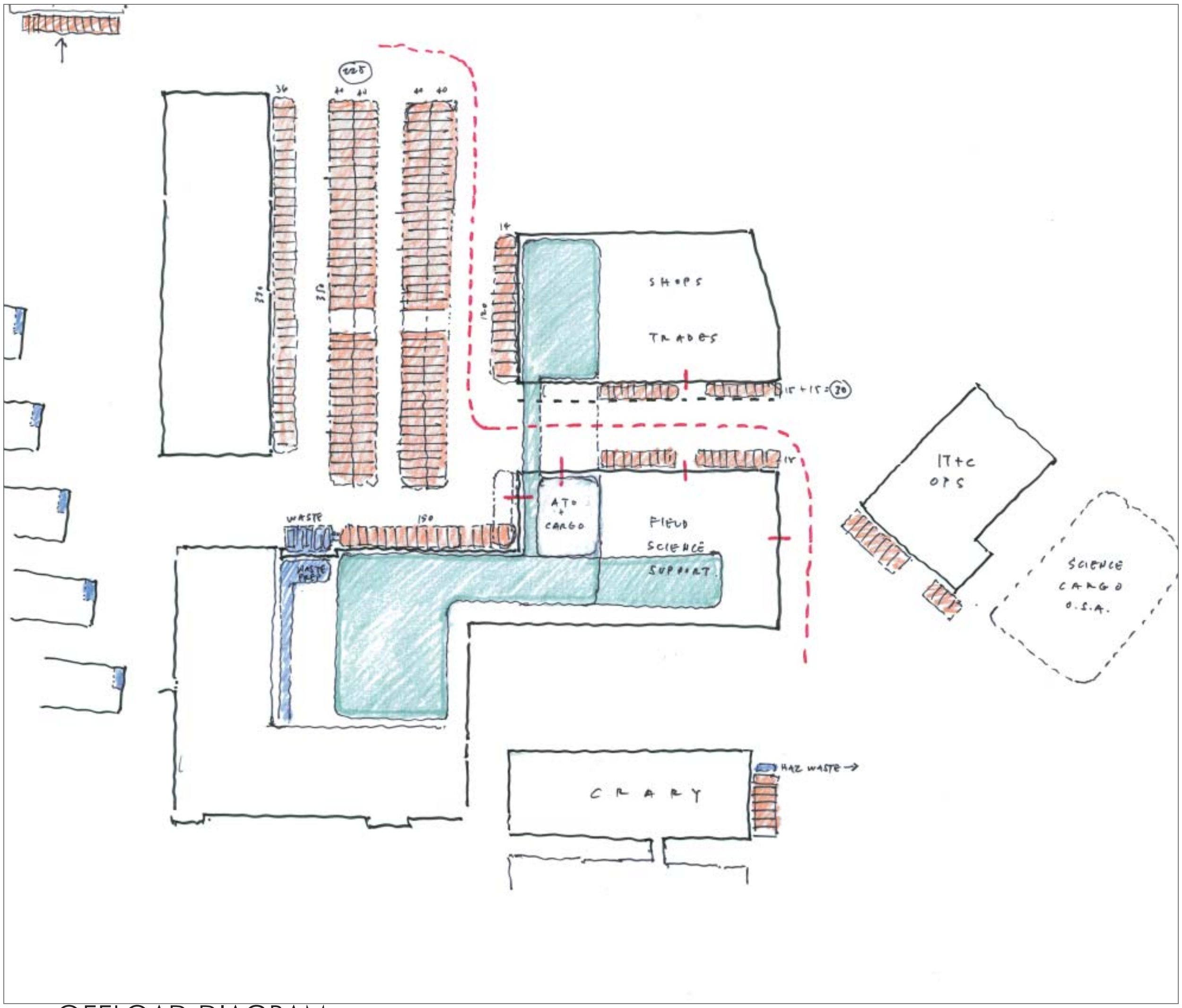
- A large central cargo yard to serve as a flexible staging area for both incoming and outgoing sea containers.
- This yard to be sized for approximately 200 sea containers and appropriate associated vehicular access.
- 2 additional areas where sea containers may be temporarily staged:
  - Galley Pad.
  - Ballpark.
- Upon emptying of sea containers, material to be placed in high-efficiency warehousing adjacent to its point of use., thereby minimizing touch points.

McMurdo lacks a "front of house" and "back of house," leaving all operations and material visually exposed,. Detailed site design will be required to assure a both functional and orderly arrangement of containers and associated equipment.

As the central Cargo Yard is an active working zone, dedicated pedestrian pathways will be required.

Airfield supply & storage requirements:

- Loading and unloading airplanes.
- Assembly of pallets.
- Storage for (10) Do Not Freeze and (5) Do Not Thaw pallets.
- Hazardous waste storage.
- Food waste storage.



OFFLOAD DIAGRAM

4.1.2 FACILITY OPERATIONS

Warehousing:

- Three categories required: Frozen, Do Not Freeze (DNF) and Room Temperature.
- Material handling equipment will determine racking height and aisle width.
- Preliminary preference for equipment that allows for higher racking and narrower aisle width for more overall efficiency.

NEXT STEPS:

- Conduct life cycle cost analysis on alternative equipment and associated racking systems for optimal function and value.

WEEK 4 - ASC LEADERSHIP

WEEK 4 - DAY 2

The day focused on establishing requirements for a wide range of both “In Town” and remote support facilities, including Waste Operations, and the Hazardous Materials /Fuels, Sea Ice Support/Dive Services, Vehicle Maintenance,Traverse Operations, Trades and Field Science Support.

TUESDAY AUGUST 4 (4.2)

4.2.1.1	9:00-10:30	(Merrick)	Track 1: Waste Operations, Hazardous Materials, Fuels
4.2.1.2	9:00-10:30	(Merrick)	Track 2: Airfield Redevelopment
4.2.2.1	10:45-12:00	(OZ)	Track 1: Dive Services / Sea Ice Support
4.2.2.2	10:45-12:00	(OZ)	Track 2: VMF & Traverse Operations
4.2.3	1:00-5:00	(OZ/Merrick)	Track 1: Trades
4.2.4	1:00-5:00	(OZ)	Track 2: Field Science Support

WEEK 4 - ASC LEADERSHIP

BREAKOUT SESSIONS

4.2.1.1 WASTE OPERATION, HAZARDOUS WASTE, FUELS

Operation:

- Hazardous waste is primarily produced by Vehicle Maintenance Facility, Crary Lab and Fuels work center.
- Hazardous waste is collected at satellite stations throughout McMurdo, and consolidated in containers.
- Appropriate container is identified, labeled and sealed for staging until being loaded onto vessel as retrograde.
- Radioactive materials also processed.

Facility Requirements:

- Small testing lab with fume hood and running water for basic testing.
- Unheated storage space for spill-response materials, including absorbent pads and tools, currently stored in (3) sea containers. Material may freeze without damage.
- Unheated storage space for (20) drums awaiting processing (before loading into sea container)
- Bathroom, shower, safety shower, safety eyewash, drain (will need to be collected), changing room, lockers to keep ECW for spill response.
- Unheated storage for used oil filters, batteries, fluorescent light tubes.
- Unheated parking area for spill response vehicle.
- Detection system.
- Secondary containment for all storage tanks, except if containers are placed within sea containers.

Contaminated soil cooker :

- 20’ sea container with attached generator with a melting system. This function could increase greatly as existing buildings are remediated.
- 20’x30’ lay down space.

Hazardous Waste administrative workspace requirements:

- Open workstation for (4) technicians.
- Enclosed workstation for (1) supervisor.
- Counter area for label printers.
- Paper printers.
- File storage.
- Regulatory factors make you keep hard copy paperwork (keep for 7 years) – only keep one year’s worth of paperwork because it is shipped off.

WEEK 4 - ASC LEADERSHIP

Fuels work area requirements:

- Hazardous Waste and Fuels could be co-located.
- Building length of approximately 100’ to accommodate fuel hose testing and repair.
- Lab with running water to clean glassware.
- Explosion-proof construction.
- 10’x10’ area with fume hood for testing equipment.
- Ample Counter space.
- Dishwasher .
- Mechanic shop.
- Hose reel base repair area.

Fuels work area administrative support and workspace requirements:

- Lockers for 20-24 staff.
- (3) open work stations:
    - -Foreman.
    - -Supervisor.
    - -Administrator.
- Shared meeting and stretching space for up to (24) staff.
- Physical and acoustical separation between lab and offices.

Solid Waste Operations:

- Food waste handling is the primary challenge.
- Scrap metal sorting area.

Administrative workspace requirements:

- (1) enclosed supervisor office, which can be located away from work center, in Central Services.
- (11) shared workstations for Solid Waste staff.

WEEK 4 - ASC LEADERSHIP

4.2.1.2 AIRFIELD REDEVELOPMENT

Airfield Requirements:

- Additional storage area for materials currently not accommodated in the existing propeller building.
- Food waste storage area at both airfields.
- Required structures for wheeled runway: Head unit, power plant unit, and consolidated operations building.
- Weather staff requires office with exterior door.
- Kitchen and dining separated, AGE office, ARFF storage immediate adjacent, Flight operations and general maintenance storage.
- Bathrooms for both staff and passengers.
- Do Not Freeze storage for in-bound flights.
- Freezer storage for goods bound for main station.
- Plug lines necessary for 15 pieces of equipment, can be 2-3 plugs per piece of equipment.

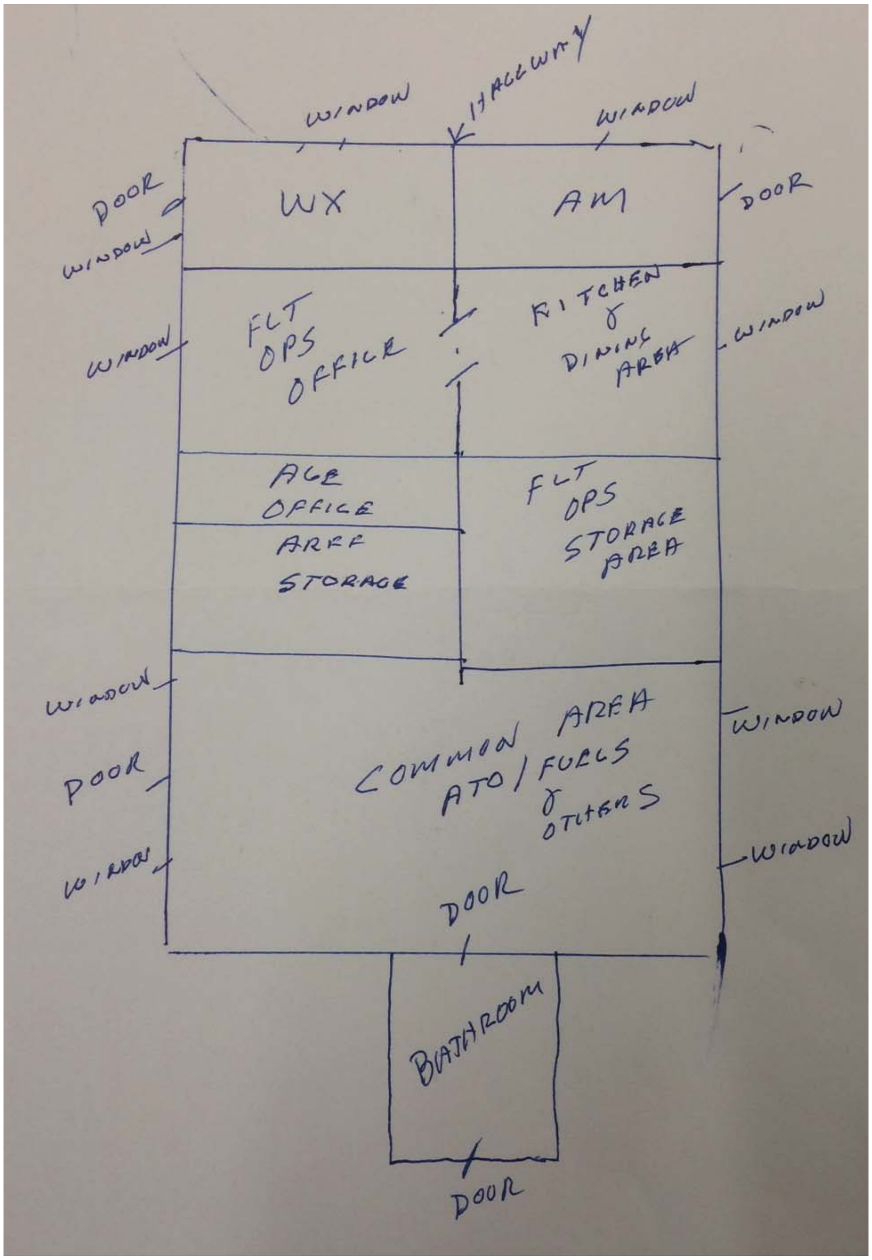
4.2.2.1 DIVE SERVICES / SEA ICE SUPPORT FACILITY

Dive Services operation:

- Current divers typicall number 18, with a maximum at 32 divers.
- Trending to dive services doing most of the dives for grantees. 5 staff other grantees.

Dive Services Requirements:

- Shower stalls to rinse gear.
- Locker space for each driver.
- Dry clothes, personal effects (2'x2') needs to be secured.
- Regulator servicing sink, integrated within shop.
- Access to medical the decompression chamber (at Medial) for testing of gauges and equipment.
- 2 breathing air compressors – one high compression, one low compression.
- Dry regulator storage.



WHEELED RUNWAY FACILITY CONCEPT DIAGRAM

4.2.2.2 VMF & TRAVERSE OPERATIONS

Traverse Operations Requirements:

1. Vehicle Maintenance activity requires 2 bays long enough to accommodate (2) vehicles at once.
2. High Molecular Weight (HMW) preparation and assembly activity requires (2) bays long enough to accommodate repair and assembly of (2) fuel bladders at once.
3. Tool Assembly area can occur within any of the bays listed in items 1 and 2 above.
4. Adjacent area required for the storage and staging of food.

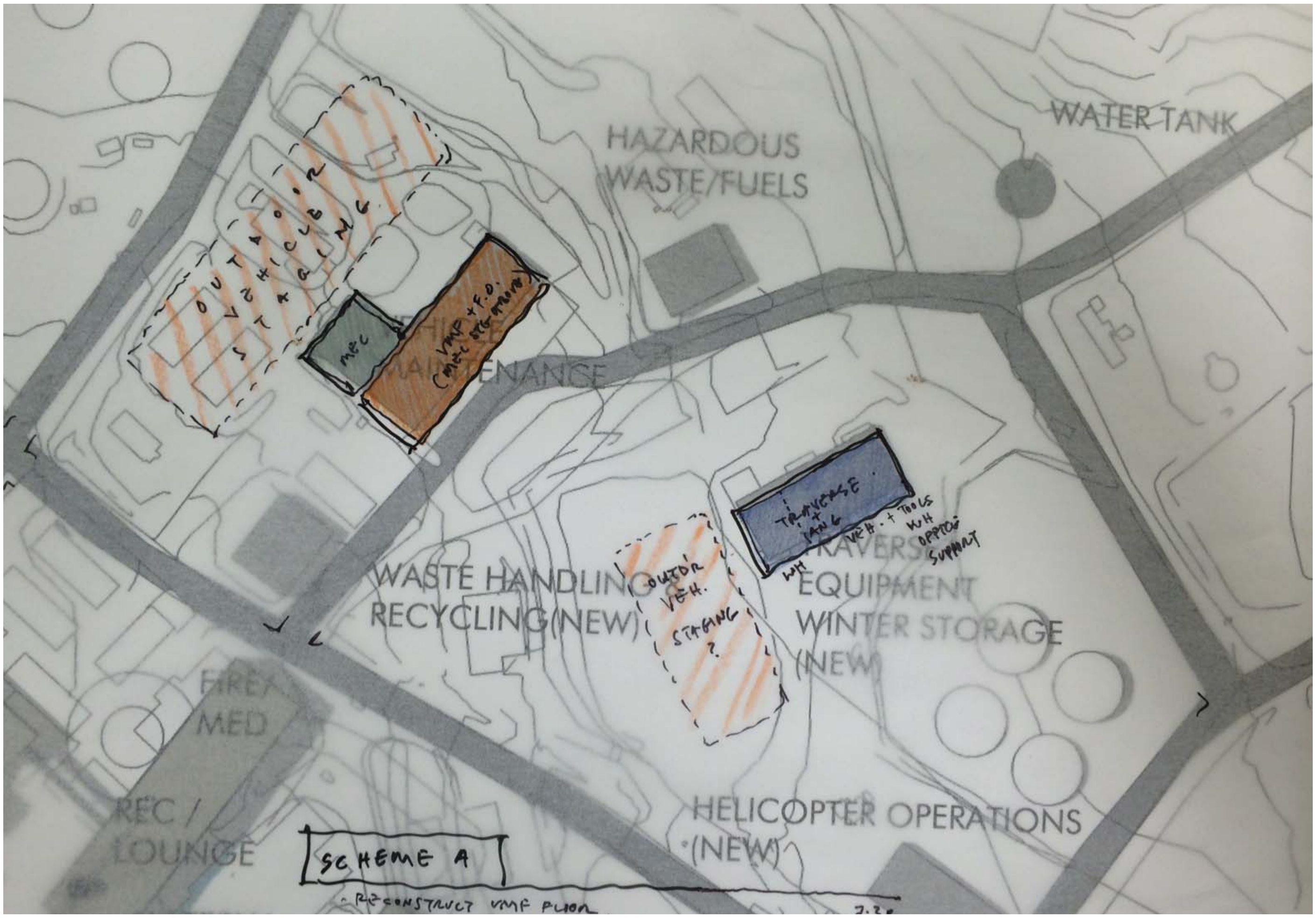
Air National Guard (ANG) and Air Ground Equipment (AGE):

- ANG: Storage required for large equipment accessories, including propellers and skis, with flanking work benches.
- AGE: Storage required for heaters and generators. (2) adjacent work stations and (1) office.

Traverse Operations and Vehicle Maintenance Facility (VMF) Alternatives:

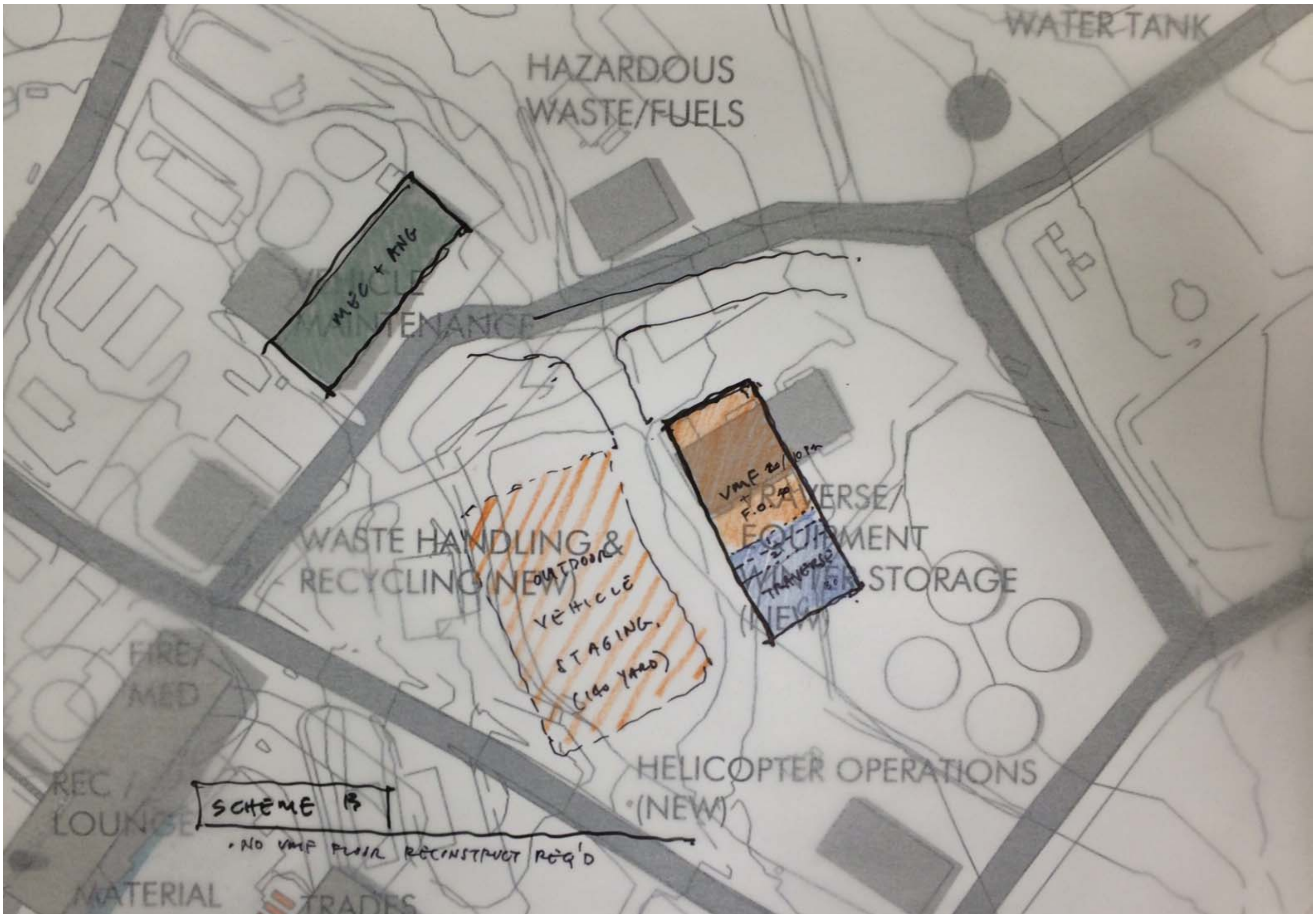
(4) Alternative site strategies were developed, presented and evaluated. These include:

Scheme	Description
A	This alternative is as proposed in the Master Plan, with separate facilities for Vehicle Maintenance and Traverse Operations. In this scenario, the existing VMF floor would need to be replaced. In addition, this scheme could not capitalize on shared support spaces such as a breakroom, bathrooms, parts and tools storage. As such, this alternative was ruled out.
B	This alternative combines the two facilities, leaving the existing VMF to be being repurposed light vehicle maintenance and storage, together with the Air National Guard (ANG) and Air Ground Equipment (AGE) storage areas.
C	This option combines the two facilities, but its orientation limits function with respect to topography. As such, this alternative was ruled out.
D	This alternative consolidates all functions into one facility. This alternative was ruled out due to the restricted adjacent site area and topography.

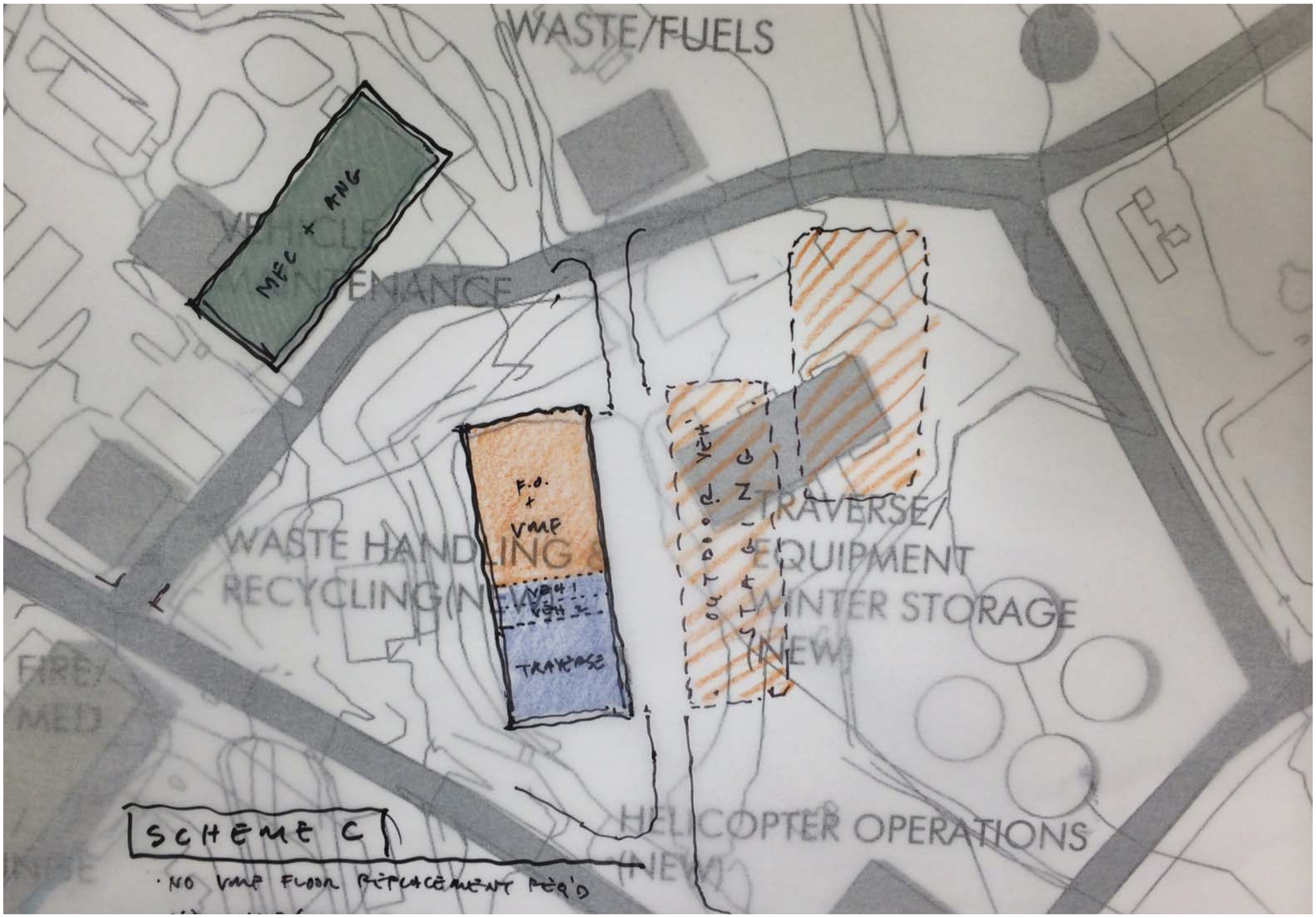


TRAVERSE OPERATIONS / VEHICLE MAINTENANCE FACILITY SITE PLAN
SCHEME A

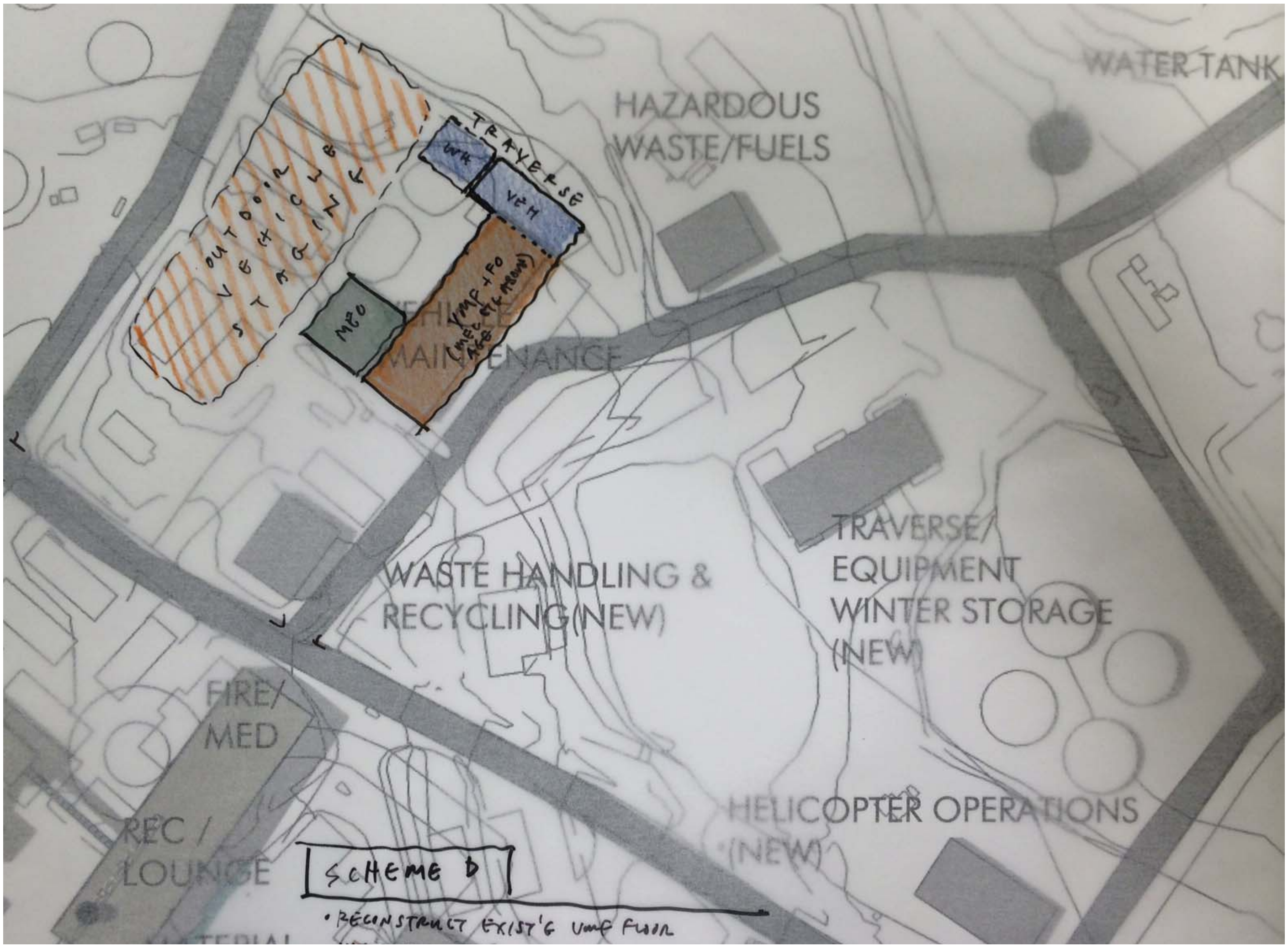
WEEK 4 - ASC LEADERSHIP



TRAVERSE OPERATIONS / VEHICLE MAINTENANCE FACILITY SITE PLAN
SCHEME B



TRAVERSE OPERATIONS / VEHICLE MAINTENANCE FACILITY SITE PLAN
SCHEME C



TRAVERSE OPERATIONS / VEHICLE MAINTENANCE FACILITY SITE PLAN
SCHEME D

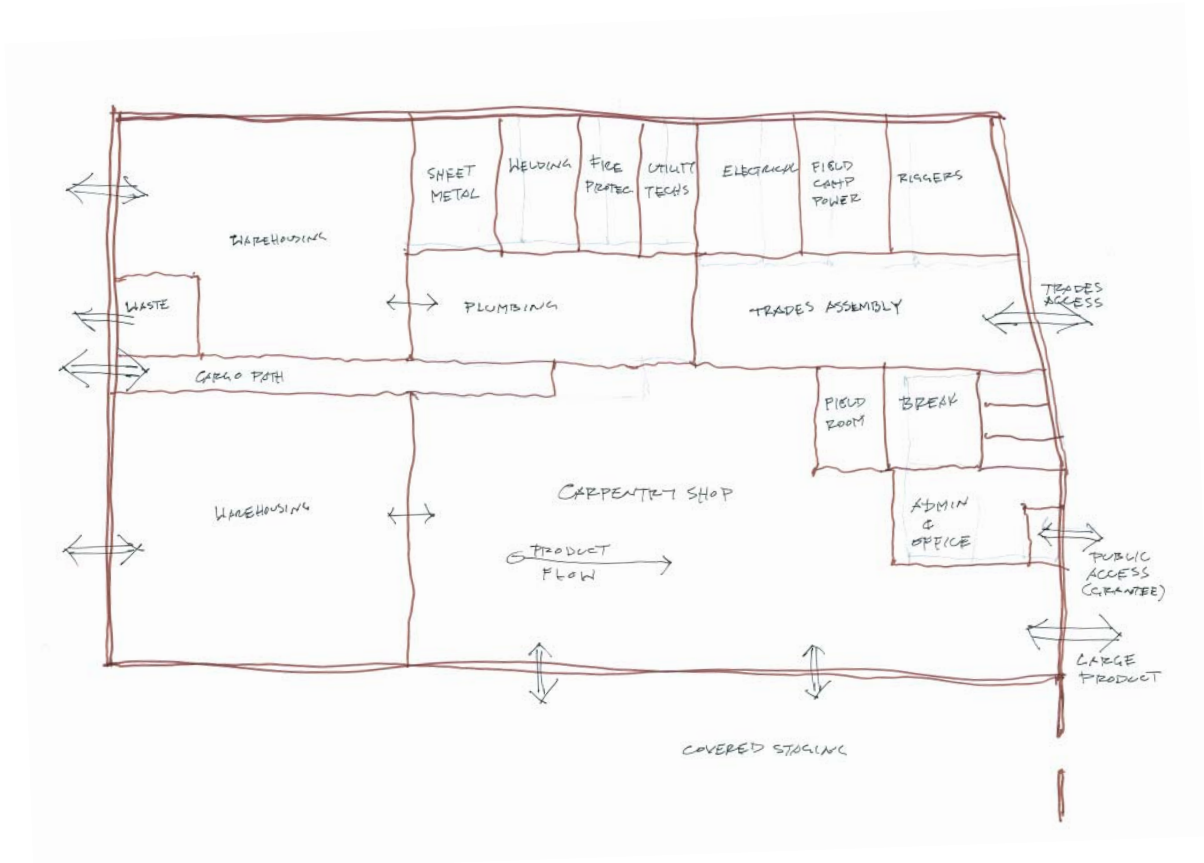
4.2.3 TRADES

Trades Operation:

- The Trades staff supports both science and town maintenance.
  The proportion of trades staff supporting science :town is approximately 80:20.
- The current workforce of 97 staff, including 35 carpenters, 20 utility tech, 5 electrical, 3 rigger, 3 fire tech, 5 insulators, 6 plumbers, 6 electrical, 3 alt energy technicians.
- The projected workforce may be reduced as a result of a diminished station footprint and improved durability through new and more standardized construction techniques.
- The Carpentry shop experiences high level of activity during Early summer (Winfly) season.
- All materials from Trades enter the cargo stream for either fixed-wing or helicopter transit.

Trades Requirements:

- Welding fabrication shop with direct access to the exterior, with adjacency to sheet metal and plumbing trades area.
- Overhead door to exterior.
- The largest material size is 20’ in length.
- A covered, but unheated or semi-tempered staging area would be advantageous for preparation of wiring harnesses, cabling, stoves and tents.
- Offices for Trades staff should be adjacent the shops themselves, as opposed to remote location in Central Services administration areas.
- Tool storage room.
- Secured storage room for Field kits, survival gear, tents and sleeping bags for field carpenters.



TRADES FACILITY PRELIMINARY ADJACENCY DIAGRAM

4.2.4 FIELD SCIENCE SUPPORT FACILITY

Cargo Processing component:

- Co-location of Field Science Cargo and Air Transport Operations (ATO) for the efficient staging and transfer of Science Cargo wooden pallets onto Air Transport Operations aluminum pallets.
- Tie Down equipment storage required.
- Nearby storage of approximately 250 pallets (out of a total 900 program-wide).
- Nearly 100 ATO pallets are assembled at beginning of season.
- Additional staging of pallets at airfield possible for items that are not Do Not Freeze (DNF).

WEEK 4 - ASC LEADERSHIP

Tempered Storage component

- (3) bays of tempered storage required to serve the South Pole Station, including refrigerated and freezer bays.
- (1) dedicated Ice Core storage requires direct access to roadway for minimal transfer time.

Field Science Gear Processing and Storage

- Cleaning, repair, storage and staging of Field gear are functions that equally serve Deep Field and local science activities.
- Space for concurrent washing and drying of tents required. Tents could be hoisted above the washing area.

Search and Rescue (SAR)

- Secured, dedicated area for Hagland vehicle, and SAR staff provisions required.
- Direct access to exterior roadway required.
- Emergency helicopter landing pad adjacent Medical would be beneficial.

Training Area

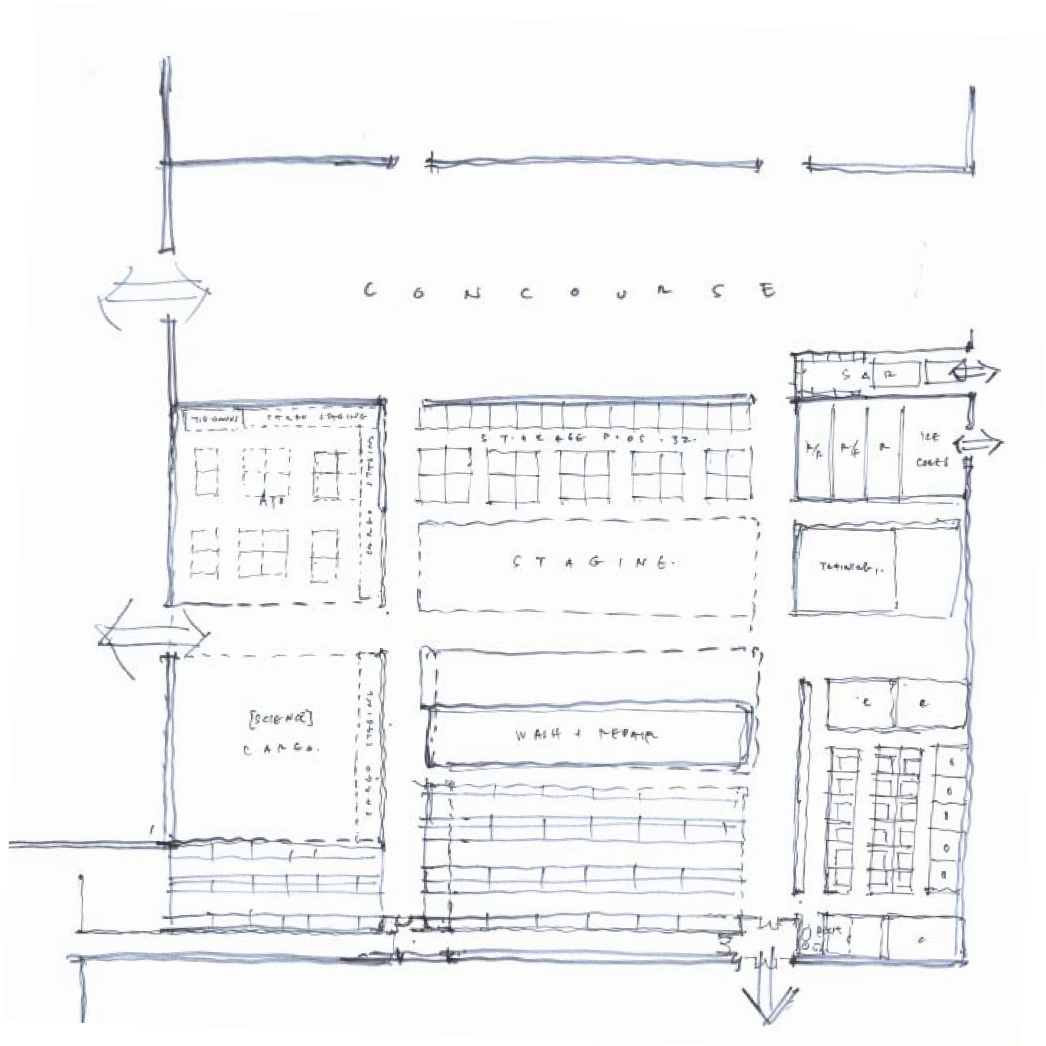
- Acoustically-separated area for 20-30 persons required.

Administrative Workspaces

- (3) enclosed offices, including McMurdo Implementation Manager and Continental Field Manager.
- (5) open workstations for camp managers.
- (3) workstations for Science Cargo staff.
- (1) workstation for Hazardous Cargo staff.
- Shared workstations for 13 Field Science Support staff.
- Shared workstations for 25 Air Transport Operations staff.
- Meeting/Training Space for 16-20 persons for both Field Science Support and Field Safety and Training (FSTP).

Storage/Warehousing

- High-bay racking systems to be used for optimal efficiency within building volume.
- Double-loaded, 6'-wide aisles serviced by state-of-the-art electrically-driving lifts are preferred.



FIELD SCIENCE SUPPORT FACILITY PRELIMINARY ADJACENCY DIAGRAM

WEEK 4 - ASC LEADERSHIP

WEEK 4 - DAY 3

Day 3 focused on the utility infrastructure and its relationship to the facilities and overall operations. Demolition and environmental requirements were articulated. Finally, a presentation on energy and conservation was given by representatives of the Rocky Mountain Institute.

WEDNESDAY AUGUST 5 (4.3)

4.3.1	9:00-12:00	(Merrick)	Utilities/Facilities/Operations
4.3.3	1:00-2:00	(Merrick/ASC)	Environmental Demolition: Buildings Demolition: Site Remediation and Retrograde
4.3.4	2:00-4:00	(ASC/RMI)	Rocky Mountain Institute presentation: Energy and Building Performance

WEEK 4 - ASC LEADERSHIP

BREAKOUT SESSIONS

4.3.1 UTILITIES / FACILITIES / OPERATIONS

Review and confirmation of a looped system with a appropriate number of interconnections to enable back-feeding in order to maintain overall station operations in the event of a localized failure.

Concept of 2 water storage tanks 500,000 gallons each, located above the station. This creates gravity "head" to provide adequate pressure in the system.

Water storage strategy combines domestic and fire water.

The current fuel distribution system allows for fuel oil boilers in the new station.

Reconsider the location of the water storage tank in order to eliminate the need for a fire water pump and required redundancy.

Confirm the requirement for a dedicated water storage tank pipe if a looped system can be used to fill tanks and supply fire and domestic water to the station.

Utilidor Strategy:
Advantages and disadvantages of below-grade and above-grade utilidor strategies were discussed. Further analysis of cost, maintenance will be necessary to determined preferred alternative.

CHP Plant and Heat Recovery – Microturbine Units

- Boilers can be electric, gas, or waste-fired.
- Distributed plant concept should be considered to augment or replace central power plant.
- Each distributed plant can be appropriately sized for each facility.
- Wind and solar-driven power could be employed to support a battery bank.
- All heating to be glycol, including heat recovery loop.
- Heat demand will be greatly reduced in new facility, but the electrical demands may remain relatively unchanged.

Next Steps:

- Identify a consistent equipment strategy.
- Identify facilities that are served by the loop, and how this strategy may change over time.
- Investigate future uses for process heat.
- Explore use of sea water intake for cooling.
- Determine optimal of level of automated control.

4.3.3 ENVIRONMENTAL

- A register of hazardous materials material is inconclusive.
- Technicians will perform appropriately-targeted hazardous material surveys.
- Geotechnical testing will follow.
- Areas for mitigation will be identified.

4.3.4 ROCKY MOUNTAIN INSTITUTE PRESENTATION: ENERGY AND PERFORMANCE

See the report from the Rocky Mountain Institute located in the Appendix regarding Building Performance, Goal and Strategies.

WEEK 4 - ASC LEADERSHIP

WEEK 4 - DAY 4

The final day of the charrette focused on building performance and efficiency goals along with energy production and efficiency. Strategies for lighting, both natural and artificial were presented.

THURSDAY AUGUST 6 (4.4)

4.4.1	9:00-10:30	(OZ/RMI)	Building Efficiency and Performance
4.4.2	10:45-12:00	(Merrick/ASC)	Energy: Production, Efficiency and Performance
4.4.3	12:00-1:00	(N. Clanton)	Lighting
4.4.4	1:00-3:00	(Merrick)	Waste-to-Power/Heat Generation
4.4.5	3:15-5:00	(Baker/RMI)	Smart Grid

WEEK 4 - ASC LEADERSHIP

BREAKOUT SESSIONS

4.4.1 BUILDING EFFICIENCY

Goal:

- Bi-annual shipment of fuel.
- Net-Zero building performance.
- Commensurate investment in envelope efficiency.

Lighting - Electrical

- Dimmable.
- IP addressable.
- Define correct light levels.
- Consideration for circadian rhythm.

Lighting – Natural

- Options: Windows, skylight, solatubes, fiber optics.
- Consider solar angles.
- Conduct studies to balance daylight harvesting and heat loss.
- Integrate with artificial lighting controls.

4.4.2 ENERGY PRODUCTION / EFFICIENCY / PERFORMANCE

Power Summary:

- o Two-thirds of McMurdo's energy is used for heating.
- o Generator production(diesel): 10 Gigawatt hours per year. Electrical demand is 12 gigawatts.
- o Heating – 18 gigawatt hours per year.
- o Harnessing of jacket water and exhaust equates to 5 gigawatts hours per year.
- o Generator heat recovery runs at approximately 54% efficiency.
- o Generators could be running at 80% with more robust heat recovery systems in place.
- o Normalized – by area – gallons/SF = 2.3 gal/sf.
- Critical that Central Plant is right-sized for new station.
- Consider Energy storage strategies.
- Consider Peak load shifting.

4.4.3 LIGHTING

- Reduction of blue lighting promotes sleep.
- LEED Daylight requirements are ineffective outside of the "Lower-48."
- Can redirect the glare to make it useful – different passive technologies.
- Look at lighting surfaces – personalized lighting vs overhead lighting.
- Wall lighting is the ideal lighting.

4.4.4 WASTE-TO-POWER / HEAT GENERATION

Key Elements:

- Coil selection - Size for 150 degree F heating water supply and 60 degree F “Delta T.”
- Pump selection - smaller pumps, N+1 redundancy, Minimum of 3 pumps for systems greater than 400 GPM.

Ventilation Systems:

- Heat recovery for all outside air intakes.
- Demand-controlled ventilation.
- Low static duct and fans.
- Variable speed fans.

Domestic Water System:

- Low-flow water fixtures results in reduced water processing and therefore energy use.
- Consider gray water reuse.
- Consider Surplus power heat injection.
- Maximize heat reclaim from effluent.

Waste-to-Power:

- Use existing waste streams in lieu of shipping waste off continent.
- Perform environmental assessment prior to implementation.
- Consider wood chip boiler for wood and cardboard waste stream.
- Consider expansion of Clean Burn boiler use for waste oil & fuel.
- Explore possibility of food waste as an input source.

4.4.5 SMART GRID

- Control system to optimally balance power sources with demand.
- Programming of load flexing and load shedding logic.
- Identification of appropriate systems are to be monitored and controlled.
- Has ability to provide public “dashboard” to enhance awareness of energy use.

August 10, 2015

Dear Brandon, Kyle and Neal:

We are delighted to have been able to help your team complete a successful charrette. There were tons of great ideas presented! This informal note, our final deliverable for our contracted support of the charrette, summarizes some observations and ideas that the RMI team developed while preparing for and participating in the workshop. There are some additional observations, best shared in a call, which I am happy to do at your convenience.

In line with what we discussed before and during the charrette, setting up a clear set of goals, linked back to clear cost reductions in the near term and over the station lifecycle, is an imperative. Equally important is a contracting/governance structure which lets the talent you have assembled work together to solve the entire system problem. We'd be happy to help you set that up, in a form useful to NSF decisionmaking. Tools such as Homer, that you are already using, will be one key to setting those goals intelligently and doing the early and iterative quantification that is needed.

Buildings

1. Building thermal performance - We see many benefits from pushing insulation levels and building tightness and window specifications (plus smart placement) to extreme levels. The record on insulation and tightness, as far as we know, is R-103 and .05 ACH in a house near Bristol Bay, Alaska. It has very limited windows though… We believe the design limitation is likely a practical one of materials availability, handling and construction ability, rather than a theoretical optimum. The discussion of ASHRAE standards and "cost optimization" is false logic, we believe (see Goals and Strategies for more). Extremely high performance, modern buildings are extremely comfortable, easily maintained, cleaner, healthier, and far more stable and easy to manage. We want all those benefits, which all drive real economics, not just the heating side fuel savings.
2. Summer Building light performance – daylighting (in summer) everything except a few specific hard-to-handle tasks makes sense, is totally achievable, and will by itself have major productivity and morale benefits
3. Winter building lighting performance – Given the fast-moving technologies we heard about, what is key right now is to set appropriate targets with the right metrics – ie .1 or .2 W/SF and luminance, not illuminance, as the key design parameter other than certain task lighting. Also important is ensuring a contracting/process design that includes the right expertise at the right stage in design. A specialist lighting design like Nancy Clanton should be part of every bidding team as a criterion for the Design-Build contract stage, for sure. Plan to redo lighting several times as technology improves over time, even if just for the health and productivity benefits.
4. Heating performance – with much tighter and better insulated buildings, different delta-T's for heating might be the norm. This will change the approach logic, and maybe point

away from the boilers and site-wide loop. Perhaps the loop would be limited to a handful of buildings with significant or peak-driven needs/contributions to make. This can and should be simulated in a model before design gets too far along.

5. Timely data gathering, without overdoing it: Although many buildings will be demolished, there is some key data to gather, ideally this season, especially from major energy using buildings that are not going away or have key functional roles. This data can confirm key assumptions made in modeling and conceptual design. This idea should be tested – it's not worth doing if there is no system design or component that it could change. But we think it will change system designs if most of base is extremely low demand, as planned. Two suggestions (not a complete list) and logic here:
    a. Crary Lab thermal performance and improvement options - under the assumption that Crary is a major load (ie 10% of McMurdo) of key importance to "get right" and that will affect microgrid strategy. If it is not, then less work needed. This might be a simple test – ideally repeated a few times to ensure validity – let's discuss.
    b. Crary lab science equipment load, load reduction opportunity, and load flexibility (ie can Crary be a "grid asset" and if so how) – for same reason as above
    c. Same (b) for 155 – the kitchen/cafeteria/key shared space – not the building, , since it is being rebuilt, but internals important, again especially if it's a significant part of station load on an annual basis

Microgrid and power generation:

1. Diesel plant - More insights about how the use of diesels can be limited, and what that means to McMurdo economics, will be important in setting strategy. The diesels are quite new, and will run for a number of years under any scenario. It's not clear to us that in the 10 years out time frame, when this project is complete, that you'd even want to consider adding a different diesel when current ones are too old, given the maintenance needs. Unless new technology changes that need, of course – digital valves, ceramics, adiabatic operation etc are all possible in that time frame. Fuel cells, microturbines, and far more thermal gain (ie solar) and storage for example will fundamentally change the option set. But last week we did not hear anyone thinking very far ahead. For a once in a generation, or more redevelopment, looking ahead is vital.
2. Load flexibility opportunity – between heat trace, some remaining electric boilers or heat pump water heaters, and other flex loads (maybe some science gear, etc) this is a huge opportunity. Easy to study with Homer. In other "small city" studies we have seen that getting just 2% load flexibility can save huge amounts of capex. Will likely be important for this project, esp once existing gear (like the diesels) wears aout and ideally is not replaced. It also is important element in managing renewables variations, especially wind.
3. Out-of-town loads (and opportunities) – we understand there is load on the grid that was not part of the conversation at the charrette. The airfield, Scott base, the satellite equipment etc all have demand reduction and demand flexibility opportunities. Though

they look small today, in the future they might be some of the biggest single loads – and they too will be replaced or upgraded over time.

4. Thermal storage – McMurdo's requirement for prefab/shippability means conventional (heavy) thermal mass is not possible, but storage of heat is in our experience an imperative for efficiency extreme cold climate. The obvious places to do it are in the buildings, in water (available on site) or phase change materials (they are much lighter and can be tuned for the usage needed). Campus level (the heat loop) is a second option – maybe both is best). See Goals and Strategies for how this links into the need to do some modeling/quantification to more effectively explore options
5. Wind and solar will happen – economics, and ability to withstand harsh conditions – will continue to improve and the program should plan on taking a path to primarily renewables operation. There is no real doubt about this, techno-economically speaking; the limits will likely be driven by space and placement, not economics.
6. On batteries we do not agree with the assessment of batteries and their issues as presented by the AE in the workshop. Batteries can add a lot of value, certainly within the implementation time frame here. They just need to be in semiconditioned space, or which we will have plenty. Modelling the system with batteries will show just how valuable they can be, especially in scenarios other than keeping a big diesel running – which cannot happen often and still meet fuel use targets.
7. Controls – we need to discuss; it is imperative to get these right and future flexible (easily and locally upgradeable) and integrated with building management and the electrical and thermal storage and the key flexible loads (and on an open platform, not the rigid custom-spec proprietary system I think we heard about). There are many considerations beyond those mentioned by the relevant AE. There are other players with a lot of relevant experience to add, including experience in Antarctica.

Goals and Strategies

1. Create a set of parameterized cost numbers for all to use in design. At least 5: For potable water delivered, for nonpotable fresh water delivered, for heating, for electricity, for storage of heat in a baseline design thermal loop. Maybe a few more system-derived ones, such as the value of load flexibility, once we are a little further along. As Amory emphasized, creating a clear set of cost numbers to work against – and for all subcontractors to use in exploring and designing concepts - makes sense. It can even be a range, based for instance on a couple of scenarios. Setting it high results in better design, as long as total capex is also a (separate) criterion. The best analog situation we know of is the North Slope of Alaska. Utilities are run by a government entity, thus the numbers are public and as it happens recent (http://www.north-slope.org/assets/images/uploads/Feb2015_draft_NSB_ Energy_Plan _2.6.15.pdf). Their full costs/kwh (including Barrow, which has local natural gas) are .50 (an exception) to 1.03/kwh, and average about $.90/kwh. For ships the number is $.40-$.50/kwh or more, depending on size etc. Personally it's tempting to simply set $1.00 a kwh for McMurdo, and significantly more for South Pole. This would stress the design in exactly the right way – and

likely result in MUCH lower life cycle costs over the 20-30 years that doing such a calculation makes sense. The design can always be tested, later on, for LCCA and associated risks and cost mix at lower fuel costs. Labor costs, for instance, will remain a fundamental driver.

We understand that, it's more complex than Alaska or a ship, but the approach above is meant to give the designer something to work with. The Blue Ribbon Panel emphasized that given the magnitude and nature of the fixed costs (tanker trips, largely for AN-8 for the air fleet) that this subject is sensitive and complex, but Maggie Knuth of NSF had a great approach – eliminating a tanker trip or more - entirely. I did not understand her resulting budget of 550,000 gallons per year number though –its clearly dependent on the performance of the air fleet and a large chunk of that is trips to the South Pole, which we would reduce. But that approach is tunneling through the cost barrier in part to reduce a capital cost (what a tanker run is, here). A winning logic. If working that out with any confidence proves unwieldy, at the end of the day this is a design parameter – a choice – meant to help gain many other benefits too. Hence my vote for $1.00.

2. Understand and design for the end game – as we move, over time, to highly efficient buildings, parsimonious electrical loads, and cost effective and sturdy wind and solar – in our view there is no doubt the global market will supply these to us, and pretty soon - there will be room for, and need for, more electrical/localized heating and/or storage. The large scale waste heat loop, in other words, may not in fact be a good thing in the longer run. Calculating this is important to do in the conceptual/system design Phase we are now in. More electrification of heating will need to be wired into the new buildings (and space allocated, or electric or water-based radiant gear – pipes/mats) put in place even if a building is not run that way at first. The good news is, the electric radiant heaters are very cheap. That's why they worked for RMI's new building even though we will seldom use them.

3. Net zero in summer – and maybe a bit more – this has huge branding and social/workforce engagement benefits and given the 24 hour sun and more wind power should be quite do-able once better buildings are in place. It also means that solar thermal will have to be looked at carefully – and that thermal storage might in fact need to be quite big and operable in a different mode than a waste heat sharing loop. Not coincidentally a lot of cold weather low energy homes use a massive amount of thermal storage – usually hot water and rocks. The leaders in Alaska actually store almost enough heat to last all winter! So in working this out – Homer can likely help – it's pretty interesting to consider how far the "season" can be extended. This is a great topic to get ahead of, and maybe even involve some university students to shape and run simulations.

4. Two-mode station – the station at the moment does not reflect the vastly lower population in its energy numbers as much as we'd like. Thinking through a winter mode and a summer mode, and making both work really well, is important. Its not

clear, without some modeling, what the target here might be – clearly a lot of building space is warehousing precisely to enable a long unsupported winter – but dorms and other space could be designed to totally shut down. A demountable plumbing module, for instance, might enable a dorm building to be totally unheated, given the dry climate. Creativity is needed here. It's even a good topic for a design contest.

5. Water – as we noted in the charrette, water at McMurdo is far more than a convenient life necessity. It should serve many uses at once – thermal storage, movement of heat, use for excess electricity, and a key element in the control logic are some of the obvious ones. Yet it was hard to sort out, in the charrette structure at least, how to ensure that water is sufficiently analyzed and that design approaches are created and tested enough to be able to play these key roles. Keeping the entire water system – and an expanded set of roles - in scope makes sense, at least for now.

6. Explore alternative metrics (to set success criteria for AEs). Things like lower surface to volume ratios, % daylighting, storage cost per kWh thermal delivered, all might have a role, at least in setting some performance bonuses. See below on project governance.

Project Governance and Roles

1. Reference design – We did not see a process for ensuring that the base design keeps up with (and possibly helps shape) technologies. The best way we know to do this is a reference design, representing where NSF would LIKE McMurdo to go once the right technologies (and their reliability) are proven out. It should also do a first cut plan of how to help those technologies progress – whether a few localized tests or tracking some inportatn data to help fine tune a system or new design.

2. AE contractor alignment – there should be a system model – developed by Lockheed Martin and shared – to help ensure all designs fit together harmoniously. Assumptions and setpoints in that model should be clear and controlled. Furthermore, the acceptance goals set for AE's should (as Amory pointed out for the Hypercar) should all be for the WHOLE station – not for bits of it. AE's should then be required to work together, and co-located. This will get far better results than any other approach we know of. In the charrette we heard a lot of discussion from individuals about what was in or not in their scopes. This issue needs to be fixed to avoid poor results from local optimization at the expensive of the whole design.

3. Strategy selection – if, as we understand it, the task in FY 2016 is to create a 35% complete design suitable for setting up a competition to select a design-build (D-B) house, there needs to be a very clear process to examine a far broader range of

options that were presented last week, and to select one (or more) overall strategies for the base. Strategy should be set for a set of time horizons – first build (ie 2020-2025 or so), then time frames going forward, and include, using the reference design, ideas that may come into play. This needs far more numbers – and frankly less premature focus on specific technical ideas in isolation, like the microturbines. Otherwise much of the work in FY 2016 might be wasted, as the D-B contractor finds better ideas, finds out details that change the problem, etc. etc. Finally, once a strategy is set the team needs to be encouraged to find ways to overcome its challenges – each will have some – with creativity and good engineering, rather than jumping to another and presumably less valuable strategy. Our new building faced many such challenges, and we had to expand our research and add additional advisors in order to overcome them.

4. Consider (simulated) delivered energy savings or related performance incentive bonuses for the design team – to ensure that the impoertance of these goals to Lockheed Martin and NSF is clear, and that AE management teams reviewing ideas do not force their teams to revert to more traditional approaches based on inappropriate standards or other less-than applicable logic.

Brandon, Neal and Kyle, as you can imagine this list of quick reactions is just some key starting points. We also apologize if there is something we have not fully understood in the session, or your efforts – our time on this was limited. I understand you were able to speak with Cara about goalsetting in the context of buildings and RMI'S work on our own building in Basalt. We'd be happy to help you think through a starter set of goals, and the tools and structures to manage them. It will become easier to understand with some numbers, especially on the buildings thermal side, and doing some parametric work is actually pretty easy. In fact our first proposal to you included such a person, but he could not make the date we ended up with. Lets look for a time to talk – both to ensure that this quick note is intelligible and useful, and to think about next steps. This week is good, next week after Monday not so good.

Warm Regards

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SECTION 2
Facilities Program Tabulations

The previous section describes in **narrative form** the working requirements for the various users of McMurdo Station.
This section states those requirements in **numerical form** as the basis of a space program to guide future development.
This spatial program describes each of the components that comprise the entire McMurdo facility.
In addition, the following tabulations describe the associated *circulation, support* and *enclosing wall* area required of each component.
The methodology of determining these circulation, support and enclosing wall areas is on the following page.

The Program Documents within in this section represent the organizational structure by work center for McMurdo station. It is divided into two major categories, McMurdo Town and McMurdo Outlying areas. Master Plan 2.0 involved the reconfiguring the majority of McMurdo Town. This Program Document combines the information gathered from the charrette and begins to catalog and strategize the areas required for the redevelopment of primarily McMurdo Town. There is some information for McMurdo Outlying included within this report, it is included for reference only.

The previous section describes in narrative form the working requirements for the various users of McMurdo Station as recorded from the charrette meetings.
This section states those requirements in numerical form as the basis for the redesigned station. It is divided into sections based on the areas of McMurdo Station as cataloged in the Antarctic Support Contract's inventory of buildings on base. Those areas were defined as McMurdo Town, McMurdo Outlying and other areas excluded for the Master Plan 2.0.

The basic metrics for measuring the components of the programming documents are:

Basic Metrics Definitions:
Net Square Feet (NSF) - The area of each individual program space. This includes individual workspaces (workstations and private offices), support spaces and special program critical spaces.

Circulation Factor – This accounts for the primary circulation (main circulation route connecting the building elevators/lobby, exit stairs and core toilets). It also accounts for secondary circulation between individual spaces and support spaces.

Usable Square Feet (USF) – Area of the floor that is occupiable by a tenant minus the building elevators/lobby, exit stairs and core toilets). This includes primary and secondary circulation.

Occupiable Square Feet (OSF) – Total usable area plus the prorated allocation of the floor and building common area within a building.

Total Gross Building Square Footage – Total area of a building enclosed by the exterior face of the perimeter walls. This is done on a floor-by-floor basis.

The program documents were developed around two levels of information. Those were:
Building Level - quantifies all the work centers to be co-located in a specific building and calculates their footprint.

Within the Program Documents you will find the following:

McMurdo Station Program Summary (first page) - designates the buildings by area (McMurdo Town and McMurdo Outlying) for what was defined in Master Plan 2.0 and it also identifies the combined square footage totals per area and building as a result of the programming exercise. We have included a tabulation for the existing square footage of the areas and buildings being affected by the programming exercise. This allows a comparison of the reduced footprint for specific buildings and areas as discovered through the charrette discussions. Using these values, we are able to show the percentage of building footprint that has been reduced by the further refinement of the square footage of each building. There is one exception to the reduction of footprint, the Helicopter Operations buildings and hanger have increased in size due to additional requirements of a modern maintenance facility for helicopters.

We then move into individual building summaries based on individual work centers for all the buildings within McMurdo town and some of McMurdo Outlying. These sections begin with a summary of all the work centers within a building, followed by an itemized tabulation of the different type of work areas (private office, work station, support spaces, etc) within a work center. Each section ends with a summary of any shared support spaces used by more than one group in the building.

Building Summary – shows the total number of workstations or rooms required for the building with any designated support spaces for each work center. The net square footage per work center is calculated and then has a circulation factor applied to the net square footage to determine the Total Usable Square Footage. This does include primary and secondary circulation. An occupiable factor is then calculated to yield the total interior square footage of the building. Lastly, the Total Gross Building Square Footage is determined by multiplying the Occupiable Square Footage by a sizing factor for the exterior skin. This yields the gross footprint of the building with all components accounted for.

Work center Summary- summarizes the work center's space allocations based on work space type (private office, work station, etc) with a total square footage for the number of spaces required. The designated support spaces specific to that work center are shown and broken out by name as identified in the charrette. These are combined to show the total number of spaces and square footage per work center. No multipliers are applied at this level of information.

General Floor Shared Support Summaries – calculates the total square footage for all support areas that serve more than one work center within a building.

MCMURDO STATION
Building Summaries

Building Name		ExistingTotal Square Footage	Basis of Design Total Square Footage (Program Data)	Percentage
McMurdo Town				
	Lodging		148,449	
	Central Services		81,405	
	Level 1		66,254	
	Level 2		13,123	
	Level 3		2,028	
	Contingency & Operations Building		61,561	
	Waste Handling/Recycling		3,143	
	VMF/Traverse Operations		9,279	
	Fuels/Hazardous Waste		9,226	
	Trade Shop		30,505	
	Field Science Support		35,187	
	Crary		49,500	
	Sea Ice Support		11,948	
	IT OPS		21,651	
*Power Plant, Waste Water, Lift Station, Sea Water Intake, Helicopter Facility, Fuel Pump House excluded				
Total SF of areas as part of Programming relevant to MP2.0		**576,322**	**461,854**	**80%**
	Helicopter Operations		**44,069**	
Total SF of additional areas to MP2.0		**8,224**	**44,069**	**536%**
McMurdo Outlying				
	Wheeled Airfield Facility		4,891	
	Ski Equipped Airfield Facilities		23,386	
Total Gross Bldg S.F.			**28,277**	

LODGING
Summary

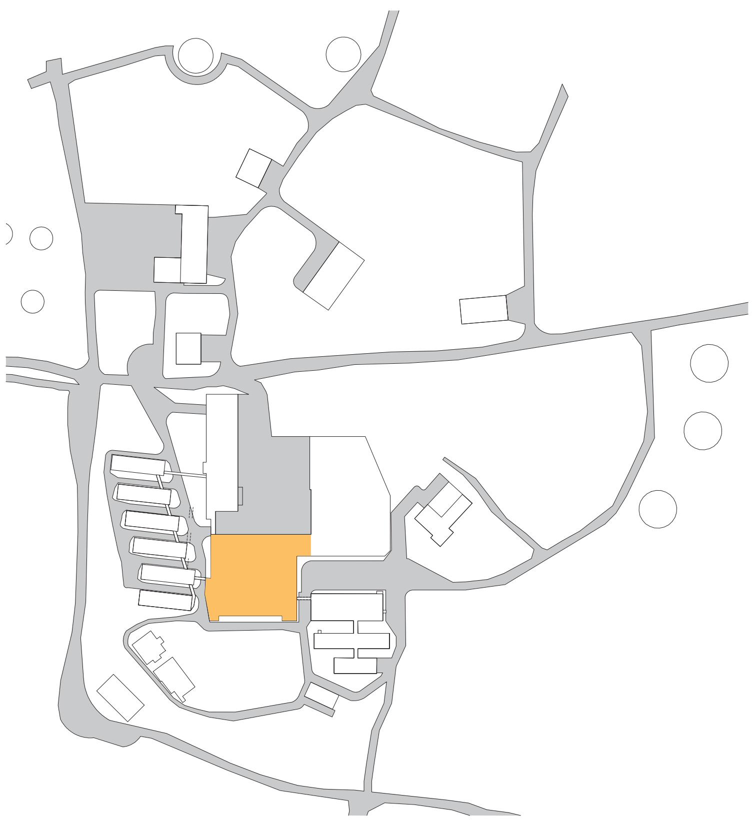
		Requirements				Potential Adjustments				Notes
Executive Summary:		Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Lodging		850	1,034		114,840	0	0		0	
	Private Rooms		810		75,300		0		0	
	Support Space		224		39,540		0		0	
Total Staff		850				0			0	
Total Private Rooms			810				0		0	
Total Support Spaces			224				0		0	
Sub-Total (NSF)					114,840				0	
Circulation 15% (factor of .17)					19,523				0	
Total USF					134,363				0	
Total OSF (assuming OF of 1.08)					145,112				0	
Total Gross Bldg S.F. (1.023 multiplier)					148,449				0	

LODGING
Room and Space Allocation

	Requirements				Potential Adjustments				Notes
SPACE REQUIREMENTS	Staff Count	Qty.	Program SF	Total SF	Staff Count	RMQty.	Program SF	Total SF	
Single Room	770	770	90	69,300					
Double Room	80	40	150	6,000					
Private Room Sub-Total (NSF)	**850**	**810**		**75,300**	**0**	**0**		**0**	
Dedicated LodgingSupport Space									
Bathroom		170	150	25,500					
Private Shower									
Janitor's Closet		18	80	1,440					
Storage		18	100	1,800					
Total OSF (assuming OF of 1.08)		18	600	10,800					
Total Gross Bldg S.F. (1.023 multiplier)									
Dedicated Lodging Support Space Sub-Total (NSF)		**224**		**39,540**		**0**		**0**	
Sub-Total (NSF)		**1,034**		**114,840**		**0**		**0**	

CENTRAL SERVICES - LEVEL 1
Summary

		Requirements				Potential Adjustments				Notes
Executive Summary:		Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Transportation & Logisitcs		28	5		268	0	0		0	
	Workspace		5		268		0		0	
	Dedicated Workcenter Support Space		0		0		0		0	
Infrastructure & Operations		90	23		1,120	0	0		0	
	Workspace		23		1,120		0		0	
	Dedicated Workcenter Support Space		0		0		0		0	
General Floor Shared Support			116		43,700		0		0	
Total Staff		118				0			0	
Total Workspaces			28				0		0	
Total Support Spaces			116				0		0	
Sub-Total (NSF)					45,088				0	
Circulation 25% (factor of .33)					14,879				0	
Total USF					59,967				0	
Total OSF (assuming OF of 1.08)					64,764				0	
Total Gross Bldg S.F. (1.023 multiplier)					66,254				0	



CENTRAL SERVICES - LEVEL 1
Transportation & Logistics

SPACE REQUIREMENTS		Requirements: Type	Staff Count	WS Qty.	Program SF	Total SF	Potential Adjustments: Type	Staff Count	WS Qty.	Program SF	Total SF	Notes
Supply Supervisor		PO1	1	1	100	100						
	Materials Person Sr.	WS1	7	3	48	144						
	Materials Person		17									
	Inv. Data Spec Lead	WS2	1	1	24	24						
	Inv. Data Spec		2									
Workspace Sub-Total (NSF)			**28**	**5**		**268**		**0**	**0**		**0**	
Dedicated Workcenter Support Space				**0**								
	None											
Dedicated Workcenter Support Space Sub-Total (NSF)				**0**		**0**			**0**		**0**	
Sub-Total (NSF)				**5**		**268**			**0**		**0**	

CENTRAL SERVICES - LEVEL 1
Infrastructure & Operations

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Dispatcher	WS1	4	2	48	96						
Camp Supervisor - Marble Point	WS1	1	1	48	48						
Sous Chef - MP	WS1	1	1	48	48						
Calibration Coord.	WS2	1	1	24	24						
Post Master	PO1	1	1	100	100						
Postal Clerk	WS1	1	1	48	48						
Recreation Supervisor	PO1	1	1	100	100						
Retail Clerk	WS1	1	1	48	48						
Food Service Supervisor	PO1	1	1	100	100						
Lead Baker		2									
Food Clerk		1									
Sous Chef	WS3	6	2	10	20						WS in Kitchen. 1 People/Shift
Production Cook		18		10	0						Staff of 18. 6 WS needed.
Prep Cook		2									
Lodging Supervisor	PO1	1	1	100	100						
Rooms Coordinator	WS1	1	1	48	48						
Lodging Assistant	WS1	1	1	48	48						
Hairstylist		1									See salon requirements
Steward Supervisor	WS1	1	1	48	48						
Dining Lead	WS2	4	4	24	96						
Steward Supervisor (Jano)	PO1	1	1	100	100						
Janitor Lead	WS2	2	2	24	48						
Steward		37									Locker needed for everyone
Workspace Sub-Total (NSF)		**90**	**23**		**1,120**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**23**		**1,120**			**0**		**0**	

CENTRAL SERVICES - LEVEL 1
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Shared Support Spaces	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Coat Room - East	1	300	300				
Coat Room - West	1	300	300				
Handwash - East	1	85	85				
Handwash - West	1	85	85				
Kitchen	1	5,000	5,000				per existing
Dining	1	2,850	2,850				230 seat x .85 x 18 sf/person
Servery	1	2,500	2,500				per existing
Multipurpose/Lecture	1	1,500	1,500				150 people x 10 sf/person
Multipurpose/Lecture Storage	1	100	100				
Total Support Spaces	1	25,000	25,000				Central Supply + Food (Ref, Freezers, Dry Goods)
Waste Prep	1	400	400				
Housing Office	1	200	200				supervisor, key issue
Recreation Office	1	200	200				
Recreation Gear Storage and Issue	1	180	180				
Salon	1	200	200				
Station Entertainment (Radio + A/V servers)	1	250	250				
Station Entertainment/Assignable Server	1	50	50				
IT&C Backup Operations Data Center	1	1,200	1,200				
Network Operations Center/Offices	1	200	200				
Mission OPS Comms/SPAWAR Primary	1	700	700				
Wiring Closet/Fire Suppression/UPS	1	500	500				
Passenger Terminal	1	900	900				
Passenger Terminal Storage	1	200	200				
Touchdown Stations - Personnel	8	10	80				shared by all personnel for time sheets. etc.
Post Office	1	200	200				
Growth Chamber							
Touchdown stations for personnel	4	10	40				1:20 ratio for workstation to personnel, WS3
Lockers	80	6	480				
Shared Support Spaces Sub-Total (NSF)	**116**		**43,700**	**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Summary

	Requirements				Potential Adjustments				Notes
	Staff Count	Space Count		Total SF	Staff Count	Space Count		Total SF	
National Science Foundation	**5**	**5**		**548**	**0**	**0**		**0**	
Workspace		5		**548**		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
McMurdo Ground Station	**2**	**2**		**96**	**0**	**0**		**0**	
Workspace		2		**96**		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
SFA	**12**	**12**		**872**	**0**	**0**		**0**	
Workspace		12		**872**		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
Ken Broek Air	**3**	**3**		**196**	**0**	**0**		**0**	
Workspace		3		**196**		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
Antarctic Support Contract (ASC)	**9**	**9**		**660**	**0**	**0**		**0**	
Workspace		9		660		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
Tech Management & Admin	**23**	**23**		**642**	**0**	**0**		**0**	
Workspace		23		642		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
Transportation & Logistics	**2**	**2**		**200**	**0**	**0**		**0**	
Workspace		2		200		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
Infrastructure & Operations	**20**	**20**		**1,228**	**0**	**0**		**0**	
Workspace		20		1,228		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
Project Management and Prof. Services	**12**	**12**		**628**	**0**	**0**		**0**	
Workspace		12		628		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
IT & Communications	**1**	**1**		**100**	**0**	**0**		**0**	
Workspace		1		100		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
Science & Tech. Project Services	**1**	**1**		**100**	**0**	**0**		**0**	
Workspace		1		100		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
SPAWAR	**5**	**5**		**396**	**0**	**0**		**0**	
Workspace		5		396		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
General Floor Shared Support		**17**		**2,640**		**0**		**0**	
Total Staff	95				0				
Total Workspaces		95				0			
Total Support Spaces		17				0			
Sub-Total (NSF)				8,306				0	
Circulation 30% (factor of .43)				3,572				0	
Total USF				11,878				0	
Total OSF (assuming OF of 1.08)				12,828				0	
Total Gross Bldg S.F. (1.023 multiplier)				13,123				0	

CENTRAL SERVICES - LEVEL 2
National Science Foundation

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
National Rep Antarctica	PO3	1	1	160	160						
National Rep Antarctica - visiting	PO2	2	2	120	240						
NFS Station Manager	PO1	1	1	100	100						
NFS Admin	WS1	1	1	48	48						
Workspace Sub-Total (NSF)		**5**	**5**		**548**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**5**		**548**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
McMurdo Ground Station

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
MGS Engineer	WS1	1	1	48	48						
Weather Manager	WS1	1	1	48	48						
Workspace Sub-Total (NSF)		**2**	**2**		**96**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**2**		**96**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
SFA

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
1st Sargent	PO3	1	1	160	160						
Squad Commander	PO2	1	1	120	120						
Visiting DP	PO3	1	1	160	160						
Flight Ops	WS1	3	3	48	144						
Flight Maintenance Manager	WS1	1	1	48	48						
Safety	WS1	1	1	48	48						
Admin	WS1	1	1	48	48						
Transient WS	WS1	3	3	48	144						
Workspace Sub-Total (NSF)		**12**	**12**		**872**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**12**		**872**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Ken Borek Air

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
KBA Station Supervisor	PO1	1	1	100	100						
Support	WS1	2	2	48	96						
Workspace Sub-Total (NSF)		**3**	**3**		**196**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**3**		**196**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Antarctic Support Contract (ASC)

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
McMurdo Area Manager	PO1	1	1	100	100						
Disbursing Specialist	PO2	1	1	120	120						
Continuous Improvement	PO1	1	1	100	100						
HR Manager	PO1	1	1	100	100						
Admin	WS1	3	3	48	144						
Property Specialist	WS1	1	1	48	48						
Scheduler	WS1	1	1	48	48						
Workspace Sub-Total (NSF)		**9**	**9**		**660**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**9**		**660**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Tech Management & Admin

SPACE REQUIREMENTS	Requirements: Type	Staff Count	WS Qty.	Program SF	Total SF	Potential Adjustments: Type	Staff Count	WS Qty.	Program SF	Total SF	Notes
Mission Assurance Mgr.	PO1	1	1	100	100						
Chalet Admin Coord Sr.		2	2								
Chalet Admin Coord		1	1								
HR Generalist Sr.		1	1								
Disbursing Specialist		1	1								
Human Resources		1	1								
Continuous Improvement		1	1								
Property Specialist		1	1								
Scheduler		1	1								
Environmental Engineer Manager	WS1	1	1	48	48						
Enviro Engineer SR.	WS1	1	1	48	48						
Enviro Specialist SR	WS2	1	1	24	24						
Enviro Specialist	WS2	1	1	24	24						
H & S Engineering Lead	WS2	1	1	24	24						
H & S Engineering SR	WS2	1	1	24	24						
Safety Engineer, LCRM	WS3	1	1	10	10						
Safety Engineer	PO1	1	1	100	100						
Bldg/Safety Inspector	WS1	1	1	48	48						
Emergency Response Lead	WS1	1	1	48	48						
R/O Manager/ Comms Manager	WS1	1	1	48	48						
Comms Specialist	WS1	1	1	48	48						
Work Order Sr Scheduler	WS1	1	1	48	48						
Workspace Sub-Total (NSF)		**23**	**23**		**642**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**23**		**642**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Transportation and Logistics

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Supply Manager	PO1	1	1	100	100						
ATO Manager	PO1	1	1	100	100						
Workspace Sub-Total (NSF)		**2**	**2**		**200**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**2**		**200**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Infrastructure & Operations

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Operations Manager	PO1	1	1	100	100						
Admin Assistant	WS1	1	1	48	48						
Fire Dispatcher Lead	WS1	1	1	48	48						
Dispatcher	Ws2	4	4	24	96						
Surveyor Supervisor	WS1	1	1	48	48						
Surveyor	WS1	1	1	48	48						
Station Svs Manager	PO1	2	2	100	200						
Culinary Manager	PO1	1	1	100	100						
Admin Coord Sr	WS1	1	1	48	48						
Accounting Clerk LD	WS1	1	1	48	48						
Facility Senior Engineer	PO1	2	2	100	200						
I & O Project Manager	PO1	1	1	100	100						
Airfield Manager	WS1	1	1	48	48						
MAC OPS Supervisor	WS1	1	1	48	48						
Comms Operator	WS1	1	1	48	48						
Workspace Sub-Total (NSF)		**20**	**20**		**1,228**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Work Center Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**20**		**1,228**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Project Management & Professional Services

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Acting Manager	PO1	1	1	100	100						
Architect	WS1	1	1	48	48						
DDC Engineer	WS1	1	1	48	48						
Energy Engineer	WS1	1	1	48	48						
Mech Sr. Engineer	WS1	1	1	48	48						
Fire Protection Engineer	WS1	2	2	48	96						
Designer/Drafter	WS1	1	1	48	48						
Project Manager	WS1	2	2	48	96						
Construction Sr. Engineer	WS1	2	2	48	96						
Workspace Sub-Total (NSF)		**12**	**12**		**628**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Work Center Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**12**		**628**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
IT & Communications

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
MCM IT&C Manager	PO1	1	1	100	100						
Workspace Sub-Total (NSF)		**1**	**1**		**100**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Work Center Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**1**		**100**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
Science & Tech Project Services

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
S&TPS Implementation	PO1	1	1	100	100						
Workspace Sub-Total (NSF)		**1**	**1**		**100**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**1**		**100**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
SPAWAR

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
SOPP Site Manager	PO1	1	1	100	100						
Weather Manager	PO1	1	1	100	100						
Air Traffic Control Manager	PO1	1	1	100	100						
Air Traffic Control	WS1	1	1	48	48						
Weather Observer	WS1	1	1	48	48						
Workspace Sub-Total (NSF)		**5**	**5**		**396**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**5**		**396**			**0**		**0**	

CENTRAL SERVICES - LEVEL 2
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Shared Support Spaces	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Conference Rooms - Large (16-20 people)	1	300	300				
Conference Rooms - Medium (8-12)	4	180	720				
Conference Rooms - Small (4-6)	6	120	720				
Work/Copy Room	3	100	300				dispersed across floor
Storage	3	200	600				dispersed across floor
Shared Support Spaces Sub-Total (NSF)	**17**		**2,640**	**0**		**0**	

CENTRAL SERVICES - LEVEL 3
Summary

		Requirements				Potential Adjustments				Notes
Executive Summary:		Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Chapel		1	3		580	0	0		0	
	Workspace		1		100		0		0	
	Dedicated Workcenter Support Space		2		480		0		0	
Coffee		0	2		800	0	0		0	
	Workspace		0		0		0		0	
	Dedicated Workcenter Support Space		2		800		0		0	
General Floor Shared Support			0		0		0		0	
Total Staff		1				0				
Total Workspaces			1				0			
Total Support Spaces			4				0			
Sub-Total (NSF)					1,380				0	
Circulation 25% (factor of .33)					455				0	
Total USF					1,835				0	
Total RSF (assuming OF of 1.08)					1,982				0	
Total Gross Bldg S.F. (1.023 multiplier)					2,028				0	

CENTRAL SERVICES - LEVEL 3
Chapel

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Chaplin Office	PO1	1	1	100	100						
Workspace Sub-Total (NSF)		**1**	**1**		**100**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Multi Purpose Area			1	400	400						
Storage			1	80	80						
Dedicated Workcenter Support Space Sub-Total (NSF)			**2**		**480**			**0**		**0**	
Sub-Total (NSF)			**3**		**580**			**0**		**0**	

CENTRAL SERVICES - LEVEL 3
Coffee

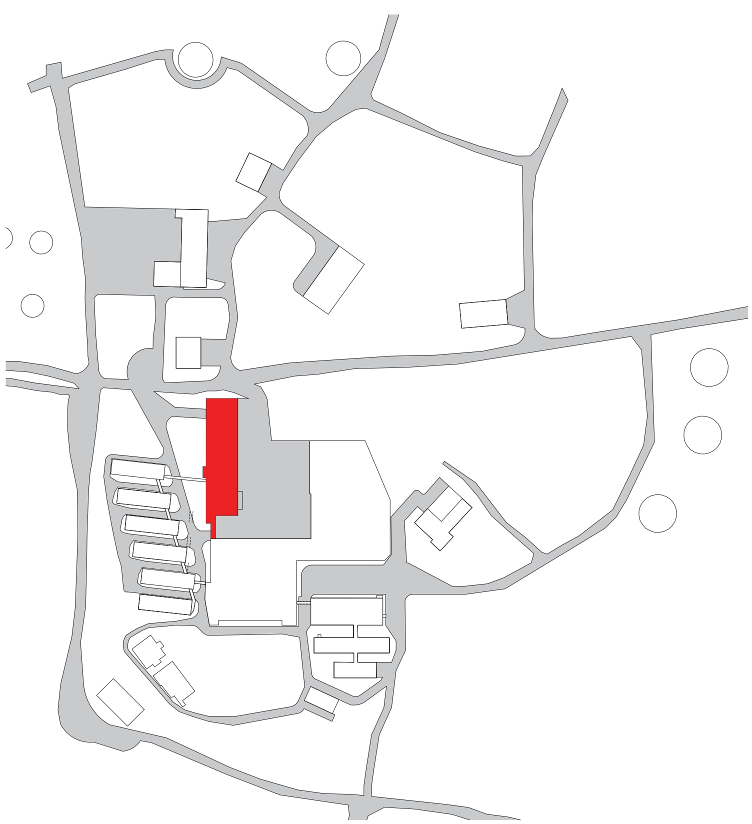
		Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS		Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
	None											
Workspace Sub-Total (NSF)			**0**	**0**		**0**		**0**	**0**		**0**	
Dedicated Workcenter Support Space												
	Multi Purpose Area			1	600	600						
	Warming Kitchen/Coffee			1	200	200						
Dedicated Workcenter Support Space Sub-Total (NSF)				**2**		**800**			**0**		**0**	
Sub-Total (NSF)				**2**		**800**			**0**		**0**	

CENTRAL SERVICES - LEVEL 3
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Shared Support Spaces	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Shared Support Spaces Sub-Total (NSF)	**0**		**0**	**0**		**0**	

CONTINGENCY & OPERATIONS BUILDING
Summary

Executive Summary:	Requirements: Staff Count	Requirements: WS Qty.		Requirements: Total SF	Potential Adjustments: Staff Count	Potential Adjustments: WS Qty.		Potential Adjustments: Total SF	Notes
Medical	8	32		5,224	0	0		0	
Workspace		7		220		0		0	
Dedicated Workcenter Support Space		25		5,004		0		0	
Fire	43	39		9,180	0	0		0	
Workspace		18		840		0		0	
Dedicated Workcenter Support Space		21		8,340		0		0	
Contingency Facilities	0	10		27,150	0	0		0	
Workspace		0		0		0		0	
Dedicated Workcenter Support Space		10		27,150		0		0	
General Floor Shared Support		1		340		0		0	
Total Staff	51				0			0	
Total Workspaces		25				0		0	
Total Support Spaces		57				0		0	
Sub-Total (NSF)				41,894				0	
Circulation 25% (factor of .33)				13,825				0	
Total USF				55,719				0	
Total OSF (assuming OF of 1.08)				60,177				0	
Total Gross Bldg S.F. (1.023 multiplier)				61,561				0	



CONTINGENCY & OPERATIONS BUILDING
Medical

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Lead Physician	PO1	1	1	100	100						
PA/NP	WS1	1	1	48	48						
Nurse Lead		1	1								
Flight Nurse		1	1								
Pharmacy Tech	WS2	1	1	24	24						
Dentist		1	1								
Medical Resident	WS1	2	1	48	48						
Workspace Sub-Total (NSF)		**8**	**7**		**220**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Decompression Room			1	340	340						
Reception/Waiting			1	320	320						
Bathroom			2	50	100						
Physical Therapy			1	560	560						
Xray			1	192	192						
Nurses Station			1	144	144						
Procedure Room			1	192	192						
Exam Rooms			6	96	576						
Open Office Area for Work Stations			1	400	400						
Hospital Room w/ Restroom			4	160	640						
Storage			1	360	360						
Pharmacy			1	300	300						
Resusitation Room			1	280	280						
Inventory/ Storage			1	240	240						
Dental Lab			1	160	160						
Dental Exam			1	200	200						
Dedicated Workcenter Support Space Sub-Total (NSF)			**25**		**5,004**			**0**		**0**	
Sub-Total (NSF)			**32**		**5,224**			**0**		**0**	

CONTINGENCY & OPERATIONS BUILDING
Fire

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Fire Chief	PO2	1	1	120	120						
Fire Chief Assistant	PO2	1	1	120	120						
Fire Captain	PO1	2	1	100	100						1 or 2 offices?
Fire Lieutenant	PO1	8	4	100	400						how many offices for this group?
Firefighter	WS3	30	10	10	100						how many touchdown stations and where?
Fire Equipment Main. Spec		1	1								where does this position live?
Workspace Sub-Total (NSF)		**43**	**18**		**840**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Bedrooms			8	120	960						
Kitchen			1	150	150						
Dining Area			1	150	150						
Day Room			1	200	200						
Bathrooms			1	400	400						
Training Room			1	320	320						
Tool Room			1	250	250						
SCBA Clean Room			1	240	240						
SCBA Storage Room			1	240	240						
Apparatus Bay			1	4,750	4,750						
EMT Storage			1	96	96						
Bunker Gear			1	288	288						
Decontamination Room			1	96	96						
Hose Tower			1	200	200						
Dedicated Workcenter Support Space Sub-Total (NSF)			**21**		**8,340**			**0**		**0**	
Sub-Total (NSF)			**39**		**9,180**			**0**		**0**	

CONTINGENCY & OPERATIONS BUILDING
Recreation

SPACE REQUIREMENTS	Requirements: Type	Requirements: Staff Count	Requirements: WS Qty.	Requirements: Program SF	Requirements: Total SF	Potential Adjustments: Type	Potential Adjustments: Staff Count	Potential Adjustments: WS Qty.	Potential Adjustments: Program SF	Potential Adjustments: Total SF	Notes
None											
Workspace Sub-Total (NSF)		**0**	**0**		**0**		**0**	**0**		**0**	
Support											
Fitness Room			1	1,500	1,500						
Crafts Room			1	350	350						
Gym			1	10,000	10,000						
Library			1	600	600						
Bar #1			1	1,500	1,500						
Bar #2			1	2,500	2,500						
Beverage Warehouse			1	3,500	3,500						
Kitchen			1	2,500	2,500						
Weight/Cardio Room			1	2,200	2,200						
Laundry			1	2,500	2,500						
Dedicated Workcenter Support Space Sub-To			**10**		**27,150**			**0**		**0**	
Sub-Total (NSF)			**10**		**27,150**			**0**		**0**	

CONTINGENCY & OPERATIONS BUILDING
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Shared Training Room	1	340	340				
			0			0	
			0			0	
Workspace Sub-Total (NSF)	**1**		**340**	**0**		**0**	

WASTE HANDLING & RECYCLING
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary:	Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Infrastructure & Operations	11	11		200	0	0		0	
Workspace		11		200		0		0	
Dedicated Workcenter Support Space		0		0		0		0	
General Floor Shared Support		9		2,300		0		0	
Total Staff	11				0				
Total Workspaces		11				0			
Total Support Spaces		9				0			
Sub-Total (NSF)				2,500				0	
Circulation 12% (factor of .138)				345				0	
Total USF				2,845				0	
Total OSF (assuming OF of 1.08)				3,073				0	
Total Gross Bldg S.F. (1.023 multiplier)				3,143				0	

WASTE HANDLING & RECYCLING
Infrastructure & Operations

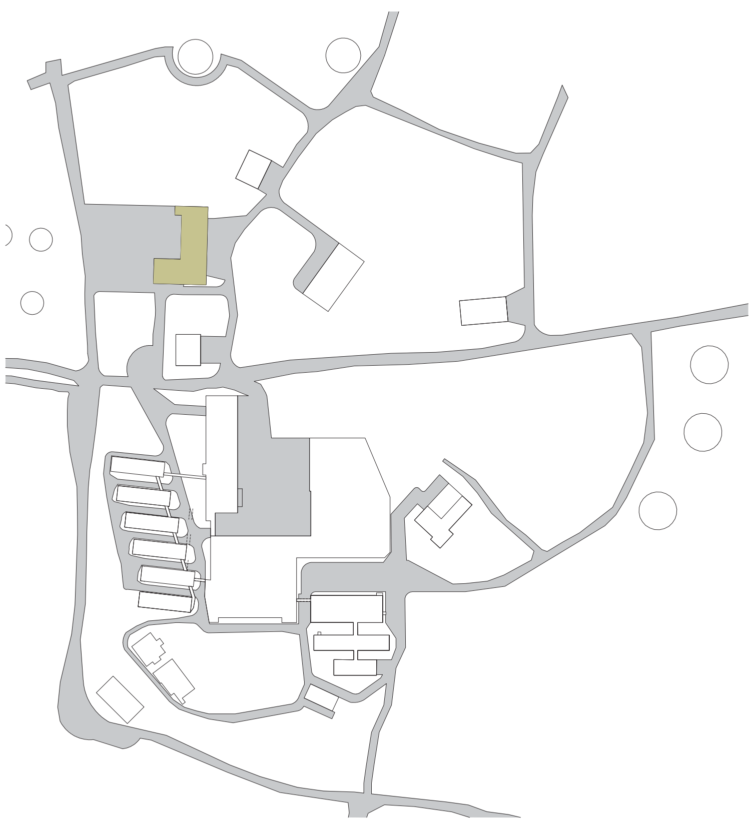
	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Waste Ops Manager Sr.	PO-1	1	1	100	100						
Waste OPS Manager	PO-1	1	1	100	100						
Recycling Tech Lead		1	1								
Recycling Tech		4	4								
Recycling Coord		3	3								
Resale Technician		1	1								
Workspace Sub-Total (NSF)		**11**	**11**		**200**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**11**		**200**			**0**		**0**	

WASTE HANDLING & RECYCLING
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Lab	1	200	200				
Drum Processing Area	1	500	500				
Radioactive Material Processing Area	1	500	500				
Changing Room with Lockers	1	200	200				
Spill Response Storage	1	200	200				
Restrooms	2	200	400				
Break Room	1	150	150				
SCUA	1	150	150				
Touchdown stations for personnel	1	10	10				1:20 ratio for workstation to personnel
Lockers	9	6	54				
Workspace Sub-Total (NSF)	**9**		**2,300**	**0**		**0**	

VMF/TRAVERSE OPERATIONS
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary:	Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Infrastructure & Operations	70	70		400	0	0		0	
Workspace		70		400		0		0	
Support Space		0		0		0		0	
Traverse OPS	21	32		6,920	0	0		0	
Workspace		21		300		0		0	
Support Space		11		6,620		0		0	
General Floor Shared Storage		6		60		0		0	
Total Staff	91				0			0	
Total Workspaces		91				0		0	
Total Support Spaces		17				0		0	
Sub-Total (NSF)				7,380				0	
Circulation 12% (factor of .138)				1,018				0	
Total USF				8,398				0	
Total OSF (assuming OF of 1.08)				9,070				0	
Total Gross Bldg S.F. (1.023 multiplier)				9,279				0	



VMF/TRAVERSE OPERATIONS
Infrastructure & Operations

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Fleet Analyst	PO1	1	1	100	100						
VMF Supervisor	PO1	1	1	100	100						
Tool Room Attendant		1	1								
Machinist		1	1								
Pipefitter		1	1								
Service Writer		1	1								
Shop Foreman		3	3								
Heavy Equipment Mech		9	9								
Light Equip Mechanic		3	3								
PM Mechanic		2	2								
Mechanic Helper		2	2								
Mech Shop Foreman	PO1	1	1	100	100						
Light Vehicle Mechanic		5	5								
Fleet OPS Supervisor	PO1	1	1	100	100						
Blaster, Lead		1	1								
Blaster		1	1								
Fleet OPS Foreman		7	7								
Heavy Equip OP		22	22								
Equipment OP		3	3								
Crane Operator		4	4								
Workspace Sub-Total (NSF)		**70**	**70**		**400**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
None											
Dedicated Workcenter Support Space Sub-Total (NSF)			**0**		**0**			**0**		**0**	
Sub-Total (NSF)			**70**		**400**			**0**		**0**	

VMF/TRAVERSE OPERATIONS
Science & Technical Project Services

		Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS		Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Western Antarctic Support			4			0						
SIPLE Dome			2			0						
WAIS Divide			12			0						
Pig Traverse			4			0						
Wissard			5			0						
Wissard Traverse			4			0						
Dry Valley			2			0						
Workspace Sub-Total (NSF)			**33**	**0**		**0**		**0**	**0**		**0**	
Dedicated Workcenter Support Space												
	None											
Dedicated Workcenter Support Space Sub-Total (NSF)				**0**		**0**			**0**		**0**	
Sub-Total (NSF)				**0**		**0**			**0**		**0**	

VMF/TRAVERSE OPERATIONS
Infrastructure & Operations

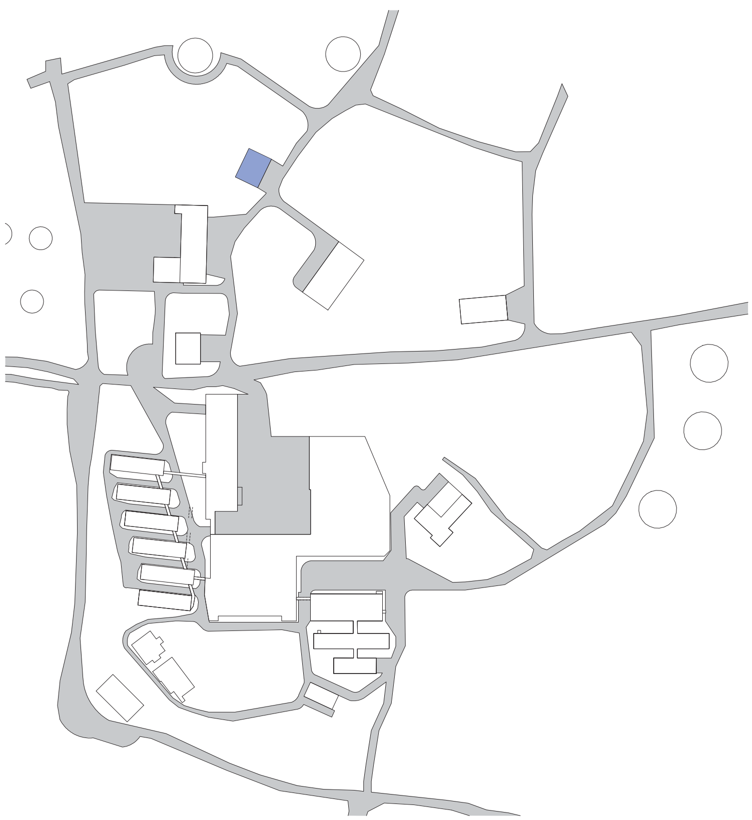
	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Traverse Manager	PO1	1	1	100	100						
Traverse Coordinator		1	1								
Traverse OPS Supervisor	PO1	2	2	100	200						
Mountaineer		1	1								
Shop Foreman		2	2								
Heavy Equipment Mech		6	6								
Heavy Equipment OP		8	8								
Workspace Sub-Total (NSF)		**21**	**21**		**300**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Vehicle Work Bays			2	960	1,920						
Parts Storage			1	600	600						
Computer Stations			1	400	400						
Bladder Lay Down Space			4	400	1,600						
Food Storage			1	1,000	1,000						
Supply Room			1	100	100						
Equipment Storage			1	1,000	1,000						
Dedicated Workcenter Support Space Sub-Total (NSF)			**11**		**6,620**			**0**		**0**	
Sub-Total (NSF)			**32**		**6,920**			**0**		**0**	

VMF/TRAVERSE OPERATIONS
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Touchdown stations for personnel	6	10	60				1:20 ratio for workstation to personnel, WS3
Workspace Sub-Total (NSF)	**6**		**60**	**0**		**0**	

FUELS/HAZARDOUS WASTE
Summary

		Requirements				Potential Adjustments				Notes
Executive Summary:		Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Infrastructure & Operations		32	54		4,268	0	0		0	
	Workspace		4		296		0		0	
	Dedicated Workcenter Support Space		50		3,972		0		0	
General Floor Support Spa			10		3,070		0		0	
Total Staff		32				0			0	
Total Workspaces			4				0		0	
Total Support Spaces			60				0		0	
Sub-Total (NSF)					7,338				0	
Circulation 12% (factor of .138)					1,013				0	
Total USF					8,351				0	
Total OSF (assuming OF of 1.08)					9,019				0	
Total Gross Bldg S.F. (1.023 multiplier)					9,226				0	



FUELS/HAZARDOUS WASTE
Infrastructure & Operations

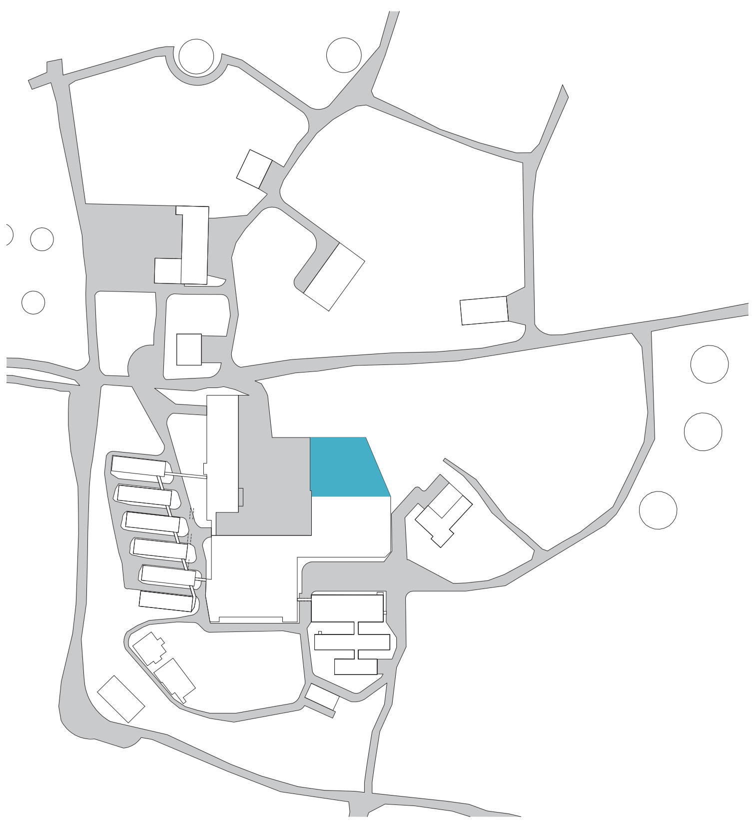
	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Fuels Supervisor	PO1	1	1	100	100						
Fuels Foreman	WS1	1	1	48	48						
Admin	WS1	1	1	48	48						
Fuels Coord.		1									
Fuels Mechanic		1									
Fuels Op, Lead		6									
Fuels Operator		13									
Heavy Equip OP Simple		1									
Heavy Equip OP Superdarm		1									
Hazardous Waste Supervisor	PO1	1	1	100	100						
Hazardous Waste Tech		5									
Workspace Sub-Total (NSF)		**32**	**4**		**296**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Lab			1	100	100						can be shared with Haz Waste
Locker Space			24	6	144						Shared with Haz Waste
Hose Preparation/ Processing/ Inspection Area			1	2,000	2,000						
Hose Reel Storage/ Repair Area			24	72	1,728						
Dedicated Workcenter Support Space Sub-Total (NSF)			**50**		**3,972**			**0**		**0**	
Sub-Total (NSF)			**54**		**4,268**			**0**		**0**	

FUELS/HAZARDOUS WASTE
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Fuel Warehouse Storage	1	1,500	1,500				Could be in VMF, need to verify size.
Briefing Area	1	200	200				
Laundry	1	150	150				
Restrooms	2	200	400				
Breakroom	1	200	200				
Locker Room w/ Showers	2	300	600				
Touchdown stations for personnel	2	10	20				
Workspace Sub-Total (NSF)	**10**		**3,070**	**0**		**0**	

TRADE SHOP
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary:	Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Infastructure & Operations	92	41		24,262	0	0		0	
Workspace		21		1,408		0		0	
Support Space		20		22,854		0		0	
General Floor Shared Support		0		0		0		0	
Total Staff	92				0			0	
Total Workspaces		21				0		0	
Total Support Spaces		20				0		0	
Sub-Total (NSF)				24,262				0	
Circulation 12% (factor of .138)				3,348				0	
Total USF				27,610				0	
Total OSF (assuming OF of 1.08)				29,819				0	
Total Gross Bldg S.F. (1.023 multiplier)				30,505				0	



TRADE SHOP
All Trade Disciplines

SPACE REQUIREMENTS	Requirements: Type	Staff Count	WS Qty.	Program SF	Total SF	Potential Adjustments: Type	Staff Count	WS Qty.	Program SF	Total SF	Notes
Facilities Maint Supervisor	PO1	1	1	100	100						Located in admin area
Admin Coord Sr. (ASC)	WS1	1	1	48	48						Located in admin area
Construction Superint (ASC)	WS1	3	3	48	144						Located in admin area
Carpenter Foreman (ASC)	WS1	5	5	24	120						Located in admin area
Carpenter (ASC)		13									
Carpenter Apprentice (ASC)		8									
Plumber (ASC)		1									
Electrician (ASC)		4									
Field Camp Power Foreman	PO1	1	1	100	100						Located in Field Camp Power
Carpenter Foreman (PAE)	PO1	1	1	100	100						Located in admin area
Carpenter		4									
Carp Apprentice		2									
Total Painter Foreman	WS1	1	1	48	48						Located in admin area
Painter		1									
Plumber Foreman	PO1	1	1	100	100						
Plumber		1									
Plumber Apprentice		1									
Pipefitter		1									
PM Foreman (Utility Tech) (PAE)	PO1	1	1	100	100						Located Utility Tech Area
Refrigeration Mech		2									
Boiler Mech.		3									
Utility Mechanic		8									
Maintenance Spec		3									
Doc Controls Tech		1									
Admin Coord Sr. (PAE)	WS1	1	1	48	48						Located in admin area
Sheetmetal Foreman	PO1	1	1	100	100						Located in sheetmetal area
Sheetmetal Worker		2									
Welder Foreman		1									Located in welding area
Insulator Foreman	WS1	1									
Lineman Foreman		1									in elec. Shop - share with Elec. Foreman
Lineman		1									
Fire System Foreman	PO1	1	1	100	100						Located in Fire Protection Area
Fire Systems Tech		2									
Electrical Foreman	PO1	1	1	100	100						Located in Electrical Area
Electrician		4									
Electrician Apprentice		1									
Field Camp Power (Alternate Energy)	PO1	2	1	100	100						
Field Camp Power (Alternate Energy Specialilst)		1									
Antenna Rigger Lead	PO1	1	1	100	100						
Antenna Rigger		3									
Workspace Sub-Total (NSF)		**92**	**21**		**1,408**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Touchdown Stations			4	10	40						1:20 ratio for workstation to personnel
Breakroom			1	300	300						
Carpentry			1	2,000	2,000						
Paint Room			1	500	500						part of Carpentry Shop
Tool Room			1	600	600						
Field Room			1	400	400						
Sheet Metal Work Area			1	400	400						
Welding, Grinding and Metal Shop			1	800	800						
Fire Protection Work Area			1	540	540						
Utility Technicians Work Area			1	540	540						
Electrcian's Work Area			1	1,020	1,020						
Field Camp Power Technician's Work Area			1	860	860						
Rigger's Work Area			1	1,400	1,400						
Plumbing Work Area			1	2,000	2,000						
Trade's Assembly Laydown Space			1	5,000	5,000						
Warehousing			1	6,000	6,000						
Office Storage			1	40	40						
Lockers			69	6	414						
Dedicated Workcenter Support Space Sub-Total (NSF)			**20**		**22,854**			**0**		**0**	
Sub-Total (NSF)			**41**		**24,262**			**0**		**0**	

TRADE SHOP
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
None							
Workspace Sub-Total (NSF)	**0**		**0**	**0**		**0**	

FIELD SCIENCE SUPPORT
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary:	Staff Count	Space Count		Total SF	Staff Count	Space Count		Total SF	
SAR	1	3		772	0	0		0	
Workspace		1		100		0		0	
Dedicated Workcenter Support Space		2		672		0		0	
Field Support	26	54		9,104	0	0		0	
Workspace		17		880		0		0	
Dedicated Workcenter Support Space		37		8,224		0		0	
Cargo	55	13		4,758	0	0		0	
Workspace		12		726		0		0	
Dedicated Workcenter Support Space		1		4,032		0		0	
Transportation & Logistics	9	7		5,356	0	0		0	
Workspace		6		316		0		0	
Dedicated Workcenter Support Space		1		5,040		0		0	
General Floor Shared Support		71		7,996		0		0	
Total Staff	91				0				
Total Workspaces		36				0			
Total Support Spaces		112				0			
Sub-Total (NSF)				27,986				0	
Circulation 12% (factor of .138)				3,862				0	
Total USF				31,848				0	
Total OSF (assuming OF of 1.08)				34,396				0	
Total Gross Bldg S.F. (1.023 multiplier)				35,187				0	

FIELD SCIENCE SUPPORT
SAR

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
SAR / Mountaineer LD Work Station	PO1	1	1	100	100						
Workspace Sub-Total (NSF)		**1**	**1**		**100**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
SAR Equipment Storage -Vehicle			1	480	480						
SAR Equipment Storage - ECW / Personnel Gear			1	192	192						
Dedicated Workcenter Support Space Sub-Total			**2**		**672**			**0**		**0**	
Sub-Total (NSF)			**3**		**772**					**0**	

FIELD SCIENCE SUPPORT
Field Support

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Field Support Supervisor	PO1	1	1	100	100						
Continential Field Supervisor	PO1	1	1	100	100						
WAIS Divide		4			0						
Pig Traverse		2			0						
Wissard		2			0						
Wissard Traverse		1			0						
Field Support Supervisor	PO1	1	1	100	100						
Field Equipment Lead	PO1	1	1	100	100						
Field Coorinator	WS1	5	5	48	240						
Mount Tech/Train LD	WS1	1	1	48	48						
Mountaineer/SAR Lead	WS1	1	1	48	48						
Mountaineers	WS2	5	5	24	120						
FSTP Scheduler	WS2	1	1	24	24						
Workspace Sub-Total (NSF)		**26**	**17**		**880**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Grantee Storage Pods			30	64	1920						(30) 8'x'8 cages
General Staging Area			1	3,616	3616						Multi-use, central high-bay space
Field Gear Wash/Laundry			1	644	644						12x16, (2) industrial + (4) standard W's+D's
Field Gear Repair / Sewing			1	924	924						12x16 , with under-and over-counter supplies
Tent Wash Bays			4	280	1120						with overhead drying capabilty
Dedicated Workcenter Support Space Sub-Total (NSF)			**37**		**8,224**			**0**		**0**	
Sub-Total (NSF)			**54**		**9,104**					**0**	

FIELD SCIENCE SUPPORT
Science Cargo

SPACE REQUIREMENTS	Requirements: Type	Staff Count	WS Qty.	Program SF	Total SF	Potential Adjustments: Type	Staff Count	WS Qty.	Program SF	Total SF	Notes
MCC Supervisor	PO1	1	1	100	100						
Shift Supervisor	PO1	2	2	100	200						
ATS 2	WS3	6	3	10	30						
ATS 1		12			0						
ATS Apprentice		6			0						
LOAD Planner	WS1	4	1	48	48						
Airfield Shift Supervisor	PO1	2	2	100	200						
ATS 3		2			0						
Vehical OPS Supervisor	PO1	1	1	100	100						
Vehical Oper, SR		2			0						
LRG Passenger Vehicle		3			0						
Vehical Operator		12			0						
Pass SVCS Rep SR	WS2	1	1	24	24						
Pass SVCS Rep	WS2	1	1	24	24						
Workspace Sub-Total (NSF)		**55**	**12**		**726**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Science Cargo Staging Area		1	1	4,032	4,032						
Dedicated Workcenter Support Space Sub-Total (NSF)			**1**		**4,032**			**0**		**0**	
Sub-Total (NSF)			**13**		**4,758**			**0**		**0**	

FIELD SCIENCE SUPPORT
Transportation & Logistics

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Aviation OPS Supervisor	PO1	1	1	100	100						
Aviation OPS Coordinator		3			0						
USAP Cargo Supervisor	PO1	1	1	100	100						
Admin Coordinator	WS2	1	1	48	48						
Cargo Person SR	WS2	1	1	48	48						
Cargo Person	WS3	2	2	10	20						
Workspace Sub-Total (NSF)		**9**	**6**		**316**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
ATO Staging Area			1	5,040	5,040						
Dedicated Workcenter Support Space Sub-Total (NSF)			**1**		**5,040**			**0**		**0**	
Sub-Total (NSF)			**7**		**5,356**			**0**		**0**	

FIELD SCIENCE SUPPORT
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Racking - Long Rows	7	448	3,136				
Racking - Short Rows	3	288	864				
Walk-in Freezers (Medium Size)	3	384	1,152				
Walk-in Freezers (Large Size)	1	576	576				
Mountaineer Gear Storage	1	440	440				Part of SAR?
Conference Room	2	240	480				
Classroom Training	1	896	896				
Office Storage	1	128	128				
Touchdown stations for personnel	3	10	30				1:20 ratio for workstation to personnel
Lockers	49	6	294				
Workspace Sub-Total (NSF)	**71**		**7,996**	**0**		**0**	

SEA ICE SUPPORT
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary	Staff Count	Space Count		Total SF	Staff Count	Space Count		Total SF	
Science & Tech. Project Services	**5**	**16**		**1,737**	**0**	**0**		**0**	
Workspace		5		230		0		0	
Dedicated Workcenter Support Space		11		1,507		0		0	
Infastructure & Operations	**11**	**1**		**350**	**0**	**0**		**0**	
Workspace		0		0		0		0	
Dedicated Workcenter Support Space		1		350		0		0	
General Floor Shared Support		**18**		**7,416**		**0**		**0**	
Total Staff	**16**				**0**				
Total Workspaces		**5**				**0**			
Total Support Spaces		**30**				**0**			
Sub-Total (NSF)				**9,503**				**0**	
Circulation 12% (factor of .138)				**1,311**				**0**	
Total USF				**10,814**				**0**	
Total OSF (assuming OF of 1.08)				**11,680**				**0**	
Total Gross Bldg S.F. (1.023 multiplier)				**11,948**				**0**	

SEA ICE SUPPORT
Science & Technical Project Services

SPACE REQUIREMENTS		Requirements: Type	Staff Count	WS Qty.	Program SF	Total SF	Potential Adjustments: Type	Staff Count	WS Qty.	Program SF	Total SF	Notes
Dive		PO1	2	2	100	200						
	Diver	WS3	3	3	10	30						
Workspace Sub-Total (NSF)			**5**	**5**		**230**		**0**	**0**		**0**	
Dedicated Workcenter Support Space												
	Dump Tank			1	240	240						
	Suit Wash			2	60	120						
	Wash Room			1	120	120						
	Tank Inspection			1	120	120						
	Washer/Dryer			1	72	72						
	Work Bench Area			1	144	144						
	Work Room			1	255	255						
	Regulator Repair			1	120	120						
	Tank Filling Area			1	216	216						
	Compressor Room			1	100	100						
Dedicated Workcenter Support Space Sub-Total (NSF)				**11**		**1,507**			**0**		**0**	
Sub-Total (NSF)				**16**		**1,737**			**0**		**0**	

SEA ICE SUPPORT
LDB

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
LDB		4									
LDB		4			0						
LDB Grom Team		3			0						
Workspace Sub-Total (NSF)		**11**	**0**		**0**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
LDB Work Area			1	350	350						
Dedicated Workcenter Support Space Sub-Total (NSF)			**1**		**350**			**0**		**0**	
Sub-Total (NSF)			**1**		**350**			**0**		**0**	

SEA ICE SUPPORT
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Lockers for Grantees	8	36	288				
Coffee/ Breakroom	1	120	120				
PistenBully Loading Area	1	6,720	6,720				Parking for 8
Infastructure & Operations	8	36	288				
Workspace Sub-Total (NSF)	**18**		**7,416**	**0**		**0**	

CRARY
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary:	Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Science & Tech. Project Services	**8**	**10**		**0**	**0**	**0**		**0**	
Workspace		8				0		0	
Support Space		2				0		0	
General Floor Shared Support		**0**		**0**		**0**		**0**	
Total Staff	8				0				
Total Workspaces		8				0			
Total Support Spaces		2				0			
Sub-Total (NSF)				**26,990**				**26,990**	
Circulation 40% (factor of .66)				**17,813**				**17,813**	
Total USF				**44,803**				**44,803**	
Total OSF (assuming OF of 1.08)				**48,387**				**48,387**	
Total Gross Bldg S.F. (1.023 multiplier)				**49,500**				**49,500**	

CRARY
Science & Technical Project Services

		Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS		Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
MCM S&TPS Manager		PO1	1	1	100	100						
	Lab OPS Supervisor	PO1	1	1	100	100						
	Laboratory Asst.		2	2								
	Instrument Tech		1	1								
	HAZ Chem/ Cryo Supervisor	PO1	1	1	100	100						
	Research Assoc.		1	1								
	Admin Coord Sr.		1	1								
Workspace Sub-Total (NSF)			**8**	**8**		**300**		**0**	**0**		**0**	
Existing Area												
	Existing Crary (Phase 1,2,3)			1	46,000	46,000						
Additional Area												
	Phase 3 Mech Addition			1	3,500	3,500						
Dedicated Workcenter Support Space Sub-To				**2**		**49,500**			**0**		**0**	
Sub-Total (NSF)				**10**		**49,500**			**0**		**0**	

CRARY
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
Staff Breakroom/Kitchen							
Group Session Rooms							
Print/Copy/supply Room							
Conference Rooms							
Interview Rooms							
Training Rooms							
Learning Lab							
Resource Room							
Workspace Sub-Total (NSF)	**0**		**0**	**0**		**0**	

IT OPS
Summary

		Requirements				Potential Adjustments				Notes
Executive Summary:		Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
SPAWAR		5	6		790	0	0		0	
	Workspace		5		140		0		0	
	Dedicated Workcenter Support Space		1		650		0		0	
IT & Communications		30	48		12,914	0	0		0	
	Workspace		30		1,744		0		0	
	Dedicated Workcenter Support Space		18		11,170		0		0	
General Floor Shared Support			0		0		0		0	
Total Staff		35				0				
Total Workspaces			35				0			
Total Support Spaces			19				0			
Sub-Total (NSF)					13,704				0	
Circulation 30% (factor of .43)					5,893				0	
Total USF					19,597				0	
Total OSF (assuming OF of 1.08)					21,164				0	
Total Gross Bldg S.F. (1.023 multiplier)					21,651				0	

IT OPS
SPAWAR

SPACE REQUIREMENTS	Requirements: Type	Staff Count	WS Qty.	Program SF	Total SF	Potential Adjustments: Type	Staff Count	WS Qty.	Program SF	Total SF	Notes
Ground Electronics Manager	PO1	1	1	100	100						
Ground Electronics	WS3	4	4	10	40						
Workspace Sub-Total (NSF)		**5**	**5**		**140**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
SPAWAR Electric			1	650	650						
Dedicated Work Center Support Space Sub-Total (NSF)			**1**		**650**			**0**		**0**	
Sub-Total (NSF)			**6**		**790**			**0**		**0**	

IT OPS
IT & Communications

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Data System Supervisor	WS-1	1	1	64	64						
Help Desk Support Lead	WS-1	1	1	64	64						
Systems Admin Sr.	WS-1	1	1	64	64						
Systems Admin	WS-1	1	1	64	64						
Network Engineer Sr.	WS-1	1	1	64	64						
Network Admin	WS-1	1	1	64	64						
Computer Supervisor (Crary)	PO1	1	1	100	100						
Computer Tech Sr. (Crary)	WS-1	1	1	64	64						
Computer Tech (Crary)	WS-1	1	1	64	64						
Computer Tech Lead	WS-1	1	1	64	64						
Computer Tech Sr.	WS-1	1	1	64	64						
Computer Tech	WS-1	1	1	64	64						
Multimedia Prod.	WS-1	1	1	64	64						
Broadcase Engineer	WS-1	1	1	64	64						
IT Trainer	WS-1	1	1	64	64						
Telco Supervisor	WS-1	1	1	64	64						
Telco Tech Sr.	WS-1	2	2	64	128						
Camp Manager - BI	WS-1	1	1	64	64						
Sous Chef - BI		1	1								
Comms Supervisor	PO1	1	1	100	100						
Satcom Engineer	WS-1	1	1	64	64						
Comms Coord	WS-1	1	1	64	64						
Comms Tech Lead	WS-1	1	1	64	64						
Comms Tech Sr		3	3								
Comms Tech		1	1								
Project Manager	PO1	2	2	100	200						
Dedicated Workcenter Support Space Sub-Total (NS		**30**	**30**		**1,744**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
IT&C PC Electronics Shop			1	600	600						
Shared Battery Charge			1	320	320						
Warm Storage			1	1,350	1,350						
Cold Storage			1	1,250	1,250						
IT&C Communications & Electronics			1	1,500	1,500						
Staging			1	500	500						
Data Center			1	900	900						
NSF			1	300	300						
NASA/JPSS			1	350	350						
Cold			1	350	350						
Science Gen Co.			1	300	300						
UPS			1	250	250						
Fire			1	250	250						
Wiring			1	250	250						
EOC Meeting			1	400	400						
EOC Mission Coms			1	2,000	2,000						
Breakroom			1	150	150						
Restroom			1	150	150						
Support Space Sub-Total (NSF)			**18**		**11,170**			**0**		**0**	
Sub-Total (NSF)			**48**		**12,914**			**0**		**0**	

IT OPS
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Shared Support Spaces	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
None							
Shared Support Spaces Sub-Total (NSF)	**0**		**0**	**0**		**0**	

HELICOPTER OPERATIONS
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary	Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
PHI, Inc.	**18**	**39**		**35,050**	**0**	**0**		**0**	
Workspace		24		**1,660**		0		0	
Dedicated Workcenter Support Space		15		33,390		0		0	
General Floor Shared Support		**0**		**0**		**0**		**0**	
Total Staff	**18**				**0**				
Total Workspaces		**24**				**0**			
Total Support Spaces		**15**				**0**			
Sub-Total (NSF)				**35,050**				**0**	
Circulation 12% (factor of .138)				**4,837**				**0**	
Total USF				**39,887**				**0**	
Total OSF (assuming OF of 1.08)				**43,078**				**0**	
Total Gross Bldg S.F. (1.023 multiplier)				**44,069**				**0**	

HELICOPTER OPERATIONS
PHI, Inc.

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
PHI Manager	PO3	1	1	160	160						
Pilots		6	6								
Helicopter Tech		6	6								
Helicopter Mech		5	5								
Dispatcher			1	250	250						
Office			2	225	450						
Office			1	150	150						
Office			1	350	350						
Maintenance Office			1	300	300						
Workspace Sub-Total (NSF)		**18**	**24**		**1,660**		**0**	**0**		**0**	
Support											
Hanger (Includes Airlock)			1	26,650	26,650						
PAX			1	500	500						
Loading/Receiving			1	1,175	1,175						
Loading Dock			1	260	260						
Conference/Briefing Room			1	430	430						
Breakroom			1	400	400						
Bathrooms			1	560	560						
Storage			1	110	110						
Restroom Storage			1	110	110						
Crew Dressing Room			1	250	250						
Sheet Metal Shop			1	435	435						
General Storage			1	410	410						
Winter Warm Storage			1	500	500						
Parts Room/Winter Warm Storage			1	1,100	1,100						
Compressor, Generator, Water Dis.			1	500	500						
Dedicated Workcenter Support Space Sub-Total (NSF)			**15**		**33,390**			**0**		**0**	
Sub-Total (NSF)			**39**		**35,050**			**0**		**0**	

HELICOPTER OPERATIONS
Hanger & Airfield

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
None							
Workspace Sub-Total (NSF)	**0**		**0**	**0**		**0**	

WHEELED AIRFIELD FACILITY
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary	Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
Infrastructure & Operations	8	14		2,190	0	0		0	
Workspace		7		340		0		0	
Support Space		7		1,850		0		0	
General Floor Shared Support		6		1,700		0		0	
Total Staff	8				0				
Total Workspaces		7				0			
Total Support Spaces		13				0			
Sub-Total (NSF)				3,890				0	
Circulation 12% (factor of .138)				537				0	
Total USF				4,427				0	
Total OSF (assuming OF of 1.08)				4,781				0	
Total Gross Bldg S.F. (1.023 multiplier)				4,891				0	

WHEELED AIRFIELD FACILITY
Infrastructure & Operations

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Airfield Manager	PO1	1	1	100	100						
Flight OPS Office/AGE Office	PO1	2	1	100	100						
Weather	PO1	1	1	100	100						
Heavy Equipment Operator	WS3	4	4	10	40						Staff count found at VMF/Traverse Ops
Workspace Sub-Total (NSF)		**8**	**7**		**340**		**0**	**0**		**0**	
Dedicated Workcenter Support Space											
Touchdown Desks			5	10	50						
Generator Building			1	900	900						
Communication Tower			1	900	900						
Dedicated Workcenter Support Space Sub-Total (NSF)			**7**		**1,850**			**0**		**0**	
Sub-Total (NSF)			**14**		**2,190**			**0**		**0**	

WHEELED AIRFIELD FACILITY
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
PAX (Passenger Terminal)	1	800	800				
Flight Ops Storage	1	100	100				
Airfield Storage	1	100	100				
Common Storage	1	500	500				
Kitchen/Dining	1	120	120				
Toilet	1	80	80				
Workspace Sub-Total (NSF)	**6**		**1,700**	**0**		**0**	

SKI EQUIPPED AIRFIELD FACILITIES
Summary

	Requirements				Potential Adjustments				Notes
Executive Summary	Staff Count	WS Qty.		Total SF	Staff Count	WS Qty.		Total SF	
ANG Building 1	**0**	**10**		**1,800**	**0**	**0**		**0**	
Workspace		6		**600**		0		0	
Dedicated Workcenter Support Space		4		1,200		0		0	
ANG Building 2	**0**	**8**		**3,600**	**0**	**0**		**0**	
Workspace		4		**400**		0		0	
Dedicated Workcenter Support Space		4		3,200		0		0	
AGE/Cargo/KBA	**0**	**7**		**1,200**	**0**	**0**		**0**	
Workspace		4		**400**		0		0	
Dedicated Workcenter Support Space		3		800		0		0	
SPAWAR	**0**	**6**		**1,400**	**0**	**0**		**0**	
Workspace		1		**200**		0		0	
Dedicated Workcenter Support Space		5		1,200		0		0	
FLEET Operations	**14**	**18**		**1,800**	**0**	**0**		**0**	
Workspace		14		**600**		0		0	
Dedicated Workcenter Support Space		4		1,200		0		0	
ARFF	**0**	**6**		**1,200**	**0**	**0**		**0**	
Workspace		2		**200**		0		0	
Dedicated Workcenter Support Space		4		1,000		0		0	
General Floor Shared Support		**6**		**7,600**		**0**		**0**	
Total Staff	**14**				**0**				
Total Workspaces		**31**				**0**			
Total Support Spaces		**30**				**0**			
Sub-Total (NSF)				**18,600**				**0**	
Circulation 12% (factor of .138)				**2,567**				**0**	
Total USF				**21,167**				**0**	
Total OSF (assuming OF of 1.08)				**22,860**				**0**	
Total Gross Bldg S.F. (1.023 multiplier)				**23,386**				**0**	

SKI EQUIPPED AIRFIELD FACILITIES
ANG Building 1

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Hydraulics Office	PO1		1	100	100						
Electric Office	PO1		1	100	100						
Engines Office	PO1		1	100	100						
Struct/Fuels Office	PO1		1	100	100						
Supply Office	PO1		1	100	100						
Avionics Office	PO1		1	100	100						
Workspace Sub-Total (NSF)		**0**	**6**		**600**		**0**	**0**		**0**	
Support											
CTK Shop			1	300	300						
Common Area			1	300	300						
Elec/Avionics Shop			1	200	200						
Maintenance Operations Center			1	400	400						
Dedicated Workcenter Support Space Sub-Total (NSF)			**4**		**1,200**			**0**		**0**	
Sub-Total (NSF)			**10**		**1,800**			**0**		**0**	

SKI EQUIPPED AIRFIELD FACILITIES
ANG Building 2

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Flight Line Office	PO1		1	100	100						
Office	PO1		1	100	100						
QA Office	PO1		1	100	100						
Life Support Office	PO1		1	100	100						
Workspace Sub-Total (NSF)		**0**	**4**		**400**		**0**	**0**		**0**	
Support											
Life Support Shop/Storage			1	200	200						
Common Area			1	600	600						
ANG Heavy Maint. Shop & Storage											
Engins Hydraulics Fuels Shop			1	800	800						
Storage			1	1,600	1,600						
Dedicated Workcenter Support Space Sub-Total (NSF)			**4**		**3,200**			**0**		**0**	
Sub-Total (NSF)			**8**		**3,600**			**0**		**0**	

SKI EQUIPPED AIRFIELD FACILITIES
AGE/Cargo/Ken Broek Air

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Cargo Office	PO1		1	100	100						
AGE Office	PO1		1	100	100						
KBA Office	PO1		1	100	100						
KBA Office	PO1		1	100	100						
Workspace Sub-Total (NSF)		**0**	**4**		**400**		**0**	**0**		**0**	
Support											
KBA Shops			1	200	200						
Common Area			1	400	400						
Cargo/KBA Storage			1	200	200						
Dedicated Workcenter Support Space Sub-Total (NSF)			**3**		**800**			**0**		**0**	
Sub-Total (NSF)			**7**		**1,200**			**0**		**0**	

SKI EQUIPPED AIRFIELD FACILITIES
SPAWAR

SPACE REQUIREMENTS	Requirements: Type	Staff Count	WS Qty.	Program SF	Total SF	Potential Adjustments: Type	Staff Count	WS Qty.	Program SF	Total SF	Notes
SPAWAR Maintenance Office	PO1		1	200	200						
Workspace Sub-Total (NSF)		**0**	**1**		**200**		**0**	**0**		**0**	
Support											
SPAWAR Shop			1	200	200						
Storage			1	100	100						
Common Area			1	300	300						
ATCT Storage			1	200	200						
ATCT Cab			1	400	400						
Dedicated Workcenter Support Space Sub-Total (NSF)			**5**		**1,200**			**0**		**0**	
Sub-Total (NSF)			**6**		**1,400**			**0**		**0**	

SKI EQUIPPED AIRFIELD FACILITIES
Fleet Operations

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Airfield Manager	PO1	1	1	100	100						Staff count in Central Services
Fleet Ops Office	PO1	1	1	100	100						
MET OPS Manager	PO1	1	1	100	100						
AGE Supervisor	WS1	1	1	48	48						
AGE Mechanic Lead	WS1	4	4	48	192						
AGE Mechanic	WS3	3	3	10	30						
Age Equip. Operator	WS3	3	3	10	30						
Workspace Sub-Total (NSF)		**14**	**14**		**600**		**0**	**0**		**0**	
Support											
Common Area			1	200	200						
Shop			1	200	200						
Tool Storage			1	200	200						
Vehicle Maintenance Shop			1	600	600						
Dedicated Workcenter Support Space Sub-Total (NSF)			**4**		**1,200**			**0**		**0**	
Sub-Total (NSF)			**18**		**1,800**			**0**		**0**	

SKI EQUIPPED AIRFIELD FACILITIES
ARFF

	Requirements					Potential Adjustments					Notes
SPACE REQUIREMENTS	Type	Staff Count	WS Qty.	Program SF	Total SF	Type	Staff Count	WS Qty.	Program SF	Total SF	
Office/Berth	PO1		2	100	200						
Workspace Sub-Total (NSF)		**0**	**2**		**200**		**0**	**0**		**0**	
Support											
Shop/Berthing			1	200	200						
Storage			1	100	100						
Common/Training Living			1	300	300						
Berthing			1	400	400						
Dedicated Workcenter Support Space Sub-Total (NSF)			**4**		**1,000**			**0**		**0**	
Sub-Total (NSF)			**6**		**1,200**			**0**		**0**	

SKI EQUIPPED AIRFIELD FACILITIES
General Floor Shared Support

	Requirements			Potential Adjustments			Notes
Support & Auxilliary	Qty.	Program SF	Total SF	Qty.	Program SF	Total SF	
AGE Maintanence Shop & Storage	1	1,200	1,200				
DNF Storage	1	1,000	1,000				
DNT Storage	1	500	500				
Airfield Storage	1	100	100				
PAX Terminal	1	1,600	1,600				
Galley	1	2,400	2,400				
Head	1	800	800				
Workspace Sub-Total (NSF)	**6**		**7,600**	**0**		**0**	

SECTION 3
Adjacency Diagrams

The previous section describes in both **narrative** and **numeric** form the working requirements for the various users of McMurdo Station.
This section states those requirements in **graphic** form. These graphics, otherwise known as *Adjacency Diagrams*, describe the internal ideal relationships between each of the required sub-components of McMurdo's facilities.
Taken together, the narrative, numeric and graphic description of requirements will define a critical aspect to the eventual *Basis of Design* for McMurdo Station.

FIELD SCIENCE SUPPORT

This diagram describes relationships between the various components that make up the Field Science Support Facility. Furthermore, this graphic indicates the relative sizes of each component.

A primary concept of this organization is that of a centrally-located multi-purpose staging area, surrounded by each of the allied activities whose purpose is the support of Field Science activities, including Air Transport Operations, Science Cargo, Grantee Storage Pods, Field Equipment storage and handling, Training rooms and tempered storage bays. This central staging area can therefore support the testing, training and assemblage of the entire range of material relevant to Field Science activities.

Flanking the multi-purpose staging area are 30 8′x8′ Grantee Storage Pods, for the temporary consolidation of assembled field gear, ready for eventual palletizing and transportation via either fixed-wing or helicopter.

A critical aspect to gaining efficiencies at McMurdo lies in the co-location of Air Transport and Science Cargo Operations. In the Science Cargo portion of the space, relatively smaller wooden pallets of Field Science gear and food are assembled. These completed smaller, wooden pallets are then moved to the adjacent Air Transport space for assembly onto the larger, aluminum Air Force pallets. This Air Transport space is sized to accommodate up to 15 pallets to be assembled at any given time. Additional pallets can be accommodated either outside in the adjacent Supply Yard, or within the “Concourse,” a multi-purpose covered, semi-tempered space between the Field Science Support Facility and the Trades Shops. This concourse can also accommodate the winter storage of sleds on a mezzanine above, and a dedicated Search and Rescue (SAR) facility that houses both personal and overland vehicle equipment.

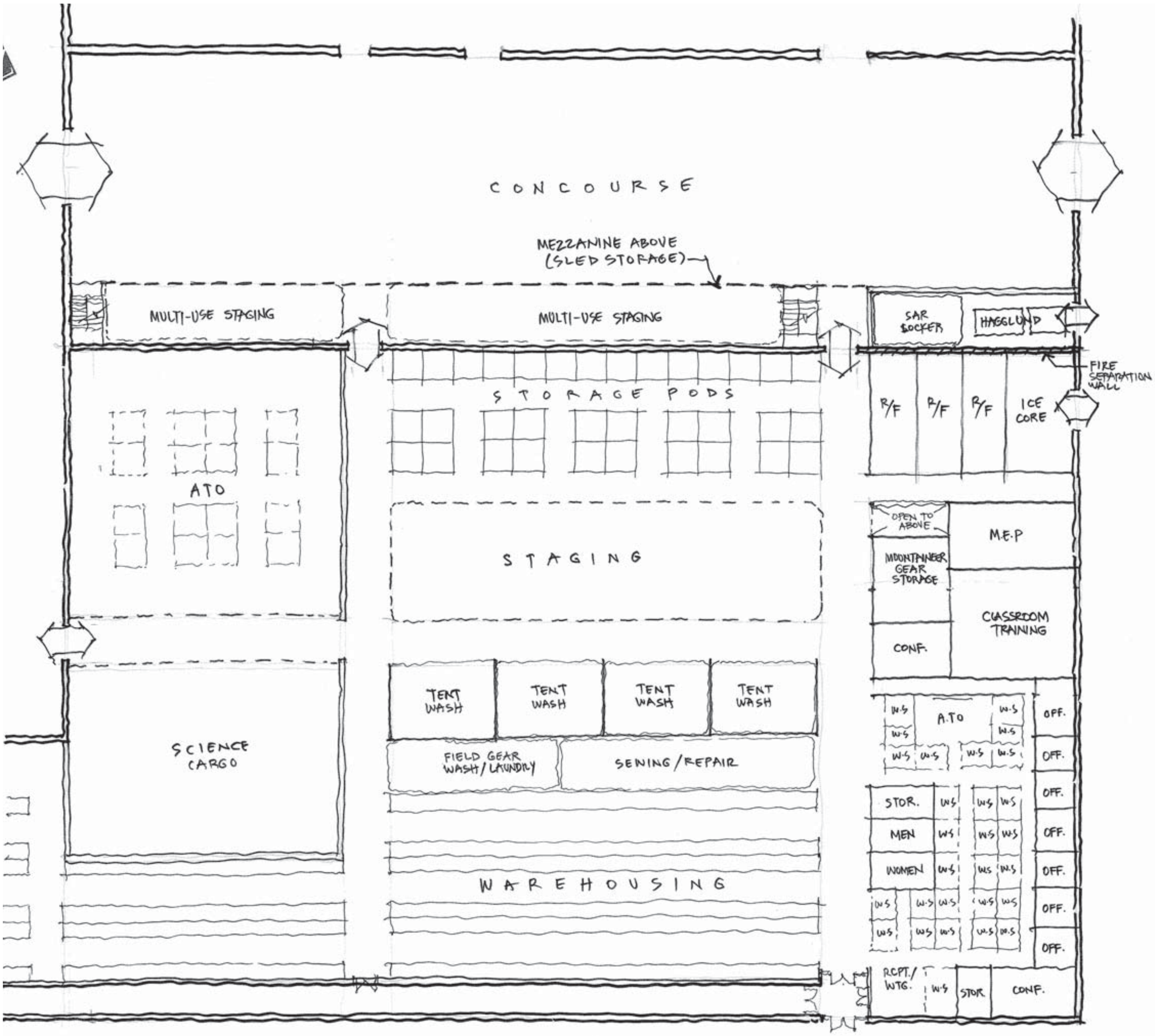
Following a guiding principal of the Master Plan, warehousing of field gear is located directly adjacent those activities where the material is processed, in this case at washing, repair and issuing facilities.

Easily accessed, yet acoustically-separated conference rooms are located immediately west of the central staging area. These spaces support field science safety training as well as collaboration between the various activities associated with field science activities.

A series of tempered storage bays include walk-in refrigerators and freezers to support the South Pole Station, and a dedicated freezer for the storage of ice cores.

Finally, a consolidated administration area, housing both dedicated offices and open workstations, is located adjacent the primary pedestrian entrance to the Field Science support facility. To best facilitate orientation and contact between grantee and supporting staff, this administrative area is located directly across a new pedestrian entrance to the existing Crary Lab.

FIELD SCIENCE SUPPORT



not to scale

FIRE/MEDICAL/DENTAL

This diagram describes relationships between the various components that make up the Fire House. The graphic indicates the relative sizes of each component and their relationship to other components.

The Fire House serves the entire base with some personnel and equipment located at the airfield for the flights. It anchors the north end of the main building and is adjacent to the medical unit. It is also in close proximity to the Housing components. It is connected to the rest of the campus via a corridor along the western side and has a separate public entrance at the northeast.

The overall organizing concepts of this diagram are based on a three bay drive through facility for the apparatus, with the Emergency Medical bay next to medical facility for quick access and the office and main work areas on the opposite side of the bay. The main living quarters are located above the offices for quick access to the bays.

The apparatus bays are flanked on either side by the service needed at the bays including bunker gear, tool room, decontamination, Emergency Medical Treatment storage, SCBA equipment and fill area, Scuba gear, toilets and a training/hose tower. The bay opens directly into medical. A shared training room for firefighters as well as non-firefighters is located adjacent to the medical area and accessible from the main corridor without entering the station.

Five Offices are provided for the officers and fire protection engineer with an open office for the firefighters located off of a public door to the exterior. The office area has direct access to the apparatus bays for a quick turnout time.

Because of the required height for the apparatus, between 20 & 24’ clear, the flanking offices and support space can accommodate a second floor. Over the southern support space a mezzanine is proposed for excess bunker gear now stored off site as well as mechanical and training areas. On the north side above the offices are the firefighters living quarters consisting of eight dorm rooms with bathrooms across the hall for both sexes, and the main living space consisting of a day room, dining area and a kitchen all within a few feet of the stair to the apparatus bays. A small work area and storage area are also located upstairs.

The efficiency of the space is derived from using the tall volumes to stack the office and living area and to create a mezzanine above the storage. Normal fire station functions such as a fitness area and laundry area are shared space located off site in close proximity to be usable by on duty personnel.

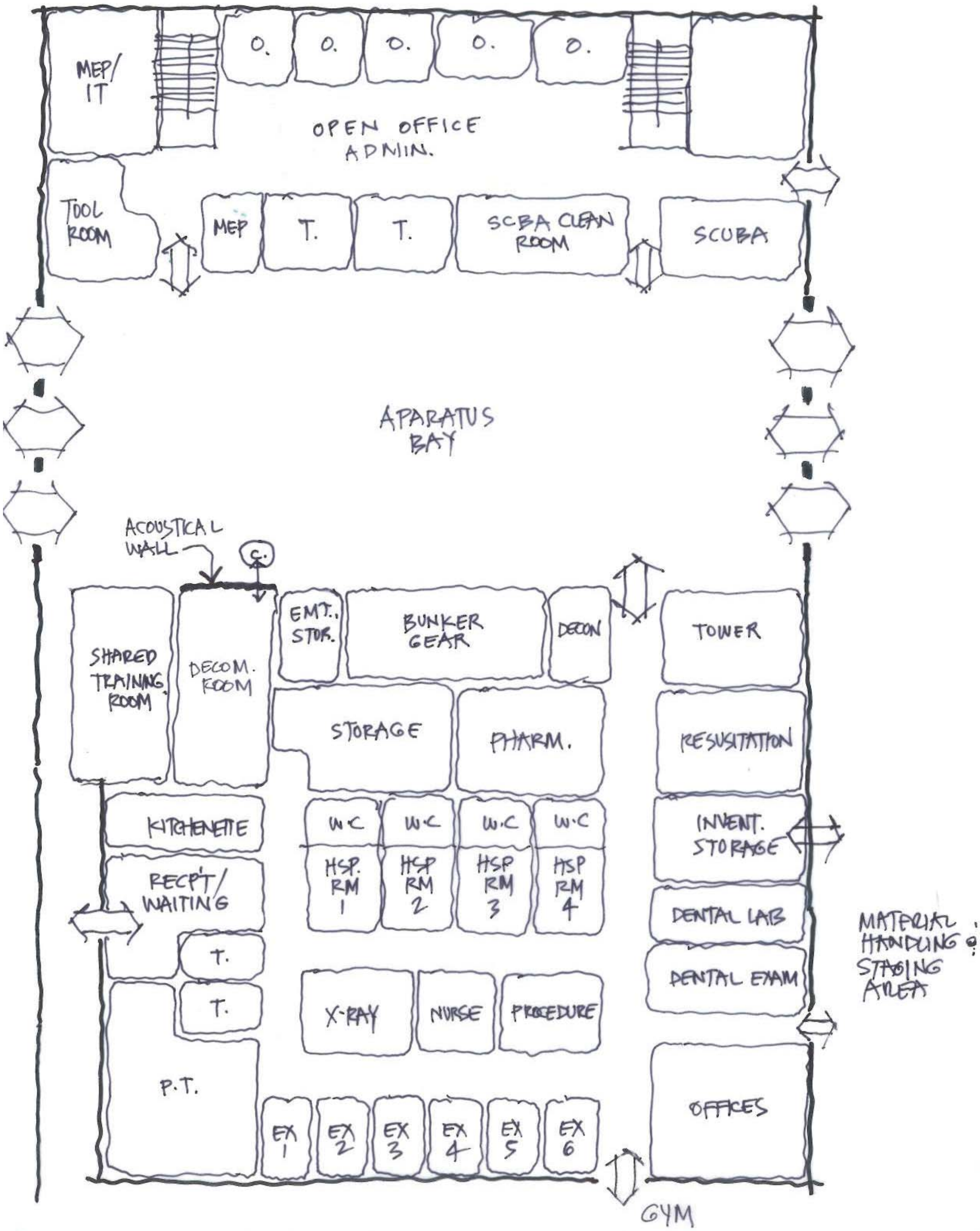
Within the Contingency Operations component of McMurdo Station, a Medical/Dental facility is a key complement to the Fire Station. The following diagram describes an overall organization that creates two primary zones.

A more public zone of Reception, Physical Therapy, Exam Rooms, and medical/dental staff Offices is located adjacent the Hall connecting to Central Services and the gymnasium which can act as a triage center in the event of a mass casualty. Here a bank of 6 examination rooms is flanked for efficiency by a Procedure and Xray room. These rooms are flanked by a Nurse station with a clear view to both the Reception/Waiting area and hospital rooms.

These hospital rooms, along with a kitchenette, pharmacy and storage, comprise a more private zone. The hospital rooms total 4 in number, and are equipped with dedicated bathrooms. These rooms abut a series of rooms that provide further acoustical privacy, namely storage, pharmacy and decompression chamber room. The pharmacy is located within this more private zone for maximum security. Finally, a kitchenette is positioned between the hospital rooms and the main circulation hall connecting to Central Services. This will facilitate the delivery of food prepared in the Galley, while minimizing contact with delivery staff.

Finally, a resuscitation room is located immediately adjacent the Fire Station apparatus bay for quickest transfer from an incoming ambulance.

FIRE/MEDICAL/DENTAL - LEVEL 1



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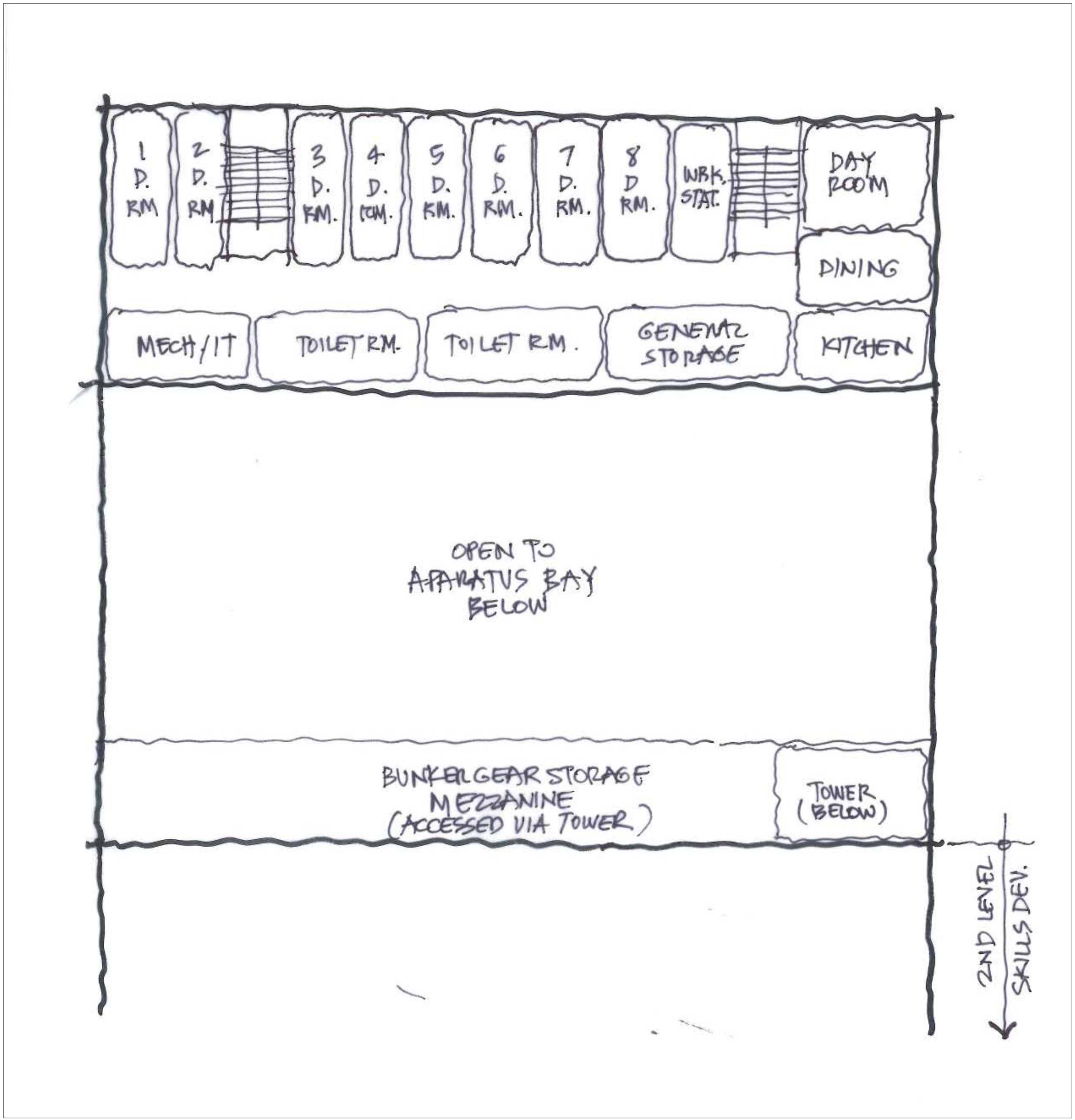
FIRE - LEVEL 2



not to scale

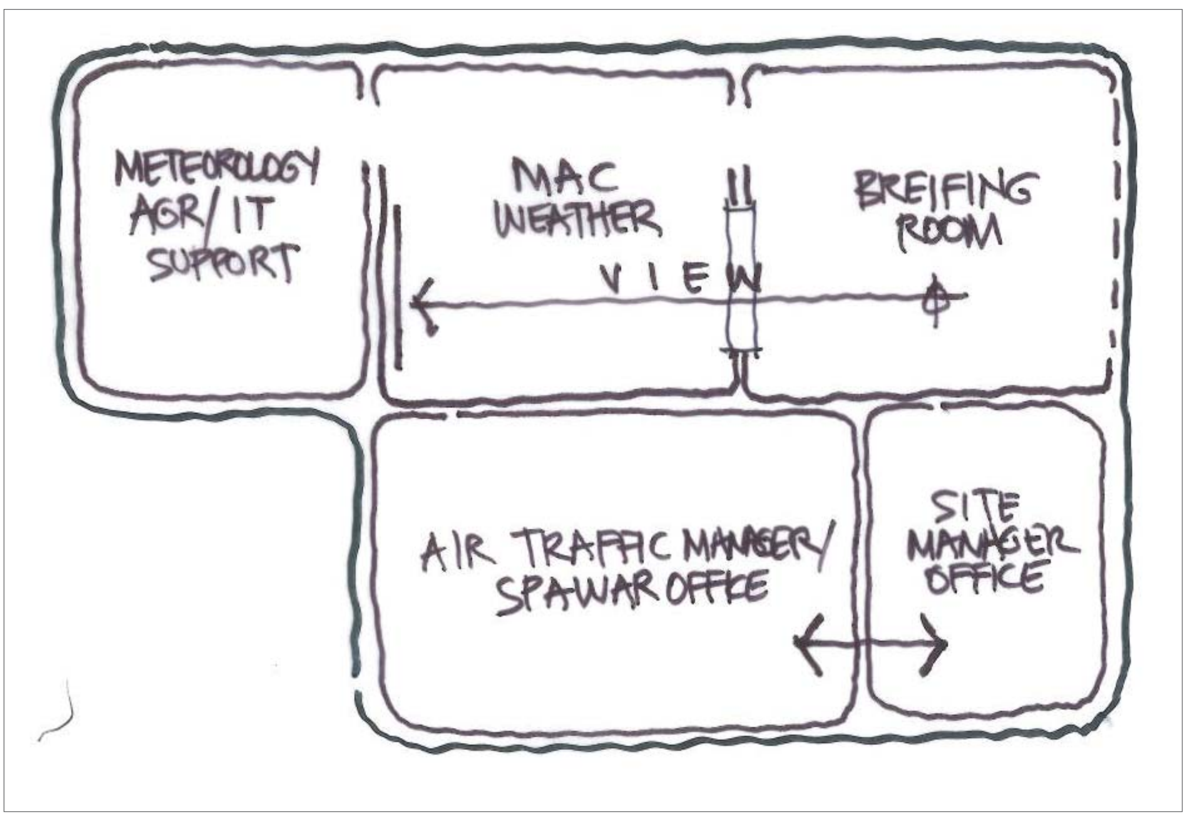
MCMURDO WEATHER

This diagram describes the relationships between various parts that comprise McMurdo Weather. The space is an office suite to be located in administrative area of Central Services that provides weather information/ briefings for the station, those traveling out of town and for pilot operations (KBA,C-130's and Helicopter). The suite should have direct access from primary circulation.

The suite consists of the following spaces and requirements:
A Briefing Room for up to 10 people standing. The briefing room is a walk-up space that has direct visibility to a wall mounted monitor located in the MAC Weather office space. An additional wall mounted monitor is located in the briefing area.

The McMurdo Weather office is to be located directly adjacent to the Briefing Room and Meteorology AGR/IT Support Office. This office provides a customer service function for the Briefing Room and houses 2 personnel. The Meteorology AGR/IT Support Office is adjacent to the Weather office and houses 2 personnel.

The single person Site Manager Office is to be directly connected to the Air Traffic Manager (ATM)/SPAWAR Office. These offices need acoustic privacy due to human resources related conversations.

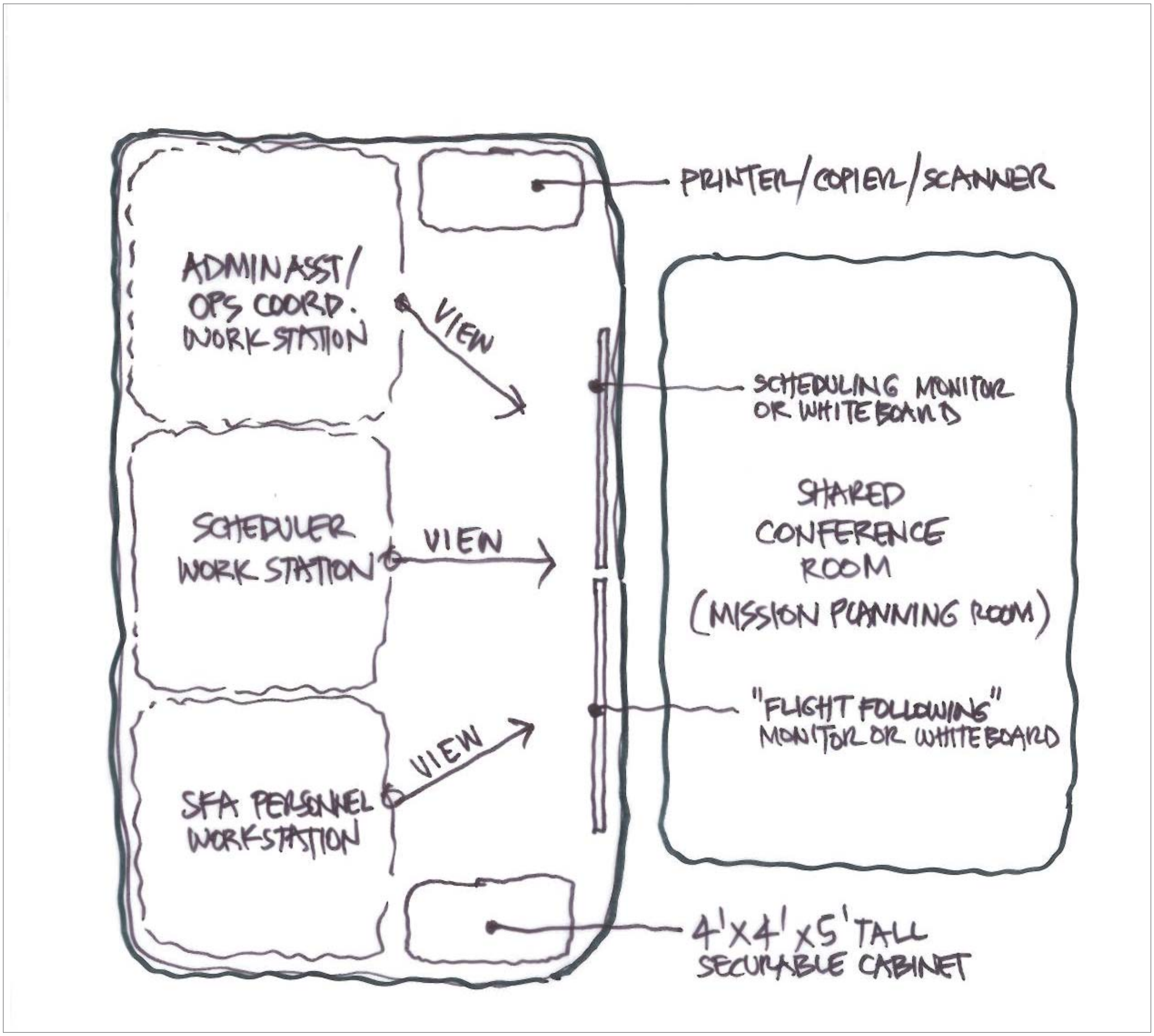


not to scale

RAVEN OPERATIONS SUITE

This diagram describes the relationships between various parts that comprise RAVEN Operations. The space is an office suite to be located in administrative area of Central Services. It functions in a highly collaborative, open office environment co-located with Command and Control.

The suite consisting of the following spaces and requirements:
A Mission Planning Room or shared conference room with a 12 person capacity for pre-flight pilot briefings. Workstations are required for an Administrative Assistant/Operations Coordinator, Scheduler and Support Forces Antarctica (SFA) personnel.



not to scale

SUPPORT FORCES ANTARCTICA

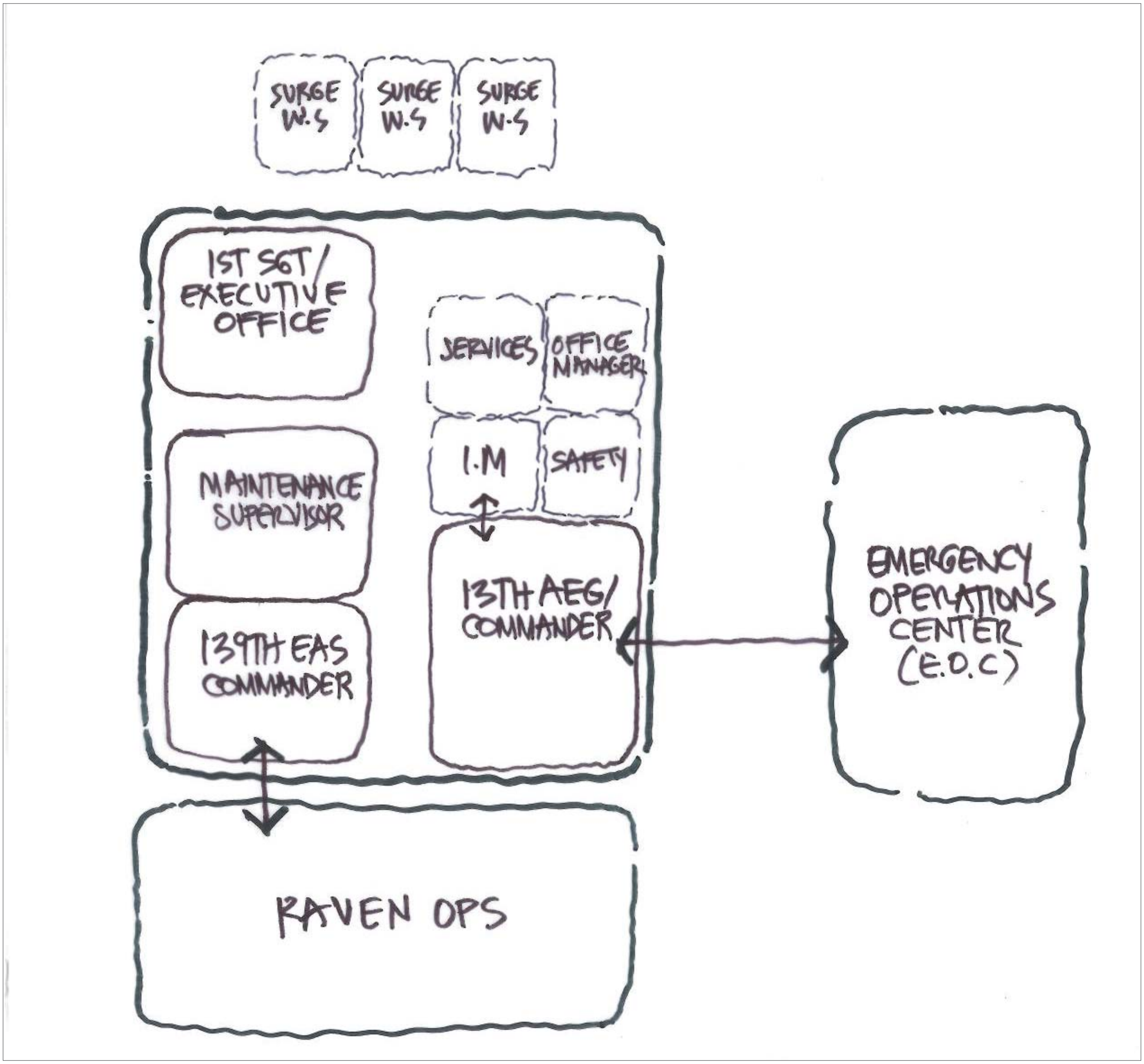
This diagram describes the relationships between various parts that comprise Support Forces Antarctica. The space is an office suite to be located in administrative area of Central Services. The suite should have direct access from primary circulation and be adjacent to RAVEN Operations and the Emergency Operations Center. The Support Forces Antarctica personnel that occupy this office suite are full summer season duration.

The suite consists of the following spaces and requirements:
A Briefing Room for up to 10 people standing. The briefing room is a walk-up space that has direct visibility to a wall mounted monitor located in the MAC Weather office space. An additional wall mounted monitor is located in the briefing area.

The McMurdo Weather office is to be located directly adjacent to the Briefing Room and Meteorology AGR/IT Support Office. This office provides a customer service function for the Briefing Room and houses 2 personnel. The Meteorology AGR/IT Support Office is adjacent to the Weather office and houses 2 personnel.

The single person Site Manager Office is to be directly connected to the Air Traffic Manager (ATM)/SPAWAR

SUPPORT FORCES ANTARCTICA



not to scale

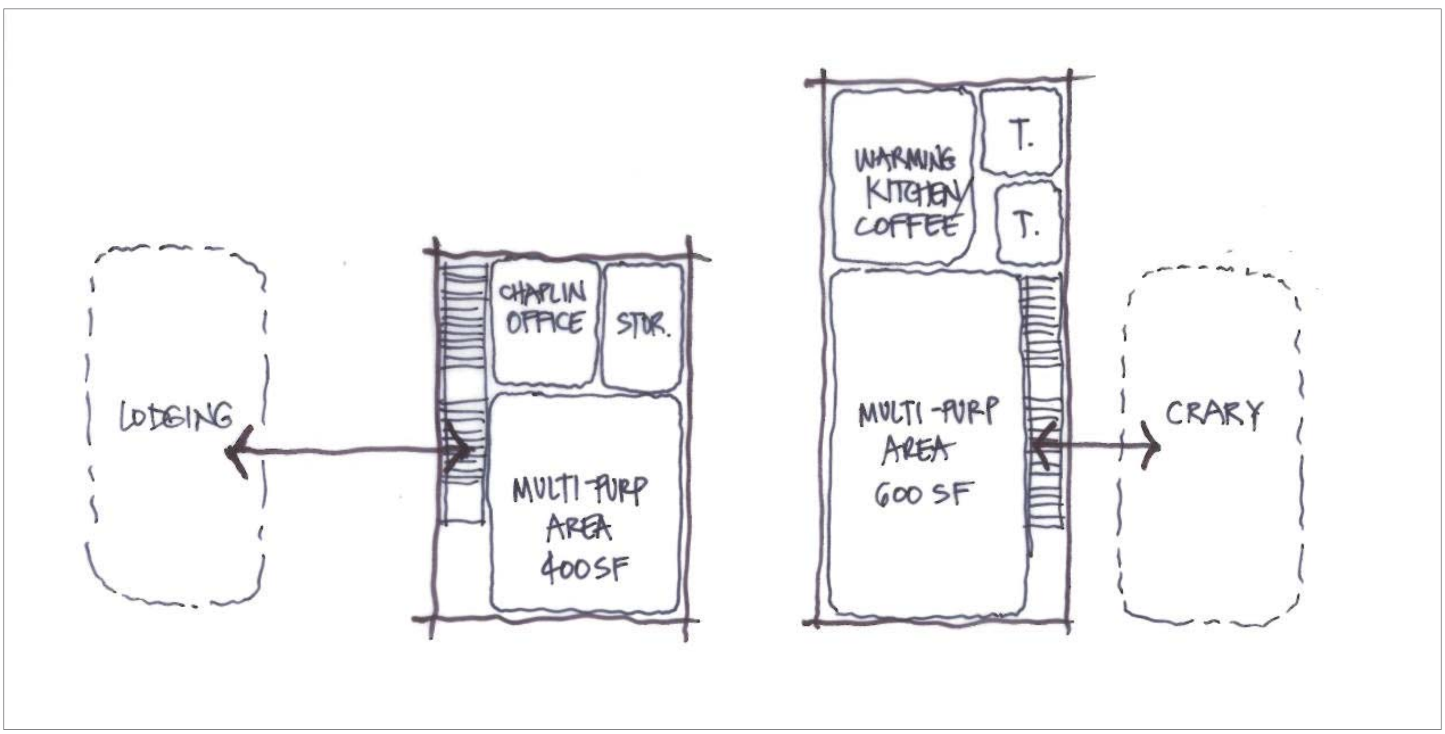
MULTI-PURPOSE SPACES

CHAPEL

A multi-denominational chapel is envisioned to occupy a flexible space to accommodate approximately twenty persons. This space is served by an adjacent storage room for religious implements and artifacts. In addition, an adjacent office is provided for both private meetings and an administrative space for the assigned chaplain. It is anticipated that this chapel space be located within the West end of Central Services, near the Lodging, and overlooking the Royal Society Range.

CAFE

Located at the opposite, East end of Central Services, a multi-purpose Café will accommodate approximately 30-40 people. This location postitions the Café between the Lodging and Administrative functions of Central Services and the working areas of the Crary Lab, the Field Science Support and the Trades/Shops facilities. The Café is serviced by a warming kitchen and toilets. Through scheduling, this multi-purpose space can support special events and receptions.



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CHAPEL

CAFE

TRADES FACILITY

This diagram describes relationships between the various components that make up the Trades Facility. The graphic indicates the relative sizes of each component and their relationship to other components.

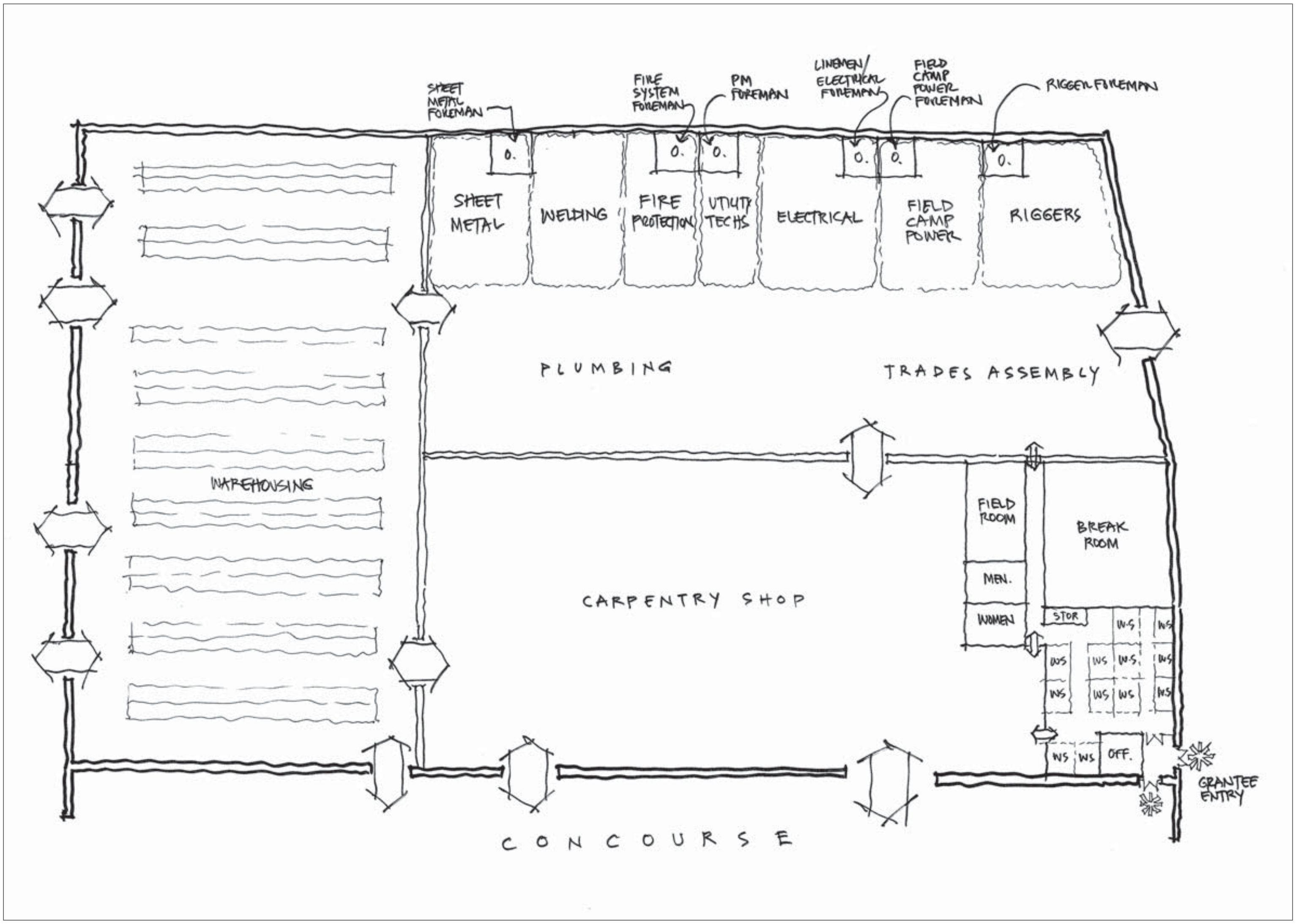
The Trades Facility provide equipment and manpower to the field scientists as well as maintain the McMurdo facilities.

The overall organizing concepts of this diagram are based on the flow of material from its raw state in the adjacent warehouse area to bench stock in individual shops where the material is fabricated to an assembly area if needed to shipment off site. The flow and storage of material, craftsmen, and scientists is in all four directions creating a cohesive team of people goods and services with clear access ways to maintain a safe environment.

Warehouse	Shop	Shop	Assembly	Field
Raw Material	Bench Stock	Fabrication	Assembly	Installation

The overall shops space is divided into four parts with the carpenter shop at the south end having direct access to the covered storage area; the north end having the remaining shops for Plumbing. Fire Protection, Sheet Metal, Electrical, Utilities, Field Camps, and Riggers; the area between serves as a laydown and assembly area as well as a drive aisle for loading and unloading materials for all the shops. The welding area is located to be accessible to all the shops. The Administration area, toilets and break area is located at the southeast corner with a separate entrance for grantees to meet with the tradespersons and review their projects if needed without entering the shops unescorted. Each shop is envisioned to have a space for a foreman to oversee the work as well as storage space for bench stock and portable tools and of course workspace for employees and fixed tools. Cranes are envisioned to move larger pieces within the shops and the assembly areas.

TRADES FACILITY



CRARY SCIENCE & ENGINEERING CENTER

This diagram describes relationships between the various components that make up the Crary Science & Engineering Center. Furthermore, this graphic indicates the relative sizes of each component.

A primary concept of this organization is to create additional lab space, provide for collaborative spaces and renovate existing lab space. A new mechanical equipment wing will be added across the central circulation spine from the Aquarium. This allows for the additional labs and collaborative spaces to be added without additional increase to the building footprint.

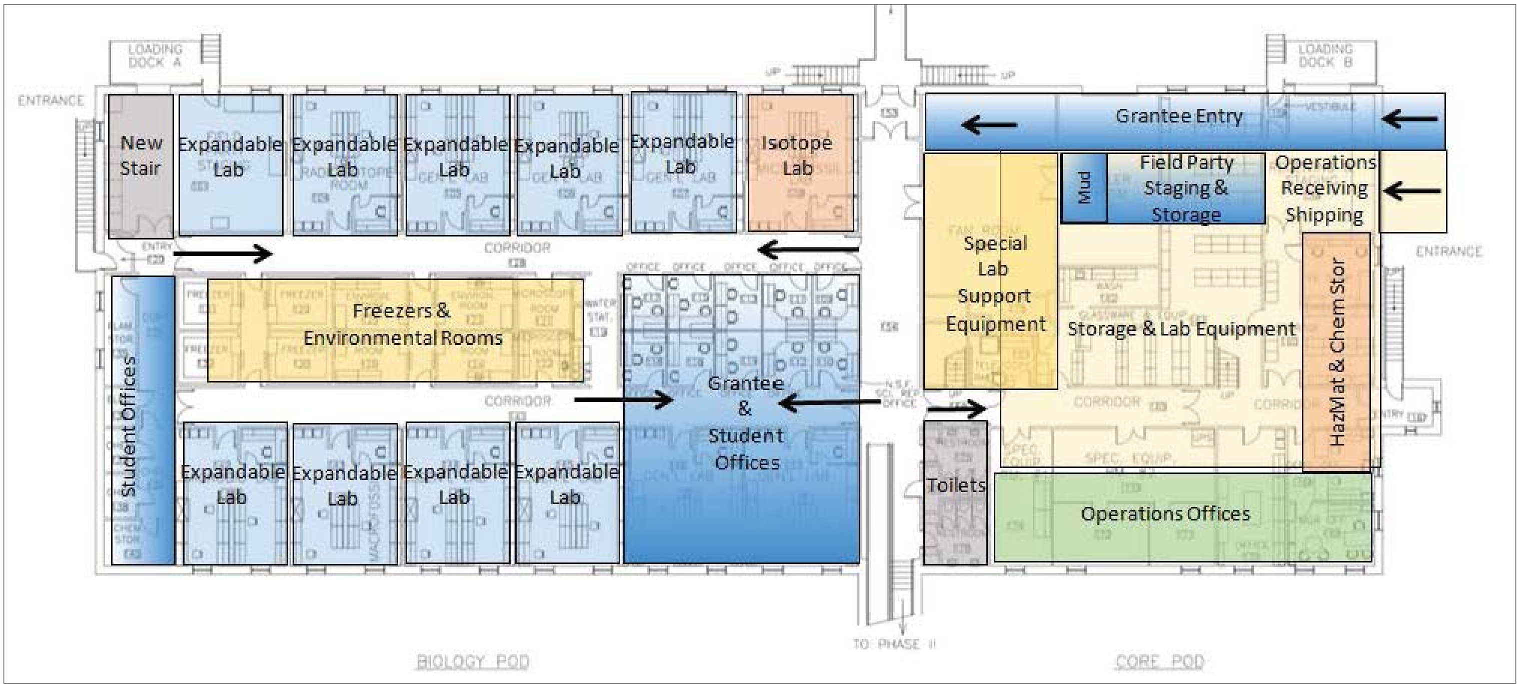
The first floor of Phase 1 will be reconfigured to provide a new centralized Grantee and Student office space. The Environmental Rooms will be maintained between the two rows of lab spaces. A new stair will be added to the northwest corner that will connect Crary to Central Services allowing for a climate controlled connection. The east portion will be reconfigured to provide a new primary entry that aligns with the entry of the Field Science Support Facility. Other functions will include special lab support equipment storage, a field party staging area, hazardous & chemical storage, shipping & receiving, and operations offices.

With removal of mechanical equipment, the second floor of Phase 1 will be modified to provide for additional storage and conference/multi-purpose spaces.

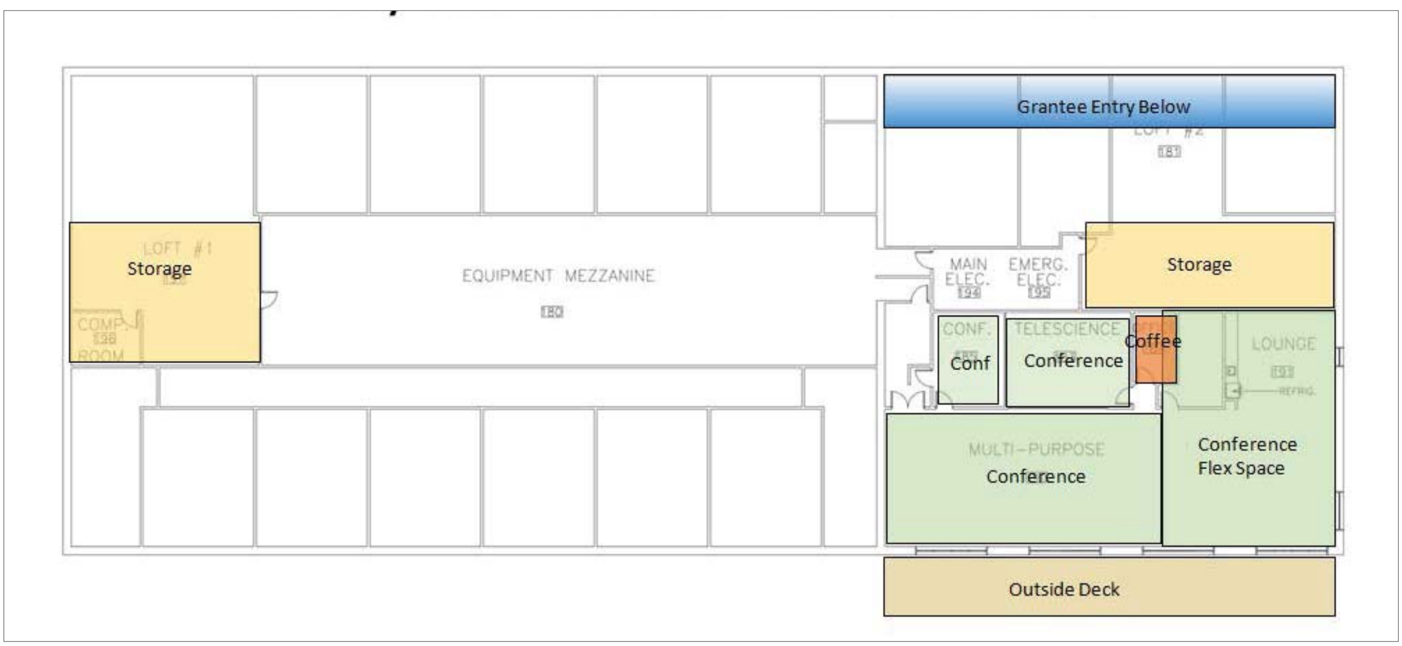
Phase 2 will be reconfigured to provide for Grantee & Student office space, flexible lab spaces, assembly & testing rooms, environmental rooms, freezers and a break room / coffee bar.

Phase 3 will see an expansion of the aquarium capacity and an additional lab made possible by the addition of the new mechanical room.

CRARY SCIENCE & ENGINEERING CENTER

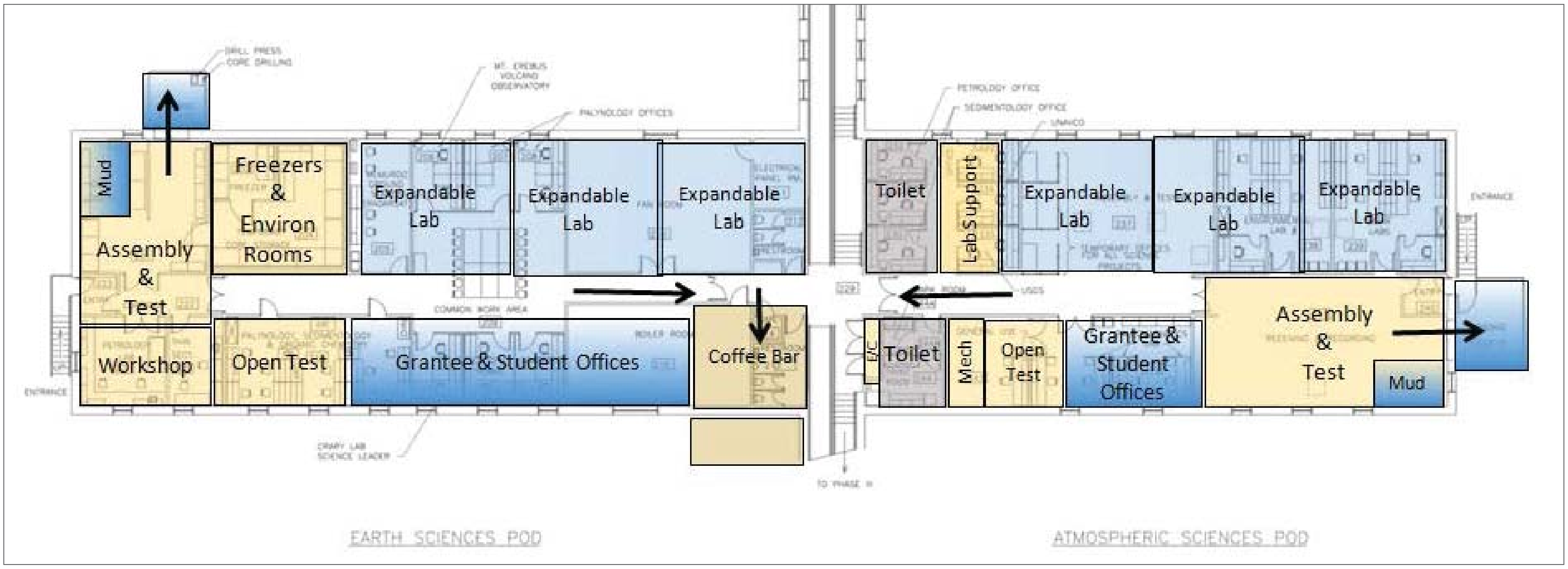


PHASE 1 - 1ST FLOOR not to scale

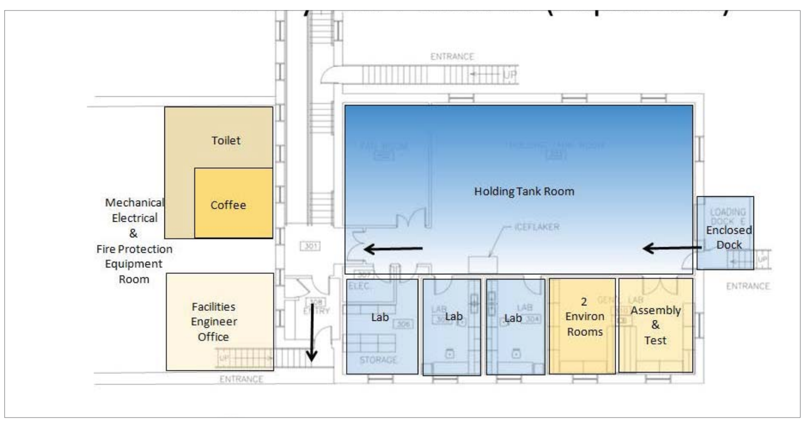


PHASE 1 - 2ND FLOOR not to scale

CRARY SCIENCE & ENGINEERING CENTER



PHASE 2 not to scale



PHASE 3 not to scale

INTERNET TECHNOLOGY OPERATIONS FACILITY

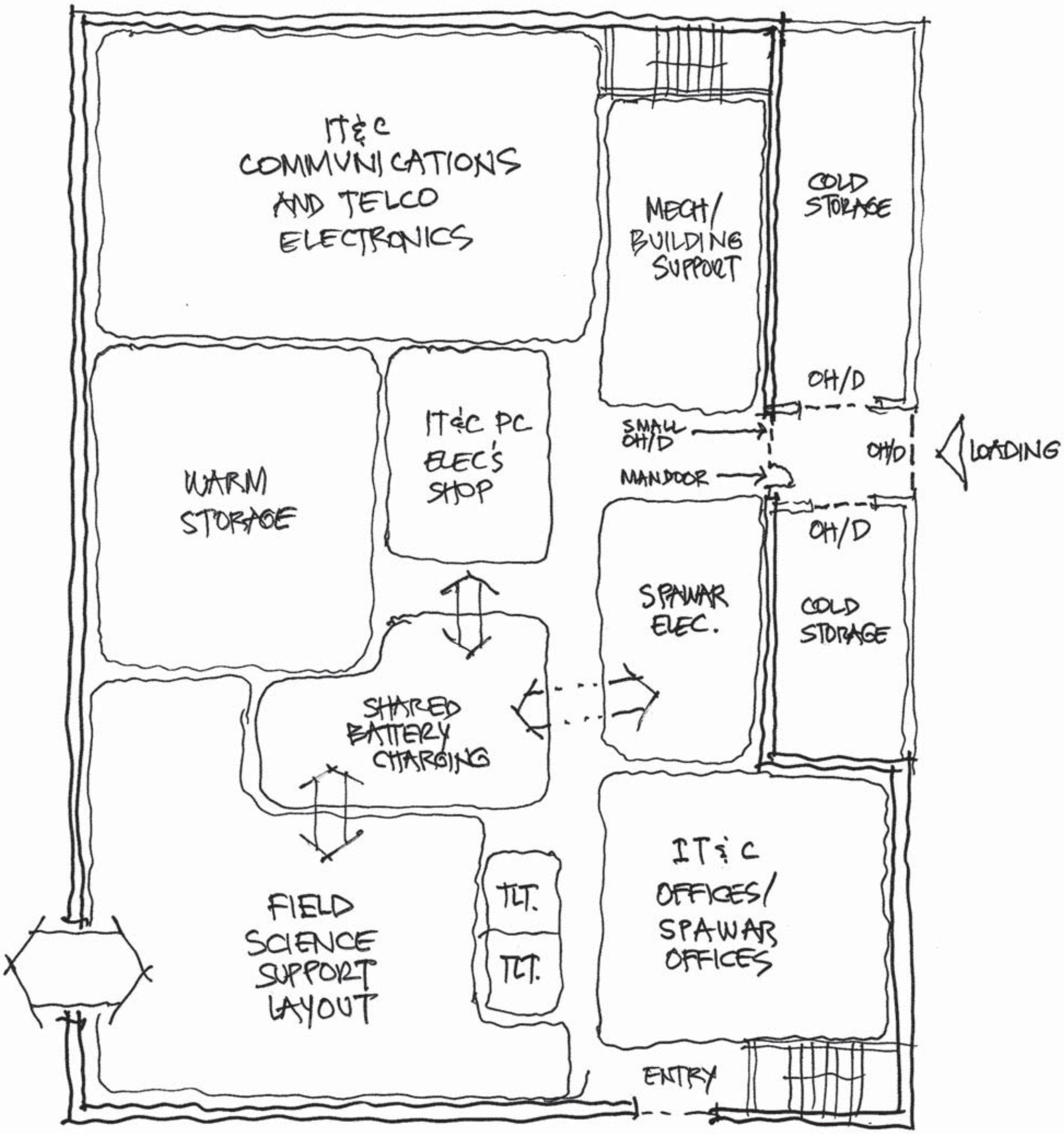
This diagram describes relationships between the various components that make up the Internet Technology Operations Facility. Furthermore, this graphic indicates the relative sizes of each component. This facility is what has previously been referred to as Building 004.

This facility will be the location for computer and electronics intensive station functions. A skybridge at level 2 will connect this facility to the Field Science Support Facility and provide a safe pathway year round for personnel to access their work center even in Condition 1 situations.

Functions located in level 1 will include Communications and Telophany Electronics office & shop space, the personal computer electronics shop, offices for Information Technology & Communications and SPAWAR, an electronics shop for SPAWAR, shared battery charging, storage and additional layout space for Field Science Support.

The primary function located in level 2 is the consolidated Data Center for all groups on station. These groups are National Science Foundation, NASA, Joint Polar Satellite System, Science servers and Antarctic Support Contract. The data center will have office space for technicians on a shared wall with the data center. A common loading dock and make-ready room is included. In addition to the Data Center, the secondary emergency operations center is located on level 2 along with assignable office space.

INTERNET TECHNOLOGY OPERATIONS FACILITY



1ST FLOOR

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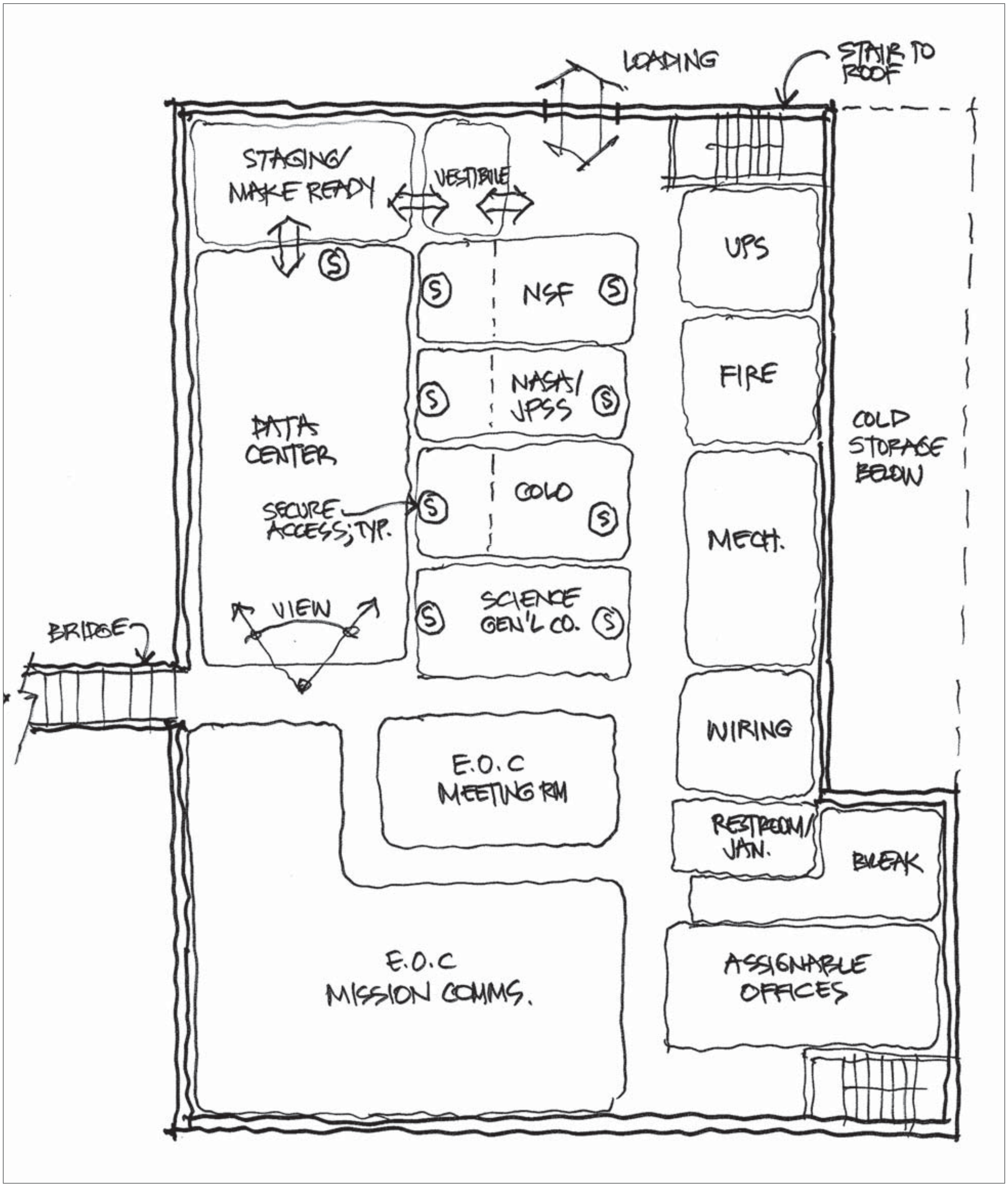
IT OPERATIONS BUILDING



2ND FLOOR not to scale

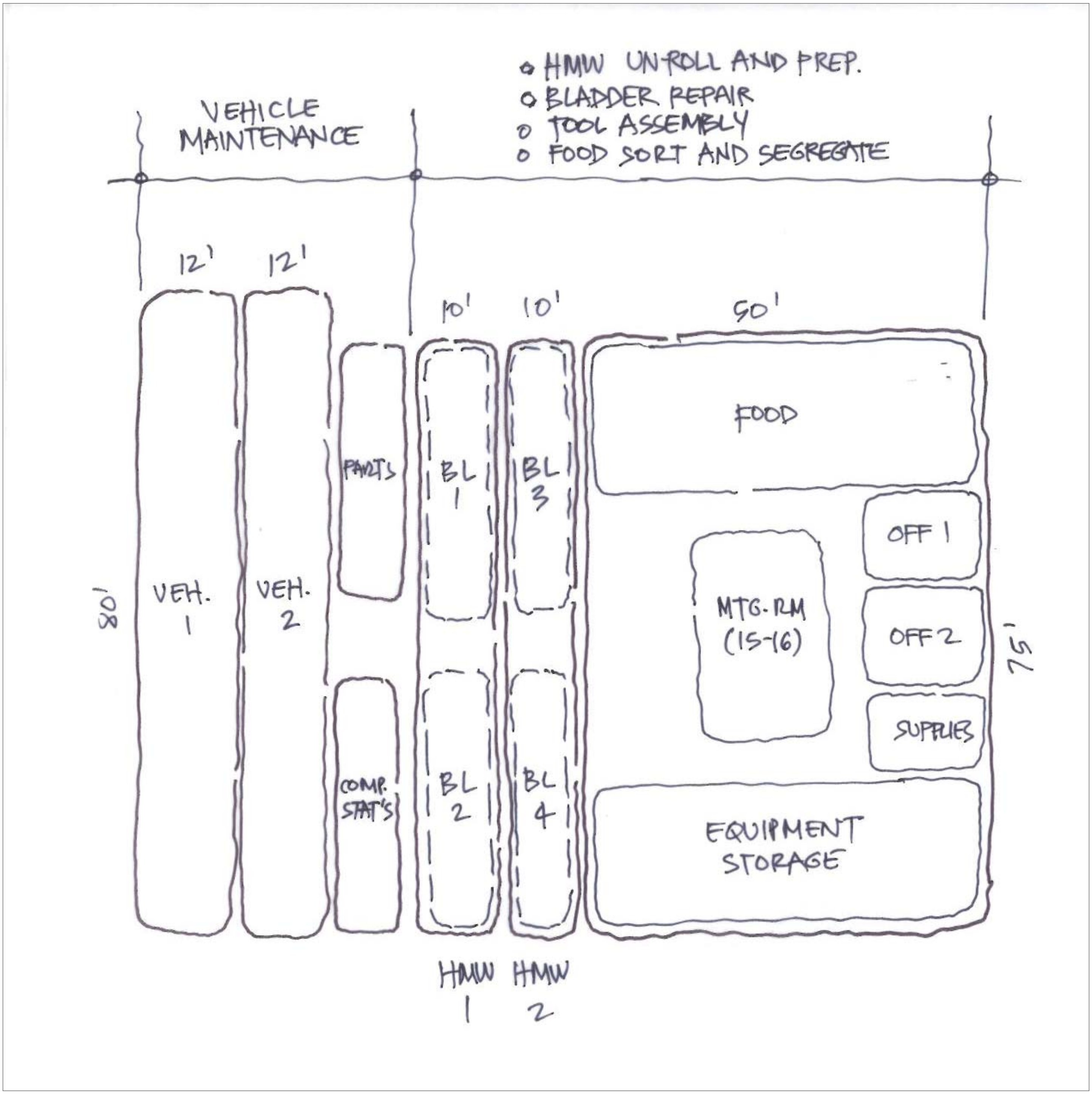
TRAVERSE OPERATIONS

A facility to support Traverse Operations is primarily comprised of four bays, flanked by supporting storage areas.

Two bays accommodate (2) traverse vehicles each and are flanked by parts and computer stations for both diagnostics and resources. Two additional bays are required for the preparation, assembly and repair of both the High Molecular Weight (“HMW”) sheets and fuel bladders.

An adjacent space is required for the storage of supporting equipment and food. Finally,two offices and a meeting room to accommodate 15-16 people is required.

TRAVERSE OPERATIONS



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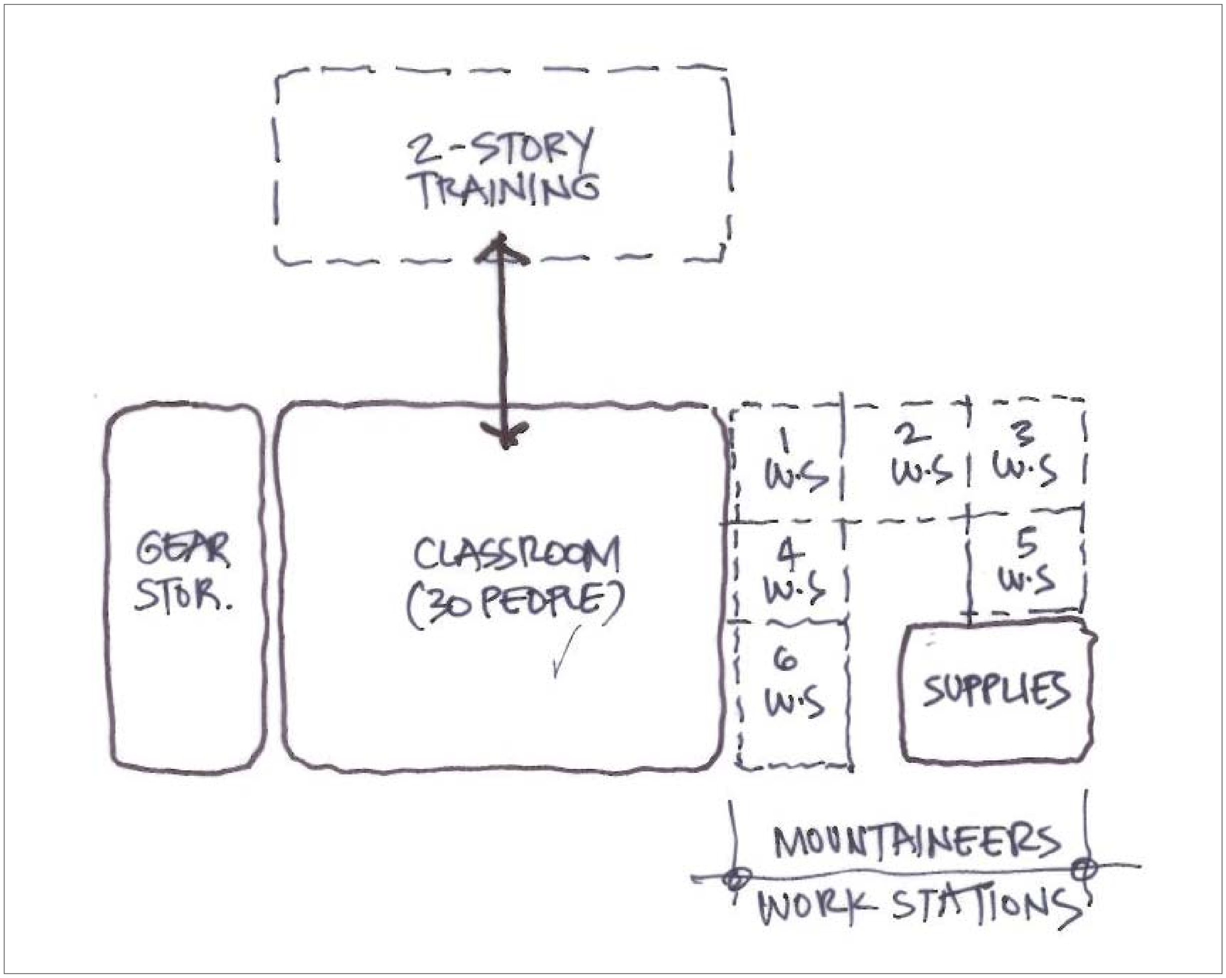
FIELD SAFETY TRAINING

This diagram describes the relationships between various parts that comprise Field Safety Training. The space is envisioned to be located in the remodeled Vehicle Maintenance Facility.

The space is used for the classrooom training of all groups and personnel that work in the "field". The classroom space for 30 persons is supplemented by a 2 story space for mountaineering training. Gear storage is needed adjacent to the classroom and training space for demonstration equipment.

Office space for the mountaineers and manager will be located adjacent to the classroom.



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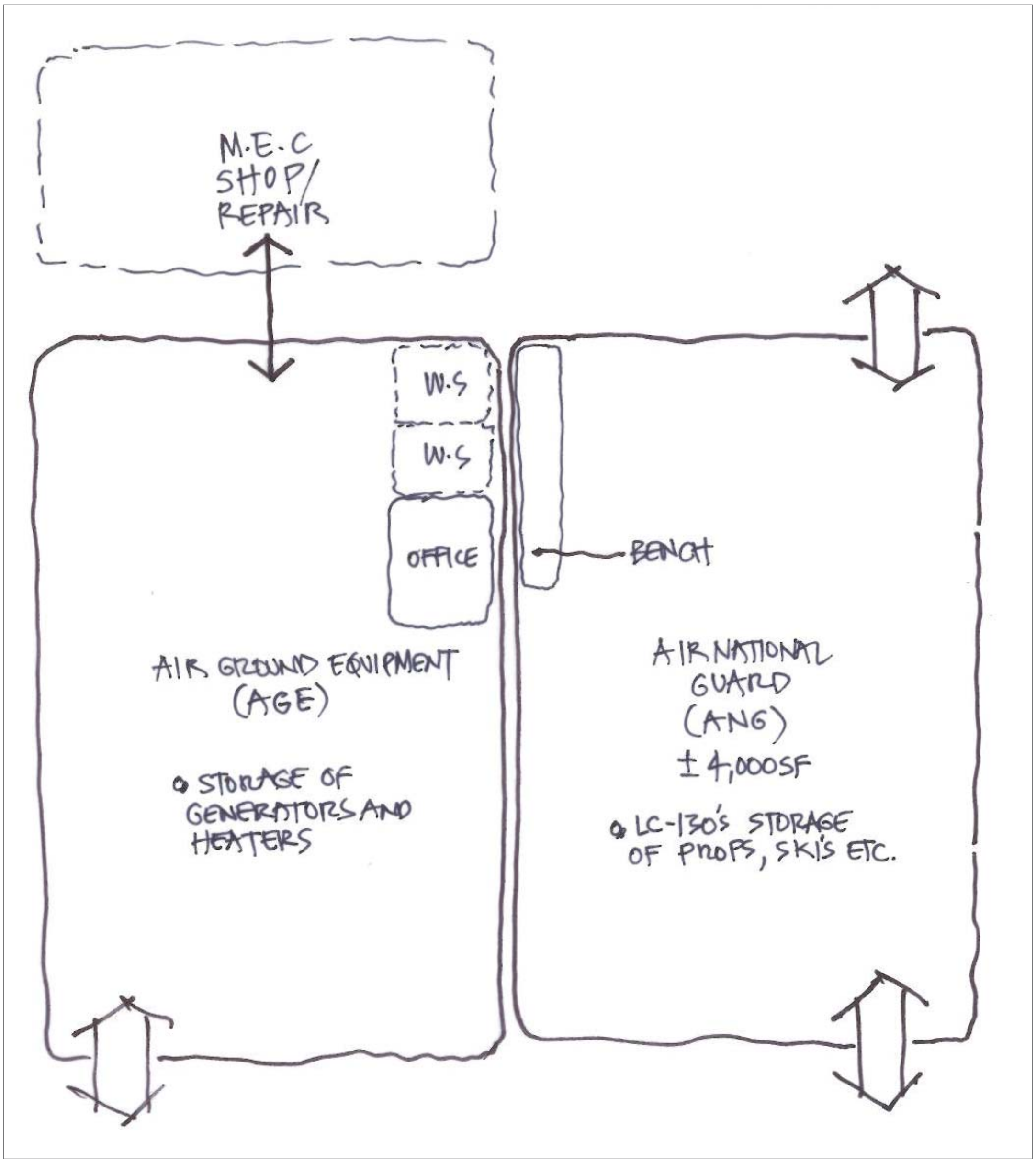
AIR GROUND EQUIPMENT
AIR NATIONAL GUARD

This diagram describes the relationships between various parts that comprise Air Ground Equipment and Air National Guard station facility. The space is envisioned to be located in the remodeled Vehicle Maintenance Facility.

The space is a combination warehouse and light repair shop space. They want to be located adjacent to the Mechanical Equipment Center repair shop as many of the same skill sets are transferable between the different equipment types.

Each facility needs security separation along with direct access to the exterior for the movement of supplies and equipment.



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SEA ICE SUPPORT

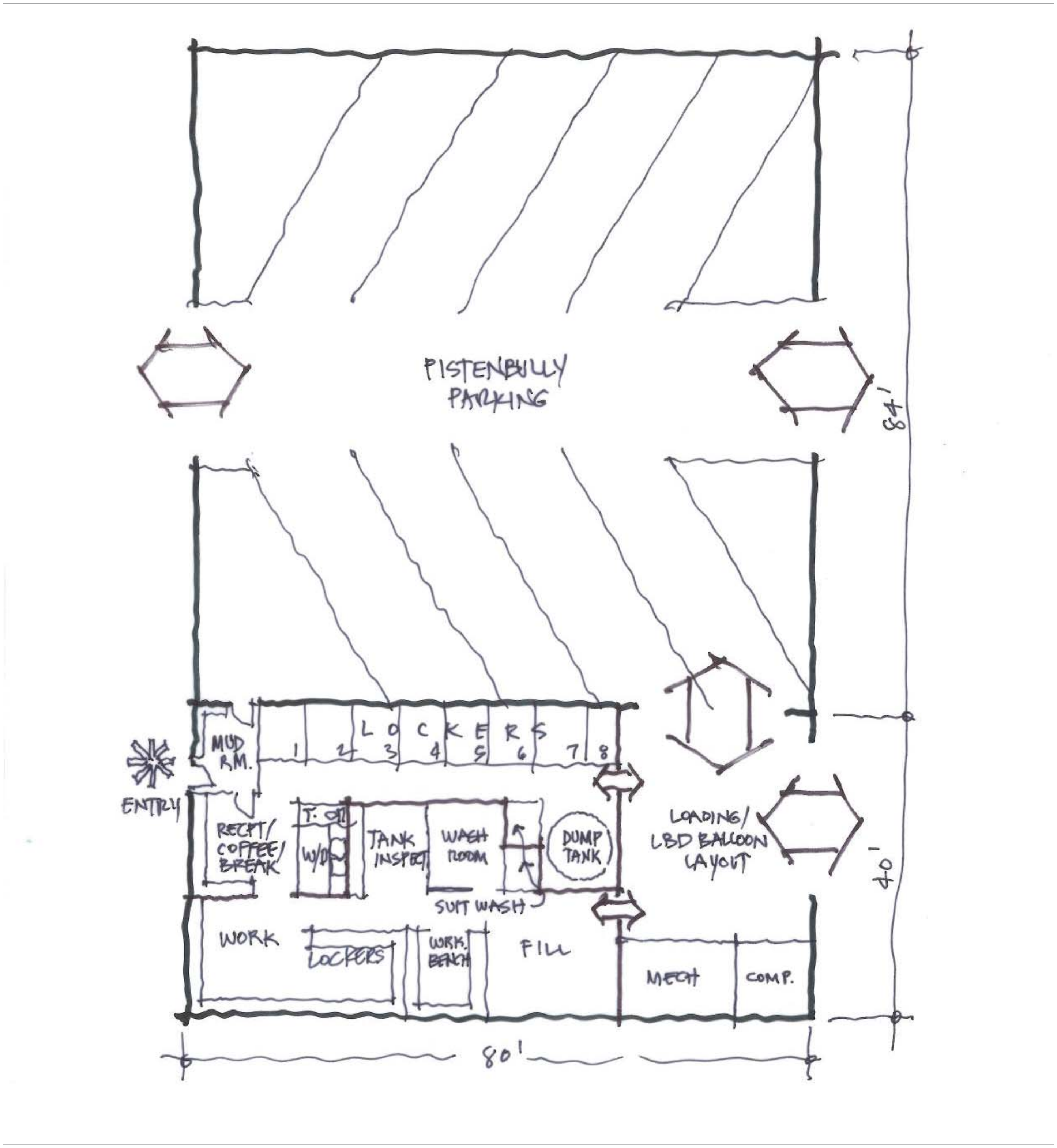
This diagram describes relationships between the various components that make up the Sea Ice Support Facility. The graphic indicates the relative sizes of each component and their relationship to other components.

The Sea Ice Support Facility is located just south of the Crary Labs. It serves the sea ice scientists and the divers that serve them. Some scientists will use the facility daily while others may be out for weeks at a time. Pisten Bullys will transport the scientists and divers to the helicopter operations and back. Close proximity to the sea ice is preferred. The facility is designed to be accessed from two sided to efficiently move goods and equipment. The locally launched and daily weather balloons also will use this facility for setting up their equipment prior to launching. It is a free standing structure.

The overall organizing concepts of this diagram are based on the three main uses for the facility with a forth use, the Balloon operation sharing space for they laydown areas. One side of the building houses the Divers and the Scientists who share common areas including a mud room, toilet, washer dryer area and small area for a coffee pot. The Scientists then have seven individual lockers which may be shared and a common locker and a dunk tank and suit wash area. The lockers are loaded from an enclosed loading area which also serves as a balloon laydown area. The Divers have work areas, lockers, tank filling and inspection areas, a general work area and a suit wash and storage area.

Adjacent to the support areas is a storage area for 8 Pisten Bullys. Having an enclosed and minimally heated area the Pisten Bullys will not require a plug line, or digging out from drifting snow, or the added maintenance from being out side. The Pisten Bully area adjacent to the balloon launch area can be used for balloon layout area with some of the Pisten Bullys either out in the field or temporarily placed in the drive aisle.

SEA ICE SUPPORT



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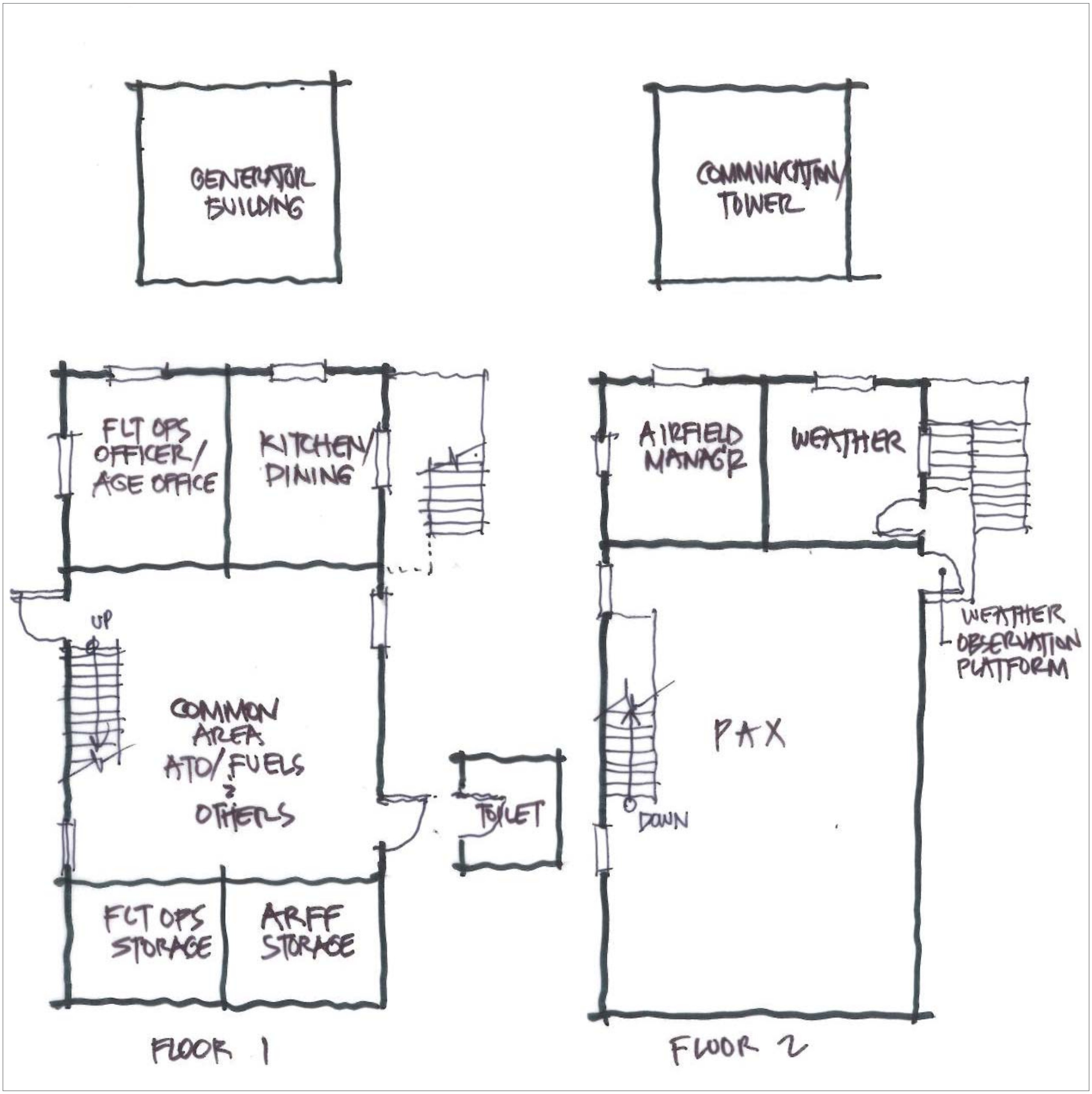
CONSOLIDATED WHEELED RUNWAY FACILITY

This diagram describes relationships between the various components that make up the Wheeled Runway (Pegasus) consolidated facility. The graphic indicates the relative sizes of each component and their relationship to other components.

The Wheeled Runway serves as a terminal and support area for the wheeled aircraft on the permanent ice at McMurdo. It is a modular building on skis that is augmented and fed by a generator building and a communications tower that are also on skis.

The overall organizing concepts of this diagram are based on a modular tow-able building that is two stories high with the lower floor is for the staff and storage and the upper floor for the passengers and two offices. The lower floor contains storage for Flight Operations, Antarctic Terminal Operations, and Antarctic Rescue Fire Fighters. The lower floor also has a shared office for the Flight Operations Officer and the Aircraft Ground Equipment official as well as a kitchen/dining area and common space for the workers at the airfield. The upper floor has two offices for the weather official and the airfield manager adjacent to the passenger terminal with an internal and an external stair. The external stair also serves as a platform for the Weather office. The passenger terminal is designed to hold 50 people. More than 50 people would be accommodated in the vehicles that transported them to the airfield until the plane arrives should there be flight delays. A toilet facility would be accessible from the exterior for both staff and passengers.

CONSOLIDATED WHEELED RUNWAY FACILITY



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APPENDIX

Attendees Lists

Transcripts

Questionnaires

ATTENDEES LIST

TRANSCRIPTS

OZ ARCHITECTURE
MICHAEL BAKER INTERNATIONAL
FERRARO CHOI
MERRICK & COMPANY

QUESTIONNAIRES

APPENDIX

Attendees Lists

Transcripts

Questionnaires

ATTENDEES LIST

CHARRETTE ATTENDEES

Company/Affiliation	Name
ASC	Rita Lynn Pittmann
ASC	David R Winkler
ASC	Larry C Male
ASC	Brandon Wayne Neahusan
ASC	Kevin Peter Gibbons
ASC	Anne Maureen Burton
ASC	Michelle J. Tombre
ASC	Curtis David LaBombard
ASC	Elizabeth Kauffman
ASC	Bija Pema Dogar Sass
ASC	Beverly Jeanne Walker
ASC	Mark Stephen Neeley
ASC	Michael Anthony Davis
ASC	William Joseph Turnbull
ASC	Anthony Scott Buchanan
ASC	Steve Dunbar
ASC	Cara Sucher
ASC	Sune Tamm
ASC	Judy Shiple
ASC	Samina Ouda
ASC	Matthew Erickson
ASC	Esther Hill
ASC	BK Grant
ASC	Jeffrey Alan Scharf
ASC	Joseph Patrick Harrigan
ASC	Jeffrey Huffman
ASC	Neel Williams Pahl
ASC	Gary Stephen Cardullo
ASC	Alexander Hamilton Morris
ASC	Peter James Cruser
ASC	Pamela Jondreau
ASC	Lisa Kauffman
NSF	Ben Roth
NSF	Jessie Craine
NSF	Scott Borg
NSF	Scot Arnold
NSF	Nature McGinn
NSF	Paul Sheppard
NSF	Maggie Knuth
NSF	Tony Pierpoint
NSF	Pat Smith
NSF	Tim Howard
NSF	Mike Scheuermann
NSF	Polly Penhale

NSF	Pete Ridilla
NSF	Sue Lafratta-Decker
NSF	Thom Wilch
NSF	Chuck Amsler
NSF	Byron Adams
NSF	Mike Jackson
NSF	Chris Fritsen
NSF	Mark Kurz
NSF	Peter Milne
NSF	Kevin Porter
NSF	Brian Stone
DOD/NSF	Gary James
OZ	Joseph Philip Levi
OZ	Frederick Harrell Petersen
OZ	Donald Ray Schieferecke
OZ	Daniel Webb Miller
OZ	Tracy Yashiro Tafoya
OZ	Christopher Kiley Baham
OZ	Christine Lee Eldridge
OZ	Danielle McCoy
Ferraro Choi (consultant)	Phil Wirdzek
Ferraro Choi	Joseph James Ferraro
Ferraro Choi	Kimberly Suman Claucherty
Ferraro Choi (consultant)	Daniel Thomas Rauchenstein
Jacobs	Daniel Paul Dozer
Merrick	Jon Currey DeLay
Merrick	Aaron Christopher Seal
Merrick	Kevin Peter Breslin JR
Merrick	Daniel Patrick Harrington
Merrick	Richard Boehne
Merrick	Pat Finley (local)
Merrick	Keith Binkley
Merrick	Orlando Trujillo
Merrick	Doug Yester
Merrick	Christine Lurtz
Baker	William Gabriel Kontess
Baker	Nicholas J. Icamina
Baker	Lance LaVere Mackie
Baker	Ray Kin Thom
Baker	Alex Taylor
BYU	Byron James Adams
IRIS PASCAL	Kent Anderson
NASA	Kelly M Brunt
University of Alaska - Anchorage	Jennifer Moss Burns
University of Illinois - Urbana	Chi-Hing Christina Cheng-DeVries
Montana State University	Amy Lee Chiucholo
University of Colorado - Boulder	Xinzhao Chu

university of Washington	Howard Bruce Conway
University of Minnesota - Diluth	John William Goodge
University of Colorado	Michael Nikolai Gooseff
NASA	Christy Hansen
IRIS PASCAL	Jason P. Hebert
University of Coloado	Lars Eriks Kalnajs
University of San Francisco	Deneb Karentz
Polar Geospatial Center	Cole Michael Kelleher
Texas A&M	Andrew George Klein
UW - Madison/Madison College	Matthew Anthony Lazzara
University of Texas - Austin	Joseph Sidney Levy
UNAVCO	Thomas Henry Nylen
UNAVCO	Marianne Haiguhi Okal
BGSU	Kurt Samuel Panter
Sonoma State University	Sean Patrick Place
Grantee	Kristina Rachelle Slawny
University of Washinton	John Owen Stone
UC - Davis	Anne Todgham
UCSC	Slawomir Mariusz Tulaczyk
University of Chicago	Abigail Goodhue Vieregg
ANG	Lt Col Rick McKeown
SFA (109th)	SMSgt Jack Lawlor
SFA (109th)	Lt Col Blair Herdrick
NASA	Jon Z. Walker
NASA	Kevin P. McCarthy
NASA	Bruce E. Thoman
NOAA/JPSS	David Littman
NASA/JPSS	Bill Munley
NASA	Mark Harris
NOAA/JPSS	Scott C. Douglas
PHI	Steve Taylor
PHI	Steve Lavergne
PHI	Keith Cox
PHI	Nicholas Maffei
KBA	Brian Crocker
SPAWAR	Matt Rushing
SPAWAR	Dusty Barrett
SPAWAR	Greg Thomas
SPAWAR	Art Cayette
Dept. of Energy	Robert S. Anders
Cced	Brad Gustafson
The Center for Disaster and Humanitarian Assistance Medicine	Dr. Geoffrey Oravec, Maj, USAF, MC, MD, MPH, MALD
NASA, Office of the Chief Health and Medical Officer	Marc Shepanek, PhD
ASC	Nathan Hoople
ASC	Dave Scheuerman

ASC	Keith Johnson
ASC	James Hilden
ASC	Tim Briggs
ASC	Joseph Orton
ASC	Bob Faulhaber
ASC	Dan Pickett
ASC	Erin Lancaster
ASC	Todd Eanes
GSC	Mike Gay
GSC	Tom Senty
ASC	Mike Raabe
ASC	Kim Bowyer
ASC	Celia Lang
ASC	Cameron Bortolussi
UTMB	Dr. McKeith
ASC	Erin Oliver
ASC	Dale Jacobs
ASC	Mark Bartram
ASC	Floyd Dial
ASC	Jack Corbin
ASC	Neil Miller
ASC	Mike Casey
ASC	Kyle Hoppe
ASC	Anthony Andrade
Best Recycling	Patrick Kenneth Bell
Best Recycling	Mark William Furnish
ASC	Mike Spatter
ASC	Dave DesAutels
ASC	Rick Campbell
ASC	Bill Ames
ASC	Ted Doerr
ASC	Kaneen Christenson
Damco	Rob Rolsky
Damco	Prince Duke
ASC	Mike Santos
ASC	Andre Fluette
ASC	Ches Goldston
ASC	Andy White
ASC	Rob Robbins
Intesa	Matt Morse

AIMS Charrette

Date: 13 JUL 2015

Printed Name	Company
Judy Shiple	ASC - LM
DAN MILLER	OZ-ARCHITECTURE
Abby Vieregg	University of Chicago
Cole Kelleher	Polar Geospatial Center
Richard Boehme	Merrick
Thomas Nylen	UNAVCO
Andrew Klein	Texas A+M
Jason Hebert	IRIS PASSCAL
KILEY BAHAM	OZ ARCH
BILL KONTESS	MICHAEL BAKER INTERNATIONAL
Christy Hansen	NASA - Goddard
John Goodge	U Minnesota Duluth.
JOHN ~~GEO~~ STONE	UNIVERSITY OF WASHINGTON
HOWARD CONWAY	U. WASHINGTON
JOE LEVY	UT-AUSTIN
Amy Chiuchiolo	Montana State University
Phil Wirdzek	I2SL
Anne Todgham	UC DAVIS
SEAN PLACE	Sonoma State Univ.

AIMS Charrette

Date: July 13, 2015

Printed Name	Company
CHRISTINA CHENG-DEVRIES	Univ. of Illinois, Urbana-Champaign
DENEB KARENZ	UNIV OF SAN FRANCISCO
JOE FERRARO	Ferraro Choi-Architects
Kim Claucherty	Ferraro Choi + Assoc.
DAN DOZER	JACOBS
Kevin Porter	NSF - Large Facilities Office
STEVE DUNBAR	ASC - Lockheed Martin
ESTHER HILL	ASC - Lockheed Martin.
TRACY TAFOYA	OZ ARCHITECTURE
Nature McGinn	NSF
DAN HARRINGTON	MERRICK & CO
Bija Sass	ASC - PAE
JON DELAY	MERRICK & COMPANY
Aaron Seal	Merrick + Company
Kevin Breslin	Merrick & Company
Rita Pittman	Lockheed - ASC
KEVIN GIBBONS	ASC - LOCKHEED
Tony Buchanan	ASC - PAE
CURT LABOMBARD	ASC

AIMS Charrette Date: 13 Jul 15

Printed Name	Company
Ben Roth	NSF
MICHAEL DAVIS	ASC
BEVERLY WALKER	ASC
William Turnbull	ASC
Marianne Okal	UNAVCO
Phil Wirdzek	I^2SL
Xinzhao Chu	Univ. of Colorado Boulder
Cara Sucher	ASC
Bija Sass	ASC
Liz Kauffman	ASC
Thom Wilch	NSF
Chuck Amsler	NSF
LARRY MALE	ASC
Sune Tamm	ASC
Samina Ouda	ASC
Matthew Erickson	ASC
Pamela Jondreau	ASC
JOE LEVI	OZ
BYRON ADAMS	NSF/MCM LTER

AIMS Charrette

Date: 7/13/15

Printed Name	Company
Anne Burton	ASC
Mark Meekey	ASC
Mike Jackson	NSF
Kent Anderson	IRIS
Kurt Panter	BGSU
SLAWEK TULACZYK	UCSC
Scot A [illegible]	NSF
Lars Kalnajs	U-colorado / LASP.

AIMS Charrette

Date: July 14 - Tues.

Printed Name	Company
Larry Male	ASC-AIMS
Michael A. Davis	ASC-PAE
Bija Sass	ASC- PAE
Mark S. Meekey	ASC-LM
Cara Sucher	ASC
Matthew Lazzara	UW-Madison / Madison College
Lars Kalnajs	U. colorado / LASP.
Branden Neahusan	ASC-AIMS
Dave Winkler	ASC- AIMS
Mike Jackson	NSF PLR
Thom Wilch	NSF - PLR
Mark Kurz	NSF - PLR
Bev Walker	ASC-LM
Chris Fritsen	NSF - PLR
Samina Ouda	ASC
Matthew Erickson	ASC

AIMS Charrette

Date: July 14- Tues

Printed Name	Company
Deneb Karentz	Univ. of San Francisco
Jennifer BURNS	UNIV. Alaska Anchorage
ANNE TODGHAM	UC DAVIS
SEAN PLACE	Sonoma STATE
Marianne Okal	UNAVCO
JOE LEVY	UT-AUSTIN
Amy Chiuchiolo	Montana State Univ.
MICHAEL GOOSEFF	University of Colorado
BYRON ADAMS	BYU
John Goodge	UMD
Joe Ferraro	FCA
Kim Claucherty	Ferraro Choi
DAN DOZER	JACOBS
Sune Tamm	ASC
Nature MGinn	NSF
JOHN STONE	UNIV. OF WASHINGTON
Ben Roth	NSF
DAN HARRINGTON	MERRICK & Co
JON DELAY	MERRICK & COMPANY
Aaron Seal	Merrick + Company
Kevin Breslin	Merrick & Company

AIMS Charrette

Date: July 14- Tues

Printed Name	Company
William Turnbull	ASC
Curt LaBombard	ASC -LM
ESTHER HILL	ASC - LM
KEVIN GIBBONS	ASC - LM
Anne Burton	ASC
Tony Buchanan	ASC
Bev Walker	ASC-LM
Matthew Erickson	ASC
STEVE DUNBAR	ASC-LM
Kurt Panter	BGSU
Jason Hebert	IRIS PASSCAL
Kent Anderson	IRIS
DAN MILLER	OZ ARCHITECTURE

AIMS Charrette

Date: July 14 - Tues

Printed Name	Company
Thomas Nylen	UNAVCO
Andrew Klein	Texas A+M
HOWARD CONWAY	U. WASHINGTON
KILEY BAHAM	OZ ARCH
Abby Vieregg	U. Chicago
Cole Kelleher	PGC
TRACY TAFOYA	OZ
Richard Boehme	Merrick
Pamela Jondreau	LM

AIMS Charrette

Date: July 14

Break Out Session LDB / Town Science

Printed Name	Company
Ben Roth	NSF
Abby Vieregg	U. Chicago
Mark Neekey	ASC-LM
ESTHER HILL	ASC - CM
XINZHAO CHU	CU-Boulder
BYRON ADAMS	BYU
Dave Winkler	LM ASC
Don S	OZ
JOE F	F-C

AIMS Charrette

Date: July 14

Break Out Session 0930-1200 // TRACK 3 - DRY VALLEY & HELO

Printed Name	Company
DAN HARRINGTON	MERRICK & Co
JOE LEVY	UT-AUSTIN
Mike Gooseff	Univ. of Colorado
Amy Chiuchiolo	Montana State Univ.
Marianne Okal	UNAVCO
Liz Kauffman	ASC
Cara Sucher	ASC
Bija Sass	ASC

JACOBS
CONSULTANCY

Project: TUESDAY 9:30 7-11 **Date:** Track 2 Sea Ice

Scale 1/8" = 1'

ATTENDEE LIST	INSTITUTION
DAN DOZER	JACOBS
Bev Walker	ASC-LM
Andrew Klein	Texas A&M
CHRIS CHENG	U. of Illinois, Urbana
SEAN PLACE	SONOMA STATE UNIV
ANNE TODD Ham	UC DAVIS
Jessie Crain	NSF

AIMS Charrette Date: July 14

Break Out Session Sea Ice

Printed Name	Company
Chuck Amsler	NSF
Nature McGinn	NSF
Lars Kaluzji	U. colorado.
Deneb Karentz	U San Francisco
Matthew Erickson	ASC
Jenn Burns	UAA
Tony Bowman	ASC
Bev Walker	ASC-LM
Andrew Klein	Texas A+M
CHRIS CHENG	Univ. of Illinois, Urbana
SEAN PLACE	~~SSU~~ SONOMA STATE UNIV.
ANNE TODGHAM	UCDAVIS
Kevin Breslin	Merrick
Kim Claucharty	Ferraro Choi

AIMS Charrette Date: July 14

Break Out Session #1 DEEP FIELD SCIENCE

Printed Name	Company
SLAWEK TULACZYK	UCSC
Kelly Brunt	NASA GSFC
CURT LaBombard	ASC
Matthew Lazzara	UW-Madison / Madison College
Kent Anderson	IRIS
JASON HEBERT	IRIS PASSCAL
John Goodge	UMD.
Thomas Nylen	UNAVCO
Cole Kelleher	Polar Geospatial Center
JON DELAY	MERRICK & COMPANY
Kurt Panter	BGSU
Jessie Crain	NSF
Judy Shiple	ASC - LM
MICHAEL DAVIS	ASC-PAE
William Turnbull	ASC-LM
KEVIN GIBBONS	ASC - LM
BILL KONTESS	MICHAEL BAKER INT'L
Thom Wilch	NSF

JOHN STONE — UNIVERSITY OF WASHINGTON

Howard Conway — U. Washington

Susan Taman — ASC

AIMS Charrette

Date: 7/15/15

Printed Name	Company
Anne Burton	ASC
Mark Mackey	ASC
Larry Male	ASC - AIMS
Dan Harrington	Merrick & Co
Kevin Gibbons	ASC
Kim Clouchertry	Ferraro Choi
Joe Ferraro	" "
Dave Winkler	ASC
Ben Roth	NSF
Matthew Lazzara	UW-Madison / Madison College
Samina Oude	ASC
Sune Tamm	ASC
Tony Buchanan	ASC
Bill Turnbull	ASC
Esther Hill	ASC
Curt LaBombard	ASC
Rita Pittmann	ASC
Jon DeLay	Merrick & Company
Aaron Seal	Merrick + Company
Kevin Breslin	Merrick & Company

AIMS Charrette Date: 7/15/15

Printed Name	Company
Bija Sass	ASC-PAE
Nature McGrann	NSF
Cara Sucher	ASC
Bev Walker	ASC-LM
Kent Anderson	IRIS
Matthew Lazzara	UW-Madison / Madison College
JOE LEVI	OZ
TRACY TAFOYA	OZ
Jason Hebert	IRIS PASSCAL
Richard Boehne	Mesnick
Liz Kauffman	ASC-LM
Cole Kelleher	Polar Geospatial Center
Howard Conway	U. Washington
Lars Kalnajs	U. Colorado
KILEY BAHAM	OZ ARCH
Andrew Klein	Texas A&M
Thomas Nylen	UNAVCO
Kelly Brunt	NASA/Goddard
BILL KONTESS	MICHAEL BAKER

Ben Roth NSF

AIMS Charrette

Date: 15 Jul 15

Break Out Session FIELD SCIENCE SUPPORT

Printed Name	Company
MICHAEL A. DAVIS	ASC- PAE
KURT Panter	BGSU
William Turnbull	ASC - LM
Howard Conway	U. Washington
Michael Gooseff	Univ. of Colorado
Bija Sass	ASC - PAE
Liz Kauffman	ASC LM
JUDY SHIPLE	ASC - LM
Marianne Okal	UNAVCO
JOE LEVY	UT-AUSTIN
JOHN STONE	UNIV. OF WASHINGTON
Kent Anderson	IRIS - PASSCAL
Jason Hebert	IRIS PASSCAL
SLAWEK TULACZYK	UCSC
Thomas Nylen	UNAVCO

Track 1

AIMS Charrette Date: 7-15

Break Out Session Crary Lab

Printed Name	Company
Samina Ouda	ASC
Bev Walker	ASC
Jessie Crain	NSF
Xinzhao Chu	CU-Boulder
ESTHER Hill	ASC
KEVIN GIBBONS	ASC
Kevin Breslin	Merrick
Cole Kelleher	Polar Geospatial Center
DAN HARRINGTON	MERRICK & CO
[illegible]	EZ ARCH.
Matthew Lazzara	UW Madison / Madison College
Mark [illegible]	ASC
BYRON ADAMS	BYU
Deneb Karentz	U San Francisco
SEAN PLACE	SONOMA STATE UNIV.
ANNE TODGHAM	UC DAVIS
Jenn Burns	UAA
Andrew Klein	Texas A&M
Dave Winkler	LM - ASC
Ben Roth	NSF

AIMS Charrette Date: 7-15

Break Out Session DIVE /SEA ICE/BALLOON

Printed Name	Company
ANNE TODGHAM	oops! UCDavis
SEAN PLACE	Sonoma STATE UNIV.
CHRIS CHENG	Univ. of Illinois, Urbana
Lars Kalnajs	U. colorado
Mark Meehey	ASC
Aaron Seal	Merrick + Co
Andrea Klein	Texas A+M
Jenn Burns	
Cara Sucher	ASC
Matthew Erickson	ASC
Chris Fritsen	NSF
Chuck Amsler	NSF
Curt LaBombard	ASC
Dave Winkler	ASC
Deneb Karentz	U San Francisco
JOE LEVI	OZ

AIMS Charrette

Date: July 16

1.4.0 + 1.4.1

Printed Name	Company
Christine Eldridge	OZ Architecture
Anne Burton	ASC
Larry Male	ASC
Michael Davis	ASC
Mark S. Meekey	ASC
Cara Sucher	ASC
Mike Gooseff	Univ. of Colorado
Tracy Tafoya	Q
Cole Kelleher	Polar Geospatial Center
Matthew Lazzara	UW-Madison / Madison College
Lars Kalnajs	U. Colorado
Bill Kontess	Michael Baker
John Goodge	UMD
Rick Petersen	OZ Architecture
John Stone	Univ of Washington
Howard Conway	U. Washington
Jason Hebert	IRIS PASSCAL
Thomas Nylen	UNAVCO
Byron Adams	BYU
Kiley Bahana	OZ Arch

AIMS Charrette
1-4-2

Date: JULY 16

Printed Name	Company
Amy Chiuchiolo	Montana State University
Marianne Okal	UNAVCO
Kurt Panter	BGSU
Kevin Breslin	Merrick & Company
Jon DeLay	Merrick & Company
Dan Harrington	Merrick & Co
William Turnbull	ASC-LM
Michael Gooseff	Univ. of Colorado
Mark Meehey	ASC

AIMS Charrette   Date: 7/16/15

Printed Name	Company
Bryan Sass	ASC-PAE

AIMS Charrette Date: July 16

Break Out Session Crary Part 3

Printed Name	Company
Aaron Seal	Merrick + Co.
Beverly Walker	ASC
Kim Claudhurty	Ferraro Choi
CHRIS CHENG	~~Ch~~ Univ. of Illinois.
Joe Ferraro	FCA
Jenn BURNS	UAA
SEAN PLACE	SONOMA ST.
Deneb Karentz	U. San Francisco
CHRIS CHENG	U. of Illinois.
Marianne Okal	UNAVCO
Amy Chiuchiolo	Montana State Univ.
Dave Winkler	LM - ASC
BILL KONTESS	MICHAEL BAKER
KILE BAHAM	OZ Arch
Thomas Nylen	UNAVCO
JASON HEBERT	IRIS PASSCAL
Andrew Klein	Texas A+M
XINZHAO CHU	~~[illegible]~~ CU-Boulder

more other side →

AIMS Charrette

1.4.0 & 1.4.1

Date: July 16

Printed Name	Company
CHRIS CHENG	Univ. of Illinois
XINZHAO CHU	CU-Boulder
Deneb Karentz	U. San Francisco
ANNE TODGHAM	UC DAVIS
SEAN PLACE	SONOMA ST.
Andrew Klein	Texas A&M

AIMS Charrette

Date: July 17, 2015

Printed Name	Company
Pete Ridilla	NSF
Kim Claudherty	Ferraro Choi
DON SCHIEFERECKE	OZ ARCHITECTURE
Chuck Amsler	NSF
Tony Pierpoint	NSF
Chris Fritsen	NSF
Mike Jackson	NSF
Jessie Crain	NSF
Scott Borg	NSF
Dave Winkler	Lm - ASC
Ben Roth	NSF
Branden Neahusan	AIMS
Nature McGinn	NSF
Peter Milne	NSF -PLR
Mark Kurz	NSF
Thom Wilch	NSF
Kevin Porter	NSF
Tim Howard	NSF
JON DELAY	MERRICK & COMPANY
BILL KONTESS	BAKER

AIMS Charrette

Date: July 20

Printed Name	Company
Christine Eldridge	OZ Architecture
DAN HARRINGTON	MERRICK #6
Michelle Tombre	Lockhead Martin
Rita Pittman	"
Kim Claudhertly	Ferraro Choi
Scott Douglas	NASA / JPSS
Kevin McCarthy	NASA
Dave Winkler	ASC
BILL KONTESS	MICHAEL BAKER
PETE CRUSER	ASC
Jon Walker	NASA
Mark Harris	NASA / SCNS
Lance Mackie	Michael Baker
DAVE LITTMANN	NOAA / NASA
Bruce Thoman	NASA NEN
JON DE LAY	MERRICK & COMPANY
KEVIN GIBBONS	ASC
Jeffrey Scharf	ASC
Ben Roth	NSF

AIMS Charrette

Date: July 20

Printed Name	Company
~~Art Cayette~~	SOPP
Neel Pahl	PAE
MATT RUSHING	SOPP
Joe Harrigan	ASC
Alex Morris	PAE
Maggie Knuth	NSF
Paul "the meanie" Sheppard	"
Gregory Thomas	SOPP
Anne Burton	AIMS
Tim Howard	NSF
MATT MORSE	Intesa
ESTHER HILL	ASC-CM
MIKE SCHEUERMANN	NSF/PLR
Patrick Smith	NSF/GEO/PLR/AIL
[illegible]	ASC-LM
GARY CARDULLO	ASC-LM
Dustin Barrett	SPAWAR
Bill Munley	NASA/JPSS (AEROSPACE)

AIMS Charrette

Date: July 21, 2015

Printed Name	Company
Christine Eldridge	OZ Architecture
Anne Burton	AIMS
Dan Harrington	Merrick & Co
Joe Harrigan	ASC
Lance Mackie	Michael Baker
Kim Clauchertly	Ferraro Choi
Kevin Breslin	Merrick
Pete Cruger	ASC
Neel Pahl	ASC
Mark Harris	NASA/SCNS INEN
Scott Douglas	NASA / JPSS
Keith Cox	PHI
Nick Maffei	PHI
Kevin McCarthy	NASA
Jon DeLay	Merrick & Company
Joe Ferraro	Ferraro Choi
Michelle Tombre	ASC
Alex Morris	PAE
Brian Crocker	KBA

AIMS Charrette

Date: July 21, 2015

Printed Name	Company
Alex Taylor	Michael Baker
Dave Winkler	LM ASC

AIMS Charrette

Date: JULY 21, 2015

Break Out Session IT OPERATIONS BUILDING.

Printed Name	Company
Jeffrey Scharf	LM
KEVIN GIBBONS	ASC
Joe Harrigan	ASC
Kevin McCarthy	NASA
Jon Walker	NASA
Kim Clancharty	Ferraro Choi
Bruce Thoman	NASA NEN
Mark Harris	NASA NEN
Michelle Tombre	ASC
Patrick Smith	NSF/GEO/PLR/AIL
Alex TAYLOR	Michael BAKER
Joe Ferraro	Ferraro Choi
Tim HOWARD	NSF
Brandon Meahusen	AIMS
Dan Miller	OZ
Bill Koates	Baker

AIMS Charrette

Date: July 21

Break Out Session Airfield

Printed Name	Company
Dustin Barrett	SPAWAR
Gregory Thomas	SPAWAR
MATT RUSHING	SPAWAR
Jack Lawlor	109th
Blair Herdrick	109th AW
GARY JAMES	DOD LIAISON NSF
Maggie Knuth	NSF
JEFFREY HUFFMAN	ASC-LM
[illegible]	ASC-LM
Alex Morris	ASC-PAE
BRIAN CROCKER	KENN BOREK AIR
Neel Pall	ASC-PAE
PETE CRUSER	ASC-LM
JON DELAY	MERRICK & COMPANY

cr

AIMS Charrette

Date: 7-21

Break Out Session: Airfield (main room)

Printed Name	Company
LARRY MACE	LMASC AIM
Cara Smith	ASC-LM
Ben Roth	NSF
Nick Maffei	PHI
Keith Cox	PHI
Richard Boehne	Merrick

AIMS Charrette Date: 7-21

Break Out Session IT operations

Printed Name	Company
BILL KONTESS	MICHAEL BAKER
Lance Mackie	Michael Baker
NICK ICAMINA	BAKER
ART CAYETTE	SoPP
Scott Douglas	NASA JPSS
Bill Muncey	NASA JPSS (Aerospace)
DAN MILLER	O2 ARCH.
SHAGGY	ASC

AIMS Charrette

Date: July 22

Printed Name	Company
Christine Eldridge	OZ Architecture
Michelle Toubre	ASC
Neel Pahl	ASC - PAF
Dan Harrington	Mortenson
Alex Taylor	MBaker
Bill Munley	NASA JPSS (Aerospace)
Anne Burton	ASC
Maggie Knuth	NSF
Rita Pittman	LM-ASC
Scott Douglas	NASA JPSS
Dave Winkler	LM ASC
Lance Mackie	Michael Baker
Bill Kontesj	Michael Baker
Ben Roth	NSF
Kim Clauchertz	Ferrano Choi
Gregory Thomas	SOPP
Pete Creuser	ASC-LM

AIMS Charrette

Date: 7-22-2015

Break Out Session Remote Ops

Printed Name	Company
Jack Larlor	109 +L
Blair Herdrick	109th AW
NICK ILAMINA	BAKER
LANCE MACKIE	BAKER
BILL KONTOSS	BAKER
Jeff Scharf	LM
Tim Howard	NSF
Jna Roth	NSF
Maggie Knuth	NSF
BRIAN CROCKER	KBA
PETE CRUSER	ASC
Neel Pahl	ASC
SCOTT Douglas	NASA / JPSS
Jeff Huffman	ASC-LM
MATT RUSHING	SPAWAR
Gregory Thomas	SPAWAR
ARTHUR CAYETTE	SPAWAR
Dustin Barrett	SPAWAR

AIMS Charrette Date: July ~~[illegible]~~ 23

Break Out Session ____________________

Printed Name	Company
Christine Eldridge	OZ Architecture
Michelle Tambre	ASC
Kim Claucherty	Ferrara Choi
DAN HARRINGTON	MERRICK & Co
Kevin Breslin	Merrick & Co
Aaron Seal	"
Jon Delay	"
Lance Mackie	Michael Baker
KEVIN GIBBONS	ASC
BILL KONTESS	MICHAEL BAKER
Ben Roth	NSF
BRIAN STONE	NSF
MIKE SCHEUERMANN	NSF/PLR/AIL
TONY PIERPOINT	NSF/PLR/PESH
GARY JAMES	DOD Liaison to NSF
Pat Smith	NSF/GEO/PLR/AIL
Brandon Neahusan	AIMS
Dave Winkler	AIMS

Richard Boehne Merrick

AIMS Charrette

OUT BRIEF

Date: July 28, 2015

Printed Name	Company
LARRY MACE	LM
Rita Pittmann	LM

AIMS Design Charrette
Monday, July 27, 2015

	Printed Name	Signature
1	[illegible]	[illegible]
2	BILL KONTESS	[illegible]
3	Dave Winkler	[illegible]
4	Anne Burton	Anne Burton
5	JOSEPH ORTON	[illegible]
6	Nathan Hoople	[illegible]
7	Joe Levi	[illegible]
8	Don Schiferke	[illegible]
9	Rick Petersen	OZ
10	Christine Eldridge	OZ
11	DAN HARRINGTON	Merrick & Co
12	JOE LEVI (OZ)	
13	DON SHIEFERKE (OZ)	
14	KIM CLAUCHERTY	
15	KEVIN GIBBONS	[illegible]
16	Mike Gay	[illegible]
17	William Turnbull	[illegible]
18	Aaron Seal	[illegible]
19	SARAH MALE	[illegible]
20	Pat Finley	[illegible]
21	Ben Rath	[illegible]
22	Curt LaBonde	[illegible]
23	FRANK J. ARDUINI	[illegible]
24	Michelle Tombre	[illegible]
25	Erin Lancaster	[illegible]
26	Kim Bowyer	Kimberly Bowyer
27	Joe Harrigan	[illegible]
28	ROB ROBBINS	[illegible]
29	Dave Scheuerman	[illegible]
30	DAN Pickett	[illegible]

AIMS Design Charrette
Monday, July 27, 2015

31	Keith Johnson	KEITH JOHNSON
32	[illegible]	James Hilder
33	[illegible]	J. TODD EANES
34	Kyle Hoppe	Kyle Hoppe
35	[illegible]	Neil Miller
36	Tim BRIGGS	[illegible]
37	Jim McKeith	[illegible]
38	Steve Dunbar	[illegible]
39	Lance Mackie	Lance Mackie
40	Danielle McCoy	Danielle McCoy
41	Liz Kauffman	[illegible]
42	JON DELAY	Jon DeLay
43	Kevin Breslin	Merrick
44	Rich Boehne	Merrick
45	Kiley Baham	OZ
46	Christine Lurtz	Merrick
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AIMS Design Charrette
Tuesday, July 28, 2015

	Printed Name	Signature
1	Anne Burton	Anne Burton
2	Sydney Brown	Sydney Brown
3	Kevin Breslin	[illegible]
4	Brandon Noahse	[illegible]
5	Lance Mackie	Lance Mackie
6	Christine Eldridge	OZ
7	David Winkler	D. Winkler
8	William Turnbull	[illegible] out 10:30 - 1:00
9	Aaron Seal	[illegible]
10	RICK PETERSEN	OZ ARCH.
11	Kim Clauchertz	Ferrano Choi
12	DANI HARRINGTON	MERRICK & CO
13	Donald Schieferecke	OZ Architecture
14	Christine Lurtz	Merrick / Clurtz
15	Dan Pickett	[illegible]
16	Mike Gay	[illegible]
17	Tom Senty	[illegible]
18	KEVIN GIBBONS	[illegible]
19	FRANK ARDUINI	[illegible]
20	Carol Mahe	[illegible]
21	TODD EAVES	[illegible]
22	Ben Roth	[illegible]
23	Joe Harrigan	[illegible]
24	Michelle Tombre	Michelle Tombre
25	JOE LEVI	[illegible]
26	JOSEPH ORTON	[illegible]
27	Kim Bowyer	Kimberly Bowyer
28	Erin Lancaster	[illegible]
29	KEITH JOHNSON	Keith Johnson

AIMS Design Charrette
Tuesday, July 28, 2015

	Print Name	Signature
30	TRACY TAFOYA	[illegible]
31	Joe Ferrare	Joe Ferraro
32	James Hilden	[illegible]
33	Nathan Hoople	Nath Hoople
34	Steve Dunbar	[illegible]
35	JON DELAY	Jon C Delay
36	Mike Santos	[illegible]
37	DANIELLE McCoy	Danielle McCoy
38	Rich Boehner	Merrick
39	Kiley Baham	OZ
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AIMS Design Charrette
Wednesday, July 29, 2015

	Printed Name	Signature
1	Anne Burton	Anne Burton
2	Lance Mackie	Lance Mackie
3	Brandon [illegible]	[illegible]
4	Danny Rauchenstein	Danny Rauchenstein
5	Dave Winkler	[illegible]
6	Christine Eldridge	[illegible]
7	Donald Schieferecke	O2 Arch
8	KEVIN GIBBONS	[illegible]
9	Joe Ferraro	J Ferraro
10	Kim Claucherty	Ferraro Choi
11	Rick Petersen	O2 Arch
12	DAN HARRINGTON	MERRICK & Co
13	TRACY TAFOYA	[illegible]
14	DANIELLE McCoy	Danielle McCoy
15	Ben Roth	
16	JOE LEVI	[illegible]
17	Mike Gay	[illegible]
18	TODD EVANS	[illegible]
19	KEITH JOHNSON	[illegible]
20	Tom Sentry	[illegible]
21	Michelle Tombre	Michelle Tombre
22	FRANK ARDUINI	[illegible]
23	Kim Bowyer	Kimberly Bowyer
24	Erin Lancaster	[illegible]
25	Tim Briggs	[illegible] Briggs
26	JOSEPH ORTON	[illegible]
27	DAVE SCHEUERMAN	[illegible]
28	Stevie Dunbar	[illegible]
29	Nathan Hoagh	Matt Hoagh

AIMS Design Charrette
Wednesday, July 29, 2015

	Print	Signature
30	Daniel Pickett	
31	Jon DeLay	
32	Joe Harrigan	
33	ANDY WHITE	
34	James Hilden	
35	Rich Boehne	Merrick
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AIMS Charrette

Crary Breakout

Date: 7-29

Printed Name	Company
Kim BowyeR	PAE - ASC
Nathan Hoople	LM ASC
Danny Rauchenstein	PDC Inc. / FCA
Karen Brady	PDC
Robert Posma	PDC
Bev Walker	ASC
Michael Douglas	ASC
Keith Johnson	ASC
Tim Briggs	ASC
Aaron Seel	Merrick
Nathan Hoople	ASC
Kim Boyer	ASC
Danny Rauchestein	PDC
Kim Chaudhurty	FCA
Matt Emerson	PDC
Pat Finley	Merrick

AIMS Charrette Date: 7-29

Central Services Breakout

Printed Name	Company
ANNE SHAVER	OZ ARCHITECTURE
Christine Eldridge	OZ
JON DELAY	MERRICK & COMPANY
KEVIN GIBBONS	ASC
Michelle Tambe	ASC
Steve Dunbar	ASC
Ben Roth	NSF
~~[illegible] BAHAN~~	OZ
TRACY TAFOYA	OZ
DANIELLE McCOY	OZ
Erin Lancaster	ASC
JOSEPH ORTON	ASC
Lance Mackie	Michael Baker
Pat Finley	Merrick
JOE LEVI	OZ
Kevin Breslin	Merrick
Christine Lurtz	Merrick
DAN HARRINGTON	MERRICK & Co
DAVE SCHEUERMAN	ASC
Dave Winkler	ASC
Brandon Neehusan	ASC
Bill Kontess	Baker
DONALD SCHIEFERECKE	OZ

AIMS Design Charrette
Thursday, July 30, 2015

	Printed Name	Signature
1	Anne Burton	Anne Burton
2	Dave Winkler	[illegible]
3	Brandon Neahusan	[illegible]
4	Danny Rauchenstein	[illegible]
5	Aaron Seal	[illegible]
6	Rick Pfefer	OZ
7	Christine Eldridge	OZ
8	DANI HARRINGTON	METRICK Ho
9	Sydney BROWN	Sydney Brown
10	JOSEPH ORTON	[illegible]
11	Kim Claudherty	Fernando Choi
12	Joe Ferraro	" "
13	BILL KONTESS	M. BAKER.
14	Ben Roth	[illegible]
15	Jim McKeid	[illegible]
16	MIKE WINDLE	[illegible]
17	JOE LEM	[illegible]
18	Steve Dunbar	[illegible]
19	TODD EANEY	[illegible]
20	Chesley Goldston	Chesley S. Goldston
21	Keith Johnson	Keith Johnson
22	LARRY MACK	[illegible]
23	FRANK ARDUINI	[illegible]
24	DAVE SCHEUERMAN	[illegible]
25	Kim Bouyer	Kimberly Bouyer
26	ERIN OLIVER	Erin Oliver
27	James Hilden	[illegible]
28	ANDRE FOUSETTE	[illegible]
29	Christine Lurtz	CLurtz

AIMS Design Charrette
Thursday, July 30, 2015

30	Neel Fehl	ASC - PAE
31	Donald Schiefereck	OZ Arch
32	Kory H~~[illegible]~~	ASC - Pae
33	Mike Spatter	ASC - PAE
34	Tony Buchsbaum	ASC
35	Jeffrey Huffman	ASC - LM
36	Michelle Taube	ASC-LM
37	Kiley Botham	Merrick
38	Rich Boehm	Merrick
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AIMS Design Charrette
Friday, July 31, 2015

	Printed Name	Signature
1	Anne Burton	Anne Burton
2	Brandon Neuhusen	[illegible]
3	Michelle Tambe	[illegible]
4	Donald Schiefereck	[illegible]
5	Dave Winkler	[illegible]
6	Pat Finley	Pat Finley
7	DAN HARRINGTON	[illegible]
8	Joe Ferraro	Ferraro Choi
9	Rick Petersen	c.z.
10	Danny Rauchenstein	Danny Rauchenstein
11	JOE LEVI	[illegible]
12	BILL KONTESS	[illegible]
13	Kim Claucherty	Kim Claucherty
14	Ben Roth	[illegible]
15	Christine Eldridge	[illegible]
16	JON DELAY	[illegible]
17	Nathan Hoople	[illegible]
18	Rich Boehne	Merrick
19	Aaron Seal	Merrick
20	Kevin Breslin	Merrick
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AIMS Design Charrette
Monday, August 3, 2015

	Printed Name	Signature
1	Anne Burton	Anne Burton
2	Dave Winkler	[illegible]
3	Dale Jacobs	Dale Jacobs
4	Nathan Hoople	[illegible]
5	DAN HARRINGTON	[illegible]
6	Kyle Hoppe	K Hoppe
7	Christine eldridge	[illegible]
8	Aaron Seal	[illegible]
9	Donald Schieferecke	O2 ARCH [illegible]
10	Branden Meihusen	[illegible]
11	KILEY BAHAM	[illegible]
12	Pat Finley	Pat Finley
13	BILL KONTESS	MICHAEL BAKER
14	RICK PETERSEN	02 Arch.
15	DAN MILLER	O2 ARCH
16	Orlando Trujillo	[illegible]
17	Ben Roth	[illegible]
18	JON DELAY	Jon C DeLay
19	Michelle Tombre	[illegible]
20	MARK FURNISH	[illegible]
21	MARK BARTRAM	Mark E Bartram
22	Kimberly Bowyer	Kimberly Bowyer
23	PETE CRUSER	[illegible]
24	KEITH JOHNSON	[illegible]
25	Ren Carpenter	[illegible]
26	JOE LAVI	[illegible]
27	FRANK ARDUINI	[illegible]
28	TED DOERR	[illegible]
29	Tim Briggs	Tim Briggs

AIMS Design Charrette
Monday, August 3, 2015

30	DAVE SCHEUERMAN	[illegible]
31	James Hilden	[illegible]
32	Kareen Christensen	[illegible]
33	Ken Bell	[illegible]
34	Floyd Dial	Floyd Dial
35	Neil Miller	[illegible]
36	Steve Dunbar	[illegible]
37	Rob Kolsky	[illegible]
38	Prince Duke	[illegible]
39	Margaret Knuth	[illegible]
40	Paul Sheppard	[illegible]
41	Curt LaBombard	[illegible]
42	Carol Macc	[illegible]
43	GARY CARDUCCI	[illegible]
44	Bill Ament	William [illegible]
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AIMS Design Charrette
Tuesday, August 4, 2015

	Printed Name	Signature
1	Kiley Bahan	[illegible]
2	Anne Burton	Anne Burton
3	Nathan Hopple	Nate Hopple
4	Dave Winkler	[illegible]
5	Orlando Trujillo	[illegible]
6	Donald Schieferecke	[illegible]
7	Brandon [illegible]	[illegible]
8	Christine Eldridge	[illegible]
9	RICK PETERSEN	OZ
10	DAN MILLER	OZ ARCHITECTURE
11	BILL KONTESS	[illegible] MICHAEL BAKER INTL
12	DAN HARRINGTON	[illegible]
13	Kyle Hoppe	[illegible]
14	Ben Roth	[illegible]
15	JON DELAY	[illegible]
16	Kareen Christensen	[illegible]
17	Larry Male	[illegible]
18	MARK BARTRAM	Mark E Bartram
19	DAVE SCHEUERMAN	[illegible]
20	Margaret Smith	[illegible]
21	Paul Sheppard	[illegible]
22	Ken Bell	P Kenneth Bell
23	Michelle Tambre	Michelle Tambre
24	MARK FURTSH	[illegible]
25	GARY CARDULLO	[illegible]
26	Kimberly Bowyer	Kimberly Bowyer
27	PETE CRUSER	[illegible]
28	Mark A. Neely	[illegible]
29		

AIMS Design Charrette
Tuesday, August 4, 2015

	Printed	Signature
30	Prince Duke	[illegible]
31	Rob Rolsky	[illegible]
32	Nathan Williams	[illegible]
33	JOE LEVI	[illegible]
34	[illegible]	[illegible]
35	Robert Hutchinson	[illegible]
36	KEITH JOHNSON	[illegible]
37	Ron Carpenter	[illegible]
38	Neil Miller	[illegible]
39	Steve Dunbar	[illegible]
40	Alex Morris	Alex Morris
41	Rob Robbins	[illegible]
42	KORY Hottel	[illegible]
43	Mike Spatter	[illegible]
44	Bill Amos	[illegible]
45	RAY THOM	Ray Thom
46	Curt LaBar	[illegible]
47	Bija Sass	[illegible]
48	William Turnbull	[illegible]
49	Tony Welterlen	[illegible]
50	[illegible]	[illegible]
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AIMS Design Charrette
Wednesday, August 5, 2015

	Printed Name	Signature
1	Anne Burton	Anne Burton
2	Dale Jacobs	[illegible]
3	Dave Winkler	[illegible]
4	Nathan Hoople	[illegible]
5	KILEY BAHAM	[illegible]
6	Steve Dunbar	[illegible]
7	DAN HARRINGTON	[illegible]
8	Christine Eldridge	[illegible]
9	Donald Schieferecke	[illegible]
10	RAY THOM	Ray Thom
11	Kyle Hoppe	[illegible]
12	RICK PETERSEN	[illegible]
13	BILL KONTESS	BAKER [illegible]
14	Brendan [illegible]	[illegible]
15	Pat Finley	Pat Finley
16	Orlando Trujillo	R. Orlando Trujillo
17	MARK BARTRAM	Mark Bartram
18	Ben Roth	[illegible]
19	Larry Mak	[illegible]
20	Margaret Knuth	Margaret [illegible]
21	Paul Sheppard	[illegible]
22	MARK FURNISH	[illegible]
23	Michelle Tonbe	Michelle Tonbe
24	JON DELAY	Jon C. [illegible]
25	Amory Lovins	[illegible]
26	Titiaan Palazzi	[illegible]
27	GARY CARDOLLO	Gary Cardollo
28	Anthony Andrade	[illegible]
29	Robert Hutchinson	Robert A. Hutchinson

AIMS Design Charrette
Wednesday, August 5, 2015

30	John Rosenblum	[illegible]
31	KEITH JOHNSON	[illegible]
32	[illegible]	[illegible]
33	Mike Casey	[illegible]
34	DAVE SCHEUERMAN	[illegible]
35	FRANK ARDUINI	[illegible]
36	Floyd Dial	[illegible]
37	JOSEPH ORTON	[illegible]
38	Mark Neeley	[illegible]
39	Neil Miller	[illegible]
40	James Hilden	[illegible]
41	Joe Harrigan	[illegible]
42	Ken Bell	BEST Recycling
43	[illegible] HUFFMAN	[illegible]
44	Nathan Williams	[illegible]
45	PETE CRUSER	[illegible]
46	John Burns	[illegible]
47	DAN MILLER	O2 ARCHITECTURE
48	Mike St. Jean	[illegible]
49	JOE LEVI	[illegible]
50	Week Hust	[illegible]
51	Joe Bissonnette	[illegible]
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AIMS Design Charrette
Thursday, August 6, 2015

	Printed Name	Signature
1	Anne Burton	
2	Nathan Hoople	
3	Dave Winkler	
4	Brandon Newhouse	
5	Kyle Hoppe	
6	Donald Schieferecke	
7	KILEY BAHANE	
8	Christine Eldridge	
9	RICK PETERSEN	
10	Ben Roth	
11	DAN HARRINGTON	
12	RAY THOM	
13	Neil Miller	
14	Robert Hutchinson	
15	Lia Guccione	
16	Cara Carmichael	
17	John Rosenthal	
18	Chris Lyon	
19	Bill Kontese	
20	MARK FURNISH	
21	Michelle Tombre	
22	Rich Godlasky	
23	Nancy Clanton	
24	JON DELAY	
25	JOE VENI	
26	Mike Casey	
27	Anthony Andrade	
28	MARK BARTRAM	
29	FRANK ARDUINI	

AIMS Design Charrette
Thursday, August 6, 2015

30	Larry Male	[signature]
31	James Hilden	[signature]
32	Floyd Dial	[signature]
33	Ron Carpenter	[signature]
34	KEITH JOHNSON	[signature]
35	Ken Bell	[signature]
36	Steve Durber	[signature]
37	John Burns	[signature]
38	Pat Finley	[signature]
39	Margaret Knuth	[signature]
40	Paul Sheppard	[signature]
41	Del Jacobs	[signature]
42	Joe Bissonnette	[signature]
43	Dave Jula	[signature]
44	DAVE SCHEUERMAN	[signature]
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TRANSCRIPTS

OZ ARCHITECTURE
MICHAEL BAKER INTERNATIONAL
FERRARO CHOI
MERRICK & COMPANY

OZ Architecture Charrette Notes

Charrette Week 1
Washington DC/NSF, July 13-17

Mon July 13 (1.1)

8:30-10:15 (ASC /A-E Firms) Team Meeting

- Goal of this Charrette is to publish a Charrette Report, which documents 4 weeks of information used to move forward with design after review comments are gathered
- Broad spectrum of scientists participating in week 1 – Goal is to learn what their needs are, not what they currently have
- Focus on understanding priorities and project requirements in order to move forward. NSF gets this kind of money approximately every 10 years so there is a major push to get McMurdo and Palmer where they need to be
- Charrette – Preliminary Design Review (PDR) happens at 35% DD - Conceptual Design Phase to be completed by end of June 2016 – Phasing Plan to be presented to an external panel. Have funding in 4 years. Construction complete 2027
- 8 Design Build packages (Merrick/OZ)
- 6 Design/Bid/Build Packages (Merrick – Baker – OZ – Ferraro Choi) 30/60/90
- DB is generally faster and promotes better collaboration
- ASC feels they could get the best industry talent utilizing DB
- Designed to be a 35 – 50+ year outlook
- NSF doesn't dictate the science – what science should be supported comes from the community to NSF; It is a community-based granting structure.
- NSF has done outreach to entire Antarctic community
- Master Plan 2.0 shows where the buildings are going to be but space within the footprint can change. The idea is to start with big vision and narrow it down. Start with size requirements, number or rooms. Collect data so design can begin for the Program Plan.

Scope:

- Ross Island Earth Station will move to McMurdo
- Airfield Complex
- McMurdo Redevelopment
- Palmer Master Plan

Week 1 goal: Listening to the grantees

- How are they compromised at McMurdo currently?
- What is the latest technology that can help support their needs?
- Broad Spectrum of grantees coming in week 1
- Develop a platform that supports the scientists current needs which is also designed with flexibility for future needs and a variety of research
- Looking to find out the big requirements and constraints – how things need to be laid out to support the broadest range of science

1.1.1 10:30-12:00 (ASC) ASC Science Support

Introductions

- ASC is present as Subject Matter Experts and as a reference library - Grantees are presenting requirements

Shaggy – Goals for the week:

- Recognizing Masterplan 2.0
- Gather requirements in terms of infrastructure and space
- Question what can be done on the ice and what can be done elsewhere? How does McMurdo stay scalable and support future science? What is keeping grantees from doing their best work?

How does a grantee get lab space?

- Once NSF agrees the science is approved – the planning team works with the principal investigator (PI) and looks at all areas of proposal, including time/where/implementation considerations – and comes up with a plan.
- Planners work with the implementation team to cover the breadth of the project. Generally 2-4 year projects
- Come up with an Operational Notice to describe how science will be executed and determine the logistics
- Fill out a Support Information Plan (SIP) during season to deploy, which is a detailed plan for getting their work done on the ice. The SIP has a drop down list of what is available in the lab. If they don't have it and can't get it they let the grantee know. Look for alternates that can work.
- Research Support Plan is created which outlines the exact support NSF is providing. This is issued right before the scientist goes to the ice and is shows exactly what they need.
- Plan includes material goods, logistical support – summary of support needed for when they come to the ice
- Support plan comes out right before going to the ice – all folks in Antarctica will use the plan to make sure the science can happen
- ASC will tell grantees what is safe – such as if they are not experienced they will arrange to have a mountaineer go with them
-

Resource/Material Storage:

- How long is the equipment left there? Staging and Warehouse needs could change depending on this
- When a program finishes and items are left they can be incorporated into inventory. Have to decide if it stays, goes home or gets retrograded
- One of the biggest things left behind is drilling equipment (can stay 10+ years). Need space to accommodate these items
- Some groups collaborate so it doesn't belong to any one entity
- Operational notice (Contract between NSF and ASC) – they try to capture retrograde
- Inventory control issues do exist even though there are standardization practices

- Ideally the resources/equipment are returned to inventory if funding doesn't continue. Can take a couple of years to disassemble and ship back
- Grantees resources (not inventory) aren't always a part of McMurdo's inventory. Grantees are supposed to remove their supplies but often it stays pending approval of additional funding
- Need a closeout plan
- Need to work on inventory control – barcodes. Not at a level of modern inventory control
- McMurdo supports Pole – so there is a need to figure out a way to move inventory back and forth

Long term vs short term projects (Jesse)

1. Standard Field Project: 3-5 years science funding before 1-3 years of field work
    - Come in and do their work and leave
2. Long Term – Observation Projects over time, or one that involves installing equipment – funding for 5 years but will re-propose for longer period of time. Expect that they will commit the resources
    - Long term efforts that use drills may use an existing drill or a new drill (ice coring)
    - Have to commit to the resources

When a project stops being funded, items are returned – however the instrument might stay for a few years – or it just stays

- Jesse – There is a focus on autonomous systems where scientists aren't present for active research
- Dave – Will have more monitoring capabilities with new facilities
- Staging space is needed for scientists to stage and test and repair equipment before going out to the ice.
- If winter flights become routine there will be a need to learn winter needs vs summer needs
- If operating consistently during winter – might get requests for things they can't currently do, such as fly at night in the dark. Will have to decide on how far they push the winter model.
- There is interest in the shoulder season
- Can't ever level out the population in summer and in winter. Plan on winter population going up but summer would stay the same
- Need to be open to the possibility that the population might shift over time. Summer tempo – if we are going to keep the South Pole open then need to consider if they could move oil to be stored at Pole. It's a reinvention of how things ae being run. The key word is "flexibility".
- Science is the thin layer on top of everything else
- McMurdo trains scientists (students/post-doctoral students). Have conversations with grantees – can a technician do sampling? – Long way out if ever.
- On a facilities side – have a higher caliber of techs/smart city vision They will likely always need boots on the ground as well as good connectivity/tools that can monitor what is going on.

1.1.2	1:00-1:30	(ASC) Attendees	Introductions and Objectives, Rules of Engagement – All

Scott Borg (NSF):

- MREFC (Major Research for Engineering, Science, and Construction) is the funding account used for the South Pole Station and many big science investments. This will be used to fund

McMurdo. Develop plans to a stage deemed worthy of this budget; Engage with stakeholders at this point. We can reinvent the program to make it more efficient but do not have license to grow the program. Do better science by creating efficiencies.

Brian Stone:

- Grantees need to bring their perspective in broad sense. Get all ideas out of the table to design an infrastructure that will be flexible and efficient for a long time in the future. Hope is that this gets funded in 2017 by the President and Congress.
- Preliminary Design Phase (PDR) will lock in scope and cost.
- Building for 35-50 years – Run a program on seasonal work force and focus on better continuity of work force
- Think about what researchers could do during time away from McMurdo
- Built as an efficient program so there is more money for science.
- Fewer touches equals more efficiency and more safety.
- Want to get into the 2019 budget so need to submit in 2017. We are 4 years out to get funding for construction.

Schedule:

- Goes to external panel in September
- Design-Bid and Design-Bid-Build process and schedule to June 2016
- Final check before construction – Funding in FY 2019
- Construction complete 2027
- Bringing in external stake holders for initial discussion but will have additional opportunities as the process moves forward
- Congress understands there is no immediate return on investment and that this is not a profit center
- Team consists of Lockheed/Merrick/Baker/FC/OZ
- Master Plan 1.0 had been done many years prior to 2.0. Phasing changed in 2.0. Master Plan 2.0 is a refresher document.
- Footprint was consolidated from 104 buildings to 19 and 388,000SF.
- Acknowledge repeated requests for lab requirements that couldn't be accommodated before
- Need for staging space – equipment testing, repair, update. This is for all groups not just field
- Looked at training constraints

Winter Science:

- If winter science changes, that changes required resources
- RP – Design for high of 850 and a low of 200 people – even though this population is never really level
- Summer numbers may not go down but winter numbers could go up
- Brian Stone – Reduce/contain operation costs
- Counter with flexibility because it should include possibility that it COULD drop down from 850
- Keyword is "flexibility" – configured for one thing today while configuring for another in the future

1.1.3 1:30-2:00 (ASC) Review and Confirmation of MP 2.0: Goals, Assumptions, Parameters, Building Siting – All Attendees

Dave Winkler : Presentation of scope – Palmer Master Plan includes southern part currently. Ross Island. McMurdo. Airfield Complex, Overall IT campus package

Formal NSF Process. Preliminary Design is the next phase pending approval.

Understand requirements, adjacencies to provide wellness, logistical changes for design, and efficiencies while staying operational the entire time, has to be fully functional at the end of each phase

Serviceability of utilities is a goal

Work flow, with less wok touches = higher efficiency and safety

Rick P: Explain to Grantees about support facilities for scientific needs with 3 main missions**:**

- Improve logistical efficiency – reduce touch points
- Resource efficiency – e.g.: heat
- Improve quality of life

Will keep, grow, or shrink existing frames of lodging in order to reuse as much as possible

Overview:
Scope:

- Here to discuss Palmer/McMurdo and the Airfield Complex/Ross Island earth station

Evolution –

- National Research Council report
- Blue Ribbon Panel
- August of 2014 approval for conceptual design

14 design packages total (8 design/build and 6 design/bid/build)

Schedule

- Sept go to external panel (Feb 2017)
- Final check before construction 2019
- Construction complete 2027

Charrette:

- Unvarnished opinions from grantees to engineers/architects/designers

1.1.4 2:00 – 3:00 Material and personnel work flows and adjacencies:

Work flow

- Guiding principles – keep things working well in place (Lodging and Crary)
- Field science support near Crary
- Staging
- Contingency Plan – close to Central Services and storage near areas where goods are used.

Science operations overview:
Evolution of MP 1.0 to 2.0

MP 1.0

- Every 2-3 years look at
- 10 years since last master plan
- Started looking at efficiencies/touch points/how spread out things are
- Consolidation of footprint/material
- 104 buildings 600,000 s.f. – to 19 buildings and 388,000 s.f.
- Determines how and where to consolidate
- Utilities and serviceability of the utilities.
- Where is management and administration (currently really spread out)

MP 2.0

- Refresh – phasing changed
- Realized Crary was good for lab work but not field science support. Idea to build field science support and conn support with cargo.
- Trade shop should be close to cargo
- Site plan is pretty set
- Co-location of work centers and work flows
- Less touches = more safety
- Program of efficiency
    - Logistical (touch points) 7-11 touches
    - Resource (buildings that lose heat/send tanker to repair this/building envelope..)
    - Improve quality of life (happy/healthy/inspired)
- Re-use what we can – best sustainable solution is to not building anything new

Defining Parameters:

- Support a population of up to 850
- Need to make sure we have uninterrupted service to pole and base line level of science
- Scalability (grow or shrink through the life of these 50 year buildings)
- Leave basic infrastructure of power, water and fuel tanks
- Crary remains
- Contingency plan in place (Recreation Center serves as redundancy if main source goes down).

Guiding Principles

- Reflect seriousness/state of the art science being done in USAP mission
- Promoting environmental stewardship (reduced footprint/skin to volume ratio/envelope and systems)
- Wellness – individuals/collaboration/sharing of info
- Reflect United States and its permanence
- The design should be of its place – fit and work in the environment

Facilities at McMurdo:

- Crary Science and Engineering
- Warehousing (22 buildings down to a few strategically located warehouses) Will locate goods adjacent to where will be used.
- Outdoor Storage (looking to consolidate and reduce footprint)
- Central Services (consolidate goods and people, improve and streamline flow of people arriving and departing)

- Emergency Services/Contingency Operations (double duty with gym/medical/fire/small kitchen/back up emerge space)
- Light Industrial Trades/Carpenter's Shop (serves Science Support)
- Field Science Support (Field Gear Prep - needs staging area)
- Field Support Center (primary data center) - cables/wires/technological things – not just gear. Co-locate. Electr shop. Becomes more it centric/electronics.
- Equipment Operations (studying viability of keeping Vehicle Maint Facility). Ok if sometimes there is open area storing equipment that doesn't need to be protected.
- Traverse Ops and equipment winter storage (in VMF – studying if it should be on its own/shelter and cover equipment)
- Helicopter Operations (promoting and giving optimal support)
- Waste Processing (more efficient and create energy from waste)
- Lodging for 850 (singles that can also be made into doubles) democratic – all the same. 4 of the existing buildin have great bones.
- Dive Services/Sea Ice Storage (currently not optimized – fold into new facilities)
- Hazardous Waste and Fuels Processing

Central Services building comments:

- Service loading in the back so the building can sit up almost a story. Maybe put admin down low.
- Are there exterior walkways or a deck to sit outside? Need some efficient ways to get around and to provide wa move around the campus outside. (raised sidewalks/outdoor space)
- Vehicle staging is big concern
- For sea science – staging is by Crary. VMF is far away. New location is by diving services down low. Better link f sea ice.
- Frequent access to the runway – what is plan for vehicle transportation? Same format as existing.
- Want to have access to McMurdo year round (can't do everything during science. Much of construction will ha in the winter so summer is available)
- Historic preservation – do any have historic preservation – for example (Gerbil Gym and the coffee house and th Chalet). Some of this is a clean break.

Comments:

- Outdoor storage? Rick: Aware that it's ok to have some materials outside. Look at opportunities to stack highe balance with efficiency – unclear of how much of footprint is heated
- Shaggy – existing Science Support Center – Add addition and square it off and it becomes primary IT with NASA, have front space and field science becomes more cables and wires for IT, across from cargo. Field Science Supp staging large equipment
- Rick – how and why where they are: Centralized service yard in center of 155, accommodate efficient on load ar off-load
- Field Science – warehouse zones located around the staging yard
- Creates better entry and wayfinding experience
- Working with topography with good relationship with the land for loading and orientation towards the landscap
- Provide efficient and safe ways to get around but also options to move outside
- Grantee: (Rich) Vehicle Staging – Piston Bullies are currently outside of Crary
- Question about where is this happening – answer – Dive Services. More of a relationship between vehicle and S Ice

- NASA – question about access to sea ice airfield; Don – current route to sea ice runway is present
- Question about ship load and unload – where do you put cranes and forklift – considered part of Site Programm understand traffic flow and ASC knows they need to look further.
- Brian – evolution of 1st plan from Blue Ribbon Panel Report. Master Plan 2 represents the evolution of a constructible space. 2.0 deals with Blue Ribbon Plan concerns like consolidation. It is a new space that science g define. Bring practical knowledge to the table. Hoping to get McMurdo accessible year round – pushing constru in winter so summer research can be done
- New Field Support space – question about movement of large cargo. Question – is it big enough? Answer – dor know yet. Will know after modeling.
- Orient public spaces around central services and landscape
- Question about preserving historic facilities = Brian: Some of this is a clean break – but they are open to listenin ways to capture the heritage and history of the station.
- Shaggy explained the stages of demo, renovation and new construction – following MP 2.0
- Nick phone question – can you shift HELO pad movement to phase 8 because buildings will be in the way
- Understand that footprint is fixed but floorplans are flexible
- Brian Stone – construction expense vs operational expense noting the limited choices on what is available at McMurdo
- Brian Stone – Presidential Directive states that only supposed to do things in Antarctica that can be done in Antarctica

Shaggy – Phasing Plan shows order of demolition. Many parameters have gone into this phasing plan. 8 phases over 8 years (but not necessarily a phase per year)
NOTE: Not all phasing from MP 2.0 was touched on – this is a summary of detailed phasing from Master Plan 2.0

Phasing Plan (8 years total of construction)

- Many parameters went into the phasing plan
- Drainage/keeping ops going/views/pedestrian traffic/constructability/didn't want to move someone to temp space and then to final space.

Phase 1

- Pump water up to the tanks (potable/fire)
- Create rings for utilities
- Robust fire protection system/monitoring/
- Data center – outside ring. Nodes

Phase 2

- New building – traverse ops – winter storage
- New lodging – takes pressure off 155
- First Crary lab addition (house major utilities for the building/switch gear/risers) if we can get utilities in a new room – after that it is all just distribution.
- Building 189 – network ops/NASA workspace is left empty – easy to move

Phase 3

- First remodel of Crary – aquarium
- 209 – first dorm to be remodeled

- First remodel of the garage bay

Phase 4
- Central services is built
- Additional remodel of Crary
- More lodging work

Phase 5
- Fire/medical
- Chalet and 175/165/chapel demo
- Command and control is adjacent to admin.
- Crary remodel

Phase 6
- Admin and supply side of Crary remodeled
- Fire house and medical demo
- 206 lodging remodel
- Lounge/rec/skills enhancement /kitchen/storage/locker rooms
- New waste center

Phase 7
- Take down 203 dorms
- Helicopter ops and terminal (needs to be flushed out) – can't fly over open water. When heavy and full of gear – have to do a climb. If you start out in the gap – wind is in your favor – easier to fly out of and gives more flexibility.
- Big impact to move Helo – high in hydrocarbons
- Hazardous waste and fuels – zones of how things happen. Traverse ops and VMF needs to be handled by hazardous waste. Good to co-locate.
- Last phase of Crary remodel
- Trade shop/field science support
- 004 gets final remodel

Phase 8
- Last phase is demo of remaining buildings
- New lodging if needed

Utility loop (water/power/heat/fuel/IT and Comms)
- Entire campus is a loop – redundancy
- Skybridges – connect dorms/services/Crary – these move passengers indoors but it also keeps utilities in a conditioned space. Reduces maintenance and heat trace.
  - Central services is designed to be its own hub
  - Road crossings are tough so minimize these as much as possible
  - Change in fuel distribution – instead of trucking will be pumping
  - Can consolidate all utilities into one main utilidor that is conditioned.

- Existing medium voltage cable that is on poles – will go away.

Working on snow scouring and deposition modeling – need to understand snow management.

Operational costs:

- Bandwidth – costs are not going down. Expense that continues. Hope to be able to improve this.
- Need to keep the facility running for next 12 years.
- Making investments in network hardware starting next year. Segmenting network into ops/science/guest etc. which will allow them to manage the current bandwidth.
- Will wait to do this once they can control and prioritize the bandwidth
- Pushing to do things remotely as much as possible.
- "If I don't have to do it in Antarctica – I will do it somewhere else" – this is tied to presidential directive.
- Trying to get bandwidth through New Zealand so they have parallel tracks. Might make it possible to do things remotely.
- Building size and location is really set, but may change slightly after snow modeling. The interior spaces are malleable and this is where we need their input.
- Snow model will help us learn angle of roofs/walls etc.
- Initial report of computer simulated model – finishes around October.

Construction costs:

- Can get money for construction – but can't use it to improve bandwidth or to go to operational costs. MRSFC money can't be used for ops.

Demo Questions:

- Where does the building debris go? Need to deal with hazardous material first. Demo follows and is shipped to US for disposal.
- Question about demo activities for grantees going from lab to eat to sleep. Shaggy: return to grade.

Comments:

- Importance of multi-purpose spaces to support a variety of science now and in future. Can be meeting space, collaboration space, etc.
- Command and control is adjacent to Central Services
- What is the advantage to moving HELO ops? Over open water – heaviest load affects climb, new spot gives more flexibility Environmental concern – hydrocarbon issue
- How does loop system develop during the project? Entire campus is a loop with intermediate loops within. Prevents complete loss of utilities.
- There will be some temporary utilities while loops are being built
- Central services is its own hub of utilities
- Minimize road crossings
- Water- power- sewer- heat- IT. Pumping fuel to buildings instead of delivering fuel
- Consolidating utilities and into conditioned spaces
- Snow scouring and deposition modeling is going to be done by replicating topography and use 3-D printers and put it in a wind tunnel.
- Question about burning wood – Working with Rocky Mountain Institute. Will have the sustainability discussion in week 4 of the charrette.
- Still looking at snow management
- Grantee Suggestion to move Helo pad move from phase 7 to Phase 8 when the rest of demo is complete – becomes dangerous to fly through remaining buildings

- Grantee CU Boulder – large equipment could be a hazard to the people or the electromagnet interference. Needs daily vehicle access from Crary to Arrival Heights - and housing for winter scientist, and improve IT
- Answer – no plan to change access to Arrival Heights
- Arrival Heights access looks out of the way. Will need to look at a topo map to explore further.
- Antarctica may collaborate with New Zealand on a more modern plan for Arrival Heights – which is why it's not included in this plan
- Operation costs are still high for large bandwidth service. Understand people need to be on site but want to be sure to consider automation
- Want buildings slated for demo to not be occupied for any use. Idea of phasing plan Have to stay in operation until new building is ready for occupancy
- Phase 3 Crary renovations include new mechanical room (boilers, elect equip). Would continue to add on to the utility to get it where it needs to go
- Crary is a major remodel in need of grantee input.

1.1.5 3:15-5:00 (OZ) Science Operations Overview – All Attendees

- *DC1.1.5.1* Role of science within McMurdo

Skipped

1.1.5 3:15-5:00 (OZ) Science Operations Overview – All Attendees

- *DC1.1.5.2* Current operations/Challenges

Skipped

1.1.5 3:15-5:00 (OZ) Science Operations Overview – All Attendees

- *DC1.1.5.3* Scalability of Spaces

Skipped

1.1.5 3:15-5:00 (OZ) Science Operations Overview – All Attendees

- *DC1.1.5.4* Anticipated science

Skipped

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

Tuesday the focus is on science. Don S – Understand the "business model" of their work. Wednesday will be a discussion on their needs within the buildings.

Questions for breakout sessions – printed.

Some people are interested in airfield conversation so they can call in next week if they would like to listen/participate. Don S to present concept plan for airfield.

Take-aways from Brian:

- Elements of the operational design may change the facility design
- Being billed as an efficiency project
- Ben talks about prominence but not at the expense of something else. If we can

accommodate something that is making it more efficient then it is a win-win

- Economics – Want to save money in Ops to be able to have more science
- If you save money you will use the savings to actually do the maintenance to what is needed. Right now, only 50% might be getting done.
- Currently have enough fuel storage for 2.5 years. Need to get to 3 if you want to do a fuel vessel every other year. This isn't what they are interested in really saving. Save by reducing number of people.

Grantee Concerns:

- Grantees worried about getting around with demo and debris around the site during construction
- If HELO is moved where shown – you will have high hydrocarbons – look into this in more detail. Also issue of flying into the wind with a heavy load and not being able to fly over water.
- Shift HELO location to Phase 8 from Phase 7
- Atmosphere/remote sensing/stratosphere etc – they don't want this equipment to be a problem. They need daily access to reach Arrival Heights – even in the winter
- If winter flights – some of the science can be done in the winter. Figure out how to house winter scientists.
- Figure out how to improve the network so they can do real science in the winter
- Assure daily vehicle access to Arrival Heights – this can be done but in bad weather it is a challenge. There is to plan to change access to Arrival Heights – due to ongoing discussions with NZ – more modernized facility as they have better standards. This was judged not to hold in this Master Plan. This could be done independent of this. NSF pushing to have this be remote access from US
- Winter office space
- How much can they improve network speed? Operational expense – hope to improve
- Electromagnetic interference
- BSC needs staging area
- Energy discussion in week 4
- Working with Rocky Mountain Institute – looking at renewable and alternative energy sources (looking at micro turbines and waste to heat)

Tues July 14 (1.2)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

Modify agenda to discus Crary constraints Wednesday morning – not Crary mechanical constraints

ENERGY Discussion (week 4)

- Undecided are R values, solar, wind, geothermal.
- Think tank people working on this in week 4
- Wind change
- Sun isn't year round - Need to determine a year round solution
- Wind charge when blowing, sun charge when shining – always see clean power. Most power outages are from wind blowing too hard
- Micro turbines could be an option (third tier back up)
- More we know footprint/envelope – can make good energy decisions
- Will come out of the charrette knowing what we want to model

- Need design solutions that work year round
- Week one day two: Need to know if they need uninterrupted power
- Energy isn't specified in AE scope yet – closest to Merrick's – but this will be discussed after Charrette (as well as LEED)
- Shaggy: Long range operational costs are important for this in the Preliminary Design Review
- Dave: Need to know what is actually going to be modeled when it's time to do the Energy Model – Many factors, including envelope, CHP
- Factor in political considerations with New Zealand as McMurdo wants to be as self-sufficient as possible.
- Dave – Note that walkway discussion needs to happen – can discuss exterior and interior as filler time throughout week 1 agenda

What we are looking for from the grantees:
Morning Session:

- Here to focus on work as it is today
- Focus on their current work and process. Not the details right now – this will come tomorrow
- Walk us through arrival to McMurdo and time until you get back on the plane.

We can reinvent the program but we can't GROW it. Do Better science by gaining efficiencies.

WHERE DO YOU SEE THE GENERAL NATURE OF SCIENCE GOING:

- Challenge in answering this question – report from National Academy of Science is being developed. Group trying to lay out the big questions. Not out yet.
- Crary is an opportunity –Grantees know what is there so they write their proposals knowing how to use that resource. Doesn't have everything so have to think about what you need to do to get all of your science done.
- Dry Valley – focus on the ecosystems of the ice habitats near McMurdo.
- SCA Horizon Scan did extensive survey. This group spells out what the group sees for Antarctic science in the future.
- Biology – whatever you are doing – it is going genomics and molecular for the most part. Involves collecting samples and taking them back to the university.
- Should look at renovation as what each need is for their science and community.
- 4 differing science wings and one central services wing currently in Crary. Now cooperating/collaborating as one center:
    - Sharing labs – flexible systems (adaptability)
    - Sharing circulation
    - Sharing offices
    - Cannot accomplish all the work needed down at McMurdo so do the field work and continue/complete the work at home. McMurdo is a good field reserve station.
    - Need efficient storage and staging and movement of materials (efficiency)
    - Need efficient movement of people – dorm/galley/lab (quality of life)
    - Energy – new MEP and heating (reliability)
    - Operation in shoulder seasons (adaptability)
    - IT services w/ backbone (reliability)
- Hard to accomplish it all when there. Most of work is still done at home so this should be looked at only as a place to do good field science.
- More and better science – UNAVCO AND PASCAL – good advancements in things like battery

technology. Funded science still growing. Higher than current. Consider what anticipated work 12 years down road. What happens next? How can science grown within a fixed footprint?

- Deep field science has grown with remote sensing capabilities
- Confidence in scability of the master plan gives us confidence for growth and contraction.
- Growing area of science is Airborne Science. Ice Pod Project (this will be increasingly used). Putting instruments on the LC-130's.
- Meteorology – weather stations – getting to point where future is more sophisticated installation. Still going to get acquired information with future coming technology. Expanded seasons – if they can stand extreme weather. Since all controlled with money – may not get as much funding as they all hope for.
- Crary was built with a pod that never got used as designed. Spaces need to meet the intended use (i.e., benches in Atmospheric science lab that can hold the weight of heavy equipment).
- Winter Flights – will grantees propose to do work at different times of the year? YES
  Winter offers better conditions for their science (Atmospheric – ideal to do it in July - UAV's)
- Doesn't mean lower in summer – just more in winter.
- NSF – outlines winter science that can be done. This would be substantial contributions to the summer science support.
- Doing Micro-biology to test the samples – know that they have what they came for. They may only have 2-3 field times to do this. The real science happens at home vs. reconnaissance science (preparing science to happen at home).
- Scientists do analysis of what is needed to decide if the sample or experiment is correct (diversity of the sample). Vs. analysis done to publish their paper. Don't leave McMurdo with a science paper written.
- Increased throughput of samples at Crary and some processing in field at Crary vs just collecting and sending home. Equipment size may reduce but more systems may be desired.
- Need sufficient facility to make sure you are on the right track to do your science.
- Water Samples – need to get them analyzed before they get home. Time sensitive.
- Samples may not make it home – ie. Count live and dead. Must be done at Crary. Need facility and time to do this.
- Might need to stay past Feb.
- Technology – As it advances (ie. GPS) it changes. For example, you used to want 2 of something but now want 20 because it is smaller and more transportable. Instead of large batteries- new technology. 2000 lbs vs. 400 lbs. Instead of 10 heavy/large systems, you might have 20 systems that can be lighter and easier to deploy. Equipment could go up in count not go down (size goes down)

1.2.0	8:30-9:30	(OZ)	Review previous day's work – All Attendees
Rick – Reminder that today is about listening and understanding operations for doing work as a way to build a more efficient McMurdo			
Morning is for breakout sessions with the afternoon used to share information from breakout sessions			
Divided by process and operation for each of the 4 tracks to be discussed			
Important for us to understand how it happens today and how you see it evolving.			

Each breakout session to have a spokesperson that will debrief in the afternoon sessions

Charrette Report:

- Grantee question – do they get to see end result? Yes – Charrette book will be published and review that we heard the correct things
- Will it go to general community? Go to stakeholders and associated teams but not to general community
- Will not be distributed to public due to not having background info – although will be sent to broader group of stakeholders
- Active participants are providing input and will have access to Charrette book

- Rick – tomorrows focus is on facilities but today is broad view of what work is and where it will be going
- Thursday is shared facilities with more time to follow up on other science needs
- Week 2 integrates Allied Users and Tenants with similar format – understanding facility and operational needs
- Weeks 3 – 4: Concentrates on what we heard in 1 and 2 and integrating with ASC leadership in Denver and confirming and validating and testing designs against Master Plan 2.0. To see how we can infill the perimeter of Master Plan 2.0
- Week 4 will be more infrastructure and energy to serve all the buildings
- Participants are all welcome to call into any of the sessions.

Joe Ferraro – Overview of Crary – Slide Show Presentation

- Look at Challenges as Opportunities – if one knows what's there then they can write a proposal based on knowledge of what is there (at Crary)
- Lot of science involves taking samples in Antarctica and taking them back home for analysis
- Always supporting core sciences – how does the facility enable you to do your work?- In the end – most of the work is done at home
- Deep science moving towards autonomous observation
- Consider today's work and down the road work and see what can happen next – How do you grow amount of science within a fixed footprint
- Meteorology – more sophisticated systems installed even though they don't grow but still need to collect data – Crary -concern is that space was never used as it was designed – i.e., benches were not designed to hold the weight of equipment that is put on them.
- New facility designed for flexibility

Impact of winter flights:

- Grantees can propose science at different times of year
- More work in winter, not necessarily less work in summer
- Non science work/internal work flows can be more dynamic

- Emphasis on Dynamic, Flexible, Efficient
- Joe L – more science at home, time constraints in field
- Consequence of design and finding
- Collecting samples to analyze
- Then doing analysis at lab
- Want to know they have what they came to get in a certain number of field seasons
- Adapt science program to different uses
- Reconnaissance Science vs Real Science
- Capturing the diversity that you came to do vs capturing science to publish paper at home
- Need sufficient facility to do the science you came to do
- Need facility for time sensitive process: Need facilities, need time – make use of facilities that don't get recommitted to someone else (example – water samples)
- Instead of less systems – could be more but smaller systems
- Could increase volume of equipment

1.2.1 9:30-12:00 Break-out Sessions - Science

1.2.1.1 (OZ) Track 1: Deep Field Science

- Brenda – How ice has changed over time in Antarctica and how it relates to climate and ice change
- Remote field camps of 6-7 people. Self-sustaining then moved by twin otter or helicopter.
- John Stone – collect samples surface rocks – large amounts – 800 lb. of rock shipped out every year.
- Collect amounts of fossil algae.
- Typical or challenging stream of flow – have to get them back throughout the season – packaged and shipped to us.
- Bio material has to be kept cold and get back to US quickly because they will degrade over time. Send back Comair. Sit at McMurdo outside and temp is cold enough – concern is back in the states for temp. Want samples back to US in 2-4 weeks.
- John Stone – Fill up staging space – empty again.
- Howard – Radar equipment to check ice thickness. Using seismic equipment to check ice thickness – collaborates with Paul Henry who needs special drill.
- Aircraft is his focus – 5 or 6 people. McMurdo needs – loading hard drives. Equipment: 600-700 pound drills that they bring. Pascal and UNAVCO needs – seismic equipment – 400 lbs. Geophones
- How much logistic capacity do we need? – Cover on Wednesday. Today is big overview get

	more specific throughout
•	Kent – IRIS – seismic observation 10 – 15 different experiments a year in Antarctica – permanent observatories and portable experiments that consist of sensors throughout remote places – autonomous observation – trying to fit into smaller spaces – the more instruments you put out the more info you get. Smaller and Lighter = more and better science. More channel (location). Easier to ship because smaller but want to ship more. Have transportation needs – camps, telemetry. Ease transportation logistics by doing things remotely. Multi-year, multi-disciplinary that share coordination and logistic experiments. Move a lot of gear and don't have the space – storage of cargo, staging of equipment. 4 – 5 Pascal employees on the ice at one time.
•	Cole – Polar Geospatial Science – support side. Not deep field but mapping. Needs to be accessible to logistic and science. More deep field science is happening so increased need for satellite imagery. Bandwidth is issue. 1 – 2 people per season for on-demand maps. High resolution maps
•	40 – 50 people. Multi-disciplinary drilling. Collect samples. Bringing biological samples from deep field has challenges. Biggest challenge is that bio samples coming from deep field is fairly new. Now – come in with a grantee to discuss storage. Temperature is a main concern. Used to be ice cores kept frozen – now trying to keep samples from freezing (Michael)
•	Kelly Brunt – NASA 40-50 people. Have own aircraft. Transporting that many people around – have meeting space big enough for that many people. 5 – 10 instruments need operators, transportation. Convene at McMurdo – big team meeting to discuss long goals. Transport to Pegasus (or where ever flying) – coordinating large number of transport. Have a camp at Pegasus would be nice. Jesse – becomes a large operational expense. Environmental issues come into play as well.
•	Thomas Nallen – UNAVCO. Co-op Provide seasonal equipment distribution. Expanding into using same equipment for multiple years in remote areas. Have 50 sites running autonomously. Increase in perma-stations (run year round). Terrestrial. Up to 5 people. Ship equipment to both hemispheres. Big projects – get funding after they start the project so they have to buy and ship equipment. Not enough space at Crary for prep work. Forced to do it that way because of the timing of funding. Did a lot of assembly and testing in McMurdo – which is a challenge. Reconfigure some cargo for shipping to the ice than shipping to deep field. Want things assembled as much as possible. QC is important – need to check equipment once it arrives at McMurdo before shipping to deep field. Need safe space for testing materials.
•	Matthew – Weather and Climate – AWS. Deploy 4-5 people per year. Installation removal services repair of weather stations. Visit about 20 stations per year. Some close to McMurdo and some farther away. 7-8k lbs of cargo with a couple thousand pounds being shipped out. Have space issues – cargo line – have to haul it to Crary shipped from Wisconsin, then shipping to field. Use every form of transportation possible. Helicopters take them last minute so have to be ready at a moment's notice. Have to take advantage of that. Also suffer from timing of funding. Different groups share the same space.
•	Kurt Panter – Geology. Studies volcanoes cryosphere and tectonics. 4 – 8 people. Get in and get ready for the field. No equipment that comes down – just camp in the field. McMurdo needs is lodging as getting to the field as quickly as possible. Collect rock samples. Would ship 1,000 pounds of ice annually. Twin Otter, HELO transport.
•	John – Geologist – Deep field small party tent camp deployment 4 – 6 people using HELO, twin otters with snowmobiles in the field. Main mission is to get through McMurdo as staging

station as quickly as possible, with equipment and food. Self-contained by the time they leave McMurdo. Key issue is you never know how long you will be there because of weather so they would like office space while there. Bringing back rock samples – as much as 15,000 pounds. No 2 – Geophysical surveys – helicopter and twin otter support for 20 people – need bench space to set up and test equipment, this involves more equipment so need to coordinate with aircraft. No 3 – Traverse type operations – heavy equipment – building a new drill. Will be deployed with 15 people traveling with it – need access to tractor shop and mechanical equipment with heavy sled transport capability. Builds on other groups experience in terms of launching from McMurdo. Using sleds to move material from McMurdo but fairly autonomous once deployed.

- Ice core community is not represented in this breakout. Need ice core samples to stay cold. 60-70 people. Couple year buildup of a camp, couple years occupation, transportation of cargo, equipment, then retrograde.
- "Hub and spoke" to camps because camping out is too expensive. Get out and consolidate logistics.
- Every 5 years Program makes available a remote field camp to people of all disciplines. Can pool helicopter resources. Supports with helicopters that are remotely-based. TAN camp – 50+ grantees that state, prepare, meeting at McMurdo. At this camp there could be 20 different projects but have pooled resources. Go through same process at McMurdo – go out to central area and then go out from there.
- Spend time at the beginning of the season unpacking and doing inventory
- Crary was meant to be transient space with 4 permanent set-ups (Matthew). Can use for the season then leave but a few use the same space over and over – from beginning of season to the end. So they spend a lot of time packing and unpacking.
- Tracy – touchdown space vs dedicated space. Lack of dedicated space. Make sure that at the permanent space is permanent for the duration of the grant period. So that it's multi-functional for who comes in next.
- Lack of space for receiving staging, lake of storage, having to move cargo too far
- Concern – where are they setting up shop? Staging areas evolved – weren't designed to be staging areas. Lack of readily accessed to handle equipment.
- Need access to the outdoors for certain equipment testing. Have had to shuffle and juggle needs for loading while trying to get work done. Need separation – physical movement, clean areas.
- Restaging after staging is a concern. Slope to loading dock is muddy, icy – etc.
- Geologist – space to promote interaction and ideas and use of facilities, would like collaboration space. Collaborate on scientific spaces to help each other. Working in Antarctica is a lot about experience.
- Riggers – deploy metal to maintain communication towers and grantees use it for support when installing towers. Currently in Bldg. 136.
- Resources for new grantees. "Siloed" – knowledge you don't know about it.
- Synergy with grantees – carpentry field foreman – building 191. Camp management – come through – consolidation – ASC function. Field Camp Management.

- NASA – concern with still having gravity based stations – long term gravity station looks like it is being demolished – Ice Bridge is going to have a concern with this and Magnetic Based Station. Gravity – concrete plug that provides a known point for calibration. Throughout town that are important to keep. Need to consider what long term geo control points you need to maintain.

- Lodging – sharing room issues – personal issues. Role for short term housing? Transients are being factored into population. Station manager perspective – helps having uniform offers. Slightly different configuration for transient population – "micro-room" set up.
- Provide surge capacity
- Consolidate training – a lot can happen before arrival at McMurdo.
- Desire would be virtual training.
- New people would likely have to have some on-site training
- Transition question – potential to impede science? Imposition? Understand how things still need to function during transition.
- Develop a science phasing plan in addition to construction phasing plan
- Take funding into consideration for what is happening at the time of transition
- Wayfinding goal is to make it easier. One stop shop. Or point of contact on ASC side.

What works well at McMurdo?

- ASC staff is great and works really hard to make sure grantees have what they need. Have to walk around a lot of McMurdo to find them. Would be nice to get from one person to the next without difficult access.
- Black Binder of info could be a little better
- HELO Ops is close to Crary – Science Staging
- Prevent work flow issue. Group that utilizes helicopter hanger with staging area
- Like that all science is at Crary
- Have to have key card currently to get in Crary
- Some interaction has to happen outside of Crary because others don't have access to Crary.
- Maintaining common space – like library, which was meant to hold books and magazines but is not serving its purpose as collaborative space. Has become more of a lounge where people can come out and work on papers or talk. Has beautiful views. One of few places where you can gather and see the view. Quiet due to its remote location. Building is open during business hours
- Trades people spend a lot of time maintaining facilities and that time will decrease with new

facilities

- Allow social spaces to be programmed different in different spaces
- Collaboration outside of the group – have extra resources come in handy (not retrograded)
- Com system and cargo system work well
- Leaving less on the shelves means good planning
- Of available resources – balance with heads-down space and social interaction space (as a resource)
- That works good in Crary – but different for Air Ops
- Closer to work? Or have office space? More efficient to have access to tools, laptops, - good thing about Crary is that it's near office – need training space at Crary. Want to maintain contact with other scientists.
- Grantees are trying to get work done quickly. If space is there for interaction, they will make use of it. Having space for people to set up gathering space, i.e. "micro-lounge" would be good for facilitating conversations.
- Not knowing who to talk to is more of an issue that not having the space.
- More access to food throughout the day/night is good

Where do you see Science going in future?

- Able to send out smaller but more sensors
- Separate budget for logistics and for science
- Putting equipment on AU's and drones
- As they miniaturize and make autonomous might put more people at McMurdo because you aren't at a field camp
- Once deployed then could optimize logistics – more remotely.
- More drilling projects that involve more traverse. Sees fewer small groups going out
- More desire for traverse platforms
- More bandwidth – for voice and data
- Motto – lean mean and green – just a drilling project – less scientists with platform.
- Process of instrumenting more science in the field – have to store that data. Traversing, Aircraft, Data Support
- Platform observing on the ground – semi-permanent research will still be around with more sophisticated technology
- More work throughout the year
- Possible boating problem

After Lunch Follow Up

Michael Davis - Does Black Book help? Not really…

ASC – need a better balance.

Byron Adams joined after lunch- 6 person camp to Shackleton camp, taking biological samples that are temperature sensitive. Groups of 3 are helicopter supported to different parts of the glacier back to McMurdo and then science transferred back home. In-situ transfer. Not just DNF – but KC.

Recap how team works-interacts with McMurdo.

Big project vs Small project

- 4 – 5 or 40-60. Big swing of accommodation as your processing through to accommodate various sizes.
- Need to accommodate 50 people for meeting
- Smart phones on the wi-fi for rapid communication
- Currently using pagers, one person per team – lot of chasing people down
- Lack of being able to communicate is an issue

Ben: Summary of getting to and from deep field:

- RP – 1. IRIS – on ice – training – find out where cargo is and when it is arriving. Unpack – test equipment – repack – back to science cargo to field camp. Grantees scheduled on flights – C130 travel with cargo. Wait for good weather to the field.
- Ben – Palletize cargo in Crary sometimes, Grantees tag the cargo, in Field Science Cargo loads it and tracks it.
- Grantees sometimes accompany cargo to helicopter or cargo processing. Issue of going up and down slope with cargo. Lots of touches. Fixed Wing once you palletize them for fixed wing you can't change to HELO.
- Have requested dedicated resource support but have to use shared resources
- Build pallets based on the type of transport you are taking to deep field. Pallets are made – grantees load equipment ON the pallets and band them. Michael's shop prepares it for shipment then to staging.
- Same process when coming out of the field
- Matthew – look for what you are expecting but also what is already there that you can use.
- Ben – out of the ordinary processes?
- Question – what is special association and what is the sequence?
- Possible to set up diagram of functional places for each group to note where they go and how they get there? Can see commonalities. Can we include this in the questionnaire?
- Tracy – testing gear and then have to move it while someone else needs the space.
- For example Tents – have a set of areas that provide space for sequencing of testing/staging

1.2.1.2 (FC/OZ) Track 2: Local Science: Sea Ice

- Rename to Sea ice Support Facility

- Research/Teaching group types:
- Seals
- Fish
- Invertebrates
- Penguins
- Teaching Course
- Sediments
- Algae
- Plankton
- Ice
- Atmospheric Science

Program would include:
- New dive facility
- Sea ice user storage - eliminate need to move non-essential equipment back to lab / office
- PistenBully storage – indoors to relieve need for plug line, people forgetting to plug in
- Direct access to Crary
- Balloon Facility – weather twice a day, science 6 – 12 times per season

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- Locate fueling nearby to reduce travel time and wear & tear on equipment
- Year round access to McMurdo means possibly 2 research locations to access in winter
- Need some flexible space, possibly PistenBully parking area?
- 12 groups would use on annual basis, 8 max at one time – variety of scale of groups
- Need general storage and staging space
- Grantee team "storage locker" for equipment that does not need to go back to lab after trip

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Facility needs:
- Hazardous waste collection
- General waste collection
- Internet access
- Potable water
- Restroom
- Sea water
- Dump tank for testing ROVs
- Mud room / changing room
- Washer / dryer for field gear – gear can smell of fish/seals/penguins
- Accommodate safe loading of vehicles – currently need to stand on tracks to get equipment into roof racks
- Field party rinsing area, dive needs same capability
- Break room counter for drinks, etc.
- "Office" space for last minute computer work

Balloon Operations needs:

- Big flat area for launching – need to run alongside until balloon has gained altitude
- 14’x14’ garage door, exterior layout area
- Work bench

Storage needs:

- Nets, traps, pelican cases, shovels, generators, electronics, tripods, ice chipper, ice axe, jiffy drill, things that use fuel, survival bags
- Equipment is checked out to individual grantee groups – need lockable storage for each group

1.2.1.3 (OZ) Track 3: Local Science: Dry Valleys and Helicopter Supported Science

1. What is the specific nature of your science research?

- Diverse scientific research in Dry Valley’s including:
  a. Geology (soils, rocks, lakes and streams)
  b. Glaciology
  c. Meteorology
- Transient science supported by helicopters.
- Deploy to field, collect and measure samples, return to Crary to verify sample, repeat

2. What is the size of your team at McM?

- Varies depending on type of science generally small 4-6 person groups
- Soils Science (3 year project) 4-5 Field people who travel back and forth to Crary
- Drilling Projects (Support IIDO) 10-12 people and sometimes 45+ people
- LTER. 31 people/yr 5-10 people at McM the rest in the field

3. What is the frequency of your research at McM? Annual? Describe the frequency in terms of years

- Dry Valleys are used entire season
- Out and back science (time in field varies with type of science from 1 day to 12 weeks)
- Multi-year projects are the norm.

4. Describe how your team currently works at or interacts with McM Station?

- McM is an equipment staging facility that supports Helo supported science.
- Field scientists return to Crary to do analysis (verify samples, measure, wash containers and prepare chemicals)
- Strong proximity relationship between Crary, Help Pad and Field Science Support Facility.
- Ideally seek ways to increase time to do science on ice-reduce “overhead”time. Travel time takes 5-6 days, on-ice training takes 7-10 days could training be done somewhere else? Several days for out-processing off the ice.
- Need for over-winter storage. Includes do not freeze and OK to freeze storage
- Over-winter storage needs to be easily accessed upon arrival for new season
- Need a staging space adjacent to Helo landing pad to stage science cargo ready to deploy to field.

- Due to the transient nature of Helo supported science scientist do not have assigned lodging and therefore "check-in" to a new room whenever they return to MCM.
- Scientists stopping over in MCM sleep, do laundry, eat, work in Crary and eventually return back to the field.
- Folks in the field need a place to store personal gear at MCM when out in the field. Personal storage could be lockers located near lodging or associated with a secure "team" storage area perhaps in the Field Science Support facility.

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5. How does MCM currently assist you to do good science?

- Prepared for scientists arrival
- Science support is comprehensive and expert (can be slow though)
- Cages for project storage
- Has everything you need but hard to move around
- Helo Pad is down slope (no trucks need to haul stuff down) need trucks to return equipment uphill. Truck/shuttle service currently is lacking.
- Self-service is good (laundry, food)
- Office mix and lab space in Crary works well.
- Collaboration aspect of getting supplies, flights communication are one-on-one conversations. Organic interaction of personal.
- The variety of walk-in size freezers in Crary is good!
- Great training ground.
- ASC staff has an amazing, positive attitude despite working conditions and the "Antarctica" factor.

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6. What is impeding you from doing good science at MCM?

- Shortage of flexible meeting spaces (large groups up to 12)
- Storage (short term and long term)
- Tracking/access of storage
- Slow-downs getting out during unusual events.

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7. Where do you see your science going in the future?

- Use of drone operations
- More off-season work
- More use of internet/telemetry
- Helo mounted sensor equipment
- Samples will still be gathered by humans.

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8. How will it alter your process at MCM?

- Basics of field science does not change.
- Instruments/technology will change.
- Process not altered but more value/results.
- Increased off-season use
- Need for roof access at Crary (antennas)
- More partitioning of IT

Don/Joe F provide introductions
Don – wants to understand the "business model" and function in MCM
Question on planning horizon
Don – 35-50 years
Pre-selected questions
Joe – requests what types of group/science
Ms. Chu – LiDAR research for atmosphere and space interaction (SAIR)
Byron Adam – MCM LTER group – long term ecological research – 11 principal investigators – most work in Dry Valleys but use Crary to process samples
Mark Neely – construction manager for MCM
Esther Hill – science manager for ASC
Jeff Warbach – health – observer
Ben Roth
Abby Vieregg – LBD – looking for neutrinos
Dave Winkler

1. What is the specific nature of your science research?

- Christie Hansen – NASA Ice Bridge – NASA airplane at runway – needs flexibility in transportation options to get from airfield to MCM – large team, communication is important – gravity stations where they need access for GPS ground stations – fly every day
- Christie – better overall internet – inefficient for data processing
- Byron – reliant upon MCM for the lab – prioritizing field time vs. lab time – some samples they have to run and analyze at Crary – intensive users of Crary lab – water samples – can't just freeze things and ship them to CONUS – a lot of it gets shipped back but they do use Crary intensively
- Ms. Chu – needs access to Arrival Heights – winter is more important to them – summer is more challenging but they're bringing in new equipment – uses laser beams in research – concerned about interference with aircraft and LDB – she needs office space for her people to be there – wants better internet – has had varying issues with the speed of the network systems – further on Arrival Heights, other users doing ELF and VLF (extremely low frequency and very low frequency) can impact magnetic field changes – things that need to stay out of town – needs power and internet and food and water – 4-5 people in summer and one winter-over
- Joe – Arrival Heights is similar to the "quiet sector" at the Pole – answer is yes

2. What is the size of your team at McM?

- Byron – 27 slots each year for his team – dependent on time of season – any one time, 15 deployed (amongst MCM and Crary in general)
- Christie – 25-30 in MCM at any time – they were in Crary but not big enough, so they moved to library – they're not there every year – team is spread – but there for a short window – normal deployment would be about a month
- Abbey – LDB up to 35 peaking just before Christmas – another 10 or 12 people for support – could be 50 people when they're preparing for launch
- Mark – seeing between 60-91 people for LDB, but dependent on payloads and amount of

payloads
3. What is the frequency of your research at McM? • LTER is annually – deploy October and stay until camps shut down in February • LDB is annually – ramps up late October and they're there until January – if everything was set up right, they could stay later • Ice Bridge – every other year but got messed up, going to be back in 2017 and then 2019 – normally down there about a month • LiDAR year-round • Abbey – LDB can't fly in winter – need the right weather conditions – but staying through February would be on the wish list • Byron – LTER has gone into April with helicopter-supported research in Dry Valleys – would love to come in earlier and stay later – WinFly would be good and then April/May
4. How does your team interact with MCM • Ms. Chu – LiDAR has an office in Crary – use de-ionized water – needs vehicle – last 2 or 3 years they just got a pickup that they could use on their own – almost self-sustained – office space for 4-5 people – they prefer Crary – sometimes they do need a fume hood for chemicals – ship cargo in by box – have consumable parts that they need to cycle through – if they bring in new systems, it would equal extra cargo – typically ships via cargo process – their equipment has been damaged by sea water before when they shipped – prefer to fly everything • BR – explain to us what happens when team first arrives at MCM – walk us through • Ms. Chu – need to clean optics from time to time – needs hoods to split chems from big bottles to small bottles – experiment is a permanent installation – no set up or break down – "standard" deployment in that it's primarily people with sporadic cargo • Abbey – day consist of very regimented schedule – one shuttle out in the morning and one in the afternoon – sometimes members of the team will stay in town for training and such – suggestion for Crary is to de-couple the kitchen/break room from work areas – there's too many people and not enough space – monitor the data after the balloons are launched – they're talking to Texas once the balloons are launched – most people stay for launch and then leave (around Christmas) – each group will then keep 3-4 around to monitor the data – a lot of times they go out to LDB anyway since they don't have a space that's conducive – 24 hours a day staffing on computers – some people working from their dorms (not preferable) – don't necessarily need lab space, just good office space – lion's share of the work is done at LDB – two huge hangars, shops, kitchen – doesn't think there's really anything they could separate/de-couple from the LDB facility – about the only thing is post-launch office space – thinks that cargo goes immediately to LDB (Mark Neely confirms) – in relation to maximizing the launch window, is weather x wind – that plus the requirement to get out of MCM at end of season limits the number of launches they can do – could maybe launch one more a year, but not necessarily 5 more a year – one of their big things is transportation – in a perfect world, they'd be able to stay an hour for training in MCM or late on a Sunday or something – essentially 24 hour access all the time – beholden to the transport schedule • Christie – conops in a nutshell – Ice Bridge they take everything in and bring it out – most stuff/cargo shipped to NZ via sea container and then flown down from CHC – need materials very early in the season – large cargo footprint – had a lot of training – cargo

either at airfield or Crary – sometimes in people's dorm rooms (not preferable) – had their own dedicated van for transport but did use shuttles as well – some people flying, some people working at air field – even with the one van it was cumbersome – in total, about 25-30 living in MCM – 15-20 people going to airfield on a daily basis – about one month in MCM – timing can vary – they were given dates by NSF last deployment (late November/December) – prefer mid-October – do have needs for MCM – some people doing data processing/checks in town – if they're not flying, space for everyone is a huge challenge – only do full team meetings on fly days around 6 or 7 at night – dedicated servers for Ice Bridge in Crary – fine with going into a cage in a co-located server/data center – had rack tents at airfield where they can do data processing and pre-flight planning (weather, etc.) – would like GPS ground station antennae, need to find a place in town where there's a heated room and a spot with a clear view of the sky – prefer 2 GPS ground stations – one at rack tent at airfield and one in town somewhere – use radios and pagers for the communication – use snowmobiles and sleds at airfield to transport parts and such – cargo staging has space in Crary (for like 3 days) – challenge because people were unpacking and taking their time – space was needed for other teams – nothing driving them to have offices in Crary itself – would be preferable to be close to their cargo

- Byron – 5 different teams – ship stuff through Huaneme and then flight from CHC to MCM – deploy in October (2 teams), December (1 team), end of December (1 team) – some teams that do need to work together – needs to be a PI there for the entire season on the ice – first thing they do is training and such – taking equipment from storage in Crary and configuring their rooms/spaces – go to science cargo to retrieve their stuff or go dig out stuff that stays down there – have to ask Crary staff to forklift stuff to field party staging – either assemble and set up in lab or stage it for transport to Dry Valleys – all table-top size – some consumables, some equipment – keep some of their stuff on "the line" in over-winter storage – some stays in Crary, some deploys to field camps – stays in field camps all summer – end of season they pack everything up and it goes to the line for over-winter – need BFC and MEC and fuels – go up to science construction to get their stuff – constantly using pickups to go around MCM – very complicated to get their current resources – almost always a week on the back end of Dry Valley deployment – teams come back on an intermittent basis – some stay the whole time, some come back periodically and some do "day trips" from MCM out to DV – rare that one person would stay from October-February – wheel/cart samples from helo up to Crary – comes in on a dolly usually (normally heavy) – 1-3 trips to get everything to the labs – they have issues with temperature-sensitive samples – part of the samples are processed and stay in MCM – vast majority of samples collected end up in CONUS – a lot of the analysis is done in Crary – temperature-sensitive samples are "stepped down" to lower temps and need to be maintained prior to shipping – some people are in Crary full-time from October-February – work in offices and in labs intensively – long-term storage is a formalized process – do intentionally leave some samples over-winter – Crary staff would then check in on it over the winter – intensive users of water – don't have the water necessary in the Dry Valleys to process, leads them to come back to MCM – most of the time the person that collects the samples accompanies those back to Crary – sometimes they'll pack it up and send it by helo for someone to accept at Crary
- Ms. Chu – needs a flammable cabinet for chem storage
- Christie – nothing special they need in town

5. How does MCM assist you to do good science

- Byron – thinks that Crary is a real gem to enable their science immensely
- Christie – SIP process went well and their complex requirements were captured – everything they requested was there – collecting requirements, working with planner and then on-ice implementation went well
- Abby – simplicity of life – someone cooks breakfast and dinner – don't have to pay bills, etc. – basic needs are provided
- Ms. Chu – enabled them to move a lab from Boulder to MCM – can run their systems 24/7 and can provide monitoring – appreciates MCM and Arrival Heights observatory – generates the most science in the world for them – Crary really good for working space but also for the equipment and diagnostics – MCM is a unique site for their science
- Abby – puts a vote in that the internet and comms helps her do good science
- Christie – wants more ports for internet
- Byron – likes that helo pad is just downhill from Crary – helps when they're wearing ECW and have to trudge down

Question #6: what's impeding science?

- Ms. Chu – internet is too slow
- Abby – internet is a blessing and curse at the same time – could be managed in a way that is a lot more efficient with the current infrastructure
- Abby – transportation – spends 2 hours a day on the bus every day she's at MCM – vans are faster and flexibility in schedule is good – have 3 or 4 more hours a day they could be working
- Christie – if transport time becomes longer, it shortens their science flights – direct impact to science
- Byron – field party staging area is too small – time restrictions on storage – sometimes they need a bigger area to assemble stuff – they do it outside which is fine on nice days but crummy on bad weather days – could be a shared space with other groups
- Ms. Chu – in summer their offices get crowded – ambiguity in whether Arrival Heights is a "field site" or MCM – they can't get field food for when they're up there for a day or two
- Byron – wants a biological safety cabinet – will cover more tomorrow – have issues with vibration in building – HVAC and helos exacerbate this as well as heavy lab doors opening and shutting
- Ms. Chu – can hear through walls/noise isolation

Question #7: where do you see your science going in the future?

- Abby – pushing toward ULDB – ultra-long duration balloons – LDB will continue for the foreseeable future
- Ms. Chu – intention to push for Arrival Heights geobase observatory
- Jesse Crain – regardless of what happens at Arrival Heights, need to figure out how to support the work that happens just outside MCM versus discrete science that happens out in the field
- Ms. Chu – main impact on MCM is power requirement – need more LiDAR stations – collaboration with China, Japan, Australia to install a potential ring of LiDAR stations
- Byron – anticipate increased need for virtual meetings and outreach – need for meeting space that's really not met right now – thinks there will be an element of expansion of the science – at some point, will have larger collaborative groups to support – anticipate a big

increase in the use of drones – if they could launch from somewhere near the station, it would be awesome – can launch some of the drones right out of the back of a pickup truck on the sea ice – if there was something on Ross Island, it would be nice but understand impact on helo ops – more data with what they currently have – also foresee molecular-level research – all needs to be done at home institutions – have suites of experiments they would love to do on the ice – experiments will become more and more extensive – would like cleaner facilities as well – doesn't think there would be a need for sequencers down there – not a good use of time/funding – more sensitive environmental chambers – wants to fluctuate temps and light on diurnal cycles – telemetry is a big deal as well, want to be able to monitor instruments from MCM or even CONUS – using iridium phone right now and is not optimal

- Mark Neely – is there a need in Crary for humidification?
- Byron – thinks this would be solved with the environmental chambers

Comments:

- NOTE – Talk about efficiencies at McMurdo. Takes 4 days to get there before getting to the field. Efficient Time in McMurdo can increase the amount of science in the field.
- NOTE – International cooperation in the future better facilitated? Currently they are brought into your team.
- Scott (Deputy Director)– priorities:
- Worries that we have gone too far. Ability to react on the fly has been reduced. Deliberately plan to have less unallocated availability. Naturally doing that because program officers don't want to say no to what is next on the list. If try to shoe horn too much stuff in – downside is to say no. Dialog has to go on with program officers. Need to find what the right balance is. The Program has a certain capacity (based on different things) – capacity issues. Program officers want to support as many projects as they can. Can only fund a certain number of programs. Don't have support for these projects – it's not just a funding issue. Run the risk of overstressing resources by having many projects. How do you plan for those unknown capacities? Crary safety – consumables in lab space. Office space encourages consumables. Coffee in cubicle space – makes it easy to have coffee next to the bench. Reinvent space in lab that have partition making it not as easy to have consumables that try to preserve for biological purposes. Crary was built – equip prep was not designed for that. Became convenient to turn it into that.
- Approve 99% capacity of science. Blue Ribbon Panel Report. Same concept – want to be able to support as much as they can – have TAN, fundamental issues like utilities but they deferred that. Blue Ribbon Report says you can't keep doing that. New facility has to be as maintainable as possible. This will come at the expense of some of the projects to be supported. As a group – what are priorities?

Phone comment – concern about electromagnetic management – manage radiated emissions from all of these devices.

Note: As McMurdo is flexible for Grantees, Grantees are flexible for McMurdo

1.2.2 1:00-5:00 (FC/OZ) Debrief of Break-out Sessions and Confirmation of Requirements

All Attendees

Summary of break out meetings:

Question 1 – What is the specific nature of your scientific research?

Sea Ice

- Researcher that have a team based out of Crary that go on ice daily/weekly transits
- Other teams go and collect samples of fishes/get samples and get them back /processing/then getting them prepped to go home.
- People samples and logistics
- Class comes down – 30 to 40 students who come down to learn

Deep field

- 2 sets – they stage once and then go out – small groups. Field camp of their own
- Others – use main stations on the continent – based from there and do spoke and hub. Not autonomous on their own – main stations to support them when they go off to do their work.

Helo Support

- Diversity – all groups but astronomy need their support
- Range from small nimble groups to semi-fixed camps
- Mix of short term and longer term monitoring studies
- Diverse needs – from science/cargo/
- Assembling and measuring and then doing science analysis

Town science

- LDB/operation ice bride/long term McMurdo environmental research

Question 2 – What is the size of your team at McMurdo?

Sea ice

- Most teams 4-8 per PI or project
- Tend to include mix of in field and some at stations that rotate through
- Some go out and come back several times/day
- In the future, might go to one large group doing fewer trips

Deep field

- Two sizes - 4-5 or 40-50 that deploy

Helo

- 4-5
- Drilling – large 10-12
- 30 – LDR?
- See partnerships of small groups to form larger groups for Helo support in the future

Town support

- 1-2
- 4-5
- In state is course of summer season
- Ice bridge - 25-30. With ASC support staff up to 100

LDB– 18 total – upwards of up to 3 projects/year.

Question 3 – What is the frequency of your research at McMurdo? Annual? Describe the frequency in terms of years.

Sea Ice

- Groups always using Sea Ice. Up to 4 field seasons. A project has any given number of years.
- Some come early season and leave early
- Others come early (Oct – Dec)
- Others come for late season ice
- Frequency – 2 years of the project – write up and then come back.
- Double deployment – some might like to do this but typically need to be there when they can be on the sea ice.

Deep Field

- UNAVCO/IRIS – 5 year + adventures. There a lot of the time to support many grantees
- Other more on 2-3 year cycle
- Pascal there constantly to provide support
- Deep field camps – tam camp (1 every 4-5 years)
- Multi year set ups – to do science there or other areas

Helo

- 6 year time scale
- Multi-year projects
- 1/year experiments also
- Big range
- Most are to monitor or monitor climate – more time out in the field the better the science that can get done.
- Commuters for day trip
- Anything that Helos can get to would be used. If longer season - Helos will be used . Go out more for longer durations.

Town science

- Annual projects that every year something is happening.
- Ice bridge is every other year occurrence. In for a month and then gone.

Question 4 – Describe how your team currently works at or interacts with McMurdo Station?

Sea Ice

- Have space and use space at Crary
- Move to and from field on daily basis
- Collecting – wet/cold/muddy/with live specimens/fish – need to get into tanks
- Clean/prep and repeat next day
- Issues of moving gear from staging to lab
- Moving vehicles to Crary and then to helo
- Snow machines to Crary
- How to facilitate transfers
- Some need to transfer quickly.
- Some do daily – some multiple times/day

Deep Field

- Arrival/training
- Confirm and inspect it
- Test it
- Repack to go back to cargo
- Fly out to get on scheduled flight
- Wait for good weather to do work.
- This is how most of the groups are operating
- Some tend to use science cargo for staging and others use Crary.
- Big difference in work flow.
- They do staging in Crary because this is where their things are
- For PASCAL – volume drives where they stage. They have too much cargo to move to Science Cargo.
- Need power to charge batteries. Sometimes use prairie for power and space.
- Short term set up – GPS set up for a few hours/day. Weather station may be up for days to test. Longer things are out at Nob Hill.
- Field testing is usually 1-2 days.
- These are several experiments happening through-out the year.
- Reverse process to get home.
- They download data before going back home. Not doing testing.
- Depo work needs to be done. May retest/repackage
- Materials come back to field. Unpack – what has to stay and what goes home.
- Some have to re-pack to be more efficient or some things have to be left for the following year.
- They do re-packing in multiple places.
- They do same process but maybe in Science Cargo instead of Crary or next to BFC.
- Moves electrons across continent
- Sea ice moves water carbons
- Groups dominated by equipment (UNAVCO)
- LTR – lab dominated/bottles or equipment calibrated on continent.
- Different sources for supplies but follow same path.

Arrival Heights

- Go to camp for resources (Crary/BFC/hanger)
- Reverse at end of season – break down and go back.
- Crary to Helo Ops and Field Science Support - going back and forth
- Somethings have to be done in Crary – mix/sterilize/etc.. But ultimately becomes cargo
- Bulk of science has less interaction with support. Minor (ie. Food box)
- Constant back and forth from Helo and Crary – (people and samples)
- Simmers down for winter season
- Big issue – where to store things over winter and then recover them when you come back.

Town science

- Biggest elements – office req/transportation req – getting out to where they need to be)
- Getting up the hill can be a challenge
- Heavy use of cargo ops
- Doesn't leave town after that
- Inbound/outbound through cargo system

- Reliance on Crary and equip and personnel in Crary
- Don't have specialized equipment – they rely on
- Use Hele/ice bridge/air field services
- Training
- Side cargo/side construction
- Ability to use collaboration space is an important element.

Common discussion:

- Use analogy of hub and spoke – each group has their own version
- Challenge – can you haul something on your back or do you need a vehicle to help you?
- Efficiencies are about how to pull it in so not so dispersed.
- Closer proximity the better
- To get to Arrival Heights – they rely on the weather forecast.

Homework:

- Chart a course of movement and flow of each group by function – not by building. Do independently for each group – then design team to compare.

- Flip side – if all in the same place – might be too challenging for all of it to happen in one space or would need to be much larger spaces.

- Unintended consequences of having the whole group in one area to pack up and test. Too many people/functions happening all at once.

Can people do them in shifts or at different times? Can some be done in the middle of the night?

- They plan to do things when ASC is open
- Some are in the lab 24/7
- Some things happen on a schedule (seals/penguins/birds know when the time of day is so dependent on their schedule.
- Self-serve is good – or getting training on a pickle is good so they can do in middle of night
- Grantees are trying to be self-sufficient but if not available (in middle of night) then they have to wait (ie. forklift to move cargo)
- Part of Crary lab has open stock room so if you need a few bottles it is easy to get these things. Then there is a part that if you need a case of something – you have to check it out. Control of flow for things stored outside of building. This can be a bottleneck if grantee doesn't plan enough in advance. Or "Antarctic" happens and you have to adjust. If more open stock were available it would help relieve this. Can't do this with generators so would need to solve this issue.
- If there are community resources – may not get good info back (need certain level of maintenance and calibration). Compromises the quality of what you are using potentially.
- In the planning process – they schedule and plan for things. Some is more reactive. Can't put in SIP since you don't know when you will need it due to weather or not enough for everyone. Reactive due to necessity not lack of planning.
- Reliance on forklift and equipment – need to try to eliminate as much as possible.

Question 5 – How does McMurdo currently assist you to do good science?

Sea Ice:

- Working at McMurdo is a special opportunity
- Support capacity is phenomenal
- Go out/come back and work/eat and go back out
- They have people who can cook/support/move things so they spend bulk of energy on science.
- Lab space – experiments/stage gear/having space right there where samples can be processed/hold fish in aquarium
- Really like informal interaction space upstairs – that's where you talk with other people.
- Collaboration in Crary and other odd corners of McMurdo. Want to keep other interaction spaces – darts/coffee house. Gets you out and talking to new people.
- Keep flexibility of these interactions.
- Lots of new things have come out of these collaborations – future work
- Support staff are invaluable to accommodate them. Best supported science spot that she works in.
- Working biology lab is very good. Not missing pieces of equipment or capacity in the labs.
- As a research lab it works really well.
- As teams move in and out it is adaptable so able to function and transition in between teams.
- Office space/lab space – shared labs/team space – works well.
- Use McMurdo on daily basis and by and large it works well for Sea Ice.

Deep Field

- Love Michael
- Support is key and good at allowing them to do their science.
- Several interact with others and many grantees so access to them at Crary being co-located is really good.
- Balance between SIPS – and ASC being ready for the contingencies – great support when Antarctica happens.
- 24 hour access
- Air support working really well
- Inventory is really good at McMurdo – they normally get what they need in order to do science.
- Food that is available at any time.

Helo

- McMurdo has evolved to support science and has done it really well
- When we design new flows make sure we are capturing all the capabilities and resources that have evolved over time.
- Tremendously well supported station
- Things prepared upon arrival with sip process
- It's a notable exception when it's not (weather/congress)
- Preparing and planning allows them to get out much faster
- Gravity – walking down hill wearing a large load – is better than walking up hill. Walking a shorter distance is better than a longer distance. They don't have access to transportation.
- Helo techs drive them up the hill on a truck.
- Expanded capabilities – support is comprehensive/electronic supplies/ ability to have a new

enclosure for your camera is astounding. Parts and experts on location are amazing. Can get more research out!
- Mix of office and lab space to process data/do work at bench/chemistry and testing…they like labs being mixed up and the cross pollination. Generally done based on need or size that can support chemical use. Share with a biologist. It is function based (assignment of lab space). Lots of safety and informal training happen in the mixed lab. Affinity in methods/research and approaches – works better.
- You know people who work in your field. The Crary experience is great due to happen stance meetings with the other groups. Share an instrument – new ideas. This is how innovation and collaboration happens. Good benefit to students. Can't replicate this at a university.
- Incredibly beneficial – sees a difference from the students who go to McMurdo. Having labs mixed up or find opportunities for those exchanges to happen.
- Highlight the "specialness" of this place.
- Expanded knowledge – new inquiries.
- Amazing atmosphere to work in – happens because the lab was designed to be versatile. People can be put in spaces that work for them.
- Design of the lab lets diff disciplines with similar methods work together. Format is very flex. How you orient the benches. Change layout.
- Freezers – environmental rooms. Different groups need different things. Large spaces that are partition-able is good. To configure these things allows diff science to happen.
- Occasionally there are things that don't work (someone is working with mercury and next to group that is trying to see how much mercury is naturally there…)
- Biology – take walls out.
- Mix of bench space – water/power/etc… is the sweet spot for most of the groups.
- Unique group of people who thrive in Antarctica – that's how you become successful there. Obstacles always exist. Get lots of people that all work towards this goal. They make it work because they recognize it is not one resource for them but overall mission is by sharing and trade-offs to help out all. Group is friendly about it. Even when really crowded.
- Things are taken care of for waste/hazards etc.. – covered pretty well.

Town science
- Planning support and ASC support – sim to other groups
- Labs is supportive
- Simplicity of life – don't have to worry about going to store/paying bills – they can focus on work/research
- Proximity of Helo to Crary good
- Helo to Arrival Heights – good – can't be done everywhere.

Question 6 – What impedes you from doing good science at McMurdo?

Sea Ice:
- Impediment at Crary – aquarium space and physical space
- Ability to move live samples in and out of aquarium
- Need for staging space/gear moving in and out
- Moving between labs to the ice – move daily between several locations
- Getting gear up and down hill multiple times a day is tough
- Need staging space for gear
- Mud Room needed - room to leave stuff in big lockers would helpful to facilitate ease of daily

movement. Both of people and things/samples/ heavy equipment

- Make sure cargo is available on time – there can be a bottle neck. Getting sample to and from station (due to permits).
- Environment rooms can be sample storage many times of year so need more room to store samples.
- Access to sea ice around shoulder seasons
- How to access snow machines and the sea ice outside of the transition in front of McMurdo station and access when it moves to Scott base side. What is vehicle flow during this time?
- Bandwidth constraints – McMurdo back off continent and also on continent.
- Could flex schedule to be there more if there was better bandwidth.
- Schedule set when she has to be in class and can't teach from McMurdo due to lack of technology.
- Better controls for analysis and research activity

Deep Field

- Lack of communications – find other members of your party. Want to use their smart phone vs. running around.
- Lack of staging space. Open sky/flat dirt parking lot ok
- Collaboration space - need more of it
- Tracking of cargo – it would be nice that once cargo goes into they could track where it is.
- Reduce training time – spend entire week doing it currently. Do more of it virtual before arriving to McMurdo. As a new person – would need to do on site as well as some training (how to use equipment etc...) Optimize time at McMurdo and on the ice. Depending on age, different ways to do virtual training.
- Shared housing – groups that are only there a few weeks – scattered in single rooms may not be efficient.
- Living with other roommates – someone else comes late – wakes you up in middle of the night.
- Orientation – the manual. Optimal balance. Overwhelming for new person. Better wayfinding – one stop orientation would be better.
- Lots of touch points for cargo – reduce touches
- Dedicated space – know they will be in the same space. Have to pack it up and put it away. Spend another week to unpack it up. Consumes lots of time that costs money. If grant is approved – can they have dedicated storage space?
- Cargo – so many touches also means they need to have to have a way to move the cargo. Trained on how to use pickle was good.

Helo

- Similar impediments
- Interpersonal – things happen by talking to support folks in person.
- Need more collaborative space/places to sit in a quiet and focused place. Saves time/money and lives.
- Flexible meeting space that accommodates many different sized meetings. Need a place to talk about their science paper.
- No place whole team can meet for 30 people
- Storage issues for short term staging
- Long term storage has issues too since no dedicated space to leave things in the off season.
- McMurdo is able to accommodate stressful items – slow downs are less common. Flex in system to do things would be good.

Town Science

- Same similarities
- Lack of bandwidth is an issue
- Adequate office space – many sharing one space together that is not large enough.

Sound and vibration isolation would be good. Could take research to the next level.

Question 7 – Where do you see your science going in the future?

Sea Ice:

- Potential for expanded season – open water work. Zodiac based. Would require things that don't' currently exist but it would open up science that would be very interesting to the community.
- Ability to work in McMurdo later into the season. Come in earlier.
- Longer term experiments in the aquarium – allows for sea water to run longer in the year.
- Field schedules are not always reflective of logistics not of the science they want to do.
- Docs outline some of these goals and challenges
- If logistics exist – could spread footprint on the station across the season. Might be smaller teams/but there longer with different turnover personnel. Or could be larger team for shorter period or time, or smaller teams with different personnel – blend of these options. Reflect science goals better not logistics.
- More collaborative efforts between sciences.

Deep Field

- Smaller and more of equipment as it gets less expensive and lighter.
- Telemetry – getting it sent back real time.
- Iridium or satellite to get data out
- Fewer smaller groups and maybe more larger groups
- Traverse teams – this will go up but maybe not as many people doing that activity.
- Need to communicate with their group – video would be needed to allow for less people in the field.
- More work throughout the year.
- Autonomous vehicles (marine use or in the air)
- Hard to guess what will happen in the future.
- More ice drilling and submarines
- Optimize logistics – before you service stations you know what is wrong with it. You may not have to go for 2 or 3 years.

Town Science

- Long duration
- Increase Geo-Spatial Observatory
- Create a wider network observatory with other countries on the continent. More data – more samples.
- Expansion of long term Environmental Research.
- Drones to capture what satellites can't
- Next level of analysis – molecular level. Refinement in research

Helo

- Electromagnetic interference – add to radar to manage this better with regards to local system
- McMurdo creates a horizon to horizon force – how to rectify this.
- Design parameter – manage radiated emissions from all of these devices.
- Radio quiet character- one of the few places on earth to look up at the sky – see background radio noise from the galaxy.

Question 8 – How will it alter your process at McMurdo?
Sea Ice:

- Aquarium open year round
- Open water or expansion of seasons
- Zodiac- how to get them back to Crary
- Send samples out more frequently on and off continent – some send out on the vessel once a
- year so accumulate until vessel comes. If going by air there are other challenges. Might relieve cargo back load.
- Cold rooms have to be used to store samples when crowded. Is this best use of this space if others could use it?
- Shelf life – needs to sit to be chilled – life span is not good. Can only hand carry a small amount back.
- Some of these experiments could be done at Crary but not good use of time. Better to do back at labs at home. Use the field time – optimize to get maximum samples.
- If they could get them home – to someone to do lab work while at McMurdo, this would be ideal. Can't do this now as they are usually on the ice.

Deep field

- More coring and drilling – look for oldest ice. Likely international project.
- Would need traverse and ship support
- Communication need – heavily reliant on this to support new work.
- Drilling – things need to be lighter and more agile.
- Create observatories – first step in creating holes – network of sub-surface observatory space.
- Transition to more traverse – out for long periods of time need communication resources.
- Using similar tractors but not the same ones that take fuel to the pole. Would need more equipment to do this.
- If more systems coming down – requires more testing – so more space needed to do this. More optimization to collaborate instruments/gps etc… seismic maybe too. More collaboration needed.
- More sophisticated instruments

Helo

- More better/smaller/faster – sim to other groups
- More remotely operated vehicles
- More antennae and spectrum mgmt.
- More roof access
- Space to launch/retrieve remotely operated systems
- More shoulder season work
- More data back to analyze off continent
- Telemetry – good data

- Remote sensing
- Helicopter or other aircraft remote sensing
- Clouds are issue so satellites are challenged.
- More of the science from Helo platforms
- Bio/earth sciences – sampling. See more science coming out of a project due to enabled scientists.
- Can't cut down team from 4 to 2 – if cut out modelor??? or chemist – not getting right samples.
- Can do more science but still need same crew.
- More access to high places and more antennae

More science – improved logistics

Grantee perspective:

- More time to save of the overall schedule that is book ended by academic needs.
- Within the window we have – away from family/students/work etc… time at McMurdo can pay dividends in what you can do and the amount of science you can do.
- Training done there/telemetry/ more efficient ways to do training – looking for opportunities to optimize time at McMurdo
- International cooperation – should this be factoring in to how they facilitate McMurdo in the future? UAV launches/marine systems/coastal areas opening up?
- International collaborations are great – what are functional things we want to do to accommodate the science? Flexibility to accommodate a device or capability they might have? Scott – hard to imagine how to plan for it from the infrastructure side?
- Think about the functional needs of that collaboration.
- They are part of your group – not a separate group.
- Ice cube project at South pole. Complicated
- Traversing capability - might be a situation where another country would give traversing equip. How do you get them to McMurdo – not different than what is happening now.
- Think of things that relate to function.

Scott:

- Worries we have gone too far in supporting as many projects as we do.
- Comments are in the lack of flexibility – do things that happen
- Ability to react on the fly has been reduced somewhat because we planned to have less unplanned capability, i.e. spare parts and FTE.
- They are naturally trying to do this but program officers don't want to say no.
- Balance issue there – if pendulum has gone too far – down side is they say no to some of the grantees.
- Safety, i.e. no consumables in the lab (coffee example is illustrative of the bigger layout issue).
- Crary didn't envision that so much of it was going to be prep space for testing of equipment. These are the areas where we need input.
- Prep of equipment is key – what is best place and way to do this?
- Capacity will reach max at some point:
    - Beds/offices/lab space/snow mobiles etc….program officers want to support as many good science projects as they can in the field. This runs the risk of overstressing our capacities. Need to keep these in balance. Lose flexibility so how to plan for buffer capacity/for unknowns?

- Are we trying to pack too much in? Raise the bar due to over-stressing the system.
- Plan to 99% of capacity. If there are things that happen they have to struggle to meet the needs.
- There are fundamental things that need to be replaced or fixed – Blue Ribbon Oanel is saying they can't defer the maintenance any more. Need to take care of these things.
- Need to decide priorities and balance needs. Science funded – maintenance of buildings and systems.
- Grantees are flexible – amazing things get done. They make it work.

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

- Use "Charrette Report" not "book" and "Contingency Plan" not "Lifeboat"
- Positive feedback about printed question pages
- Crary constraints – reporting constraints not soliciting input
- Shaggy – what wants to be done vs what needs to be done
- Start with the problem but talk about constraints due to topography, etc.
- Limitations to re-build/renovate Crary– what are the Givens?
- Footprint, physical structure, volume, aquarium stays, aquarium physical space is not going to expand, adding a wing for mechanical
- Crary wasn't designed for field science – move that function to Field Science
- A lot of people office in Crary because that's where the office space is
- Field Science Support Center needs labs and benches but not running experiments like at Crary
- Factor different types of staging – those that go out for a while vs those that go out multiple times per day – it is important to understand these staging needs

Electronics workshop will be discussed in week 2. Front Section of SSC to be called **Building 004 –** IT Primary

Rick – Commonalities:

- Collaboration between disciplines
- Optimized/reduced time to field
- Streamline Science support staging
- More and smaller equipment
- Spreading work across the year (shoulder seasons)
- Science phasing plan
- Tracking cargo

Larry – look at operational way to streamline staging. Moving your own equipment at 3:30 am downhill is ok – not ok to move uphill

Don't want to have multiple places to get cargo – One Stop Shop, eliminate too many touches

Dave – cage storage is needed at every facility as stuff is currently stored everywhere

Sea Ice transition is not in scope but is a concern

Wed July 15 (1.3)

1.3.0	8:30-9:30 (OZ)	Review previous day's work – All Attendees

Common themes:

1. Reduced Touch Points – For benefit of Grantees – wherever possible. Less confusion. When grantees get to McMurdo, reduce to most basic components: sleeping, eating, working). Flow at its most basic level. Find balance – don't go too far
2. Reduce time getting to field
3. Streamline Science Support Staging
    a. Geographically
    b. Operationally
4. Understand movement of goods and people (Concern about movement of goods between Crary and FSSC
5. Clear orientation upon arrival
6. Dedicated space for multi-year projects
7. ASC support – Front part of ASC support in Crary is critical to getting things done efficiently

- Comment – concern with flow of movement between buildings - have fork lifts going back and forth
- Comment – Strengths of Crary is having ASC support easily available
- RP –The flexibility of Crary works well and has worked well over the years. Fosters interdisciplinary work
- Comment – Unique culture at McMurdo – some of these buildings reflect the history of unique funky culture. For example the coffee house. History of McMurdo is important to the people
- Comment – Tourism is going to grow – how do you show tourist how much science has grown? No point of reference with new buildings only
- Shaggy – recognize unique history from cultural perspective. Can incorporates mementos into the design - People make the culture, not the old buildings. Goal is efficiency.
- Shaggy – can recreate the feeling of coffee house warmth
- RP – creating space for interaction and efficiency
- Comment –concern for demolishing data points (gravity hut)
- Historic Preservation – "Old hut" doesn't have to be useful space but can be preserved to represent history
- RP – look for opportunities to balance heritage with efficiency
- Comment – How much does it take to preserve the chalet, lots of history in that building
- Shaggy – Crary/Field Support Science Center/Building 004

- Wayfinding needs to be easier. Start with a "front door" – the "entry experience" which reflects the seriousness of the mission and the work. Flanked by science.
- Comments – move people around in the busiest part of where science is happening
- RP – not going to design in conflicts
- Comment – scientific space becomes cargo (Joe Levi)
- Shaggy – explain the basis of design
- Shaggy – explain the process of a centralized check in location and goal of minimizing touch points (e.g. sleeping bags)
- Shaggy – heard Tuesday that more cage space is needed
- Shaggy – understands the need to figure out space for calibration
- Comment - % of lab type calibrated stuff – Joe Levi says it can be thousands of pounds – can be up to 80%
- Comment – Joe Levi – lab is a safe secure controlled environment – needs a flow into the laboratory
- Comment – more time efficient to cart things opposed to putting it on a truck
- Shaggy – Building 004 – UNAVCO – PASCAL ; becomes communication and technology building, with workshop
- Comment – don't limit to just those 2 organizations because others need cabling – big science could use this space too, Shaggy – more of cable, instrument, tech equipment
- RP – sketch showing scale of building showing flexibility for storage of goods and explanation of what is being stored in this building
- Has the ability to accommodate needs
- Comment – day trips – how is cargo moving?
- Comment – cargo stream – grantee is her own cargo stream

Gear sequence process:

- Shows ideal sequence – Gear comes in from field
- Clean – laundry
- Arctic oven
- Bays of washing and drying
- Sewing and repairing
- Cages
- Comment – Field food? Yes – adjacent
- Comment – Central Supply, food supply and equipment supply comes together? Yes
- Comment – Lab equipment – good pathway to field but what about pathway to laboratory (e.g. beakers)

Mezzanine:

- Offices and workstations

- Conference Room

Building 004:

- Addition – this takes over what happens in 189 (NOAA, Network Ops)
- This becomes a communications/tech building
- Workshop is here – quieter space for UNAVCO/PASCAL
- Loading dock – easy part of cargo stream
- Should be limited to just UNAVCO/PASCAL
- There are other science projects that need this type of space. Conceptualize
- For big science that needs prep space.

Comments:

- Food for town store – where do you pick up before going to field
- Lab calibration – thousands of pounds – 50% - 80% and for UNAVCO and IRIS has more. Need a fume hood
- Need a controlled environment – lab is a safe space for expensive equipment – can assure that it is controlled and secure so calibration can happen
- Samples go into the lab for processing – can't go straight into the freezer
- Try to avoid putting things on a truck from Crary. Cart is much better
- How will day trips be handled? Dump things – go eat and come back later. Don't want to have to go through things right when they get back (tired and hungry)
- Not everyone uses the cargo stream
- They have central supply currently – does this all come together? Yes.
- Where is grantee access envisioned?
- Where do grantees get beakers, etc?

1.3.1 9:30-10:00 (FC/OZ) Briefing on Crary Constraints – All Attendees

• Introduction JF – Reviewed existing building program functions and how the original Crary was designed. Discussed the differences between the original designed functions and what the current uses are now. Different user grantees and groups are using the building for purposes different than originally intended.
• Comment – comparison was made that Crary operates differently than each grantees home institution.
• Comment – it was discussed that there is a level of comfort between all the scientific disciplines and that the current configuration works well reasonably well for most users.
• JF – the phasing for the proposed mechanical room as proposed in MP 2.0 was discussed. The location is to be opposite the existing aquarium and would relocate the main mechanical functions for Crary to one location. This would allow for additional room to be reclaimed in the existing footprints of Crary at Phase 1, 2 and the aquarium.
• JF – the current Phase 1 pod was summarized in its functions and layout. It was discussed that there is a need for additional office in this pod.

• Comment – the current mechanical mezzanine and field party staging were discussed, the functions of these spaces were briefly described. Still needed.
• JF – the structural grid and building module was discussed in relationship to the original Crary design. The original configuration of these elements allows for flexibility and ease of reconfiguration of the spaces. A cross section was shown of this building for reference.
• Comment – the relationship of initial receiving to the rest of the labs and building areas was discussed. This area is used to receive, store, and stage supplies for use in the lab and field.
• JF – all systems were designed to be redundant in the original design. Mechanical was used as an example. Two identical mechanical units were designed to operate independent of each other, if one were to go down, then the other could be brought on line to keep the building functioning.
• JF – level 2 of this building was designed to contain the library, lounge, dark room and other functions.
• Comment – the lounge on level 2 is currently being used for a conference room. The library has been reconfigured to accommodate overflow office space.
• JF – Phase 2 (Earth Science and Meteorology labs) general description of spaces was discussed. Spaces for offices, labs, assembly of experiments, workshop and Faraday cage are currently in the space. Faraday cage is no longer in use.
• JF – Aqaurium Pod described as containing holding tanks, brief discussion on the other functions of the space.
• Discussion of the current configuration of acceptable labs among peer institutions that the grantees were familiar with.
• DD – introduced discussion for the redesign of the lab space relative to Crary's potential. It was discussed that the current function for the labs have developed based on adaptation at McMurdo and that we have the opportunity to update those to a new standard.
• DD – gave an overview of the recent lab design methodologies. Concepts of full-interstitial, partial interstitial, saddlebag interstitial lab spaces were discussed. All furniture arrangement for these spaces have linear furniture orientation based on a plug and play ability of the individual pieces of furniture. Flexi-lab
• DD – these concepts allow the building to adapt to user type and different requirements. Matches flexibility to user requirements.
• Comment – will virtual reality labs be required in the future operations at Crary? To be determined.
• DD – Discussed the types of benchtop and furniture systems and the limitations of each.
• DD – Typical university is building for a 30-50 planning horizon.
• DD – Discussed the types of lab configurations that are being built today. Those included Open Lab/Ghost Corridor. Basic concept is to separate rooms containing functions so they can't contaminate the main function of the lab. Typically the offices are separated from the labs with the support spaces as a buffer between the lab and office space.

1.3.2 10:15-12:00 Break-out Sessions

1.3.2.1 (FC/OZ) Track 1: Crary Lab Programming, Part 1

• DD – Trends in lab design sharing of instruments and support spaces is becoming more common. Core lab functions with suites with flexible casework systems is becoming the norm.

	Can quickly adapt to changes in program as needs arise. Increase in computational work has driven some changes to casework for labs. Some labs are seeing student/lab worker write up spaces immediately adjacent to the lab space
•	DD – movement towards separating lab functions from non-lab functions.
•	DD – Trends in lab design sharing of instruments and support spaces is becoming more common. Core lab functions with suites with flexible casework systems is becoming the norm. Can quickly adapt to changes in program as needs arise. Increase in computational work has driven some changes to casework for labs. Some labs are seeing student/lab worker write up spaces immediately adjacent to the lab space
•	Bench Casework Systems. Conventional – united flexibility/connectivity between spaces. No separation of space. Flexible casework systems – the outside contractor to reconfigure. Generic design system – moveable table system vertical chase at ends. Switched to hung from hung from structure above. Moveable base cabinet. Ceiling service panels quick disconnect for power and gas. Edison I, II, III, IV motorized. Jacob's terminology wet area designed as static casework built in one location not transportable. Possible, not normal.
•	Discussed traditional lab design. Lab pods, definition/dryer walls. Support space in middle. Openness through labs.
•	Non-traditional lab designs. University settings, such as Brigham Young University, natural light coming into the lab. Designated SF per P1, flexibility to configure with larger groups sharing common resources. University of Wisconsin converted from office space. It is an older building with benches outside. Interior core – circulation services, no support space and hard to monitor. University of Colorado, the lab is adjacent. Geo physics converted to new needs, specific requirements for optics. Montana State, has no moveable furniture, and the center labs have no natural light. Sensitivity to areas that may require light control ability to darken lab.
Phase 1 • Labs 3200sf 1:1 ratio close to typical • Lab support, 2000sf - 4000sf • Office 1300 – 8300sf • Building 1700sf • Glass washing is done in where? • Remodel inlet lab space, needs to develop lab to support concept and suit different lab needs/adapt to needs through time. • The Cycle of research allows user to reconfigure space. Different approach for each user, and accommodate needs.	
•	Challenges of (E) building. Spine stays, staging/loading stays (SRE) bathroom. More new lab space allows for more lab space. The mechanical system reconfigured, mechanical expansion. All new equipment systems. Allows flexibility and phasing of lab spaces for different sequencing of science in Crary. The new systems will be better than prior systems. Acoustics from the mechanical system is a concern. Discussed wintering conditions, brought down to lesser temps while not occupied.
•	Micro turbines – produce heat and power. Concerns about existing party acoustics. Ability to add back some SF in aquarium. There is a need for a mud room for ECW gear. Identify locations out of lab space. Need for office space ration for lab to offices. Carry IT/science support accessible to science community keep located in Crary?

1.3.2.2 (OZ) Track 2: New Field Science Support Facility Programming, Part 1

TRACK 2

- Shaggy – Mezz provides a second set of offices – recognizes cross-pollination of scientists
- There is a Problem of running all over McMurdo – don't want to introduce more risk, but have to accommodate movement of equipment
- Flow question – Moving equipment for example to dry valleys – personal gear is mixed with sleeping bags, mixes with science equipment to be packed for efficiency. Currently consolidating supplies – would like to have stream where its merging in one spot
- Consolidate stuff from the station – this brings everything into one space – likes the fact that running all over the station is brought into one place
- Can you move the grand entrance and get Crary closer to FSCC? Need to factor in the grade
- Grantees don't operate much fork lift equipment (up to this year)
- Can find machinery to accommodate these changes (new fleet)
- Shaggy - Move away from trucks
- Create warehouse space for science staging? Separate area in warehouse for this?)
- Co-location – grantee has people using their service and equipment – would like to be close – many people need unified staging area, not so much just field science staging and testing. More like warehouse perimetered by lab benches in a unified area, nice to work on equipment in a tempered space
- 140 works – moving pallets in and out – yard is currently full.
- Not worried about space – worried about flow
- Move pallet to corner?
- Truck doesn't come into the ally
- Role of trades is going to be different in that time isn't spent fixing buildings – now more time to support grantees
- UNAVCO - Thomas – space needs Run cable – need space to run and test cable – widens space. Thomas needs a place with not much traffic for deep field deployment
- PASCAL – Jason and Kent
- Tech workshop – hoods for batteries
- Is it disconnected from cargo? Shaggy – 30 feet away
- 80% of what comes out of carpentry shop goes into the field

- Wizard would be a good project to share with UNAVCO/IRIS
- Thomas needs space for testing and fabricating equipment not in anyone's way – 2 weeks period of time – repackage it and give to cargo for deep field has Phase 2 loading dock currently – Ben – what kind of equipment? Thomas – 200 batteries for charging, building big stations that are 20SF, occupy as much of that space as possible, Parking area: Fire suppression systems as parking lot issue – concentrating that much lithium, Can get us the square footage number. Programming surveys to be passed out to guide us through the process. Chronicle detail.
- Comment – PASCAL -Moving towards rechargeable lithium. Have to engineer for that. Building design – plan on transitioning technologies
- Shaggy – talk through the flow of how equipment gets into the cargo stream.
- Enter – meet with contact – gear is pulled and your cage of stuff is built, combined with MEC the things that aren't hazardous. From cage got to shakeout to check – then back to the cage while you wait for the call that you are going – have a spot where it sits. RFI means ready to go for grantee to be used in the field (not ready to get on a plane) –then it goes to cargo system (Michael) and then ready to go on a plane
- Cage isn't necessarily area where personal belonging are packaged up with field equipment. Joe says having 2 stops is ok. Alternative presented as staging space at HELO pad. Want to do business the same way as much as possible
- Internal space for pile of gear that doesn't move for 3 – 4 days – it's staged ahead but gives room to add to it.
- RP – Field party cages at HELO pad. For groups moving field gear where it is staged there – can add last minute stuff
- General size – 8x8 or 10x10. How many? 20.
- Alternative – HELO Staging – Cages at HELO pad. If there was staging space at HELO pad that was covered – building that has space to collect things and moved there. Then move Crary – DNF space – then all together
- Can you integrate HELO terminal with PAX terminal? Central check in for HELO and fixed wing
- Challenge is storing Crary gear plus field gear – HELO needs to see volume and know the weight
- Could revisit previous model of central check in area where you get info flight is ready you get your cage it's put on a truck and taken to HELO pad
- John – can you stow equipment at HELO – but then you would need 2 cages.
- HELO's move fast with limited time to get from point A to point B – but maybe a small storage area? If all stays in one spot then you don't need separate cages.
- Move equipment before the day you fly out. Equipment is separated from the movement of passengers (Joe)
- Shaggy – talk about reducing footprint – but something might have to grow by the nature of the needs
- RP – What are the "givens"
- Warehousing adjacent to pallet building? Pack as much co-located warehousing together in on zone (this is double or triple of current BFC/NEC Gear)

- High bay racks are efficient

Flow of bringing in, washing, storing (which currently happens mostly during winter) – sketch flow is not integrated into warehouse sketch

- Mike to pallet (Air Force Pallets). Mike's ideal world is adjacent to palletizing
- Doesn't always to from Mike to Mill - Mike to outside until ready to go out (or in alley), or direct to HELO
- Mike to HELO

- Sleds need to be outside – grantees need access to them – alley is covered and adjacent so may be a good place for them
- Bill builds as many as 100 pallets as possible in the beginning of the season – pallets going out and coming in
- Staging - equipment is not palletized until camp tells them what needs to go (most stuff is stored outside now)
- Challenge with space serving as a road as the same time. Currently use outdoor space because that space is unlimited
- Ben – let RP know frequency of activities
- RP – helpful to know what kind of form outdoor staging is Michael's pallets or Bills Air force pallets?
- Does it need to be tempered? Some does. Need heated staged space. What percentage needs to be heated and what can go outside?
- Transient people using Crary and HELO. How does there process work?
- They need a space to breakout gear from cage and then move into wooden pallet system and flow out to cargo
- Need rooftop access to test radios
- Grantee Cages and system racks are different
- Note that Mezzanine has not been designed yet
- Maybe mark off traffic lanes in alley like tarmac at airport
- Trades has access to alley also

HELO:

- Joe feels this is supported more for fixed wing science not HELO supported science – cargo supplies
- HELO hazardous equipment goes through Mike – rest does not
- RP – think of a dedicated HELO space for non-HAZ so not in the way of everyone else, including cages. High frequency – 10+ trips per day going back and forth, maybe shoot to side so it doesn't add traffic to alley
- Joe – Where is com shops? Grab com stuff – it's a small satchel of radios and batteries? Not cumbersome equipment. Ask COM guys best way to get equipment issued
- Generators used by facilities as well as by grantees, lot does not happen by same people probably done in VMF. Small generators available here after serviced. Large generators kept in VMF.

- Need a ventilated area to test generators, stoves, other flammable equipment

- Joe – Field Party Food is critical part of support.
- User point of view – food is everything in the field – needs to be abundant, palletable, things you like.
- Currently field teams customize food and works well.
- Food is important for morale – when you are in the field – all you have is food and work

AFTERNOON SESSION:

- Incoming equipment – as well as sleeping bags etc – focus on servicing these goods and ready for storage. MEC field is going to go to shop space and serviced and RFI'd and then to the shelf
- Comment – is there a place for pallets of frozen food? Yes – supports pole and cargo space. Is it the same stream?
- F-Stop remains in the building with fuel tanks behind
- Bill would like to see access from both sides of freezers – RP says there is circulation on both sides
- Don't want food near samples – can contaminate samples
- Jesse – do you need segregated space for samples? Probably not. Usually packaged by the time they get to this stage
- One version of the flow: 2 rows of pallets (30) leaving access for driving, turning, need space for a Delta and a 950 loader with 15 pallets inside at any time with sleds outside
- Distributing Aircraft pallets outside – could you build an upper level catwalk? For working on sleds? Laying out Cable? Create a workspace?
- Cages – 18 currently. Bigger cages would be better – Things are often mixed together with other people's things. If taller – then need a safe way to have access. Cages are the only dark place in summer. General number = 30 cages.
- Would like to not carry forward the term "cage". Chicken wire, bad lighting. Does it matter that you know what's in the cage next door? No. RP – Modular unit system
- Wash and repair – Want tents coming in at the beginning of the line – wash, repair, drying space, and stored. Wants to be located close to where it comes in from the field
- Offices for admin upon entry
- Offices: Rick has number of offices. Administrative offices - Bill needs 8. Michael needs to be with science support. Create touchdown work stations? Liz – each needs access to outside bays so not getting in the way that is not in conflict
- Bill needs physical barrier keeping people out of high traffic work areas
- Joe L – garage doors where you can put them that tie to the outside that you may or may not use.
- Ability to have dedicated access to all 3 areas
- Liz – Access dedicated for large vs small stuff, foot traffic vs vehicles
- Different trucks have different deliveries

- Nice to have a receiving area where non cargo items could be dropped off for the night. If you get in late and don't want to take all the dirty gear to your dorm. Can it go to personal pod if you come through the alley?
- Need field party staging in accessible space – in connection with Crary for delivery of samples
- Don't want to complicate it by going in-out-in-out
- Retaining some field party function in Crary might make sense
- Sea Ice needs to get from the support center to Crary – messy/smelly items. Samples coming back and need to be processed that day.
- Need a way to not track "penguin poop" and dirt throughout
- Some equipment stays at HELO pad – often samples are coming back and need to get into the lab - often small enough to fit in a backpack
- Question for Tony – access? RP – ideally one touch point – not two. So instead of off plane and back here and then to mechanical repair – why not just take it straight to mechanical?
- Tony currently fixes things that are broken all in one spot.
- Tony's role in new station?
- Shaggy – maintenance at VMF. Take mechanicals out? Management issue with ASC. Light Vehicle shop might become broader based mechanics. Inefficiency? Gain efficiencies in 9 areas and 1 inefficiency in 1 area – haven't been able to solve this.
- Concern about snow machines not having a dedicated snow machine repair person. Dedicated snow mobile repair is important – resources will be available as they are now. This won't delay getting out to the field. Internal ASC may change but all the right people will be there to fix equipment/vehicles.
- Can you put a small mechanic shop within the trade shop?
- Keep supply and maintenance close to each other? Minimize the back and forth ant grantees have to do?
- Visit to Tony is "another spoke in the wheel" for Deep Field so having it convenient is good.

Touch Down Space and Workstations:

- Need for touch down space? Yes – good for transient populations.
- Having work space that is secure is important (with a locker for hard drives, ID, camera) –
- Workspace: 16 workstations are needed.
- Michael needs workstations and should be close to where grantees are
- Will be relying on management software system to communicate – plan is for pagers to go away

Offices need to stay adjacent to Lab Space in Crary. For those flowing through, having workspace is important.

Tracy – showed options for work space (see appendix):

- From more private workstations with high panels to workstations with more collaboration opportunities and heavier storage
- Layouts showed more heads down style vs more open and collaborative?

Answer: Combination of both along with meeting rooms to check out to hold up to 10 with larger meeting room with capacity to hold 40.

Workspace Comments:

- Have an enclosed room for Skye
- No need for fixed offices
- Small desk area in dorm room
- Would be nice to have a mix of office space – workstations
- Group office space needed for 4 – 6. With a locking door.
- Tack-able walls
- Lockable space that accommodates field groups would be great – but a mix of workstations would be good
- Transient people are often “shortchanged”
- Designed for flexibility as needs change this configuration can change.
- For groups that move equipment back and forth, it would be difficult to do if their workstation is on the mezzanine since there will not be any elevators in the building.
- Field Science Support Area – for people coming into and out of the field – not intensive science use
- Need place for prepping and calibrating equipment.
- Repair of electronics equipment needs? Currently in Crary – we are suggesting this happens here
- Michael’s workstation on cargo floor but needs an office
- IT and C is its own project within this project
- Comment? Is the entrance staying put? Get activity closer to Crary? Having access to 3 sides is valuable to bringing 4 things together – having dedicated access – adjacent but separate
- Connection to Crary is still important. Need to have easy cart access that can go from FSCC to Crary. This could also be solved with electric carts “golf cart”
- Keep vehicular traffic separate from pedestrian traffic
- Comment? Have skyway connecting to Crary? Would have to go up then down. This flow needs to be studied further but understand connection is important.
- Keep traffic out of main entrance and “dirt” out of main entrance.
- Will put walkway away from moving cargo
- Design so Kress can come in and make a U-turn
- We also need to keep in mind snow management/removal.
- Alley is a covered space with doors on both sides – can be tempered

ASC Follow up: Do some positions need a separate dining space (HELO pilots)? Otherwise people barrage them when in dining room.

Individual desk/heads down space can be in rooms, but provide a few focus rooms at Mezzanine

Recognize that tourism is going to affect things in the future

1.3.3.2 (OZ) Track 2: New Field Science Support Facility Programming, Part 2

RECAP: Rick pinned up the updated sketch.
Summary:

- Alley is covered but not heated space. Has garage doors on each end.
- Field gear and RFI working properly come off side (receiving area)
- Plan accommodates adjacencies and flow
- Field gear receiving has wash/repair and ample room for drying and storage
- Then they go into storage zone (this is double the size of the current BSC)
- Potential Mezzanine – good storage for sleds and cabling. Could rail crane off of it and in the trade shop
- Science cargo from Mike can go to Bill's area or to temporary staging or area of ATO storage pods (30 pods)
- Integrated workstations between grantee staging and science cargo for testing.
- Could have some mezzanine over the alley for sleds or cables.
- Trades could also store larger deltas up there as well (rail crane) from trade shop
- Offices could be on the corner near racking – also daylight and views and central location.
- Additional entry in corner aligns with the opposite side of Crary Loading which will be used for heavy pedestrian use.
- SARS Piston Bully storage is backed up by a secured gear room.
- Room for freezers and refrigerators for temp science storage.
- Cargo that gets dropped off late can be stored by freezers and close to pods (or be part of pods)

- Pods storage – benefit from making them higher? Will look at.

- Steve - Trying to empty mill-vans

- Question about using natural light since alley is covered – can you put skylights in? Yes– but done without becoming a maintenance issue, maybe clearstory windows

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- Ben – need to identify the major and minor functions of this building and identify the flow

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- Grantees are staying safe in their activities away from cargo activity

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- Can bring visitors in through mezzanine? There is a hallway – but it walks right into science cargo

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- F-Stop is on the Mezzanine

Comments:

- Add in ISTF
- Classrooms and offices are on the mezzanine
- Where are stairs (2)
- Sleds on mezzanine – might be tough. They get accessed in the middle of the night. This could be an operational opportunity – someone there 24/7 to help get them down/cargo etc…
- Put skylights in it so you get ambient heat and daylight
- No other space needs double volume except racks.

- Is there a benefit to stacking the pods if the shelves were appropriate?
- Could layer storage
- How much natural light will there be? Balance access to daylight with maintenance issues. Clerestory instead of roof.
- Group feels layout captures many needs and represents flow/adjacencies correctly.
- Roll up doors could be used to compartmentalize areas (ie. Cargo and grantee staging)
- Need some area to fire things up
- 20' container – Bija needs place for this.
- Where is mass cargo?
- Determine where hazardous materials go.

1.3.3 1:00-4:00 Break-out Sessions (Cont.)

1.3.3.1 (FC/OZ) Track 1: Crary Lab Programming, Part 2

• Recap of morning session. Propose to replace mechanical system assumed. Labs are highly changeable spaces. Some labs use are the same space year to year but does change dependent upon project needs. Dependent upon needs proximity to other teams important. Facility work off system not to interrupt experiments (full year cycle). What are the needs for labs, technology, wet labs?
• Ben asked the question of the length of time for research time limits on experiments and how was the length of occupancy affecting the layout of the lab and furniture? Transition to have shared lab space, progression towards this based on collaboration between P.I.s. Currently, offices are shared between 2-4 people. Labs are generically designed without definite users or research to be done. Lab space needs to be flexible. Functions to be moved out, need to be defined. Allows for more space for science labs. Optimized for wet lab space types.
• Discussion about how separation of types of user science vs field. Field to be relocated. UNABCO/IRIS/PASCAL able to move and willing to if they have a new dedicated space.
• Electronics dry lab, question raised as to the mechanical space requirements. Can these uses double as wet/dry lab space?
• Design team will make recommendations on size and reconfiguration of labs and support spaces.
• Build spaces which have better dedicated function and alleviate non-essential functions not required in labs. This BA needed. Currently a lot of functions occupy labs which could end up elsewhere. Convenience being able to close the door and meet with group. Informal conference spaces, accommodate needs above within (E) labs. Need for mudroom (ECW) Reality of environment.
• Concern about noise transmission between labs with open concept, leave little privacy. Concern about blackout capability's with glass walls for research requiring lower light levels.
• Type of work defines mechanical requirements. Fume hood needed for working with acetone.
• Autoclave needs own space small size, muffle furnace location currently in shared lab space not convenient for common use.
• Use of sterilizers, need to define the type required for research.
• RAD lab proximity, commented about transporting radioisotopes through facility to other lab areas. All radioisotope users should use one lab. Multiple users in lab. Requires multiple benches. Dedicate one lab for each user group.

• Have small offices with a close proximity to labs for support.
• Determine the needs for (1st Tier, 2Labs, +1 Lab) sink space for washing bottles, at times they are waiting for shared sink space. Bottle washing station sees a lot of use, 200-300 bottles at a time.
• Is the existing lab currently an efficient plan for these types of labs? (Ben) Too much circulation?
• Users are not always sent to labs with the proper mechanical requirements. Vent hoods aren't able to serve the type of user requirements. Wet lab users overlap dry lab. Need to determine what is needed within Crary.
• Not all labs need to be dedicated, some do. Need for physics dry lab. No need to make all labs wet labs. A wet lab contains hazardous chemical, natural gas, compressed air. Labs adaptable, ESD bench, fume hoods. Flexibility for mechanical requirements.
• Do not limit Crary for wet lab space. Relocation of technical equipment not necessary to research possible, need to look at where other locations could be. Functions of spaces need to be parallel with Crary services. Separate and specific types of users for Crary.
• Need in-between space for incidental tasks. Some people have needs for distinct research. "Living at these benches," never have enough space.
• Separation walls okay, if they are moveable. Open circulation allow ability for user groups to adapt spaces without little physical changes to walls or reconfiguring.
• Travel distance is pushing acquisition of resources to ends of the building. This is not efficient.
• Need a space for eating and drinking. Room in stock room not big enough (staging area) not big enough.
• Aquariums – moving to Phase 1 from Aquarium is sometimes a problem. Traveling up spine with samples is cumbersome.
• Move offices to outside walls?
• Discussion of overall building concept for circulation - field party staging, dirty contents moving through labs can be a possibility for contaminating samples. Need to look at circulation to isolate functions and keep clean areas segregated.
• Field party staging is going away. Takes away entrance for staging. Circulation of material though on chalet side.
• Types of support services. • Environment rooms, none in phase II • Freezers • Grantee workshop/field party staging • Electronic lab • Microscope room • Chem storage • Shared instrument room • Shared water room • Need environmental room for aquarium. Should have DI water to all wet labs. (Type 1?) • Is there a need for sea water for some labs closer to aquarium? Are there needs not currently being considered that would be hard to be retrofitted in the future? Analysis done here for at home institute?

• Mezzanine Level. Conference room converted to office workstation. Computer in lounge. Looking at existing condition, what is valued? What is not valued? Office space plays an important social role.
• How do we reconfigure? Get rid of workstations? Disturb people working. Some computer (MOCA) access shipping software dedicated location. Technology will alleviate this being updated.
• Get rid of hoteling, this allows for conference room space opportunity (relocate team meeting currently held in labs) Conference room, used for teaching and conference meeting. Used by all users. Need this space in Crary.
• Library used for large group lecture room, training makes conference space awkward to use. It also functions as a social space when people outside of Crary use it. Awareness among other people at the station. Wednesday night lectures relocate to FSS to accommodate bigger crowds appropriate site for larger groups.
• Space for grad students, student space outside lab up to 20 people, here or outside Crary? Coffee space has seating on mezzanine, this is nice to have.
• Power outages are a problem. Different feeders go down. Power/heating will go to micro turbines. Strategic plan for back up power.
• Use of -80 degree Freezers. Bank of Freezers grounded to help with efficiency located in various locations. Should be close to the labs. Reuse heat discharge as heat in rest of lab space?
• Physics need access to roof, ports to exterior for antenae more, they have more needs for additional locations. Communication for antenna locations.
• Deficiencies: Vacumn, DI water, no gas, no shared auto clave, Class 10000 clean room - non-certified, server class computers, would like to see movement to server based network.
• Co-Lo data center general direction for computing on station, this will allow for separate servers serving different user/separate cage.
• Town hall meetings during fall for planning?

1.3.2.3 (OZ) Track 3: Dive Services Programming

OPERATIONS

- Base for up to 8 grantee groups do work on sea ice some daily others out on ice for days or weeks can share lockers
- Dive Team operates out of separate part of facility. Grantee divers share space with them
- Balloon launches (weather, twice daily & science 6 -12 times)
- Storage of equipment used on ice that does not need to go back to the lab
- Storage of nets, traps, pelican cases, shovels, generators, electronic equipment, tripods, ice chipper, ice axes, jiffy drill, survival bags, etc.
- Touchdown space and end of day or time on the ice

USES WITHIN BUILDING

- Pisten Bully Storage for 8; angled parking preferred
- Snow Machine storage replaces Pisten Bullys as season progresses
- Grantee Sea Ice user s individual storage lockers w/ common storage area

- Dive Lockers for Grantees and Dive team (Dive team to comment on at later work session)
- 2) rinse tanks, One for grantees one for divers
- Hanging area for drying gear
- Dump Tank (10' dia.)
- Balloon Facility for balloon inflation & laying out cables and equipment
- Common areas for mudroom, toilet, work & break counter, clothes washer & dryer

NOTABLE BUILDING COMPONENTS:

- Large (14' x 14') garage doors for Pisten bullys
- Loading dock for pick-up
- Exhaust for Pisten bully storage clear of work area
- Hazardous storage

ADJACENCIES:

- Crary lab (downhill preferred to move equipment) to Sea Ice. Ideal location South of Crary
- Access to flat area for balloon launch
- Access to fueling (currently fueling is remote taking about 45 minutes for the round trip)
- Access to Helo Port
- Multiple access points to sea ice if go to increased season or yearly usage

INFRASTRUCTURE REQUESTS:

- Internet
- Fresh & Sea water
- Plug ins for block heaters if stored outdoors
- Vehicle storage does not need fully tempered space

NOT INCLUDED

- Maintenance of" fish hut"
- Separate sea ice structure

FUTURE POSSIBILITIES

- Year round operations
- Zodiac storage
- More use of robotics

1.3.4 4:00-5:00 (FC/OZ) Brief results of break-out sessions – All Attendees

4:15 Recap:

Field Science Support Recap– Mike

- Alley space will be covered but not heated with big doors on both sides to allow protected support area
- A.T.O. – palletization – lot of trucks going in and out with little pedestrian traffic, at any one time room for 15 pallets. Can spill in yard or alley
- Storage pods replaces the term "cages" that are filled with gear – shared storage pod (30 pods) may be high enough to accommodate high tents. Could be dedicated pods
- Staging – open area, lay out for short time. Grantee can use this space to take out stuff from their pod to test it and make sure it is what they need. Can lock things up that are not going to

field camp. Also drop location when you come in late at night – temporary holding place

- Keep some walls around cargo for safety
- Field gear wash and repair – along with gear receiving
- Right outside of building – SAR entrance and Bija's entrance
- Freezer Storage for vessel loading – grantees don't access these, sample storage
- Control rooms off alley (once samples are packaged) – they can be stored in here. 1 for South Pole, 1 Ref, Freezer for shipping, 1 for Air National Guard supplies and fuel
- Dedicated location for HAZ Mat needs to be defined
- Where do you test stoves?
- Keep moving cargo separate from people for safety
- Additional Door entrance lines up with loading dock to Crary, without having to use trucks and keeps carts from being along pedestrian walkways
- Support staff will have offices where grantees can find them as needed that isn't far from staging/cargo area. There will be an opportunity for touch down work spaces
- Circulation space is wide enough and will accommodate forklifts to move around the facility
- BFC Storage - Light mechanical (not snow machines) can be stored in racks.
- Question came up about snow mobile customization prior to going out in the field. This needs to be resolved.
- Sled/snow machine? Sleds might be tough – they get accessed in the middle of the night – could be an operational opportunity – someone there 24/7 to help get them down
- Tony will have an office and some equipment but repair and maintenance happens in central maintenance facility
- Tony's repairs and maintenance will happen in a central facility (pick-up truck) will happen in one space. Consolidate the expertise as well as location.
- Hub and spokes are all adjacent whether for Deep Field/Helo's
- Still need to work on how Sea Ice will use this space.
- There might be a mezzanine above (1/3 of space) this that would house offices/workstations/conf rooms/electronics work shop. This area is for folks in Deep Field that don't need wet or dry lab space in Crary but need desk space and places for their team to meet.
- Reduces pressure on Crary and opens up more space at Crary
- Reduce need for trucks to move things from Science Cargo
- Alley has ample room for storage – can store a crate for a week or so
- Allows us to consolidate a bunch of work centers. MEC/BFC/HAZZ processor will get blurred quite a bit. Will be able to expand hours as there will be 24/7 staff available.
- Comm shop - the brains of the station happen in building #004 but the field radios may come over to FSCC. t.b.d.
- There could be a crane that would come from trades shop and cross the alley.
- Want to reduce the need for trucks to transport things from Crary to FSSC.
- Robust walkway that carts can move across is ideal to move gear back and forth from Crary to FSSC.
- Where are stairs?
- Where is mass cargo?
- 20' container TDU – Bige needs a place for this
- Is there a benefit for stacking pods?
- Could layer storage

- Natural light: Skylights, clerestory lighting
- possibly be able to use a rail crane in alley
- Group feels layout captures many needs and represents flow and adjacencies correctly

RECAP – CRARY Dan Dozer:

- Talked about examples what peer institutions are doing on a research level
- Aspect of visibility and openness in building design using natural light – interior glazing between labs
- Looked at traditional lab design – trend is to locate that out of labs in communal areas and with PI offices
- Looked at metrics of existing building
- Consolidation of Mechanical system and other things moving out opens up space
- Design approach is to mainly look at Phase 2.
- Challenges with the existing building. Some components are givens (spine/stairs)
- Service access and conditioned holding space need to be better aligned
- Need to look at deleting loading dock on left – shift to other side
- Need more wet labs by Aquarium
- Phase 1 – access to freezer and controlled environment
- Staging, frequent trips in and out of Crary – need to accommodate daily activities (including staging and temporary storage)
- Corridors are jam packed – need to get this out of the traffic flow
- CRP -come back with high volume gear – will try to find ways to get that out of traffic flow.
- Functional need for office space with relationship to labs. Need more than one office for each PI (lab managers/students/multiple PI's/technicians…)
- Need informal meeting spaces.
- Need to discuss collaboration between different work centers.

Comments:

- Question regarding waste boxes – looking to consolidate and clarify waste handling. Cheaper to sort waste back in US. Location not defined yet per Steve
- Looking to co-mingle waste streams. Trash to energy component is being studied
- Where do we put samples in freeze safe? Can you mix fish and non-fish? Organics and non-organics? Once frozen it is ok to mix.
- Bev – Depends on dry ice packaging (Michael is on top of it)

5:15-7:00 (ASC/A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

- Have Bev discuss the way science is done at Crary?

- No problem with lab themselves but other issues with the building that could use improvement

- Concerned labs will change when they didn't ask for it

- Aquarium will be discussed tomorrow

- How much can we use mechanical rooms at Crary (Joe)

- Steve – new flow of building – integral part of operation. Talk about how it might look
- Don – recap sea ice support facility
- Other half of that discussion is helicopter
- Steve – lab as you know it is going to change
- Dan – can come up with concept diagram
- Ability to feed utilities to Crary from both sides
- Go on to Central Services – all attendees
- Stakeholders can review Charrette Report

Thurs July 16 (1.4)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

1.4.0 8:30-9:00 (OZ) Review previous day's work – All Attendees

RP – Sea Ice Support Review from Wed. Sea Ice could be called "Marine Ice"? "Marine Operations"?

Shaggy – touch on historic importance and culture – balance between efficiency and cost and the commitments to the NSF

3 main things building needs to support:

- Improved dive locker (place to clean off), rinse, hang, store gear, with office for admin work. Also sea ice staging, mud room, pod space, storage for traps and nets, laundry here to keep it away from the rest of the station. Tank for supporting ROV use , test CV water tanks so they don't have to put them in the testing facility at the aquarium.
- PistenBully Parking – doesn't have to be heated but not a frozen area. If we move Zodiac in the future, is this a good place to store this? Piston Bully takes them to sea ice – drive in to load and unload
- Balloon layout (for short term and long term launching). Important to protect it from the wind. Is this Central Launch or does MAC weather balloon launch from here ? Have to see what ALL balloon needs are.

PistenBully takes them to sea ice BUT not the only way they get to the sea ice. Need pick-up trucks to drive them out for Scott Base side

Would need fuel line for PistenBully

Fresh water delivery area
Tanks can't be around exhaust.

Question about size.
Ben: be careful about size – not seeing things that need support space like utilities. Diagrams – showing flow and function. RP – reminder that circulation and bathroom space to be incorporated

Comment - Divers will probably want to see more separation – dive area might be too small to fill tanks. Don't want to be in same area as dump tank – walled off from what scientists are doing

1.4.1 9:00-10:00 (OZ) Central Services: General Overview – All Attendees

MP2.0 review of spaces – Central Services Blocking Diagram

CENTRAL SERVICES BETWEEN CRARY AND LODGING:

- Eating/socializing/meeting – happens in central services and lodging.
- Opportunity to overlook sea ice and view beyond.
- Create sense of arrival with new entry between both buildings
- Blue is enclosed/pedestrian circulation (hallways)
- Hallways on the outside so all have access to views. Allows people to link to the outdoors all day.
- Access to lodging will be careful on where we are crossing utilities.
- On arrival – place to shed ECW gear.
- Restrooms adjacent
- Multi-purpose exhibit and orientation space with views to the sea ice. Can be used for orientation/lectures/group meetings/social events – well used space.
- This is a well-used/daily path of travel and great first orientation to the ice
- Daily activities – hand-wash/dining/and kitchen beyond.
- Dining might sit up higher for better access to views.
- Growth chamber potential (green house – if possible to get height that would be helpful).
- Overhead bridges carry people and utilities from each lodge building and connection to central services.
- Bag drag doesn't happen anymore- this happens in central services which is adjacent to lodging. Need to determine where you pick up sheets/blankets.
- Laundry is close but intentionally not in main orientation area.
- When you first arrive – esp with newbies in it – want to get keys/gear and go to housing. Might be good to have them adjacent to each other or is separation good so it doesn't clog up?
- May make sense to move housing up by PAX/AMP?

Exit

- PAX/AMP – drop bag and get weighed.
- Back out through entry – reverse sequence.
- Science – has excess baggage that comes from Crary and has to be checked out and will go on domestic flight home with them. With adjacency next to cargo stream– it will likely go through cargo/ATO. Not intended that people will have to bring all their baggage back through building and to PAX/AMP.
- There will be a lot of traffic between Crary and FSSC.
- Question - Can an overhead walkway be added? Crary sits down several feet lower than FSCC. Would be a challenge to try to connect these. We do have the ability to do a grated walkway and to re-imagine material handling (diff. Equipment/diff carts). Heard distinct need for material to go back and forth.
- What is day to day flow (90-120 day flow) when they are living there?
- Need to think about direct ease of use from Crary to lodging and Central Services.
- Have personal gear and science gear that both need to be weighed. Box going to baggage will be weighed and then can be taken over to passenger area. Need to work out this flow.

- If passenger air was closer to central baggage area that would be helpful.
- If you added coat room by hand wash that adjacency would work better. This is older flow – so likely your coat lives where you work. You won't be taking it back and forth.
- Comment – daily trips to Arrival Heights – how does she go in her vehicle? Is there interference? Need to look for place to park their truck to go in and out.
- Traffic modeling is yet to happen so will be studied.
- Shaggy – we will not forget about Arrival Heights and their needs.
- May be too many front doors to Crary – need to think about circulation from one end to the other end – make sure we are not circulating through labs.
- Bags not going to lodging but to work center – could go direct to their work center. Understand there are passenger bags and bags for work center.
- Sky bridges are good but people want to walk outside safely. There will be exterior ways of moving also and need to think about where coats will be located.
- Will exterior walkways be structured ? Yes – for example, steel boardwalks that are elevated. Also areas to walk on grade.
- If people walk outside – doesn't solve the wear and tear that happens. Yes - conflicting interests.
- Thinking of locker rooms – where some items can stay.
- Laundry – currently facility in each dorm. Important to understand there are micro communities. There are different lounge areas in each lodging facility – each one could take on different themes/flavors. Want to encourage mixing of communities in different dorms.
- Check out the warm room at Scott base – clothes dry really quickly so don't even need a dryer. It's adjacent to laundry facility. Could be a buffer for noise between lounge and lodging
- Between lounge and rooms there would be banks of bathrooms to also help buffer sound

Recreation:

- Contingency operations: Double duty as gymnasium and casualty staging area. Could have a stage at one end, bleachers at one end.
- Fire/Medical is just past gym – can go directly over bridge
- Lounge can be bar/lounge
- Kitchen to serve the lounge
- Taking the station from 3 to 1 bars. Need to look into this.
- Is there any consideration of day sleepers? Yes could have all day sleepers in one dorm. Could maybe do switch shift?
- Multi-purpose skills and enhancement
- Redundancy factor for food/beverages separate from kitchen

3D model Review and Comments:

- Can lecture space have a slope and can be darkened? Yes
- Views will be accessible for everyone and carefully laid out
- They will be focused for impact – exterior and internal
- Need to study grades and how connection to Crary can happen.
- Might be more efficient to move the admin area down to the first floor. More efficient use of space.
- Allows for better flow for lecture hall

- Can't dig deep holes- have to work harmoniously with the land.
- Also considering snow and how it blows in
- Provide "quieter" or more contemplative spaces.
- "Towers" each one can take on their own character.
- Could walkway be moved down to the corner and go to the other corner of Crary? Direct walkway over and no gallery?
- Bridge is raised up to allow fire truck/vehicle access and for snow clearing.
- Reminder to group – new operations and equipment/vehicles etc… can help some of the logistical issues.
- Ecstatic to see satellite equipment on the roof!

ADA – what do they have to accommodate?

Comment – taking it from 3 down to 1 bar? Need to look into this.

Accommodate day sleepers and night sleepers separately and darkened

Don Dozer – Crary Phase I circulation factors a lot of traffic into lab area. Comment – that's not new

Shaggy – site work requires explosives and is very expensive

Shaggy – reminder that current processes might change

Central Services: Recreation and Quality of Life – All Attendees

- *DC4.4.2* Skills Development

Included in Collaboration/Social Spaces below

1.4.2 10:15-12:00 (OZ) Central Services: Recreation and Quality of Life – All Attendees

- *DC4.4.3* Collaboration/Social Spaces

Central Services – RP Don Tracy Dan CE

RP – Recreation opportunities – opportunity for rec spaces and social spaces

Second floor of contingency wing

- Gymnasium – how can that be used? Plays; Theatrical presentations; Party space; Mountaineering training; climbing wall; Area off side with mattresses so people can climb by themselves; Self belay systems are problematic; Bouldering (don't need experience of training); Basketball; volleyball; All-hands meeting space
- Comments – lounge below multi-purpose weights and cardio – that space is going to want it quiet. Need acoustical separation
- Testing in the gym for non-rec uses since it's the largest open space. Steve – would like to incorporate that in HELO ops.
- If UAV's are more and more – maybe test in there? Since they need wind free space for inflating a balloon

- Question – how tall is the alley? Don't know
- Gym – scheduling/operations element for non rec things. Steve – inclined to use the hangar because it can accommodate wing spans, heights
- Sunday night science lecture has more than 100 people and would have a couple hundred if there was more space
- Comment – galley use for Sunday night is good because it's informal – not formal seating – and in the galley you are fighting the light
- Bill – current lounges get really crowded – especially if there is a band
- Wine bar/Coffee House is important
- John – importance of informal spaces but also a focus place where you don't know when you are going to bump into someone – wants a Gallagher's – Coffee type of place but not too close because of noise. Coffee house has open mic night – playing cribbage. Would be nice to isolate quiet space from social/active coffee house type of space.
- Comment – conflict with use of chapel. Matthew – control of space needs to be managed.
- Chapel function – 2 ministry staff – need privacy. Currently in office outside of chapel. Would you move current chapel features into a new space? Elements within the structure that are of historic significance.
- Useful to have place to get alcohol – enough capacity for plumbing
- Comment – where is the store?
- Store should connect to warehouse.
- Bulk of dollars in store is alcohol
- Do we need to consider/accommodate tourists?
- Mike – where do people go to buy alcohol for personal consumption and how does it differ from getting alcohol to the Field?
- Kevin – impact of laundry and kitchen on upper floor? Laundry to second floor because of exhaust. Can you vent it out the wall? Yes. More difficult to vent out the wall for the kitchen.
- Kitchen – grease build up in ventilation system (Steve) Need to think mechanically how this is handled. Problems currently at Pole
- Gym – 2 areas for open area workouts like yoga, need to understand the range of activities we need to accommodate. Group workout class accommodation.
- Skills developments – music, crafts, what else?
- Gear room for rec – has not addressed yet
- Radio room is a great way to express themselves – does this stay? RP – will accommodate. "Local flavor". Most people like radio room to be private.

Social Spaces – Tracy:
There are 6 dimensions of Well Being. The ones that most apply to McMurdo are:

- Mindfulness – being fully engaged

- Belonging – connected to others
- Meaning – sense of purpose

There are 4 day to day things that translate into a positive or negative experience. Our goal is to design these new spaces to ensure we create positive experiences when at McMurdo:

1. How much people can express themselves.
2. How much they feel a sense of control
3. How much they feel a sense of progressing
4. Being autonomous

Positive outcomes of designing for Well Being are uplifted mood, reduction in stress, being more stimulated.

Interior Design: –

- Group responded to some of the interior concept images on the screen. OZ will set standards for finishes and materials that are durable, easy to maintain, warm. Interiors will have access to daylight and views
- What do you want to come back to when you come back from the ice?
- Steve – from dorm objective – dorms taking advantage of the bay currently (circulation issue) –
- Give up views? More important for view or reduce noise?
- Mike – wants it dark when he is sleeping
- Doesn't need a view from his room. Sleeping area – hence the lounge areas associated with dorms. Do you give up views from lounges for acoustical separation?
- Bill – still going to be constant traffic.
- Bldg 210 is currently quiet.
- Mike – take advantage of natural lounge light? Is it really a function of that room
- Decks on end for bbq and social outdoor space?
- Matthew – put walkways on other sides
- Cole – there is value to privacy of lounges so having walkways going through them would not be ideal.
- RP – flip plan? Tracy – flip some?
- Bill – good compromise.
- Grantees go into field and see the views – they don't need to have them from their room. Some said they do want views/daylight in their room.
- Some do want to have chance to leave curtains open
- Concrete is too cold. Warmth, natural light, create something else that is not Antarctica – like New Zealand does – something that reminds them of where they come from (lots of green at New

Zealand station).

- Steve – from a facilities point of view it needs to be durable
- Pole's wood panel in galley is nice. Wood not as durable and doesn't do well in really dry climates. Can use other materials that give the warmth of wood but are better suited for this environment.
- Make it feel less institutional – especially in lounge area – maybe cork boards – don't want to feel like you live in a hotel
- Like bright colors. In agreement.
- Does moving from 2 – 1 How does it change space? Steve – aggressive acoustical treatments in lounges
- Need to accommodate pairs – 2-3 people. Example a glass of wine with colleagues quickly before bed.
- Steve – potential NSF issue with image of casual hangouts with wine.
- Ben – what's allowed – what's affordable – image concerns
- Comment – designed with Formality – Informality. Flip flop tank top activity happens in the "back"
- Furniture? Don't want to build in too many walls or doors – use furniture to help define space/provide privacy. Felted furniture arrangements are durable and provide good acoustic control.
- John – likes inviting image on the left
- Would like Smaller TV type areas – dorm room is too small – lounge is too big and often crowded. Likes the couch when coming back from the field.
- Consider suite type rooms? Team rooms with central space?
- Amy - Images of trees?
- Themes?
- Transient population – vs long term stays – needs are different
- Would give up more space for more quiet rooms
- Need for heads down space? Can do that in single room with new plan.
- Thomas – likes light in his room to help get used to sleeping in tent. Some current internal rooms are too warm.
- South Pole has rooms with windows and without
- Comment – introvert vs extrovert will determine how some people choose to socialize
- Current lounge rooms - people like looking out the windows
- Give town staff different rooms – that are there all season? Little bigger for them – smaller for

transients. Transient could mean a couple of weeks – not just a couple days

- Steve – furniture would include a place to put your duffle
- John – more elbow room for those that are on station all season
- Amy – light control?
- Amy – door locks are loud
- Light in hallways when you wake up to go to the bathroom affects sleep
- Maryann – Sauna? RP – going away. People like them though
- Hut-10 – where you can cook and congregate. Matthew – reception for DV's
- Want places to cook and eat with small group
- Library?
- RP – wood stove at Palmer? No for McMurdo
- Hut 10 – a needed space. One event at end – people use it to organize a party – away from everyone else on station – bring in food. Hut 10 is where you get away from the rest of the station
- George – says it has to be rebuilt often – people don't take care of it. Heavy maintenance – and how do you make people responsible/accountable.
- Do you have someone monitor it? People want a satellite building
- Steve – new station offers alternate venues for gathering. George – think it out that makes people self-police. So that you can't get away with it – peer pressure – private but visible.
- George – video cameras are realistic for safety and for accountability
- Water bottle filling stations? Steve – have faucets

Interior Space General Take-Aways:

- Color is good as Antarctica is white/brown/gray. Don't use blue
- Warm materials are important after being out on the ice
- Comfort is key – out on ice they are sitting on hard benches/poor sleeping, etc.
- Bedrooms are flor sleeping
- Introverts and extroverts will have differing opinions on how they use the dorm. Some will use as a retreat space to get away. Some want daylight. Some want dark. Variety would be good.
- Concrete feels too cold.
- Don't make spaces feel institutional.
- Concept images are good for corporate environment but not for working and living in all the time.
- Think of ways people can personalize their space.
- Cork walls might be good – can pin up and are warm and soft.

LUNCH BREAK

1.4.2 1:00-2:00 (OZ) Central Services: Entry Experience & Orientation – All Attendees

- RP – open up afternoon discussion – Crary breakout this afternoon also – Talk about Central Services? Then we will have Crary group come in here.
- RP – better understanding of where ASC support is – especially in orientation – one stop orientation – organize and promote wayfinding and organize intuitively to make it easier. Procedurally – how do you interact with support that are located here
- Will have flexible framework for various types of administration
- Thomas – meeting spot for grantees and administrative staff
- RP – maybe have more of a dedicated public area for these meetings

CRARY LAB – AFTER LUNCH

Steve – programming perspective – trades in general administration? Ben – "it depends" MP accommodates trades

Joe Ferraro:

PHASE I

- Deficit in office space and meeting areas
- Field party staging turned into a lab
- Off spine – large mud room with lockers (need for personal storage)
- Adjacent to that is a large conference room (meeting room)
- Storage – created more storage by getting rid of mech rooms
- Larger receiving and staging area
- Go through storage to come back to spine currently so storage is divided into two areas
- Created staging area outside of storage
- More hallway offices
- 1 – lab, 4 offices, mud room, locker room, storage area, conference room
- Stairs to link to main building – next to lab
- Larger student area
- More tables
- Opened with daylighting with more cubes or tables with adjacent offices and lab
- Cut down size of mud room – may have to move (could be a DV entrance)
- More storage needs

Comments

- What have you lost? Such as mechanical room. Joe – just boiler and mechanical room, net 2 lab loss
- Steve – mezzanine? Open to ceiling? Joe – could open it up for higher storage?
- Cole – Is IT centralized? Different IT needs throughout.
- Comment – Like having office across from lab (Amy)
- Joe – offers more flexibility if offices are close to each other
- New door? on field science aligns with loading dock of Crary

Phase 2:

- Even distribution of labs. Up to 4 labs – electronics shop – basic duty shop – more lab support areas – Between phase 1 and 2 – could have an open area – tables and chairs, windows, move restrooms
- 4 labs in back with 2 or 1 labs back to women's room. Dave – temporary walls? Joe – yes
- IT that is physically wired to equipment in the lab – somethings have to live there because they are attached to something (Matthew)
- Matthew – wet and dry labs? Joe – don't know yet.
- Roof – used to be antennae (still are) – Joe – still want that. Electronics that still link to antennae on roof and roof space (Grantee Test Space – not observation space on Central Services)
- Would like to see Phase 2 as flexible as possible. Phase 2 has been able to accommodate large groups because of its flex Worried about losing that flexibility if you make it dedicated space.
- Comment – Aquarium location – more lab space needs
- Steve – amount of supplies – so do you move storage down
- Ben – flexibility of space – Joe to keep that in mind
- Sea Ice Comment – Use flexible walls and cabinetry – can you change configuration? Yes – put hard stuff on the outer walls (Sea ice)
- Too many labs? No. Joe – there is less open space
- Comment – big open spaces will be used for testing equipment
- Offices were originally designed for one person
- Dry lab users – working as an office inside your lab is less of an issue – need for offices in phase 2 would probably be less
- Matthew – instead of office in the lab – you could go through lab to office
- If not a biology lab you just work in your lab
- Wish list – someway to get things up and down the spine that you don' have to use muscle – Joe – thought about some sort of trolley system
- Floor surface needs to be non-bumpy, especially when you are moving equipment
- Tony – consider that moving heavy stuff in and out for individual projects and dedicated for period of time
- Phase 2 – removed field party staging with all staging coming in from opposite side of building

Phase 3:

- Potential environmental rooms (2). Open up whole room to make it more flexible since mechanical moves. Easy to move electrical room. Have it be a modular design to accommodate specific use. Labs could be narrower.
- Water supply and filtration – One large tank currently that used by ROB group (ROB?) Maybe use in new building.
- Possibly enclosing area near loading dock with a floor and another overhead door.
- Question – move fan rooms out? Joe – will find room for fans
- Room for fans in every pod
- Need for working outside of lab so experiments need daylight. Steve – would have to rebuild that if that was to be done.
- Steve – do deck so you are close to your labs? Comment – shadow issues
- Open grated deck that makes the most sense for sun – (Phase 2). Need for aquarium folks? Maybe.
- Building is structurally is good - concern about exterior panels – has to do with original

installation

- Building has multiple mech and fan rooms - add structure to outside for this. Proposed pod adjacent to house mechanical.
- Don – Dive Locker? Joe – currently doesn't exist.
- Low point drains instead of high point drains (Kim)
- More circuitry currently - circuits pop often
- Reclaim storage areas
- Glass washing – don't need system currently there because people wash their own glassware.
- Put in better polishers
- Within aquarium there could be instrumentation to measure water coming out of water line – so you can tell back at university what is going on
- Make sure current wastewater – no chemicals go down drain (Bev)
- Universities want labs certified to some sort of standard. Waiting to get appropriate standard from NSF
- Water supply consultant working with joe to look at water supply – how many gallons per minute – and other requirements
- Cole – what is happening to upstairs (where Cole is housed)?
- Keep catwalk in phase 2? Yes. Has antennae's that interfere – too close. Line of site requirements
- Ben – roof accessibility stairs? Yes – walk out – not climb out
- Steve – root top access is important – for testing and for equipment

1.4.3 2:00-3:15 (OZ) Central Services: Food Services and Dining – All Attendees

- Lars – 1,000's pounds – Joe – snow accumulation is an issue
- Phase 2 and 3 issues include access to loading docks
- Joe to talk to Bev next week
- Glaciologists and Geologists could not attend – so we don't have their input.
- Comment – Distance classroom incorporated into Crary? Where university workers could deliver classroom info. Many modalities for the distance classroom – Studio with lighting? Smart Board? Not that complicated. Lots of requests to be able to "show Antarctica". Needs to be interactive

GENERAL COMMENTS

- Steve – potential boat needs in the future
- Transition could go away – new diver sea ice support projects if zodiac usage is approved that could be staging
- Ocean Search and Rescue – do you make space for a boat house?
- Lab question – have to weigh your samples – having an alcove with scale would be great – Amy

- Lars – Marine location? Balloon launch needs big flat area. Move to where current big gym and current HELO ops – they could use that. They launch balloons that are set up for hand launches all over the world.
- Command and Control discussions are in Week 2
- Meteorologists separate from weather forecasters
- Charrette Report:
- Pictures diagrams text for grantees to review
- 2 weeks to review and provide comments
- Design Review Meeting
- Move into Design – 35% complete – review and comment
- Incorporate comments
- Critical at this point – and not beyond
- Ben – early review is critical
- Sea Ice comment – present to McMurdo community? Ben – ASC is dedicating a website

1.4.4	3:30-5:00	(OZ)	Field Science Support Programming, Part 3

Skipped

	5:15-7:00	(ASC /A-E Firms) notes and graphics	Designers and ASC review day's input and develop for next day's sessions

- Summary to provide for Ben
- Common themes – any surprises?
- Lessons learned in 4 days that has impacted Master Plan – valid thought for future
- Ben – boat house, boat launch – Shaggy – note that 7 buildings are going away so there will be options
- Dave – into housing – do walkways change? Circulation route changes?
- Importance that Crary and science support are "connected" - but also realized that it's not as crucial as they thought
- Personal baggage and weighing needs to be figured out
- Connection between Crary and Science Support will be a challenge
- Turn around location?
- They want to walk outside
- Ben – Electronics repair – lab manager – no need to do lab work but are being assigned lab space

- How does that affect Jesse's ability to plan grantee space
- Can assign a portion of a lab that is created out of flexible space. How to keep labs without breaking them into spaces that can be contracted – expanded
- Joe – confident he can make that happen.
- Need to recognize conflicts and report to George
- Chalet – lot of emotion with that building
- Don – Chapel functions being replicated elsewhere
- Dave – for each facility show the building requirements

Fri July 17 NSF Internal Charrette (1.5)

7:00-8:00 (ASC /A-E Firms) Set-up and Confirm day's objectives

1.5.1 8:30-10:00 (ASC/A-E Firms) Overview of MP 2.0, MREFC process, and current status

Friday Morning – NSF Introductions

Remaining Introductions A-E firms, ASC

RP – present summary of week 1 and common themes

1. Understanding
   Shaggy – Grantees embraced the plan and understand the trade offs
2. Grantees understanding flow from Crary to Field Science and all of what Field Science will provide for them
   Ben – for example – Electronics present in Crary, which doesn't need to happen there. How do you move forward assigning space? Are you limiting the amount of science behind done in that space?
3. Include future boat house – Pad sites will open up by sea ice
4. Process and flow
5. Lifestyle. Comment: accommodating a variety of housing rooms could be difficult. RP – Good that there is a range because of re-use of existing buildings. Ben – develop room with bed, desk, window/without windows. Dave: Management issue of getting them where they want to be. Ben – Window coverings don't currently work. Dave: Airplane-like window shades
   - Question – Were there examples of where grantees input would not be considered? Dave – Emotional attachment to Chalet and Coffee house, and also a desire for some place like Hut-10 – some kind of "get-away". RP – Confident that we can integrate culture and heritage – as well as create inviting and warm spaces. Can do a "Cheers"-like space for remote-feeling get away space

6. Appreciation

- Jesse – Grantees said they do not want a sterile environment. RP – will design residential characteristics based on Tracy's images and furniture. They do not want all-institution all the time.
- Expressed a need for exterior circulation (note that code will require this). Will make sure it is not in conflict with vehicles. Also factor in snow systems.
- Ben – include a transition from outside-inside (mud-room), walk off. Reduced tracking due to proximity of buildings
- Scott – include entry points for fish and things that smell in Crary. RP – maintain external loading areas
- RP – Originally the grantees talked about the "triangle" of sleep, work, eat. It became more as the conversation moved on, including discussions about transient grantees vs non-transient, or short term vs long term occupancy. This is important for designers to understand
- Discussion of allocating space for multi-year projects. Dave – centralized, managed space with a deposit on it. Don't just take space – assign it (IRIS, UNAVCO). Talking about big stuff – not personal items. Recognize that grantees take stuff off continent and then turn around and ship it back the following year.
- Ben – time consuming task for inventory and tracking of equipment (and activity)

Common themes:

1. Access to support people (Generally – not just off the bus)
2. Movement of goods (and people). Ben – Personal vs Scientific material, getting it weighed at different stages and getting it all into the cargo stream
3. Streamline
4. Time to field (Comment – and also field to Mcmurdo)
5. Minimize touch points

- Comments – Steve heard grantees get great support from contractor and that they would like to design to keep quality of life good enough to retain support staff
- Drawings were recognized as functional drawings or flow diagrams.
- Staging areas were emphasized to be flexible, offering double or triple use.
- Ben – acknowledgement that advances are important with storage of goods close to where they are going, this includes food. Storage cages (pods) will be available. RP – think of the "Costco" model. Versatile space.
- Question – how do you accommodate topography?
- Build around 155 to keep everything up and running – 155 comes out – have multi-purpose yard. Ben – fill? RP – balance where we can and use existing pads. Aaron – Don't want the site to drive function, pay close attention to grade. Shaggy discussed wind modeling using 3D scalable model placed in wind tunnel to model a variety of wind events. Can change model of buildings to see what is working. Nature: Can you talk to polar geospatial center?. Comment – can get digital elevation models. Aaron – Geotechnical report will lead to structural basis of design. What is an acceptable level of grading? Ability to fill it so it becomes part of the permafrost? Drainage system for mud season? Consider the Treaty.

- Comment – vehicular traffic? Don – overall stays the same with only minor changes
- Aware of other stations? NZ museum has model of new base. Lessons learned from other stations? Worth it to look at them? Most are accessible only by boat.
- Question – can you enter a 3D model? Shaggy – yes. Will be able to do in design phase. Lockheed Martin has ability to do it.
- Question about utilities. As they connect buildings, this will allow for utilities to run on an outside utilidor. Controlled and easily accessed utility areas. No more poles. New water tanks will use gravity to supply water
- Comment – take advantage of views? Maybe a deck off of central services
- Question – what about contaminated soils? They are actively monitored. Cut and fill disturbs soil. Concerned with safety. Builders will have access to report and understand Haz-Mat and mitigation process.
- Question – Anything that would affect civil? Have to think though outside pedestrian circulation. Concern with conflict with Cress vehicle? Jesse – factor frequency of Cress vehicle.
- Question – divers were not present for Marine Support Building (Joe Levi). They will put a place holder for the dunk tank. Steve: Autonomous pickle. Required parking indoors? Yes – it eliminates down time. Request for fuel line to be extended here to save time. Chuck – diver – tank filling and adjacency to vehicles is a concern. When filling the Cascade tank is the concern. Individual tanks are filled from the Cascade tank. Have to be aware of vehicle idling when compressor is filling the Cascade. Scheduling/management issue.
- Joe explained Crary. Phase 4 physically attached to Crary?

Break

10:45 RP present Summary and Common themes to George

- No one was asking for anything unrealistic. Never have bandwidth like we have in US
- Chalet – desire to keep it – know it can't be kept – want to pay homage to it. Surprised at the attachment to it.
- Steve – aesthetics could be reason.
- Harvest pieces of the old to use in the new
- Chalet is photo op place
- Disassemble deck and put at new deck? Platform? Connection to the past. Reassemble bowling alley floor as something else.

Crary (Joe F):

- Had to explain why make changes even though it works. At 25 years old it gets a lot of use and is missing technology and needs update
- New plan shows main circulation "the spine"
- Change – bridge to new building with new pattern of circulation
- Created intersection problems – but now maybe main entrance is for DV
- Main entrance – incoming material with circulation through spine to other phases
- Ratio of labs to support – found not enough support for all the labs and have a need for more

labs

- How can they be more efficient – combine labs?
- Rethink lab – keep in same location but interjecting more office space
- Need cubes and open spaces
- Not enough space for storage
- Things like glass wash is no longer needed
- George – high storage? Joe – yes – Joe to look at with Lockheed Martin
- Ben – dedicated lab space that can expand and contract as necessary
- Working on similar furniture scheme but even more operable
- Jesse – Joe – didn't want one giant room – but wanted room for smaller groups
- Trying to get more daylight with possibly glass walls so it will feel open
- Ben – Adequate rational for closed private separate space. Important to design platform that allows expand and contract
- Carve out space for people that have to have own space
- Grantees acknowledge transient use
- Light sensitive science that will be accommodated
- Flow into Central Services – can get storage in here from other areas? Why need for storage? Ben – deliver and transport sensitive material. Why can't you get it from the other building? Jesse – decentralize warehousing since not efficient for that – each building has storage for immediate need.
- *Follow up on types of storage and size requirement.
- Dave note – that space frees up with construction of new mechanical plant
- Phase 2 – second wing down as descend through spine
- Labels have gone away and more collaboration is happening
- How do we label them?
- Bring more lab space down to Phase 2
- More flexible lab space and support space – office – equipment; field party staging
- Larger convening space (like a coffee bar) – space to interact with others
- Keep roof ports? Yes
- Expand for antennae on the roof
- Instrumentation prep room – currently congested cable routing
- In Phase 1 – large interstitial space – kept plan roughly the same in that area
- Phase 3 – Aquarium - Originally designed with large space for specific research
- More specialized tasks – smaller (originally large) have to have infrastructure that supports more small tasks
- New Mechanical and Electrical Equipment Space
- Have opportunity for larger holding tank and another opportunity for another lab
- Have environmental rooms and staging are off main door
- Temperature control issues currently
- Need for outside experiments that need to be in constant sun
- Ideally put it at old aquarium
- No permanent space for outdoor deck space as part of aquarium to have natural light – there is a need
- Challenges with moving equipment – and entrance (Ben)
- Nature – input on mezz level – social spaces – Joe – original intent was lecture and library space but never used as intended

- Now used for overflow office and Wednesday night lectures – prevents access to coffee bar.
- Take functions out of there and move those functions elsewhere. Jesse – in office inside offices – but you have to go through lab to get office – food too.
- George – phase 1 – upper right – receiving – walkway to chalet currently – Obstacle at that valley with drainage – could you leave that valley-way open? George can help guide to keep open – what changes might happen – Joe – move door and deck due to turn around needs
- Joe to follow up with George
- Taking carts back and forth – yes – good pathway for movement – using whatever works best
- Grading creates snowdrift so permanent glacier between 1 and 2.
- George to offer input.
- Ben – management – coffee is allowed in labs
- Jesse – office/lab separation
- Lab consultant presentation be part of charrette report – per Ben -**
- Haz waste processing? Did not get into that level of detail
- Crary was never meant for field science

Building 4 – IRIS PASCAL space

- Use 4 as IT primary (replicate 189 functions) – driven by phasing – has to be in central location to facilitate everything else we are doing
- 4 is a clean space and secured space
- Like a subcontractor to a grantee group
- 30 feet from field science
- Have bench space battery charging space –
- Nature – 2nd level of field science and alley
- Grantees fond of both
- Mezzanine would be for offices – collaborative spaces – still have some shoulder space that could be lay down space -

Trades –

- Mezz – catwalk in alley
- Big enough to drive a Delta
- Tempered passively
- Ben – too large of a space to heat
- George – don't let it get filled with junk. Steve – should build a schedule
- Dave – don't want to work indoors – but want it just enough to take gloves off. RP – store sheds
- George – get natural light in there for a big area? Yes – Ben – balance natural light with energy

- George –will the report engage the community that wasn't represented? Yes – will have an opportunity to review.

- Many scientists missed this discussion because they were in India. Some will be in Denver – allowed to elaborate

- Documentation of findings and also allows stakeholders to distribute amongst stakeholders not present

- Issue a design review sheet along with questionnaire.

- They will come to a meeting

- 2 weeks to review and comment on report. Brandon will distribute annotations
- Critical to review early on
- Ben – design for future design
- Nature – range of early career and long term
- Future science lines of inquiry – reminder don't think of themselves but scientific community
- Any future participants? Yes.
- Dave – all hands spaces need to be considered

Alcohol

- Alcohol in collaborative space needs to be talked about
- Where do you drink your beer or wine
- Remember that space must reflect NSF
- Management policy issues that need for design issue
- George – concept to definitive design – thinking about space and use – and flag spaces that are collaborative with yes or no questions about use of alcohol
- Create zones that are alcohol free – NSF could determine that?
- Need to define collaborative space vs community space
- Where do you buy it and use it
- If there is dorm usage – have towards lodging
- Social component in lounge spaces that includes drinking
- Steve – collaborative spaces – dorm space ones are hard to keep quiet
- Where is line of demarcation?
- Ben – teaming aspect – collaboration size of spaces – Informally and formally -
- Provide a framework for evolving use – RP
- George – recognize this part of dorm is quiet space – but also have gathering places with sound protection without disturbing whole building
- Joe F – aquarium accreditation? For animal care. Diver – what is it? Washable walls, no wood, best practice to look into this. Look into criteria.
- RP – Present 6 Summary Points
- Question from Jesse – Did grantees truly understand the movement from Crary to Field Support Center
- RP – understand all of what field support can do for them – and do understand the flow
- Ben – there are electronics in Crary that doesn't need to happen there.

1.5.2 10:15-12:00 (ASC/A-E Firms) NSF Review/Validation of Requirements

Skipped

1.5.3 1:00-3:15 (ASC/A-E Firms) NSF Review/Validation of Requirements (Cont.)

Review and revise agenda for week 2

1.5.4 3:30-5:00 (ASC/A-E Firms) Debrief, plan for next week, identify follow-ups, meeting minutes

Internal plan for Week 2

Charrette Week 2

Washington DC/NSF, July 20-24

Objective: To solicit input and consensus from *Outside Agencies* in the advancement of design for McMurdo Station, with a focus on *programming* and *concept design of* Air Operations, Command and Control, and Information Technology & Communications (IT/C)

Mon July 20 (2.1)

	7:00-8:00	(ASC /A-E Firms)	Set-up and confirm day's objectives

2.1.0	8:30-9:30	(ASC)	Introductions and Objectives, Rules of Engagement

Shaggy – understand process and flow and then determine requirements which will then drive the design process. Creates design process. Requirements understanding and gathering.

Ben – Important to understand regular and irregular flow.

Reminder to avoid acronyms and make it as clear as possible.

Week 2 Day 1 Introductions: Separate Sheet

Dave Winkler – Project Overview

- Efficiency Project
- Promise of funding on the grounds that we are more efficient. Keep economic issues in mind
- Includes Palmer Master Plan (Charrettes coming up)
- McMurdo Redevelopment – Complete re-do
- Airfield Complex – Not using a single airfield anymore
- Ross Island Earth station – there is a start of a Master Plan

Not in Scope:

- South Pole
- Palmer
- Arrival Heights
- Black Island
- Dry Valleys
- Remote Field Sites

Goal is to provide "more and better science"

NSF Process has check points along the way, from Conceptual Design to Preliminary Design to Final Design (Board Approved) to Construction to Operations. This is a long term project and we are currently vetting Master Plan 2.0

Approach to Design:

- Design Build as an industry standard creates a partnership between designers and constructors. Benefits include being quicker (can start construction before design is complete) No finger pointing (one team); NSF envisioned this – Lockheed Martin gave input when ASC was awarded the contract.

- 8 Design Build Packages (Merrick/OZ)
- 6 Design Bid Build Packages 30%-60%-90% Design with Review at each stage
- Preliminary Design Review (PDR) in September – pens down and come up with estimates with big package that is going to Congress. Congressional request goes in February of 2017
- Charrette Report goes out 2 weeks after end of Charrette meetings. Becomes the history of the project. Create basis of design and first design review will be 5 months from July 2015. Can provide input on requirements. Changes down the road become difficult and costly.

Schedule:

- Conceptual Design Review (CDR) – 07-2015
- Preliminary Design Review (PDR) – 02-2017
- Final Design Review (FDR) – 02 2019
- Complete September 2027

2.1.1 9:30-10:45 (ASC) Review and Confirmation of MP 2.0: Goals, Assumptions, Parameters and Building Siting

104 buildings down to 19 – reducing to about 400,000 SF.

MP 1.0 started to look at needs and requirement. Meant to be organic and capable of change; an overview of the project. Created 2.0 – with many things staying the same, validated 1.0 but made vision more clear.

Number 1 issue – Create an energy and operationally efficient campus.
Conceptual design – not a lot of operational cost info

- PDR we will know what buildings cost and what they cost to operate
- Discussion Follows "Defining Parameters" in MP 2.0
- Present Costco-like vision: flexibility and adaptability
- Strategic redundancies
- Healthy environment - Wellness

Guiding Principals

- Reflect USAP Mission
- Promote Environmental Stewardship
- Promote Wellness
- Project an Image of stature, Permanence, and Durability
- Is Of Its Place

Site Plan overview

- HELO and PAX – have a lot to figure out in regards to M.P. 2.0. Shown in M.P. in one place but could move
- Dorms –Butler buildings to be reused – capitalize on previous construction investment
- Contingency Operations Center: Fire, Medical, Recreation Area, Lounge and Commercial kitchen. Population can gather here in case of emergency.
- 004 – Addition for primary data center. Services that would replicate 189. Front part of 004 would be for IRIS/PASCAL/UNAVCO. Instrument-heavy science.
- Comment – connected walkway? Shaggy – Sky bridges throughout is for Condition 1 – facilitates traffic – but also allows bringing utilities along sky bridges.

- Sky bridge to 004?

Comment - Kevin McCarthy NASA – in best interest of NSF to have sky bridge to 004. If condition 1 – have one or more people sleep there. Beneficial to all 3 agencies. Gets people off the roadway.

BREAK

Pat Smith – Introduction, Tim Howard

Video followed by Phasing and Blocking Diagrams

Phasing Overview- (follows MP 2.0)

Phase 1:

- Utilities to be a looped system
- 2 water tanks 1/2M gallons each located on the hill so can use gravity – constant movement

Phase 2:

- 189 becomes empty
- Remodel 189 into lounge – workout space, etc.
- Comment – NASA NOAA IT – communication concern about transition out of 189. Support operational weather satellites – so general philosophy is make before you break – have to bring up new building, test it, and certify it before moving. Multi agency transition plan backed up by multi agency transition plan. Flip a switch and move? Could be a long transition period. Shaggy – this plan supports this. Understands the importance of the functions happening between these 2 buildings.
- Comment – all 3 bars at once go away? Lounges are noted as integral to the operational success of the station.
- Traverse Ops – new requirements have come to light so this is no longer accurately represented in the MP 2.0. Structural Engineer has shown issues floor issues in the VMF with weight
- Crary – addition that houses major mechanical systems. Crary will be done in phases and will focus on one area at a time over the winter. Mechanical equipment in there allows focus on distribution of utilities
- New lodging. Note not self-performing – will bring in construction workers.
- Remodel of 209 lodging
- Intent is primarily single rooms – rooms with no hierarchy to them. Easier to assign rooms. Based more on Pole's basic model with bed, desk. Recognize that sleep is important so creating more designated social spaces.

Phase 3:

- Repurpose 189 to include social space – individual lounges. Temporary social space? Not sure. Recognize the need for social spaces – need to figure it out during the transition time.
- Recognition of growing pains for a couple of seasons
- Question – schedule isn't detailed for understanding. Phase demo of bars so there is something left. Coffee house probably easiest demo. Question about couples? Yes – maintaining flexibility in lodging and will have some double rooms.
- Phased Crary remodel

Phase 4:

- Central Services including consolidated warehouse
- Food warehousing
- Central Supply as part of this
- Want to keep 155 as long as possible to build around it
- Demo to make room for Contingency Operations Building
- 208 followed by 209
- Comment – time between 004 and general services completion? Shaggy – 3 phases. How many seasons without backup to Comm and IT infrastructure. And how long to plan for 2nd set of equipment? Shaggy – Tuesday's discussion will discuss this further. Construction bill lists things in phases. Joe and Kevin will be able to discuss interim.

Phase 5

- 155 goes away and Fire and Medical go on-line
- Next phase of Crary
- 207 remodel
- 175 goes away
- 16 month construction of central services (roughly). Central Cervices becomes a hub for utilities to dorms

Phase 6

- Recreation-Lounge
- New Waste Facility – figure out operational philosophy
- Fire house and medical go off line
- Crary
- Remodel of 206

Phase 7:

- HELO and PAX – location to be figured out.
- HAZ waste and fuels – new building
- UNAVCO/PASCAL wires and instruments of what is current SSC
- Demo 189

Question Phase 7? Trades and cargo are in here. Looking at Phase 0 of consolidation. Shaggy – can go through and get rid of things McMurdo doesn't need any more.

Phase 8

- Figure configuration of lodging design
- 850 or less during peak population
- Significant reduction? Have had a population over 1100. Shaggy – baseline number. Comment – have annual surge in October. Look at what is supported operationally. What does that do to resource load? Summer/Winter numbers change. Realize spike in numbers for construction crews. Factor NSF funding.
- Comment – look at 2–3 seasons during stimulus package when McMurdo was bursting at seams – had 3 to 4 people in a room. Shaggy – this will be factored.
- Add new building where dive locker is; co-locate diver services and share services with Sea Ice groups. Can park piston bullies inside and possibly fuel them so they are not driving through town – keeps it where it is needed.
- Disposal back to US

- Comment regarding heliport – how do you get trash to fortress rocks and back? Safe transport? Storage for waste? Shaggy – figure out laydown space for on-load, off-load – boneyard space. Consolidation space needs to be looked at even before Phase 1.
- Not going to make anything inefficient.

Snow scouring and deposition model:

- Snow is expensive to move
- Not trying to create situations where they have more snow to move
- Can change horizontal and vertical planes of building – in a 3D mode
- Should have results in September or October – need to help inform design

Shaggy – Master Plan Review
Rules of Engagement:
Broad range of experience represented in Week 2

- Have to be able to explain it to people that are working on this – err on the side of explaining more
- If funding goes away – have to finish the phase we are on and have it better than it was and be fully operational.
- People are passionate about McMurdo – opportunity to provide input to build efficient and sustainable "city".
- Open to input on any issues that may have been missed
- Input needs to come during and after the charrette
- Currently have diagrammatic notions of how things work together and then designers have to figure out design.
- Will have opportunities to provide input on Charrette Report – this is what we heard and did we get what you were saying
- Started with Grantees. Present that info in Week 2 and discuss if this is possible. Week 3 – ASC Support staff meetings. Last week is utility design.
- ASC is here to support and "connect the dots"

- Ben comment – Wed is command and control, emergency, etc. Understand the need to address issues with cut over and phasing and overlaps and duplication of efforts to allow for things to be operational.
- During design lock-in at 35% - will need to determine physical plant requirement. At what point will people be able to provide input on their requirements (this group – not scientists)? Shaggy – ongoing (and often) throughout the process until we have it figured out. Ben – reach out to team? Shaggy – yes

- Comment – NASA NOAA – They have to have an idea of scheduling and a calendar so they can figure out personnel assignments, equipment and budgeting. Kevin – will need a detailed transition plan – requirements and timing needs to be worked out together in the near future. Need to get past conceptual phase of design before having detailed discussions. Comment – budgeting – do we duplicate equipment and deploy it? Equipment receiver timing might be good – need info to put into budget.
- Each agency that moves into data centers has to come together and go down more levels of detail – number of people, scheduling, equipment – space craft certification, operational weather satellite, mission at NASA doing something as quickly as possible.
- Shaggy – this is the info that we are looking for – need to know requirements
- Comment – Agencies – need to know where we are going with schedules but also pay attention to life cycle timing with transition periods. Shaggy – better timeline from us so they

know when to put equipment into the funding cycle (3-5 years out)- schedule needs to be refined to plan cut-over with installation – will inform on what will be constructed, as well as budgeting that goes along with it. ASC is hiring a transition manager to deal with road closures, temporary outages – anything that would affect operations.

- Dave – Agencies may want to consider a Transition Manager as well.
- Comment (Tim)– When do we start detail planning? Building 4 exists today – earliest funding is 2019 – year for IT space so move is 2020 – start refresh cycle in 2017. Expectation of this week? When do we get to the point where we can reference a calendar?
- Shaggy – point is to understand work in McMurdo. Define requirements. Capture comments in Charrette. In design we are talking about physically allocated spot – have to be able to refine time line, help with transition with budget, transition, and resource plans. Have time to figure out details.
- Comments – 3 years is not a lot for budgeting. Understand that one could miss next budget cycle.
- Comment – When approximately can this happen? At the end of the week have a sense of timing – time for review and comment. Potentially not in current budget for planning.
- Dave – first design milestone – determine if locked in or if a further discussion needed. First Charrette review end of August. End of September collect comments. Have to lock in physical requirements.
- Kevin – have time on Tuesday to touch on more details – consider budget cycle
- Ben – Worthwhile to give teams time to figure out how to move forward. Have to engage with these experts as we develop the technical drawings. How do we get there and move forward? Resources are one thing, budgeting is another. We have to factor in sequences and timing.

BREAK

Monday 07/20/15
1.2.1 9:30 am to Noon Crary Lab Ferraro Choi Meeting w/ Bev Walker and Cara Sucher:

Winfly – mid August

Current Core Crary Lab staffing:

- 7 staff (core)
    - 1 supervisor
    - 2 lab assistants
    - 1 instrument tech
    - 1 hazmat specialist
    - 1 admin
    - 1 research associate - (does not have to be in Crary) (long term projects) (over winter position) (work directly with grantees) about 6 projects now.
- +2-3 supply personnel
- 3 IT (assignable office in IT Ops?) – Kara says would be nice to stay in Crary but Joe H. is really dialed in.
- +1 facilities person sometimes with helper
- +1 refer tech who spends a lot of time at Crary

- Open stock – non-inventoried supplies
- Room 174 – currently shared instrumentation
- Copy/print in library copy room
- N2 – liquid – where is this to be located?
- Ice core storage and sometimes meteorites and Cape Bob (refrigerated space).
- Haz waste staging at current field party staging and packing samples at end of season.
- Field party staging – only held for 48 hours. Cages in here used by 1-2 groups.
- Receiving and storage – longer term staging
- Sea ice staging will alleviate same field party staging pressure for daily in/out.
- Loading bays on Phase II are longer term staging.
- Sensitive equipment typically will want to be staged at Crary where dust is less.

Phase II:

1. UNAVCO – technical event, not science event, LIDAR services
2. Iris Pascal – technical event, seismic equipment, not science

Currently these two groups use 100% of Phase II receiving /staging and 25% of assembly and test plus a separate milvan.

<u>1.2.1 1:00 pm to 4:00pm Crary Lab Meeting w/ Bev Walker and Cara Sucher</u>:

Aquarium Needs:

- Site map of seawater system
- Distance from pump to aquarium. Elevation difference = ~60'

- Same pump is used continuously for specific experiments.
- BL179 on jetty is Seawater (SW) intake pumphouse.
- SW intake pumphouse – submersible pump pumps into suction of booster pump.
- Crary Lab pump (SW booster pump) to Phase III.
- Specs for pumps?
- Water plant provides warmed water for de-icing.
- No redundancy in SW piping to lab.
- Water circulates around Phase III and back to outtake and out to sound. *Sometimes the line back to sound freezes up (has heat trace or flush with warm water).
- CRREL may be able to help with ice studies/questions.

Sound temp = -1.9 degrees Celsius.
-1.5 degrees Celsius coming into room at Phase III.
Change of 0.4 degrees Celsius is not acceptable for some researchers.
Pipes and tanks in aquarium are not insulated currently. Tanks may or may not sweat.

- Seawater intake pumps will pump either 160 gpm or closer to 200 gpm.
- Pumps at SW intake has high pressure switch so if flow around aquarium is not high enough, it will shut down.
- Consider a bypass to maintain minimum flow?
- Bev will provide photos of various experiment set-ups.
- Kim will set up share file site for Crary: Aquarium Photos.

- Limit 2nd floor mezzanine access for only Crary folks?
- Bev ok'd 1 freeze drier instead of 3 in lab support
- Centrifuges – all are a little different, so may need all or several.
- Sample packing was near field party staging so still need this area?
- Aaron Seal – Can he provide a SW line system map?
- Phase II support is more specialized for grantee issues. Should/can this be relocated to IT? Joe Harrigan (ASC) says will be provided in IT assignable offices.
- Extend roof catwalk along entire length of Phase II
- Network servers still needed?
- Phase II storage is now dark room (next to Faraday Cage), mostly used by Phase I.
- Faraday Cage is currently IT storage.
- More and more going to scientists bringing all their needs and storing crate/boxes temporarily.
- Phase III no need for many windows due to animals who are from below the ice.
- Light blue tanks may be hard on animals so a different color would be best.
- Double SW header to feed tanks to maintain stability when adjustments are made to one tank.
- Water wall – measures PH, salinity, florameter. Can add different sensors as science changes.
- *Specs for water wall by USAP?
- Add bathroom in Phase III
- Facilities folks in Phase III MEP wing – office space (2 people now and refer tech)
- Marine Ops – should this be Phase IV of Crary?
- Talk to Aaron Seal regarding flat pads adjacent loading docks.

2.1.2 11:00-12:00 (OZ) Material and Personnel Work Flows and Adjacencies

- Flow diagrams – starting with drop off – progressing through the building – get bags – go to lodging. Same is true for the reverse.
- Material flow – comes to centralized receiving area (question – where do you want your materials to go?)
- Warehousing – centralized
- Not crossing paths for materials and people
- Question – how do you get materials into 004? Have large shipments periodically? Don – will have a loading dock at 004. Shaggy – have a bridge coming into 004. Does it go directly there or centralized first and then to 004?
- Come into central point for cargo and then distribution occurs from there.
- Final stream of goods is waste. Majority comes from dining and then from residential. Find a clear path for waste. Comment – is staging as represented on the screen? Don – staging is on a TBD basis.
- Remove Field Science from Crary and create individual space. Eliminate the need for a "21-touch-point sleeping bag"
- BFC (mountain tents, cooking gear, etc) – will be next to science cargo
- Also room for search and rescue – staged and ready to go.
- Freezers for field food (including Pole)

- Reimagine trades and carpenter interaction in town – preventative maintenance will decrease

- Covered staging (alley) with garage doors on both sides. Completed air force pallets to be entered into the cargo stream. Also for traverse module for refurbish/refit. Room for fish huts.

- Shaggy – entry hall has gallery showing past science/history

- Building is situated to take advantage of views and remind us of the science being done, flanked on both sides by science

- Windows and views to be available to everyone

- Sky bridges allow opportunity for lounge space

- Contingency operations – some more privacy now with new location of medical

- Back up IT in Central services

Level 2 blocking:

- Science support
- Collaboration space
- Field science takes pressure off Crary
- Command and Control
- Skills Center – weight room

Level 3 blocking (on either side of Central Services)

- Multi-purpose lounge space
- Potential chapel location
- Social gathering space

- Dan show 3D model view of exterior and interior

- Comment – where do you dump outer gear - Dan – room off to side. Shaggy – reminder that people do want to go outside.

- Reminder that colors and finishes have not been vetted out

- Ben – all admin on second floor? Dan – ASC support staff/supervisory staff. SFA, National Guard, KBA (fixed wing aircraft), possible SPAWAR, JPSS, NASA, maybe DOE

- Show office spaces in 004 “Assignable Office Space”
- Ben – outlines anticipated components? Yes.
- Ben – Components have been identified and placed in this block of space? Yes. Next – define requirements to meet everyone’s needs.

004 Blocking Diagram Comments:

- Constrained by exterior space – get into detail with detailed sf for electronics and other access requirements.
- Can you expand or are you constrained? Shaggy – can provide work around for utilities. Have the hillside that could be dealt and flat pad on side.

- Ben – logical shape? Shaggy – yes as it stands.
- Preserve exterior dimensions? Yes. For M.P. 2.0 it did not expand.
- Charrette conversation – find out what needs are and talk about expansion. Pad exists as flat and grade ready. Comment – addition that is proposed? Diagram is existing L shape with addition.

Command and Control – back up IT?

- Intent of that is on the first floor of Central Services
- Transition from 189 to 004 – might become desirable to have backup IT in general area of Central Services. In order to facilitate transition – may have to have an extra string of equipment. Up and operational in 004 – put equipment in a backup IT center.
- Don – provide redundant data center. Is there an interim back up data center? Worthwhile to look into. Comment – desirable to have back up IT for NASA JCSS.

Lunch Break

2.1.3 1:00-2:30 (OZ) Central Services: Review most current concepts

- *DC2.1.3.1* Entry Experience & Orientation

Dave – Understand the need for Communicating early and often
AE firms reach out for info
Will set up weekly briefing meetings if needed

Central Services Feedback or input?

- Comment – NOAA NASA – possibility for NASA or JPSS but possibly not both. Aware that discussion happens Day 2
- M.P. 2.0 can be downloaded. Is there a link for Airfield? No. Dave can download on an individual basis.
- Program Survey coming out at the end of the week for more detailed requirements.

Dan and Don – Central Services discussion. Encourage feedback/comments/questions

Social Aspect of Station:
Gym Space

- Recreation and Quality of life – gym, multi-purpose room for weights, crafts, other usage?
- Gym might be a good place to open large parachute bag, backpack
- Could be large lecture space
- Gym could be for all-hands meetings. Maybe present lecture in one room with live video feed to the gym. Big enough for a C-17 size of group

- Don – do you design social space for Easter Sunday or design for every other Sunday? How much SF space for carry-on bag storage – need to figure out.
- Ben – In-Briefs need to get scheduled – for example if 2 aircraft come in at close times.
- Importance of recreation? Off hours stuff to do?
- NASA – current space is crowded. Will it fit everything? Don – scale of space is full court with space on the side.
- Include pull out bleachers? Room for observing sport events? Climbing wall, bouldering wall – multiple uses. Bigger than what is there currently. Replaces weight room and Gerbil gym. Space for other physical activities.

- Beyond what is there today – are their other elements you would like to see?
- Recognize that things might be done differently in 2017 for example briefing may happen before you get to McMurdo
- This is the time to think paradigm shifts. Have been doing the same thing for so long.
- Skills development = space that allow you to do your interest outside of your job. Addresses the quality of life
- Public computer spaces – kiosks? Aspect of social interaction spaces. Created bump-out space for social interaction – do you social-engineer it and drive it towards one location vs another?

- Questions re dorms – Lounge space at each dorm? Yes.
- Might be better to flip the lounge at other end (Kevin). Dan – This also came up last week.
- Question – dorms with laundry – does that stay?
- Don – in the building – at the "noisy" area of the building. Each dorm has 3 floors? Yes.
- Sky bridge on one level to connect/align
- If lounge on each floor then each building has 3 lounges.
- Ben – lounge space is multi-purpose space to be developed based on input from Charrette.
- Comment – Sauna stays? No.

Lounge

- Lounge – in M.P. there is one "Lounge".
- Recognize environment that coffee house is something people want
- What appeals? Nothing loud. There is a place for everything now, lose flexibility by losing 3 bars
- Potential complaint that you may only experience something you like a couple times a week instead of nightly.
- What's the alternative when someone doesn't want to be in their room?
- Can't engineer a lounge. Memories of space. It develops based on culture of the community – going to become what the people make it.
- Allocating lounge area that is open space that takes on its own.
- Does lounge space have to be one space? It could be divided.

Comments

- Joe H. - people that come down may be retired from a different profession. Didn't come back because they didn't feel they had a place to hang out – a quiet social environment.
- Where is the noisy space? Is it isolated enough to be noisy?
- Office for chaplain? Talk to chaplain for advising?
- Preserve stained glass – into new space
- Incorporate historic elements into design
- Theater space planned? Don – not as a single function – have auditorium lecture hall space.
- Coffee house appeal was being able to get a glass of wine.
- Comment – LCD tv's for presentations as well as movies
- Where is the store? Where is the barber shop?

- Social space images – what materials make the space warm and comfortable and engaging. Consistent comment is the wood paneling in the coffee house.

- Ben – how do allied agencies collaborate/socialize? Don – the informal interaction that happens?

- NASA – wintered over – small team that aren't' a part of the big piece. Think of how you keep your folks from staying isolated. How do they integrate? Summer vs winter dynamics are different. Says something is always happening.
- Phone comment – collaboration outside of office between pilots ASC and grantees. Everyone having a conversation – logistics conversations. Important to them. Work Center as well as outside of it.

- Comment – where is the store? Didn't label it on MP. Don – who is the store serving? Where should it be? Accommodate tourism? Beer and wine is the largest items moved.

- Comment – where is barber shop? Don – aware that it needs to be included

- Comment – Pick a space that is appropriate size and mark it out so it doesn't get lost in design.

What is NASA daily process? Mark Harris –

- Maintain systems for JPSS and antennas
- Isolated during the work day with IT guys upstairs
- 11 hour schedule that is partially overlapping – but 24/7
- Not watching supports but watch out for special events
- Lot of work for JPSS
- Scramble on short notice to get to antennae
- Will page people – or get fire dept at short notice
- Condition 1 storm – someone would bed-down there so they can respond. Condition 1 might require SAR support
- Need a bunk requirement
- Especially if not an enclosed walkway – would that take the need away to bed there? Might mitigate need to do that. Depends on the emergency – might still have to be there to hear an alarm.

JPSS

- 5-6 people down in January for 6 weeks. This year had 3 deployments, due to upgrades to receptors
- Typical is sustained mission – 3 weeks is sustained deployment (sustainment – maintenance on receptors – software upgrades). Upgrades every 12 years
- Scheduling might not be routine – have to watch antennae
- Most work is done in Building 189
- Spend In office space in 175
- Might need warming huts – ASC takes care of those
- Crew members 365 days a year – NASA will send a couple people down. Will have an activity where they send more people to do a specific activity.
- Collaboration spaces – team stays together, socially interact with NASA.
- Offices are primary importance. With collaboration space for debriefs – daily reports back.

- Neil - Question - Safety for social spaces? Max occupancy? Compared to projected population – need safe egress. Don – at MP level – no. From a design stage – we are aware of looking into and designing for these loads and allowances.

- Fire heads out to each site prior to each landing and needs a place to plug in trucks

- Ben – from NSF perspective – will not compromise on life safety

- Halloween party – 80% of population. Careful planning for frequency of events. Designed to meet current code but will not compromise life safely. Management needs to enforce conditions

- Support – Maintenance Lounges used couple hours a day. Crews need crew rest time. Difficult to accommodate different schedules – sleeping space and social space.
- Commanders call and training space needs- International Guard

SPAWAR –

- Retired FAA does Air control
- Have some people that go to operations spaces – eat – sleep. While others are out and away at Air fields – eat – room – bar.
- So they have both
- Different cultures there – different migrations – doesn't mix too much unless it's purposefully. Good concept that you would mix – but unlikely that it would
- Like the laid back coffee house atmosphere

SOPP people coming and going – 24 hour shifts. Ground schools training is on the ice – need space for that.

- Questions –The band room is with skills development? Loose interpretation? Don – another multi-purpose space.
- Gym – workouts like a 24 hour fitness space? Or divided? Don – have not going to that level. Likely to be larger open space with opportunities to sub-divide.
- Things like yoga – end of work day activity, so if you have the desire to do yoga vs P90X but they are both happening at the same time so how do you accommodate that?
- Lot of public space – not everyone in their off time doesn't want to be "on-display" – where is privacy? Where do you go for the 4 – 8 person get-together? Dan – don't have the solution at this point – Hut-10 reference.

- Joe – ASC-IT Collapsing work centers into large building will take care of collaborative space needs. This solves a lot of that.

- Comment – multi-function space – shift work going on. Need a room to accommodate shift workers. Dedicated rec room so they have an ability to work out in middle of night
- Comment – survey for schedules and activities.

BRIAN STONE COMMENTS

- Section Head for Antarctica Logistics
- Still in a requirements phase
- Stems from Blue Ribbon Panel Report
- Have to have a long range plan for Antarctica
- Still going to use this even the funding doesn't come through
- Choices are driven by the station we have
- Not starting from a Green Field
- Waiting for permission to go into Preliminary Design Phase – which gets access to funding
- Biggest Challenge – make sure we have a valid set of requirements. Have to build support across the government. Have to support president's mission, NSF mission
- Under pressure to justify what we are doing

- Run an influential science program on behalf of the nation
- Will use Charrette input with or without funding
- Viewed as an efficiency project
- What allows us to reduce operational costs?
- Some things will generate cost savings. Need to show them next September
- Operational cost research. What is baseline and where is it in the future?

2.1.3 1:00-2:30 (OZ) Central Services: Review most current concepts

- *DC2.1.3.2* Food Services and Dining

Skipped

2.1.3 1:00-2:30 (OZ) Central Services: Review most current concepts

- *DC2.1.3.3* Recreation and Quality of Life

Skipped

2.1.4 2:45-5:00 (Baker) IT&C Morale Services: Present Concepts and Solicit Feedback

- *DC2.1.4.1* Common areas

Nick – Baker (Hotel Experience)

- Limitation to live video. "On-Demand" streaming – like Netflix of Hulu
- Station radio – music like Pandora, Spotify
- Bringing capability and flexibility into space to play music
- Digital Displays – can use for teaching, business and communications
- Showing flights, weather, ice conditions
- Can put digital screens throughout

One grantee expressed interest to teach remotely. Ben noted that is only one request – not the overall consensus.

TV/STUDIO SPACE

- Request for live feed from the ice – is there a tv studio? There is an old outdated space that was a studio and is now an office. No good lighting. Priority? Not really. Live interaction from a studio? Talent and film crew traveling around but typically have a studio anchor. "talking head" capability.
- Studio style space – flexible space – remote teaching, live feed, tv studio. Better for limiting bandwidth. Want quality to be good on both ends.
- Ben – studio space. Brian Stone mentioned efficiency. Must be efficient to justify itself. A studio is a dedicated space – have to have adequate space, usage and volume to justify. Becomes hard to justify this space – especially since there is one there that is not in use.
- Briefing remotely of pilots – could use this space for this. Ben – are there other means of communication? Does it have to happen in a studio or can it be sent in a message?
- Joe H.– based on Pat's talk of what we have done so far - organizations will bring in their

own gear. If a network wants to come down - tell them to bring everything that they need for filming

- Bandwidth remains an issue. The focus is not on bandwidth off ice. Pat indicated they have looked at various methods such as a fiber optic cable to new Zealand but it is cost prohibitive.

Video Wall displays :

- Communication to team members – can run ticker tape feeds. Can use for movies. Can be as large or as small as possible.
- Displays can help with lack of stimulation in winter – can coordinate with heat lamps
- Include connection to McMurdo web site integrated to personal i-pads (Kevin)
- Currently have communication board with local intranet at the station and a tv scroll on the cable tv station.
- Would be great to have a dedicated channel that provides info on flights, weather, etc.
- Lot of areas not covered on station. Big burden on local staff to keep this up. If going to work may have to have it run up north pushing content down.
- Helpful to get photo of current display? Yes.
- Mass Notification can tie into display
- Question – Is part of scope to increase bandwidth? Source of frustration. Saturation happens – facebook
- Pat – scope includes bandwidth on Scott Island – depends on what is out there and how much it costs. JPSS is partner in this. Can get service and bandwidth – plug number to ask for is tripling inbound capability for NSF and doubling the outbound. Always have issue of demand. Using other appliances to optimize traffic
- Looking at satellite systems and fiber optics under the sea. Undersea fiber is 200 million dollars – so this is likely cost prohibitive.
- TV in rooms? Video on Demand? Private Phones?
- Currently have an IT lab that functions as an internet café when they are not doing classes. Need to factor in a place to do IT training. Kiosk in 155 that is public computer area or business purposes – like time cards. Training room adjacent for program training – to use station specific software. Public usage off hours.
- Pat – Internet café in the future comment – "internet café is going to be as easy to find as a pay phone is now." Important for the sense of community? Pat – all mobile tech in the future.
- Comment – Kevin – kiosk in 155. Most bring a device – but still need a computer present.
- IT operations – monitors = money. Would rather put the money into the cabling/bandwidth. Today we might not think a carpenter will be carrying an i-pad but in the future they will have to.
- Goal is to have to lower Operating Expenses. More bandwidth = more Operating Expense
- Comment – digital communications – screens looks like "fluff" from a funding perspective. Has to be marketed the right way
- Could better allocate resources to things that are not "fluff" – things that are needed. Don't need a tv in everything room
- As long as space is there and the infrastructure is there – can re-think it later

- Phone comment – would be nice to have internet availability for foreign visitors to have specific computers to use. Can communicate with other bases. Having email access is important. On the hotel experience – could incorporate flight status would be great. Have something set up with pads but this could eliminate hours of staff.

- How much of current operations is dependent on email? Varies for each group
- Used as a central method of communication – ie. Flight status

- Congress recognizes need for communication

- Morale Services discussions – If the goal is getting people off the ice then it becomes critical they can talk to anyone at any time around the ice. Audio and Video.

- Comment – potential technology to look into- cell phone usage on the ice. Allows personal traffic go across a different link.

- Comment – HD voice? Alternate path to communicate off the ice. Microwave? No. microwave is too far - 2,000 miles. No. Can't relay it. Can't microwave to Palmer. Terrain issues. Won't work.

Email needs:

- Everyone requires email
- Access to computer to do job function?
- Currently wired. Future – wireless and cloud

Joe H.– Rely heavily on email because there are no other mechanisms to provide communication.

Limitation to email – generally coordinating with other sites. S pole has very limited in bandwidth.

Steve – email for dialog? App? Develop with integration with information outlets

Off continent email? less than 7% of bandwidth

Movies/Music

- Auto populate movie capabilities – get and pull on-demand
- Joe – currently scheduled movies. New movies flown in.
- Comment – how does it work on an aircraft? Huge selection. Stream locally? Media library. Domestic flights use satellite.
- Station radio? Play content that is provided content provided by Armed Forces. Part of their services. McMurdo owns the equipment. Vinyl record library. Part of the experience. But it takes up a lot of space. Pushing NPR.
- Joe – Radio is morale service. Couple people doing – whole station enjoys it.

- Comment – as you go to wi-fi will you have segregated traffic? Yes - Morale vs business

- Need for smart boards? Request on the science side for remote teaching.

- Recording capabilities – could be uploaded.

- McMurdo received radio equipment and 6 stations from the Navy. Currently very low cost. Keep the radio,

- Thought into rooms for dedicated conference rooms that are sized appropriately. Some rooms for video conference. Design for flexible spaces – then bring in furniture that can have power/comm/AV
- Some conference rooms get used for 8 hours a day.
- Need for video conferences (for McMurdo only)
- Joe – Meeting rooms are in demand.
- Don – If you could video conference to US – how often would you use? Varies - Multiple times a day/Few times per week. If there was bandwidth to support VCT – video would be used roughly 50% of time
- Joe – technical trouble shooting? Tech off site – would like to see video on how to work on equipment
- Ben – what troubleshooting? Seasonal work force – would help someone with less experience. Joe – limited currently – send photos back and forth – send photo of broken part instead of sending a tech.
- Antarctic **Infrastructure** Modernization – remember that it's infrastructure.
- Anticipate the need to wire the space
- Kevin – doesn't see the need for McMurdo itself – see's the need for the field.
- Kevin – likes the idea of app development
- Most people bring a device but there is not always connectivity. Static is an issue at McMurdo. Form Factor is an issue – lithium and touch screens don't work well in cold
- Wall displays would tie into signage

2.1.4 2:45-5:00 (Baker) IT&C Morale Services: Present Concepts and Solicit Feedback

- *DC2.1.4.2* Residential

- Building 004 – Don S – what are unique building requirements?
- Understand the need for loading equipment in and out
- Discuss adjacencies to other entities – workshop requirements?
- Bridge structure – Bring in heavy servers? Data center element is on Level 1. So use of bridge wouldn't be for server equipment. Don't want to move heavy equipment to 2nd floor
- Kevin – Keep Tech equipment on the ground floor because you don't want to carry it up the stairs. If not adequate tech space built in going forward getting technical floor space is not going to happen. NASA has one antenna – but if there isn't rack space for 2 antennae then there will never be a second antennae. Tech floor space has to be available for future.

- Ben – Like NOAA and NASA – NSF cannot build to future requirements – but know they need to build for growth.
- Other adjacencies to consider?
- Missing special data center requirement for large electronics – space for SPAWAR support and function
- NASA JPSS data center has separate area for racks and test bench and work stations to monitor equipment. Test bench IS shown in MP 2.0
- Desire for direct connection to Central Services via skybridge specifically for Condition 1 1st, quality of life 2nd. Is there a lodging need? Yes.
- Phone comment –24 access to EOC in bad weather too
- Joe – requirements – needs for communications shops on second floor, battery charging. Loading dock (heavy equip), warm and cold storage (not heated but no snow on it)
- What does battery charging look like – 6 pounds up to 70 pounds.
- Supply area – where is military supply such as air drop, aviation supply – aircraft parts, nose skis, for LC130 and life support like parachutes, joint inspectors office – airdrop bundles and storage. Not on plan.
- 159 and 183 are currently used for these

Schedule for Tuesday:

- Talk about transition on Tuesday?
- Airfield, 004 – Data Center, Scheduling and dependencies,

Day 3 includes Command and Control

2.1.4 2:45-5:00 (Baker) IT&C Morale Services: Present Concepts and Solicit Feedback

- *DC2.1.4.3* Service spectrum (VOD, radio station, etc.)

Included in 2.1.4 above

End of Day 1

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

Note – main debrief was cancelled. Don, Dan Merrick meet with Airfield Manager -

Fuel is precious
have a fuel storage – use a tanker sled

The Guard has the largest footprint

Can't ground to grade – Dan Harrington

Re-vet the buildings. Maggie will know what they need long range

Don – basis for design was single airfield. Now 2 separate – one wheeled, one skied.

Runway documentations? Or just the facilities?

LC-130 in December has size limitation. C-17 has twice the capacity

PAX for wheeled runway – design for max number? Majority of the time ¾ of the people are waiting outside to go.

How does the scale change?

Good to have terminal at both places. Operate both at the same time. Will have year round flying.

Winter Field will be Pegasus

Revisit Master Plan? Way they operate air field has changed. Not operating under a single airfield concept.

Alpha runway built to accommodate wheeled planes

Little infrastructure at Pegasus.

Open up skiway in December when weather warms up.

Tues July 21 (2.2)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

7:30

- Aaron – have a separate conversation about HELO ops?
- No final decision on final location.
- Regardless of where it goes – there will be new building requirements for the building itself
- Don – there will be a site design exercise looking at both locations
- Look at soil boring
- Conversation on this to happen Week 2 Day 3

- Geothermal is off the table. Stick with wind and solar, Microturbines

- Budget cycle will have expenses regarding the transition.
- Come up with calendar and get to them – possibly by end of week
- After first design milestone should have things locked in

- Kevin – look at scheduling and dependencies, looked at refresh cycle, still needs to be hashed out

- Ben – keep including Allied Agencies on a weekly basis

- Building 004. Figure out name. Call it IT Primary**?**
- It has 2 functions so is that what it should be called?
- Call it **IT OPS**

- Need to figure out names for Crary – Phase 1, Phase 2. Figure out name for Sea Ice Support

- Ben – consult with Allied Agencies on a weekly basis – Design Bid Build – 30% is too late for them to see this. Bridge the gap with interim meetings. If not then we need to review around 15%
- Don – Design Bid Build – they are smaller scale building. Can we get close to 60% by June 2016? Give them a formal opportunity to be involved? Dave – don't do a lot of design work past where they would shut it down.
- Aaron – "over the shoulder reviews" – can show progress drawings. Slightly formalized review – can do a Go-To Meeting.
- Formal review at 30% as scheduled. But need to have interim reviews.
- Don – have to make sure they commit to participation
- Aaron – yes participation, but be careful you get buy-in from everyone not just an individual
- Don – once a month
- Dave – designate one person from each agency
- Kim: can we continue designing during this process – yes.
- Dan H – they had a hard time visualizing the space – show layout – space.

BOD's (Basis of Design) –

- Dave has a template (James and Company) ready to go in September with Design starting in October. Schedule is going to be tight. Recognize layers for Revit and BIM.
- Hoping for approval within a week. Important to have teams staffed and ready to go.
- Questionnaires for Grantees? Don S and Aaron. Review today. Aaron will get final to Annie for distribution. Have send back by August 21st. Want to include it as data in the report

Airfield

- Dave – IT scope for Airfield. Per Kevin – need to talk about it. In Design Bid Scope? Or overall IT McMurdo project? Don – Infrastructure would be part of Airfield project. How the utility gets to the Airfield. Potential for going wireless – will need standardization.
- Overall IT scope is Baker
- From a design standpoint – it is part of the overall project.
- Dan – demark. IT group provides active components.
- Lance (Baker) – as part of IT&C would be doing inside and outside
- Don – keep IT&C in Airfield conversation this week.
- Kevin – will provide wireless cloud
- Communicate amongst AE firms regarding IT scope.
- Don – building by building basis
- Kevin – little IT structure should not be a part of Airfield discussion
- Dave – outer ring – Merrick, nodes, and stop at building termination
- Contractors supply conduit to that and build the building with jacks, hookups, etc. as specs
- IT contractor comes in to make it all work
- Don – who is designing the low voltage and IT component within individual structures?
- Dave – Make decision about going wireless
- 14 buildings at Airfield

- Lance – not going wireless? Baker to work out with ASC. ASC relays that info to design firms.
- Kevin – Baker – overall IT, should provide specifications

Sea Water

- Sea Water line (with regards to Crary) – per Joe F. think of back up?
- Can old one become the back up? If Crary goes down it affects Town.
- Water supply is an infrastructure piece but not currently in scope.
- Talk it out and figure if it needs to be in the scope.

Thursday – debrief the NSF. Talk about commonalities – things coming forward – for example sea water. Etc. Skyway bridge, After NSF meeting we will discuss next week

Don - Commonalities from Week 2 Day 1

- Sky bridge to IT Operations
- Use of tech is growing
- Budget Cycles key issues
- Kim – Extend a spine down and make Marine Ops Phase 4 – connect it?

Aaron – decision on Zodiac support (boat operations)? Shaggy – no. Mark out a spot and we will figure it out

2.2.0 8:30-9:00 (OZ) Review previous day's work

Don and Dan – present Common Themes

Introductions –
Blair Chief of Antarctica Operations for 109 Wing
Nick LaFave – PHI Helo-tech
Keith Cox – new operations manager for PHI
Richard Merrick VP International business
Brian Crocker – VP operations KBA

Common Themes:

1. Budget Cycles are Important
2. Skyway connection requested between Field Science Support Building and IT Operations Building
3. Extend Crary spine to new Sea ice Support Building
4. Use of growing technology – making decisions and setting directions on level that this facility can accommodate

- Ben – Number 3 (Crary spine extension to Sea Ice Support Building) came from separate meeting between ASC and FC on Crary
- Any Grantees in this meeting? No. Just ASC Operations staff and FC. Function was an original design in the building that was taken out. Will be incorporated into the infrastructure of Crary (power, utilities, etc).

- Ben – Additional Introductions and reminder that Lockheed Martin ASC has 4 AE firms that tasked with providing the design. Leads are Dave and Brandon with ASC.

Break Out sessions of the morning:

- Intent of sessions regarding Airfield – review 2011 Single Airfield MP as a starting point
- IT Operations (no longer called 004) – functional requirements of that facility

Flight crews s2.2.1 9:00-12:00 (Merrick) Review/Confirm Single Airfield Requirements (size, quantity, arrangement, etc.)

OZ: Don S and Christine

Intent is no longer a single airfield.
Ski runway at Williams
Wheeled at Pegasus/Alpha Site (Pegasus to relocate as Alpha moves out)

Using the single airfield masterplan as starting going. Goals are to find out what is needed at skied location and wheeled location – for operations and buildings themselves

2013 Single Airfield Report:

- Has anyone seen this report? Yes – some attendees were involved
- KBA has not had a chance to see this report
- Report covers operations and layout requirement for facilities
- Review report and provide feedback

Discussion points:

- What are needs for serving airfield in terms of operations and support?
- Size, Quantity and Arrangement?
- Fundamental changes to layout?
- Scale and size?

- Runway is not in our scope of work

- Wheeled runway – C17 operate early season to roughly beginning of December. Pick up again early February (depending on runway conditions).

- Operations needs for Wheeled Aircraft?
- Wheeled aircraft don't stay there – need to be able to fuel
- Don't have support buildings like for ski aircraft

- Ben - asked what is the typical process on a routine daily basis? -

- Note no one is at the charrette to represent C117's

- Comment – dust off report and look at requirements. Not starting from scratch – a lot of effort went into single airfield report

- Understand the operations – the daily business component

- Aircraft generation – start with getting tail numbers – parked on Abram – pre flight – find out cargo. Cargo is loaded on the spot or nearby. Fuel – start up and move out for alignment. Once plane comes back – goes to fuel pits (depends on snow) start over – either put away or to fuel pit or perform repairs that are needed.

- Individual planes multiple times per day? yes – try to use the same "tail"

- Fuel comes to aircraft so there is only one plane start a day. Easier to bring planes to fuel pits.

- Double shuttle – if close they will use the same crew – send them out C10 – come back – get more fuel – load cargo

- Building 165 – do mission planning – get weather brief. Director of Ops and get maintenance status. Transfer to airfield – move to fuel pits – enlisted crew shows up 30 minutes before officer crews. Try not to load at fuel pits as can cause damage to snow surface. Rotate fuel locations in a circular design
- Prefer to have plane in fuel pits – they are stable enough to allow for cargo loading – decreases amount of time taxiing to fuel pits – don't want to start plane more than once
- Takes about 45 minutes – crew to dining facility in airfield for last update (weather). Life Support provides emergency equip to plane. Store cold weather bags outside of that building. Step to plane – start plane – start mission.
- 7 – 16 hours that they might be gone
- Ability to circle fuel pits is a positive aspect of design
- Circular pit – option to add more fuel pits – the ability to fuel from different spots while allowing locations to heal if needed
- Plan based on single – so what number of fuel pits? Same number. Is this part of scope? Buildings just themselves – but important to understand the scope to influence design.

KBA

- 165 crew brief and transport.
- Loaded in overnight parking and then fuel
- Could be multiple turns of same aircraft
- 8-10 hour day
- 15 – 20 minute re-fuel time
- When the plane returns it goes to overnight parking position. Does not refuel at this point because it's hard to predict next day's mission
- If they have additional fuel pits in design does KBA and smaller planes wait until LC's exit the fuel pit before they can refuel?
- Ben – it's a waiting game and eats into the day. Every 30 min you wait it chews up the day and the science. Challenges vary – delays and issues vary
- Cost design vs efficiencies. If you have an adequate number of pits you don't have to wait for LC's
- WBS manager for small aircraft – would be good if they don't share pits
- WBS operations manager – cost effective?
- Number of operators (staff) for fuel pits is important as is number of pits. Where does staff come in? Fuels operator has to be there. Would gain a permanent spot for KBA to fuel. Then determine requirements for the day. More availability to fuel.
- Some days planes are waiting – sometimes due to mechanical issues. Don't know optimum number of pits but currently there are refueling conflicts. KBA takes 1000 gallons and another 230-350 gallons
- Fuel truck makes multiple runs to fill up aircraft-
- Cost wise a tank and a pump house may be more cost effective. Train someone to do that. Fuel truck or remote site for KBA would be good,
- Don – This report has facilities info – both entities have maintenance/shop functions on the site – what maintenance?
- All work to be done in hanger or right on ramp
- Building for electrician, hydraulics,
- Put specialists together and have separate office and work space

- ANG Building 1 – maintenance operations with offices and electronics Avionics, hydraulics, structures fuels. Yes – this office space is good. Need space for debrief area (currently in a small space or dining hall for debrief)
- Floor 2 – ties into central building – supply building in McMurdo – and life support space. Is there space for this at the flight line? Want them down there – supply and life line equipment brought to the line. One person manning warehouse – bring their footprint down.
- Ben – what is the volume of stuff brought to the line? Answer – don't know (building 159 – Larry – cold storage? No it is not) 156 is current heated supply (1st fl). 159 shared with H on ground and 17 is cold storage. Did not see these functions in Central Services. Ben – confirm with Brandon – is this accommodated in town? Larry – may be part of new VMF and traverse building? Portion of 143 the existing VMF would be cordoned off to serve that purpose. Need to confirm

ANG :
Maintenance shop and storage – on plan. Consumables stored here? Yes. 3 6x6 storage areas. Navigation equipment. How do you get storage on 2nd floor (larger stuff and volume on annual basis)?

- Brandon – overall storage for Air National Guard – we missed it in the M.P. Understand now they have 3 distinct requirements. Current use with fuel drop JI
- Shop space – limited space – comes in form airfield
- Limited storage capacity in town
- Also need office space
- Looked at couple spots – Still figuring out operations – VMF, traverse ops. Constraints n 143 is presented in MP – think synergy with JI function as part of field service science? Would be next to ATO
- Need a good co-location
- Need Room to pack chutes with high ceiling
- Storage and workshop function – good chunk of space in VMF (once you pull out boilers) and renovate and give then the physical security – all together. One footprint. Revised VMF plan with equipment – lot of light. Set up for workshop. More floor space and everything in the same spot. Leaning towards this now
- Aware of security requirements to design for.
- Depends on space for storage – that would increase efficiency. Avoid trips back to town. It would have to be something major for something to be brought from town.
- Don –How much DNF is stored over winter? Currently 156 storage is heated year round
- Risk kits are hauled back and forth every year.
- What portion of stuff you consume is at airfield? Would you change that if you could? Yes – accessibility at runway is better. Lose flight because they are waiting on a part that is coming from town.
- Ideally – all storage for flight season is at Airfield (minus skis – those need to be kept out of weather in a climate controlled environment).
- Do skis go back? Kept down and rotated out every few years
- Want to review it again – important to look at it again to make sure nothing has been missed
- Question – as reviewing Airfield Report think of– any functions at airfield that can be moved out of airfield and into town? Would reduce footprint (less maintenance – Gary) – less snow maintenance. Currently at bare bones at airfield. No office staff at Airfield currently. All shop work is part of the generation.

- Larry – cargo from Christchurch? How much to town? How much to airport? Answer – into Pegasus – currently they max their storage space and then it goes into town.

Preference (Don) is to store at Airfield (since it is consumed at the airfield)-

Gary – Pete Cruiser is logistics manager – he wants to take a look at 20x40 space to possibly be split. Be sure to talk to Pete for input.

Storage Needs:
This has always been an issue

- AGE – Storage DNF. Is this cargo storage? Yes it is.
- SPAWAR facility – Shop office and Air traffic Control
- Fleet operations: Tool storage vehicular maintenance and small office space
- ARFF – Air Field Rescue Fire Fighting
- PAX Terminal: Included fitness on second floor
- Galley
- Head

This is what has been identified in Facilities

- Don – need same at Ski runway

- IT needs space for all their Comms –they need dedicated space for internet, phone, etc.

- Cara – Allocated space for Grantee Cargo and Grantee workspace. Set up racks and space every season.
- Gary – Agrees. Have a science support building to support grantees. An all- purpose building for science support.

- Air Force – Have an ice pod that hangs side of C130 that collects info. CBR is same thing used by National Guard for reconnaissance
- How often OCD's stored? Ice Pod – 3 weeks of missions – tie in CR missions to timing of ice pod – have to modify the airplane. Could increase in usage as time goes on.

- Is it efficient to store them at airfield or can you store ice pods in town? They are transferrable between airplanes.

- Recommended Town Site Layout – separate head and galley

- Is the Fleet Ops building missing? SPAWAR building? From an operations standpoint does it need to be on its own?

- How much of this is tied to funding in 2020? Potential that some won't make it to 2020 (propeller building for example)

- Maggie - there are still things that will need to be replaced before budget is approved.

- Power generation side – that is failing and we have to look at how we bridge the gap.

Aaron – utility component

- How do you currently distribute power and comms and how you would see future connection?
- How currently interconnected
- What could be working better?

- Gary – power is a time consuming process. Everything is wired in series. Takes time to wire facility – 3-5 days for electric and IT wire. Go towards a wireless system. Get from Central generator to facilities. Gary – power outages? Lack of backup power? Working on a plan to introduce new power systems. Old power systems – have had power outages – can be detrimental. Working on plan to replace generator.
- Investment in protecting themselves from town power. High expense. As power drops out, it isn't as big of deal as when it drops back in. Have invested in a UPS system. Consistent power outages – needs to be addressed. Need stable power and need clean Power. First protection is that Town should be clean.
- Maggie – LBD waste heat. Look for utilizing waste heat
- Gary – all for solar, wind, etc. have to be mindful of the time is takes to put these facilities together – Gary's concern is time to put together. If NSF decided to move buildings and every day it takes to put together means planes are waiting.
- Dan – run on spansion – that you could set down and not set a pole.
- Question – how about a utilidor?

- Larry – buildings are 2 ½ story – put on skis and move around – how many sleds? Don – in these diagrams we have a 3rd story on a couple buildings – Is that a necessity? Do you need second story? There is an angle requirement. Limited visibility down the runway currently. Looked at consolidated facilities. Top is a cap and second story is a full arrangement.
- Moving runway around – have redundancy. Have a direct link back to town. Have to have redundancy in everything to retain safety. When setting up runways in beginning of the season they need connectivity before the rest of the town is up and running. Any time they move the runway they are about a week ahead of the town.

- Maggie – Don't make buildings too big. Don't plan on a sea ice runway at this point. Think about buildings weight and keeping weight down. Buildings will be moved a lot more. Size needs to be considered. Single building model didn't work.

- Aaron – how often move airfield? Even if not moving airfield every year still have to move buildings to the berm.

- Aaron – Potential for increased flights? Would be on C117 side. Year round operations – run a flight in July – have to have communications to town all the time? We have it now.

- Pegasus flights are in an uncontrolled environment – no air traffic controller. No intention to have one. Regarding Alpha site are we into co-mingled space for wheeled airfield. Observation is required.

- Pegasus – look at what facilities we need. Bathroom needs to go away. What facilities do we need year round?

Wheeled runway and functional requirements:

- Head module
- PAX terminal
- Cargo Storage DNF/DNT requirement
- Fleet Ops
- Noted that some of these are questions that need to be answered by Pete (coming later)
- Maggie – do need fleet ops, do need fire
- 3 flights a week (that number could change) – alternate runway for skied location
- Neil – Fire Requirement – general need infrastructure to plug in and store breathing air equipment
- Don't need overnight like they do at Williams

- Team deploys at Pegasus but they don't stay out there. Once flight goes up they go back to town.
- Need a single person office? Have multi-agencies in there at one time.
- PAX terminal at wheeled runway? Yes – still important for emergency situation or for winter flights. Safe place for people to be inside and as an alternate
- Transportation needs – may have to bring in separate groups depending on how big group is

- Space – Multi-purpose office that all agencies can use as needed
- Safety – weather observer is there too – don't want that person in a stand-alone facility – so you can evacuate as a group

- Wheeled runway – fuel requirements are different. Training is different in that there is a mission or two to Pole that has 25,000 gallons. Need pump sled.

- Is there 25,000 g storage capacity today? They can make that happen.

- Fuel truck is 2,000 gallons

- Ben – at end of season is there residual fuel? Yes. They do try to forecast fuel needs.
- Between 40 – 60kg ready to go

- Is there any storage at Pegasus for spare part storage? Light bulbs, kits, prevent the run back to Willie Field. It's a considerable run to have to go get things. Don – take into consideration and look at scale. Save trips back into town.

- What is frequency – Ben – if occurs often it's justifiable. But you have to heat the space, maintain the facility.

- Fuels – how they fuel the vehicles. Would like to capture that – where is the vehicle fueling area and they would like to be able to meter that.

BREAK

10:53 Begin

- Does ANG Building 1 capture the facility's needs? Need good sightline to airfield for Moc
- Regulations that you have to debrief aircrew upon landing

- Flight crew = 6 people
- Office space on 2nd space – just office space
- Proposed 6,000 sf of space. Lose a little on stairs in multi-story buildings

- Layout captures functional requirements – moving some of McMurdo functions to flight line

- Maggie – missing office/conference space for meeting/debrief space on drawings
- Don – is there a need for private office space? No
- Security issue with Life support – this area has to be able to be sealed off (secured storage within the facility)
- Maybe make sure meeting space can be closed off – made private.
- Put table in for crew to eat – discuss mission items
- Would the moc be able to leave the tower?

- AV for space? Need spot for projection? No. Just round table.

- Storage on 2nd floor – opportunity for things to get shifted around during moving. Storage supply for supply warehouse – would be emptied. Do you lug everything upstairs? Put on a pallet and lift it up? Access to second story from outside? Functional standpoint – move to town, move it back? Most product is used during flight season? Have to check.

- Pete: There are large items to be stored on 2nd floor. Maybe caged area in Central Services?
- Shop requirements? Prop building for storage? Storage at Airfield? Singular storage.
- Is there adequate security for storage currently? Not sure.
- Recap – no need for closed offices just acoustically separated storage
- AGE/CARGO/KBA – access doors direct from exterior. Space looks ok.
- Pete Cargo office – eliminate DNF and DNT
- Consolidate AGE and KBA with shop space
- KBA storage – directly adjacent to shop space? Yes – ideally.
- Second floor – office for KBA – is this space ok for staffing from airfield admin point.
- CARGO and AGE – adequate for office needs? Yes.
- Maggie – DNF and DNT – talking Williams only
- Maggie Pete to talk about DNT – huge improvement. DNF component (doubled) – would work fine. Store 14 airdrop bundles to keep in warm environment for contingency.
- Pete prefers to keep contingency packs at airfield
- Do they need to be secured? They are not now. So no.
- Rigid inspected before being dropped.
- JI perspective – that is preferred
- Don – Life Safety element. But how often does this deploy? Do airdrops every year – contingency bundles for if a plane were to get stuck in field will drop fuel barrels. Can we store regular season airdrop bundles too? Yes.
- Don – think about pallet with fuel drums on it (pre-loaded)
- Building requirements change on scale of products being stored
- DNF and DNT – transport to field, pole.
- This type of product that is transferred to Pole. Never come into town? Is pole product segregated? Sometimes. Can palletize pole-only cargo. Don't take to town if they don't have to.
- AGE Maintenance – and shop and storage:
- AGE – Storage shed is small.
- 24x35 currently. Plan is for not much bigger. Gary – need to look at to see if they need bigger. Would combine shop and storage to 1260 sf and that is sufficient.
- Garage door on either end would be optimal. This is where a lot of injuries happen.
- Aircraft generators and heaters are stored here. Stored on dual axle wheels. Pickup truck pulls it. Very labor intensive. Would be good to be able to pull through
- Gary – store critical equipment in there – have it available for storms

Fleet Ops:

- Vehicle maintenance – trying to do vehicle maintenance there because it is hard to get it all back to town.
- To pull in and get back into service would be good.
- Vehicle maintenance and tool storage is good.
- Want to get a passenger van in there – no bigger
- Don – will do analysis before design
- Maggie – more for trouble shooting and light maintenance. Heavier maintenance needs to go

back to town.

- Office space and common space - good for air flow manager to have an office
- Maggie – 2nd shop in this building? No. Cut down and just add common space in front
- Stacking? Reduce touch points as far as setting up and taking down.

SPAWAR:

- Storage
- Common
- Air traffic control platform
- Maintenance
- 20x20 Aircraft control is ok

Fire station:

- Office birthing – micro-singles upstairs and office and briefing space downstairs – Preference 8 micro-singles upstairs.
- Living space/office space combo. 24 on 24 off – sometimes forced to do 2 days.
- Kitchen space? Rely on the galley. Need a small brig station – coffee pot microwave fridge

PAX:

Operations side

- Seating
- Fitness? Maggie – long fought battle. 109th – programming the available space is good – don't necessarily have to plan for equipment. Good for when stuck out there.
- Fire station side – fitness is component has level of fitness opportunity. In general – with 24 on and 24 off
- Maggie – have to have good discussion on fitness space.
- Shower? Need an emergency shower for fuel spills. Missing this as a requirement.
- Fuels handling – other potential exposure? Yes – in any of the maintenance shops.
- Consideration – plumbing. OSHA states for emergency eyewash at a minimum, possibly a shower
- Request for normal shower – unlikely

- Pete – Passenger terminal – suggestion for multi-story building – put passengers on top of DNT building – could give up one office.

- Gary – used to haul water to Pegasus. At Williams – generate own water by using snow melt
- Utility requirements

- Object to Pete's proposal? No. Good change to this plan .
- Pete PAX has to go upstairs – will have appropriate size stairwell.

- Ben – would this be ok as 2 single story buildings? If it's 2 stories than you have less footprint – less snow to deal with
- Pete – consolidates number of buildings they are operating
- CARGO – main storage – with passenger waiting on main floor

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- Aviation off site – special area for KBA site would be good to minimize wrangling.

- Head – end of regular season – are there 150 people headed back? No – not out if Wille (ski runway) passenger loads are only 40 or less. Out to field camp is 15 – 30 max to field.
- For checking plumbing code requirements

- General work force at ski airfield – close to 100 overall (flight crews, staff, passengers)

- Don't feed passengers out there

- With a delay they feed the passengers. Build this into ConOps to be flexible.

Galley:

- More employees than passengers.
- Galley got smaller. Sometimes it has been prep and sometimes they have it brought in
- Not sure level of full service. Maggie not sure. Don – need to understand how to improve function. Gary – primary function is to feed workers. When you have the occasional need to prep for passengers then it puts you short.

- Waste question? Haul back to town? What is plan? Don – do not know operations standpoint. NEED TO RESEARCH THIS ISSUE. Don.
- Ben – size looks the same (galley)
- Maggie – make sense to have second story for eating upstairs? Don – is there a better way to do this? IS it 3 connected elements? Align them horizontally is difficult. Ben – put 3 of them close to each other. Greg mentioned walls divide it off.

- Phone comment – second level benefit is having extra visibility

(Previously 2.3.3) 10:15-12:00 (Baker) Track 2: Co-location Center Requirements
DC2.3.3.1 Primary

Note: this item was moved to Tuesday into a day-long session – Baker.

- Facility to be known as Data Ops facility. Covered building organization between first and second floor functions, organization within space, adjacencies, architectural requirements, electrical and environmental, and communications needs. We covered items required for the roof, and looked for applicable items for the back-up Data Ops facility.

- Free-wheeling discussion on co-lo data centers being a large volume, on a raised floor; that there's a relationship between all agencies. Offices have additional functions within them. NASA comments included need for bench work space with racks; electronics shops and need for cooling—recommended elimination of hallway separating office area from data center. Need for key card access.

- Discussion on reorganizing building organization by having all industrial functions on floor with access to loading dock areas, and data centers and tech on second floor. Gained consensus; comment to have roof access to antennas via stairway to roof (not ladder and hatch).

- Additional requirement for 1,000 SF cold storage and 1,000 SF (verify) of warm storage on ground level. Cold storage is for items that can freeze, but want to keep snow and ice-free. Would like access to cold storage on East side to have access to Helo pad.

- NASA: has 2 people year-round with additional 2-6 people for summer season to perform maintenance or perform system upgrades.

- Kevin Gibbons to reserve last hour to discuss transition planning with agencies.

- Discussion of a potential large duplicate storage area at the Helo hangar to use as a phase for transition

- NASA/JPSS NOC (Network Operating Console) and Data center—prefer to see hallway down a side of the building than currently dividing the spaces. Want both offices and data center collocated. Separation in master plan was based on 2 thoughts: separation from noise of data center, and HVAC issues—heat recovery not working as anticipated, problems with louvering. Would like key card into control area. Want double door (6'-0") opening from data center to hallway.

- NSF Office—has 6 people, should be in an open office layout; no enclosed office required. There should be space for wall monitors; no meeting or layout area required. Provide 7-8 work stations, and a space for a tech library. There is a "test bed" requirement. Meeting space would make use of the common EOC meeting room, during routine conditions. Locks: same as data center—key card requirements. Acoustics: no special acoustic reduction requirements for office suites—fabric on system furniture walls will be adequate for office noise. Painted gypsum board walls adequate. Provide visibility into office and data centers for VIP tours and other tours—wall glazing and vision glass for doors. Floors: raised floor for both office and data center **(Note: consensus is to have all functions on 2nd floor on a raised floor system)** Ceiling—typical suspended acoustic tile for office space; data center to be open to structure. Finishes for NSF seemed adequate to standardize throughout facility.

- Discussion on Co-Lo Data center—the concept of one large volume with all agency servers in one space, with each agency's servers caged with limited access. After some discussion on pros and cons of separately walled in data centers versus one large co-lo data center by Nick, consensus was reached to go with one co-lo data center, so long as each agency's racks were in secure cages.

- NASA/JPSS: NASA states that surge of people in the Assignable Office space. Suggest swapping the 764 SF for Data with the 799 SF Office space. Encouraged accounting for rack space with test bench function per their diagram. NASA has a requirement for a bunk in order to have a 24/7 response—a separate room is desirable. Originally, the bunk space was for Condition 1 weather to assure response time, but with earlier discussion to advocate for sky bridge connection to IT Ops, requirement for bunk is mitigated—but still desirable. Bunk could be the size of a walk-in closet. Discussion on overhead cabling: go with industry standard for cable tray, and power under the floor. Some discussion on a pressurized air plenum—covered hot aisle/cold aisle issues and discussed a common air return. Some mention of data center humidity requirements, but no real numbers discussed.

- Separate discussion on roof access: requirement for stairway roof access for ease of technician access to roof w/toolbox. Request also for vertical chase for raceway to access roof. Roof to have landing at top of stairs; requirement for a 10 foot wide catwalk and 2 (two) 30ft X 30ft platforms for radomes and antennas.

- NASA JPSS suggests that the office spaces think about innovative modular furniture, such as 270^{o} systems furniture for more efficient work environment.

- SPAWAR (Navy) states they may not need back up control space and are wrestling with where it goes—could go at Ops Co-Lo and Assignable Office space.

- It was noted that utilities to IT Ops building will come thru the sky bridge.

- No other architectural inputs on 2nd floor.

- Lance Mackie took over to discuss power, lighting and environmental. Card readers discussions. Asked if card reader needed between office space and data center—provide capability but perhaps have it disabled until required.

- Entire building should be secure; security cameras to monitor equipment and look inside the data center remotely.

- For Co-Lo data centers, cages would have to extend below floor and above ceiling to hard deck or have their own cover, if high ceiling condition.

- Fire extinguishing—talked about a 2 phase approach—non-water system first within Co-Lo data center, then water system when higher temperatures present themselves. First stage preserves equipment if possible; water system to save building.

- Nick took over to re-verify rack numbers. NSF—20 racks; OPS Co-Lo—10; NASA/JPSS—25 racks; Science—20 racks; Science—20 racks. We will eventually need weights for specific equipment. Not expected to be heavier than 800 pound battery packs.

- Then discussed rack requirements for back-up Data Ops: NSF—20; JPSS—10; NASA—0 no requirement; Science—unknown.

- Question on ASC Terrascan—relatively small area—could be in Contingency Ops.

- Discussed loading platforms and first floors. Located functions as shown in diagram. Added 400 SF for warm storage and 1,000 SF for cold storage. Locate Assignable Office space in remaining spots.

2.2.3 2:00-5:00 (Merrick) DUEL Airfield Programming -
- *DC2.2.3.1* Agency Requirements

1:00 Resume

PAX

- Heavier inbound traffic than outbound
- What is the scale of that workforce?

- Gary – single consolidated building. Not a lot of space. Not a lot of people. Could store fuel or equipment instead of hauling to/from town.
- Bathroom – ideally a single bathroom servicing people working there with exterior and interior door.
- Square footage would have to be figured out

- Maggie – common space that needs to be protected
- Storage locker to store tools and equipment
- Maggie – Neil is comfortable keeping fire in PAX terminal – Neil just needs a small work space. Formal storage space would be even better. Fire personnel are transient – need a spot to get in and out of weather
- Gary – keep Fleet Ops co-located but separate (eat meals there, semi-prep area)
- Question TO Gary – This group of 24+ are weather observer goes out 6 hours prior they 24/7 or just out there when you are expecting a flight. Just a flight – Fleet ops is out for 2 shifts – day and night,
- If flights are not regular – keep small 24/7 contingent in a smaller facility rather than in the larger building built for 24 people.
- Gary – tied together so you could have a single bathroom so they don't have to go outside to the bathroom if there is a weather event.
- Ben – what is the size you are thinking about – Gary – TBD
- Ben – intended to be mobile? Yes
- Once set up will stay in place for a good amount of time before it's moved. Elevation changes so you have to periodically move.
- Gary – wireless locations are in same place if it is co-located.

- Don – passenger terminal – scale of that facility – particularly for Wheeled Runway. Answer – 126 people in and out early. Then it drops 50-70 for N-S flights. 50-60 person facility would be appropriate

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- Need facility to hold a lot of people even though most people stand outside. Mass exodus is back up to 120
- Duration? Out in airfield for 3 hours. Small passenger can do separate transport groups
- Outbound 2 – 3 hours – take people in and bring back.

- Beginning season – fewer people going North – but big load coming in and then it reverses around February.
- 126 come in, as only 8-15 are going out.
- If a storm comes in or mechanical problems then you have to be able to put people somewhere.
- Going north would be terminal time most used. How often? Rarely do C117 go out to NZ and come back – or they do turn around and go back where they came from because of weather.
- Ben – can they use other facilities while they wait? At Pegasus there are no facilities
- Do people sit in transport vehicles during wait? Kress vehicle holds 65 – could be portable holding area for people.
- Maggie – what stage is this in the Phasing? Airfield was not identified in M.P. Airfield came in as overall scope. No particular order for this.

- Ben – priority is what drives this.
- Might be that select facilities take higher priority
- Also impacts what fits on vessel. Don – these will be pre-fabricated structures

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Food Service –

- 2 shifts. Eat breakfast in town then head out. Or just come out because of early work due to storms. This food is microwaveable – or leftovers.
- Gary – AGE shed – existing at Williams. AGE shed would move to Pegasus after other buildings are in place

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- Being towed back and forth
- Don – in the idea of 2 airfields – we don't have ability to move equipment back and forth except at end of summer season – move shed Williams Field for Pegasus for winter flights. Is this the only object being moved for winter flights? DNF is moved to support flights.
- Maggie – want DNF at Pegasus? Pete – Yes. Doesn't need to be as big as what is at Williams
- Group using UAV's used hard surface runway – having a facility with big door would be nice. This was a one-time situation. Matt Lazaro is the PI
- Are there staff that trade between the 2 locations? Yes – some stay and some move. AGE guys might pull from Williams for Pegasus. So yes – some vehicular storage/parking needs
- Use a pick-up truck? There is a mix now and it works
- Ways to increase efficiencies? Do more with less?
- 767 Aircraft – gone for now.

2.2.3.1 Agency Requirements:

- Secure the power? Just put a Keep Out Sign
- Phone question? There are no covered storage areas for equipment
- Shuttle system gets Guard to Airfield
- Question for interior storage? ARF? Can dig them out – so not really

2.2.3.2 Utilities, IT and C

Other than power?

- What is the approach from heat generation? Electric, boiler – this will be investigated.
- Compressed air requirements? Voltage? Compressors drop off into building. So far this works well. Is this routine need?
- Water and low pressure filtered air are requirements
- Compressed Air (not filtered) No special power requirements. Shop requirements (not welding)
- UPS? Might be cheaper on individual systems.
- Number one desire is clean power
- Scale of power requirements? What is the demand factor? Demand on system spikes?
- 320k on generators and not stressed at all. Can have a separate conversation about power with Dan from Merrick
- We have loads on utilities – Anthony in Denver has load information
- Maggie – powering systems that are staying vs power that is going away – moving buildings makes this change
- Aaron – do you deal with liquid oxygen? 200 gallons for servicing carts. Yes. It is self-contained. Any requirement to test breathing air? Purity requirements. No interior need though.

- Maggie – tank requirements and testing done at station

2.2.3 2:00-5:00 (Merrick) Single Airfield Programming

- *DC2.2.3.2* IT&C

- Jeff Scharf – IT Have a rack – Have UPS – Have a tower on it. Would put it off to the side. Connect with cloud everything runs wirelessly.
- Maggie Separate space? Yes – need separate tower. Location is important. Security is important. -
- What about wheeled runway? Same for both
- Replace existing communication system? Yes. Replace radio traffic with phone? Not the notion. Would want to keep radio going. Is everything wireless? Why not just for buildings?
- Don – changes in use of technology in the future? Yes. Use of more handheld wireless for cargo activities.
- Monitoring capabilities coming up – connectivity goes up, power needs go down.
- Ben – When will this group learn the requirements? What are physical plant requirements? If something has an impact on infrastructure, we are required to support that. More and more handheld in the works – this is something the design team needs to be aware of. Require a bit more than what they have now. Could tell you based on current – knowing that power requirements will go down.
- Don – off continent or local? Maybe both
- Depends on location. As we move more functions off continent we need more requirements.
- Limitation is McMurdo bandwidth
- Optimize devices so operational traffic gets it. Limitations will always be off the island.
- Maggie – Matt do you have physical requirements. Matt – would have its own enclosure. SPAWAR.
- Jeff – question to SPAWAR – move any operations? No. Do we need high availability? Yes. Tower has air traffic control. One in town one at airfield – can use each other’s as back up primary.
- Standard telephone communication
- Smart device capability
- Connect to McMurdo network – what level of technical manuals are on site? Charts and publications are available on network.
- Matt – end goal is to deliver electronically to pilots in cock pit – or the maintenance worker on some sort of device. Don’t want to deal with radio communications in the future.
- Matt – by the time they get in cockpit they may need another brief. For flying will always use radio traffic – other planes can hear it in the air. Digital products for regulations – carry paper publication as back-up.
- Data over wi-fi is a need – Jeff. Voice over smart phone? Sure. Appropriate at airfield? Replace pager? Still use radios at airfield. Smart phones might not work in cold – lithium batteries don’t work well in cold

- PBX replacement is coming up. It's 30 years old.
- Knowing the timeline– can you wait that long? Jeff – this is the first year of a 3 year plan.
- Has to be done before you take the first building down

UPS:

- Flush out IT requirements – what are needs by building for IT needs?

2.2.3 2:00-5:00 (Merrick) Single Airfield Programming

- *DC2.2.3.3* Pax, Cargo & Transportation

2:12

What other elements of cargo are we missing?

- As long as there is a place to store stuff and people it's good.
- Need a lay down area in town.
- Need a place to store completed pallets.
- This layout seems appropriate.

Ben – Taking cargo from aircraft from airfield to town and then back out. Thoughts?

- Pete – depends on the aircraft and how they maximize space.
- Doesn't take it into town if he doesn't need too.
- 9 out of 10 – pallets are mixed so it has to go to McMurdo – and then parts of it will come back.
- May have to get worked on at McMurdo before going out to the field.
- Maximize space if possible with Christchurch guys.
- Ben – can you maximize that in Christchurch? Can they be loaded and identified so you know what pallet remains at flight line? Yes – work with pallet builders in Christchurch.

Ben – what is process when it gets pulled off:

- Pete – will have an idea what is coming from the manifest. Can see the breakdown of what is what and where it needs to go (on each pallet). Decide if it can be kept at airfield. Make determination in town. As they unload, they will pass info to staff. Pallets get off plane and are directed to where they need to go. Field stuff goes on to staging line or DNF area.
- Ben – need to be thinking ahead for construction cargo.
- Need to space pallets in truck (Delta) for weight and logistics of unloaded
- Partial breakdown of pallet happens outside nothing happens inside. Benefit to doing it inside? Due to the size and nature of equipment – doing it on the ground works.
- Christchurch fed ex items are put it into McMurdo's cargo system.

Ground transportation special needs?

- If vehicles are left at airfield – need plug-in lines and real estate for turning points.
- Plug in points are all over.
- Pegasus has a heavy lift loader. Williams has ground handling equipment. Plug requirement? Park at airfield with everyone else's stuff?

- Ben – impact on NOAA or NASA – any of these ops – indirectly yes – cargo assets coming inbound. Daily operations – weather reporting, Air traffic control, satellite.
- Their material would be part of regular cargo stream.

Water:

- Williams is using snow melter for non-potable water
- Potable water comes from delivery truck every other day. Combine trip with LBD as well
- Issues with getting delivery? Yes because it takes up an entire Delta
- Aaron – current storage- do you put potable into each building that needs it? Just the galley – only spot for potable water
- Sanitary sewer – head, galley, anyone else? But look at collection methodology if you install emergency shower. No.
- Pegasus – has no potable water delivery. Potable water is hand carried. Bathroom is non-flushable. Stay that way? Doesn't even go to waste treatment. Just hauled back
- Williams – will the bulb for wastewater continue? As far as Gary knows. Efficient way to get rid of waste. Head module makes sense

BREAK

POWER – Dan Harrington

- Timing and requirements for both Willie and Alpha
- Gary – as operator of airfield, requirement are stable and clean power. Power guy is Anthony is in Denver.
- What is definition of Clean Power?
- Had been using separate generators – everything is going to run off main generator in town. Less generators becomes less maintenance – less fuel. This includes generating power for runway
- Get rid of incandescent lights. Have battery operated runway lights. Rechargeable? They can be charged in town or in airfield. This is just for winter flights
- LED's have not been approved for approach lights yet
- Dan – for round-the-calendar flying, is there any advantage to burying utilities? Gary – wire from main generator in town to approach lights. SALOR lights are operated with underground wire.
- Williams Field – everything is provided from main generator. White elephant at Williams is where wires tie in. Install another cable.
- What about the other 2 generators and what is back up? White Elephant has one primary and one back up. Auto transfer switch.
- Could put a stand-alone generator in there
- 320 kw generator for 15 kw usage doesn't make sense
- Could facilities be connected for science? Larger presence of grantees at airfields/ Gary – have science group out there – had a rack tent out there – so have a dedicated ski science support dedicated to them. Rack tents are labor intensive to set up, maintain, and break down. Gary to provide an estimated SF for this purpose.

- If we go to something similar to LBD, it will take weeks to put together. Set ourselves up for success on power so it can be taken apart and put back together easily
- LBD issues – waste heat goes overhead over buildings. Buildings have to be spot on due to utilidor. Takes weeks to put that together. Ice runway has to have the flexibility to take down and put up.
- Ben – LBD – saw rigid connections and spot on alignment. Would put in quick connects.
- Dan – moving from Alpha to Williams? Set up for Alpha and separately set up for Willie? Gary – passenger terminal and ARF set up at Pegasus. Disconnected it and moved it to Williams and then moved it back for re-deployment. Doesn't move back and forth though.
- Matt – maintain portability if we need to move this. Ice runway means we need to power 3 airfields simultaneously. Capability to power those 3 that the FAA is checking it. Ice runway, set up Williams, set up Pegasus and FAA checks all 3 the same week.
- Ben – concept to be continued? The ice runway to continue? No plans right now to construct an ice runway. If we go back to do that this needs to be planned for. No ice runway - Willie and Pegasus. When FAA comes out – they do flight certification for Pegasus and then at Williams.
- Ben – Why not one at a time? Weather dictates basically. Too much labor.
- The last thing you want to do is turn off power when you are ready for FAA check. Can take 72 hours for a check. The more options we have – the sooner we can get the certification.
- 4 dedicated generators for airfields for FAA certification

Need for shop space:

- ANG – what is CTK – Air Force stores tool's here and have to account for them every 12 hours.
- Other half of that building is sheet metal shop.
- Remainder of space is office and shelter space.
- Engine boat house could be considered a shop – no light no heat. Looking for shop space. What do you need? A workbench? How big? These requirements will be collected in questionnaire. Lot of space currently is shelter space. Need conference space for team meetings – currently in the galley. CTK requires cabinet and shelf space
- Second floor – needs for office space – needs to house 11 people per shift (flight line). Life Support (Air Crew Flight Equipment) shop space? Work bench. Storage needs – bins and racks. Need small water supply and clean pressurized air.
- Travel time – Doing their shift at airfield eliminates need to transport back and forth.
- Propeller building serves as shop function – have to figure out storage needs.

AGE Cargo KBA

- KBA shop is sufficient for storage but need more width for shop end. 12' – 14' feet needed.
- Work bench set up
- Wall shelving
- Engine work currently happens outside. In a new facility it would be better to do it inside – wants access – a 4 x 4 overhead door. This is roughly a 10x20 space.
- This is the building Pete talked about doing PAX terminal upstairs. Highest number of passengers at one time is 16.
- AGE maintenance shop (not present) – Follow UP

Fleet Ops:

- Ideal size – needs to accommodate pick-ups and passenger vans. 20' is probably too short
- Light maintenance – tire repair, jumps, break line repair
- Shop layout needs: Not present – Need to follow up

SPAWAR shop needs:

- Electronics, net gear. First floor concern is size of door due to the size of gear coming in for communications equipment (and server rack)
- Shop to do repair on SPAWAR equipment
- Tower requirements – cab for control and weather observation
- Have a common area – controllers are limited to 10 hours – everyone else can do more.
- Air traffic control is top surrounded by glass. Below that is lab. Bottom floor with large items on the bottom. Need common room and equipment room.
- Dan – lighting controls – controlled with a Navy system. Space needs – bench with desk

BREAK

End of Day Recap: 4:10

Airfield:

- Basis of discussion was the Single Airfield report from 2015 but now it is for 2. Wheeled, Skied. Facility discussion and identified
- Wheeled – "small town" small amount of ground crew,
- *Skied runway is "big town" – lots of passenger traffic*
- Both runways on the ice? Williams stays with ski equipment and Alpha site is potential new location for wheeled runway. Moving it away to a cleaner environment.

Scheduling and Dependencies to Occupy this Building:

- Needs to be synched up with demo of 189
- Current time is September 2020 for occupancy with movement summer of 2021 (9 months to shut down and move over

Setting up working group to develop inter-agency transition plan

Ben – Phasing plans for individual buildings? Have to keep buildings open and operational. Kevin – focus primarily on this building. Did talk about pre-phasing.

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

Dave – During wrap up – be aware of any surprises, like spine in Crary (Phase 4)

Phase 4 a done deal? They want a drive through capability for piston bullies. Worthwhile idea. Has scope implications.
Design standpoint – who designs the bridge of where does that land?

Existing dorm vs new dorm – whose scope is that? Don – to be figured out.

Shaggy – get Butler involved in this –the addition of new dorm – can extend dorms out.

- Existing structure gives certain limitations and new build won't – but need to be aware of equality.
- Dave likes lounges on back of building – especially for sound proofing (similar to 210)
- Windows in all dorm rooms? No. Maybe solar-tubes
- Dorm – OZ-Baker. Limitations with structure in order to get layout to work.
- Buildings are connected/Scopes are connected.
- Housing – Maintenance – ASC – to be discussed in week 3

- Dave – galley talk needs to be further discussed in Denver (Airfield conversation)

- John Delay concern with size of structures.

- Larry – how are we going to manage scope changes? How do we do it internally? Need to document the process. Example single vs double story buildings at Airfield. Will discuss Thursday in Denver. Will start talking about this on Thursday

- Dave – when airfield is happening (budgeting purpose). Aside from McMurdo phasing. Need to discuss.

Airfield 2 Comments for Wednesday:

- 1 for wheeled 1 for skied, 1 for wheeled
- New prop building replaces shop function
- Take away – group to understand airfield schedule – don't have to give a schedule
- Do we need to retain sea ice capability – have to adjust design to do sea ice

- Aaron – building showing up in scope but Science Cargo not shown (science support) No more tent set up. Need to follow up with "Runway Science"

- Larry – not looking at different airplane types. Need to design flexibility with quick connects – might need bigger generator later. Navigation Aids might be different with different planes. Gary said no to 767's.

Transitional plan
Continual planning - collaboration – is critical

Can we do timeline for Airfield? Don – talked to SPAWAR – their upgrades are directly related to FAA aircraft upgrades.
Don – calendar of events isn't a concern because they are relating to airplane upgrades.

Dan's review points:

- Co-located data center – Dan. Have cages – can it be in same room? Confirmation of this.
- Acceptance of Reorganize plan adjacency program

Who is talking about EOC? Shaggy – depends on the event

Talk about that as part of Command and Control

EOC in IT Operations is backup for EOC in Central Services

Program decision on back up center? Yes. NASA JPSS doesn't need anything.

Ben – enforce that these drawings are diagrammatic

Don – SPAWAR – move remote Ops earlier? PHI?
Dave – FAA coming to look at helicopter in October. Takes a year to hear back from them. Need to know locations before design starts. Will know when he leaves the ice
Don – looking at space just uphill from HELO. Press them on requirements – ask the tough questions. Shaggy to attend.

Wed July 22 (2.3)

	7:00-8:00	(ASC /A-E Firms)	Set-up and confirm day's objectives

2.3.0 8:30-9:00 (OZ) Review previous day's work

Recap - Dan

Airfield

- Airfield Planning for 2 fields
- 2013 report is good for town layout
- Need to understand schedule
- Retain Sea Ice capability. Dave – this does affect design. Maggie – retain flexibility in our program, still have to move these on berms so have to consider size of these buildings.
- Include a building for Runway Science
- New prop building replaces ANG shop – Don S. New building called Prop Building – to assemble prop on engines. Replace function of shop in 2013. Ben – coming on line soon. Shop function is satisfied with new building coming on line (replaces "heavy maintenance building". Still trying to figure out supply storage space.

IT&C

- Re-name the building "IT Operations Facility"
- Transitional planning and continuing collaboration is critical
- Co-located data center – confirmed by group that this is acceptable
- Group consensus of revised blocking diagrams
- Confirmation of back up date center requirements

2.3.1 9:00-10:00 (Baker - Alex) Physical Security (incl. video monitoring) – special to agency needs

- *DC2.3.1.1* Departmental requirements

• How the building is organized
• There needs to be a linkage between the offices and the data centers.
• Data Centers will need mechanism pressurized flooring. It is agreed that co-location of agencies will be beneficial.
• Data Centers will need to maintain a raised floor for equipment to be stored underneath, agencies would like rooms.

• Surrounding the data centers to be consistent and have raised flooring as well. Chain linked fence meets security requirements. Hard walls as separation are desirable with key card access from a NASA stand point. Specify true slab to ceiling partitions
NASA/ASC
• There is a lot of time spent going from data centers to control room. Quick access is important. Single key card swipe gets you to secured area where data centers and control rooms are housed. Makes it easier maneuvering with equipment without having to use a double key card. There should be separation between equipment floor and vestibule. NASA requires storage and bench work space.
• Reconfigure the space to be similar to what is currently there. Data center in the center of the building increases circulation and decreases space for programming.
• Moving data centers to the corner will give better access to loading dock for equipment. Need large enough doors to get large equipment through. Need physical access control. There are IT security requirements for physical separation.
• If there needs to be separation per requirement this is fine, but is not a priority. Look into the possibility of flexible separation so they have the option to change separation function as needed. Contractually relationships will change so flexibility in the space is important.
IT/C 2nd floor Layout
• Shops on the second floor, can they be relocated to the first floor. Need loading dock space to pull large equipment.
• Roof access with catwalk. Not direct access from shops but availability. There will need to be Battery charging capability, fume hoods, special ventilation.
• Move data center and offices to 2nd floor. Trouble shooting equipment should not have to go between floors.
• Electronic shops will move to the first floor SW corner. Cold storage room, needs a close proximity to data centers.
• Challenge with room (175) when you go down with a crew of 5 for a special issue, there is not accurate space for the crew and influx of people for special projects.
• Assignable office space needs to be designated and assigned properly. Need temporary space for additional people that come in for special projects. Equipment is staged on the operations floor. Provide room for additional racks.
• All equipment is built first, deconstructed then sent to McMurdo. Once shipped there it just needs to be assembled - no staging space requirements. 4 pallets at one time is typical for shipping electronics. Co-location can share loading space, but need to coordinate storage of shipped equipment.
• Where can equipment be stored in warm storage throughout the station until it is ready for use?
• There needs to be a transition plan for multi-agency during construction phasing and build out. Will there be temporary buildings?

• There needs to be a large number of duplicate storage facilities for all equipment not readily used.
• Possibility of using the helicopter hanger as a temporary warm storage during transition.
• 2 issues to resolve from current data center: Heavy loud door and HVAC, trouble managing heat between human occupied space and data centers.
• Hallways down the side of the exterior this will allow one access key card point and loading dock circulation.
• No need to walk through the ops center to get to data support. Ops and data center need to be separate.
• Possible 2nd floor expansion above cold storage
IT/C 1st floor Layout
• Lack of warm and cold storage. • Lack of accessibility to loading dock. • ASC needs a loading dock they can back a truck to a loading dock level. • There needs to be a work bench per requirements. • Battery charging should be central for multiple agencies to access. • It need to be located in a warm area, ventilated and have a race way that goes to the cat walk at the top of the building. • There needs to be a central chase from the ground floor to the top of building.
• No data center or UPS needed.
• Bench space is needed per requirements for field science support.
• PC Shop needs to be located near warm storage and needs a work bench per requirements.
IT/C Building Changes
• Staging area (SW) corner, Connection bridge, Office area towards (SE) corner, Electronic shop has close access to work stations • Warm storage towards the north • Extend south west corner to the top for staging and to match square building off for cold storage • Direct access to cold storage on the same level • Help desk is more dispatch only need workstation space • Racks need to extend to top of roof
NSF Office Requirements
• 6 people in operational room
• Opened cube currently, want some type of separation, and doesn't need to separate offices. Space for wall displays

- Currently have two monitors for projections.
- Meeting space (EOC services can be used for this will just need scheduling).
- Same physical security as data center, hard walls around ops area, only authorized personnel. Glass is good (Large glass windows desirable.) good for DB tours so they don't disrupt the staff working in there, but can still see inside.
- Space for a small library function within office area, built to fit 7-8 work-stations. Fabric cute walls desirable.
- Floor ceiling, raised floor, keep it on the same level as data center to make it easier.
- Power under the raised floor.
- Ceiling tiles, water proof would help with humidity in the room.
- Storage wiring space.
- Connect operators and the data centers itself.
- NSF 20 racks

Operational Co-Location facility

- May be in the same data center location. Provide room and can be programmed later on.
- NASA storage area and work bench could be flipped with work stations to maximize spacing and interaction
- 25 total racks in data center (NASA and JPSS). 3000 lbs for 30x30 platforms.
- Cot in the data center room. OPS COLO- 10 racks

NASA/JPSS Requirements

- Data center with equip, Storage/workroom, Control center, Shared office space, Look into modular furniture to plan floor space to make sure it fits. Flexibility to change up layout.
- NASA/JPSS needs 25 racks, doubling each year

General

- Take advantage of an opportunity for utilities to be accessed from the sky bridge. Need to gather everyone's requirements. Adjacency with support offices, data center and EOC. Add hallway to give access to backs of data centers. Make sure to include UPS and Fire Suppression, Ability to capture windows where you can for daylighting.
- If we do run out of space think of places where people can move elsewhere if needed. What are the requirements of each agency of warm and cold storage? Design work would begin roughly in October. Science/ General (Crary) will need 20 racks.

Back up Data Centers

- Will have duplicate services. Need to provide foot print/ weight of the equipment going on the racks for design. +Space for physical back up of data.
- Need at least 10 racks in the back up (JPSS Requirement)
- NASA will not need back up racks.

Roof Requirements

• Weight requirements, line of site requirements. Science centers may have permanently mounted antennas on roof.
• Provide space for hook ups that go to the roof. Any and all rooms need to run coax cable from the roof to the hookups of the building. Each entity has their own requirement for how any hookups they will need.
• NASA is moving towards optical communications and requirements may be a lot less.
Co-Location: • Combining NSF, ASC, Operations, NASA/JPSS is not an issue of looking over shoulders. Would like to
• Open space with glass partitions. Partitions must be below finish floor up all the way to the ceiling under deck.
Phasing
• Phase-4: Temporary OSP Cable (48 months), Horizon Study
• Phase-3: NSF Life Cycle Analysis Plan, NSF/PBX Replacement (36 months)
• Phase-2: NSF Data Center Move Plan, JPSS Tech Refresh, Installation and Systems Management, NASA buy electronics and racks
• Phase-1: NASA Primary Data Center Transition, NEN test electronics at WFF, NASA Fiber Cable MG1 Install, Pull Fiber from JPSS receptors to IT OPS, NASA Airship NEN Rack Electronics
• Phase 1: NEN JSOC operations continue, Move 2nd string to IT OPS, Test 2nd String, NEN SAT cort start and finish
• Phase 2: Tear down/ remove old NEN JSOC, SATCOM transition, Building 189 DEMO

Joe with ASC talk about current **physical security**:

- Have locks
- Have key card access at Crary
- Cameras – used at variety of locations, like SPAWAR
- IT uses cameras looking a racks
- Used to monitor Black Island
- Emergency Ops
- Mac Ops
- ATM s
- Alcohol
- Rival Heights winter
- Not central system – different groups manage them based on their needs
- Ben – is there a station wide component of camera operations? ATM is recorded, rest are live monitor. All independent IP cameras.
- Is this physical security or just monitoring? IT –more monitoring.
- Scott: Brian Stone has ideas about monitoring station – wants to get away from stove pipe system – wants integrated system. Wants mission ops center running 24/7 in the US. Imagery available going up north. Quality to consider.
- At Pole – have a central operations center - Safety – power plant monitoring – Runway with

PAX monitoring. This can help reduce amount of field reports, updates.

- Ben – at Pole – monitored and recorded? Yes – both. CCTV installed. Can switch cameras and look at whatever view they need to see. Would look at video archive if there was an incident.

Lance
Access Control:

- Card Key access areas? Joe – main IT building – within the building have key card access. Can show logs of who has entered and exited.
- IT would look for controlled access to electronics closets
- Emergency Ops? Key card? Joe – no.
- Antennas
- Utility – power and water access. Why? NASA radome has key lock – then something sits outside that could go bad
- 10-meter is not needed (Comment – probably don't need locks but video monitoring will be needed). Internal monitoring or base monitoring (Steve comment)? Might be nice if you have an integrated camera system to monitor who is going in and out of ray-domes for a safety issue. Question about kill switch and safety.

- Neil - FAA required for secured communications center – dispatch, back ops,
- Dorms? Key cards to dorm rooms? Ben – would cut down on issuing keys. Lodging is a candidate for card key access. Comment - Looking into programming work center and dorms tied into one key
- Maggie – Still have a master control? Yes
- Don – still have a brass key that goes into a lock
- Dorm – having a key card might be a lot to maintain
- Lance – will consider cost for full blown key card system
- Comment – maintaining keys is a huge expense – Joe – but so is maintaining electronic key system
- Joe – have to sort out the process – no clear informational path to know which doors they need programed in to
- Currently work centers pass keys on to their people.
- Cara – Done now in Crary. Grantees who do a particular kind of science get key to that area, role based key assignments
- Get additional access to more rooms when they get more training – so you can change access.
- Cara – key system is old so it's hard to get replacements.
- Would be nice to have something for the whole station – not make Crary exclusive
- Maggie – Why? Don't know history of it. Scientists want to keep it locked for the integrity of their experience. Part of original design? Don't know.

- Kevin – may be helpful to have more than just a key card to provide access to rooms – in the future it could be used at the store, use as a deposit on equipment May be more of a "smart card" for the station.

- Airforce – requirement to lock doors – they have classified storage. Currently in a safe, when safe is opened the main door has to be closed and lock. Computers are in open storage

- Cara was a RA – would be nice from a RA perspective when people get locked out – so if you have master you can let them in to their rooms

- Comment – key cards make it easier to log in and out
- Technology may be different by the time this is implemented – example face recognition
- Joe – Safes – data center requirement is a fire safe for backup tapes (lockable and fireproof)
- Lance – long term storage lockers: Kevin – concept of warehousing function to have personal storage space instead of stashing stuff away – they can have a storage space they control. Defined space with security associated with that location – to leave over winter.
- Pat – In the past – halls in 155 were lined with lockers. Highly used. Why go away? Navy had rotated out and new dorms were built – widened halls.
- Phone comment – keep dry valley clothes in hallway
- Pole issues with fire safety? Fire code issues – per Maggie.
- Comment – high value stuff.
- Haz cargo ops should also be a secured area
- Key card – Neil – have a giant key ring currently. Key cards could keep it on a master system
- Medical and Pharmacy is candidate for Video
- Crary – lock safe for controlled substances used on animals
- Lockers – fuels clothes should stay at work center – not brought into common living areas (VMF lockers)
- Dan – support for campus-wide key cards but be aware of technology changes in future
- Nick – keep in mind intrusion detection – not everything needs key access that can be integrated into radome and antennae's. Not just granting access – but monitoring access.
- Airfield requirement s- secured space needed. Supply/parts building. Life support building needs to be locked (Air Force)
- Neil – Post office, and all point of sale places
- Ben – Radome requirements – multiple requirements: safety, prevent damage? Answer – for security – don't want people going tin there while they are operating. Prevent unauthorized access and once inside want to prevent an accident.
- Comment – need to make sure weather doesn't affect locking system
- Ben – fair to say threat is minimal? Low risk, but it depends on location of operational radome. People are curious. Risk is when door is opened and not shut behind it. Possible to cordon off an area? IT – door lock is fine. Do have monitoring. Would need to monitor people going in and out. Help keep folks out. Has anyone broken in? Building 221 was designed to be open as an emergency shelter. IT is referring to smaller shelters like comm shelters. IT would like to see locks. Steve – lock and key on small buildings like this is all needed. IT agrees.
- Greg – Navigation Aids at Airfield? Mac Center – has not been a problem. Lance – not trying to push key cards, trying to figure out what is needed.

- What about roof access monitoring or control? IT – Catwalk areas.

Camera Locations:

- Alcohol warehouse, store, bars
- ATM
- Pharmacy
- Antennae's (instead of card access have video monitoring?). Comment – if you are going to station wide camera – worthwhile to look at access to radomes from health and safety purpose. IT – use point tilt zooms currently to make sure doors are closed and that they are ok (interior cameras) during a storm for remote troubleshooting.so they don't have to drive there. IT sees future need probably being the same – trouble shooting web-cam.

- Nick – video monitoring – what is the activity within monitoring? Active or after?

- Ben – monitoring on an as-needed bases. Could add analytics. Could pan around interior also.

- Steve – situational awareness. Phone comment – size of support at airfield –HELO ops – would be nice from a community wide perspective

- Cameras at airfield are uses by forecasters. McMurdo used real time coming off the ice. Want to keep that capability. From flight safety perspective – would want for real time coming off HELO pad.

- Maggie – question regarding runway. Answer – just more awareness – camera on tower? Yes – maybe on Nav-Aid area. Ben feed goes where? Tower, Mac Center, maybe fire.

- Joe – set up network permissions (role based assignments)

- IT – one at Black Island to look at entire facility throughout winter; would be good at McMurdo on a tall building to look at roofs for example. Sea ice camera can even zoom out to Pegasus

- Phone comment – operational need at HELO pad.

- Question to PHI - Marble? They call out there to see what is going on there. They use for talking to weather. Would be nice to have access to situational hill top cameras so they don't have to launch anything to figure it out.

- Would be helpful to have a display of those views when pilots check in the views are displayed already. Also good for line-man going out in Con-1 there would be increased security.

- Ben – is there a compromise regarding people? No specific problems. Although during winter people have had to go to EOC (in winter). Could be a benefit to having roadways seen. Maybe existing camera at Mac Ops can do that? Have a camera pointed where connections can come loose. Airfield cameras would be helpful to figure out how to recover airfield and get it ready for med-evac.

- Lance – general exterior cameras – corner placed – viewed by command and control.

- Ben – which areas need to have recording ability?
- ATM
- Pharmacy
- Select storage areas
- Bandwith question? Joe – as soon as cameras go in everyone wants to see that camera (most requests come from off continent). Consumes a lot of bandwidth. Campus network would

suffer greatly if we put a lot of these cameras up. This is a consideration for quality. Lot of cameras have loops built into them to see a certain amount of footage.

- Pat – wouldn't worry about bandwidth.
- Air Force – With more access to McMurdo (tourism) Airfield operations would need multiple levels of monitoring, security.
- Comment – Currently use still images not video to send off continent.
- Pat – Fuels operations? Issue where real time communication is needed. Is there a need for situational awareness? Someone is always monitoring the fuel line. Not a lot to gain by having video monitoring.

2.3.1 9:00-10:00 (Baker) Physical Security (incl. video monitoring) – special to agency needs

- *DC2.3.1.2* Utilities or other specialized areas

Security (lock storage certain spaces. Cages/internal roll up doors.) Lockable storage doors.

Power and Environmental Controls.

- Need for security between the two secure doors. Build it with the capacity for secure door in case it's needed later.
- Security cameras are needed, who is monitoring these? Is there a need for security cameras in a secured space? No
- What happens with key cards in case of an emergency if power is out and fire department needs to go in? Fire/ Life
- Safety will coordinate this. Limit the amount of keycards, only where necessary.

Video surveillance

- ATM, data centers, alcohol stores, antennas, anywhere alcohol is sold it tends to be stolen a lot, surveillance.
- Power water, Remote centers, Dispatch EOC, Post office high security facilities/equipment enclosure, Helo pad areas, two airfield runways.
- Consider placing remote cameras at various sites for weather and environmental monitoring.
- Need video monitoring at Marble for PSI.
- Need increased security for the people that need to monitor cameras.
- General cameras around the entire McMurdo facility. Look into the controllability of the camera vs. viewing

- How much band width do these video surveillance areas take up?
- Moving into an integrated station wide camera system, look at the access to the ray domes from a health and safety standpoint. IT also needs a trouble shooting webcam
- Consider if surveillance use is active monitoring or passive monitoring to determine the need for surveillance.
- Data centers secure antennas need video monitoring (don't need it here for radome antennas)

Door Locking Systems

- The entire station will move towards key carded doors. This is easier to keep track of and maintain. The station will
- use lockable doors where specified and have back up hardware sets for key carded doors in case of an emergency.
- Living quarters with a master key to get into each room/Card key and Master keys can be stored in a knox box.
- There needs to be a process and security to know who's key gets processed for what
- Crary is the only key carded access of the station currently
- Long term storage lockers need to be lockable, does this need to be key carded
- Medical (lock safe for substances for animals that need to be kept separate from other medicine) Lock safe on medicine and cameras.
- Situational monitoring of the station

2.3.1 9:00-10:00 (Baker) Physical Security (incl. video monitoring) – special to agency needs

- *DC2.3.1.3* Restricted areas such as helipad, Roof access, other

- Helicopter pad needs a real time video
- Other options of locking systems to not just grant access, but also monitor access using magnetic
- Radom needs lock set for safety – equipment needs to be secure
- Currently have key access, may move toward card access with the rest of the building
- ASC – door lock on Radom is pretty secure but also need video surveillance
- Air field requirements (Life building is locked)

2.3.2 10:15-12:00 (Baker) Track 1: Command and Control

- *DC2.3.2.1* Primary

10:15 – Nick – Baker
Command and Controls consists of • EOC • Mission Ops • Station Ops
Looking to combine
Flexibility for anyone to jump on any station for communications Video wall display – weather, flight, feed EOC – adjacent to command and control with dedicated EOC terminal Assignable EOC conference room with video wall display
What are requirements for fire, Mac ops, Mac center?

FIRE:
Neil

- Consolidated communications – don't need 3 stations, 2 stations staffed 24/7 year round. Helo is seasonal only.
- EOC will never do aircraft control.
- Right now they use fire fighters to fill in in the dispatch center currently – keeps them from hiring additional persons. Distance between fire center and Mac Ops room is far.
- Question – location for utilization of fire fighters is important.
- Summer – one dispatcher One supervisor during day. Difference between daytime and nighttime pace (slower at night) – no second person on at night in summer. Not the case in winter. Reduced staffing model. Full time dispatchers – but no additional person to cover – so they call on fire fighters for coverage.
- Steve – as we consolidate Mac Ops – opportunity for consolidation of staffing and function. 5 people for Fire. MacOps has 7. This total number could be reduced to 7 total in summer. Fewer n winter.
- Steve – aware that there is a training issue.
- Neil – vision Ops and Fire positions cross training and covering for each other. Physical distance from where fire trucks are stored will affect this.
- Maggie – Ops Center – flight following – MacCenter is the en-route position – staffed by licensed flight controller
- ATC or FRO
- Dedicated position of FRO who can work en-route position and also fill in for HELO flight follower
- Training plan for FRO's – train electronics tech during winter and fill in for FRO
- Nick – ability to cross train – concern that dispatcher is far away from physical fire house. Neil – conceptual idea to keep in mind – the farther away from fire function the less likely they can help out in Command in control.
- Mac Ops and Mac Center – in both they will have conversations that are intense – concern with pulling attention away from what they should be focusing on (Jen – phone comment)
- Nick – desire to combine functions – not against it – just have to plan it property.
- Neil – fire and ops can be one in the same – Cross train and communications functions can be received at both.
- Pat – question – where more routine production of dispatch functions? Other radio dispatch?

Are they in this area? Nick – that role is currently at Fire House.

- HELO hanger has dispatch
- Co-locate dispatch at HELO hanger – don't move into command and control.
- Helo techs in office - lot of interaction – advantage to have dispatch in a more quiet area. Fixed field needs to be close to Mac Ops and Mac Center – but in a quiet area.
- HELO is customer service like – grantees coming in often
- Comment – ignoring size of building. ID remote areas.
- Nick – from life safety standpoint do you remote dispatch? Neil – He is hesitant – but it is not impossible
- Steve – might make sense to put up in administration area and not command and control room
- Pat – Helo and fixed wing dispatch
- Fleet Operations – dispatch
- Shuttle Operations – dispatch
- Don't really need to put shuttle ops elsewhere – Non-emergency and autonomous
- Lot of radio communications requirements – is there a centralized management for workflow?
- Two sides of logistics – Supply and Terminal. Each has own base station currently for radio. Will probably need more radio channels
- Nick – desire to consolidate into Control and Command
- EOC – done via pager – then all managers get page then funnel in to current EOC. Neil – this works as long as pager system works)
- Current – have ability to make quick decisions? Consolidate as central focal point for what is happening on the base. Currently efficient as it can possible be at this time. Certainly can be improved. There is a communications console where info flows into.
- Steve – advantage to combined command and control.
- Ability to get displays into EOC is something they want to see.
- Steve – where are helicopters that can be re-directed – communications is important.
- Nick – desire and efficiencies to consolidating command and control and EOC.
- Separate HELO from fixed – with some sort of noise barrier with the ability to use combined video displays and sharing EOC functions.
- Would be good for flexibility in that room to change things
- Segregate functions to help with noise
- EOC is separated to deal with just Emergency Communications
- Primary positions will still likely be used for some emergency operations.
- Have the ability for everyone to listen to incoming – need to be on headsets. In EOC you would pull up Helo following
- Will have Black mat wall finishes to eliminate fatigue – ergonomic set up.
- Steve – Areas of operations change radically – so have to display maps – need capability to do that.
- PAT – Acoustical isolations can be installed.

Needs:

- Certain comms not in fire now that they would need if there is consolidation
- Neil – comm desires – being in same location as MacOps – have each console with all requirements

Mac Center needs:
- Other displays – AFF tracking – and data messaging (automated displays funneled to them)
- Standard phones
- Concerns? No

MacOps needs
- No input at this point

- Neil – Fire dispatch and MacOps
- Steve D – communicate – receive and manage info – text messaging.
- Trend wise – communicate with work center supervisor/grantee
- Patch communications across iridium/VHF
- Jen: – communicate with pilots via iridium – iridium text to camp – then can use radio. Iridium issue is that line is shared with ac ops, fixed wing and Helo ops. So have more lines available to call with iridium.
- Situation awareness wall where pilots or other personnel can see it – like automated weather updates – (Matthew Lazario)
- Possibility of polar geospacial feed

- As we add cameras to McMurdo to look at airfield, sea ice, there comes a point where you design for passive and active monitoring – command and control would use active monitoring. Pushing feeds for weather, air traffic.

End of Command and Control with Nick

Don and Dan – command and control
- Next season 2/3 of personnel will be state-side
- From design issue – what facility needs do you need in 5 years? Off site? Depends on what is in place for IT? Currently using different skill levels. Without the infrastructure you can't take the bodies off the ice.
- 2 positions

KBA Office Needs:
- Similar to current arrangement is fine
- One single work station in McMurdo proper
- Rest of team is Airfield

Raven Ops
- 3 personnel need radio communication, scheduler, admin assistant, supervisor of flying and a scheduler with maintenance support.
- Doesn't see footprint being reduced. Individual – 13th AEG commander and first sergeant – need privacy
- These don't have to all be command and control.
- Admin area of central services needs to be within steps of EOC – Raymond Ops

Fire –
Chief's Office at Fire House

PHI –
Admin needs – with Helo supervisor – Central Services and Dispatcher at Helo-pad

MacWeather – need debriefing space

Steve – dedicated space for balloon launch at Sea ice Facility (note – as long as there are no obstructions).

Raven Ops:

- Mission planning room is needed
- They use Mission Planning software so they need dedicated space
- Typically a crew of 6, but sometimes overlapping crews
- Can be a shared conference room but available for mission planning

END

COMMUNICATIONS, COMPUTER SYSTEMS and STATION NOTIFICATION: Baker (2.3.5)

- IT Joe -Not including computer systems
- Radio pagers cellphones, Monitors and tablets.
- How does that role into integrated mass notification system? No mass integration system currently
- Have a co-located area where mass notification systems tie into.
- Will Tie into digital display systems
- Mass notification is more than just emergency – it's also day to day communications
- Joe – no needs from an IT perspective
- As-is is a multitude of systems that require a person
- System currently have emails, radio, pagers, tv displays, intranet
- During the day – most of the population is outside so they don't see mass notification
- When you need to account for everyone you do a muster the entire station to find out who is where and how they are operating
- Flight reports
- Pat – wipe the slate clean and look at other examples and utilize media outlets that we will use
- Ben – explain mass notification for flight movement – It's different for different things – depends on who needs to see the info/reports. Different aircraft require different reports. Flow of info is currently cumbersome. Would be nice for one entry – then it pushes out and is not duplicated in other areas, which is an existing problem (especially for scheduling and remote). Pat – this will require a lot of automation. Currently hard to share information.
- Jen – would welcome automation systems into publically available venues. Only mass notification info is manually entered arrival and department reports – schedule. They are displays and can be emailed. Can log into intranet/emailed in spreadsheet. For pads they are manually entered (and there are 3 different schedules). Need for consolidation and then push it out where it needs to be.
- Activation of mass casualty volunteer teams – manual process currently
- How to push out to field camps and remote operations like airfield? Need for airfield on same system? Yes – Airfield – LBD Arrival Heights T site – anything connected by a road. "of

McMurdo Proper”

- Push out to Field Camps, Dry Valleys, Wizard, etc? No – that’s what radio ops (MacOps) do. Radio operated interface currently. Depends on what they have out there – radios are often turned off.
- Joe – Muster happens at McMurdo proper so messages to field ops are tailored that way
- Dispatch centers probably handle that.
- Include Scott Base in this? Maybe a zone?
- Grantees on Sea Ice? Maybe not mass notification, but included in a muster.
- People check out and check in but always have a radio with them.
- Jen – joint effort between McMurdo and Scott base in winter and summer so good reason to include them. Support services at McMurdo support Scott Base but not included in a McMurdo muster. How do we notify Scott Base?
- Dave – big mass notifications are always being tested because of remote areas – hard to fine tune them.
- From a tech standpoint – your device would be tied into mass communications
- Mass notifications would be driven out of Command and Control – but would tie into emergency systems.
- MOC REPORT CAME OUT IN 2010 ON McMurdo communications. This will be referenced. May be different mechanisms but will see what is still applicable.

2.3.2 10:15-12:00(Baker) Track 1: Command and Control
- *DC2.3.2.2* Redundant

2.3.2 10:15-12:00 (Baker) Track 1: Command and Control
- *DC2.3.2.3* Remote

2.3.2 10:15-12:00 (Baker) Track 1: Command and Control
- *DC2.3.2.4* EOC

2.3.3 10:15-12:00 (Baker) Track 2: Co-location Center Requirements
DC2.3.3.1 Primary

- Fixed, Helo, fire and ops (functions can be co-located in one room, but proper planning must occur. Need to keep

• noise level down so the different agencies do not interrupt one another.
• Anyone can jump on any station and have the availability to complete all their functions.
• Important information to display weather, events, communication to others.
Fire
• Fire and ops will be on the same function, 365/24-7 monitoring. Fire fighters are called upon much more on the winter months then the summer months. Opportunity for consolidation combining during the summer.
• Amount of staffing combined during the summer is 12 this can be reduced to 7 people max, combined
• Fire and ops staff will be cross trained and able to work in any capacity
• Communication that is not in fire now that may be useful in the new design would be co-location with Mac Ops
• Mac Ops would like the addition of partitions.
Mac Center
• 2 positions, Flight ratio operator (FRO). Concern from fire chief that the dispatcher is far away from the fire station.
• This will reduce possibility of lowering staff.
• Communication that would be beneficial to the design that is not currently there.
• AFF tracking systems, data messaging, automated displays to funnel information down to you.
• No concerns in consolidation into co-location.
• Flight dispatch is located at the hangar it is requested to keep it here and not move it to command and control
• Helo dispatch needs to be close to the hangar and Mac center for adjacency. Will the Helo and Fixed Wing be connected remotely?
• Fly operations and terminal operations all having base stations. Need more radio stations so agencies will not have to share channels. Provide remotes and make sure all antennas are connected to the correct agencies.
EOC operations

• Communication done via pager (this is effective), Loss in timing when receiving updates co-location can help with this. Co-location set up is more efficient. Monitor connection to make decisions in the EOC
General
• Separating Helo and fixed from fire and ops could have a positive outcome. It will lower noise levels. If possible the
• agencies would prefer a flexible plan with moveable walls with the ability to add and decrease privacy as needed.
• Use acoustical workstations as an option to reduce noise. Sound barriers and acoustical wall barriers to control noise.
• Be able to patch communications from the different agencies. They are currently using iridium communications; the problem is sharing a single line with mac ops, center, and fire. Need more line for each agency.
• Command and Control will be a place within the stations that will use active monitoring. Ability to actively monitor all the video feeds.

2.3.2 10:15-12:00(Baker) Track 1: Command and Control

- *DC2.3.3.2* Backup

2.3.2 10:15-12:00 (Baker) Track 1: Command and Control

- *DC2.3.3.3* Requirement for distributed location(s)

1:00-2:30 Break Out Sessions:

2.3.4 1:00-2:30 (OZ/ASC) Track 1: Helicopter Operations

- Planned now – person at FAA certifies site – says site is safe for HELO ops with departures and arrivals. Same person that does the survey for Helo Ops. Nothing gets lost in translation.
- Ballpark – don't just look at ballpark – look at all of McMurdo
- May be confined to Ballpark
- If he finds fault with ballpark then have to get prevailing winds off of another site
- FAA has no jurisdiction be we use them as a consultant – comply to meet FAA standards
- Self-imposed standards
- Airfield person is different from HELO
- Time frame for report is about a year
- Dave – have to design for any location
- Don design for a something that can be built anywhere?
- This is Design Build

- If we move criteria – Don to do generic design – coupled with FAA requirements –on the facility, not the site.
- FAA doesn't provide requirements on building – it's the site of the Helo – where they take off and land
- Looking for Potential issues with topography and geography
- Maybe orientation – avoiding areas that have snow build up
- Good starting point as to requirements (Ben).
- Don – discuss issues of site access, relationships
- PHI brought drawings/Photos

PHI – end user of the facility (Keith)
Standard site function requirements:

- Safety of flight and operations is number one priority
- PHI designed with PHI's largest helicopter they have (thinking about growth)
- Fly near shuttles?
- Placement of T-1 tank? Proximity to fuel tank? Yes – bi-passing them
- Currently weave way through fuel tanks
- Good takeoff and landing profile currently – towards sea ice
- One over cliff – suitable landings on se ice if needed
- When melted – have to go through gap. When winds are high – take off through the gap.
- Alex's question – if fly through gap and there are vehicles – does that interfere? They would fly off to the north.
- Procedurally they are not supposed to fly over vehicles, people, buildings with a sling load
- At choke point – would have to have enough elevation to maneuver on regular flight plan
- Allows an abort flat level surface to land
- Take off – achieve altitude – then turn off
- Terrain is hard so is downhill wind – competing against downward thrust of wind. Rate of decent – have to download weight to climb hill up to the gap.
- Tell what they can handle – but then wind changes and it changes flight plans
- Favorably take off into the wind
- If coming from sea ice – not a factor because they are coming uphill
- Ideally it's a grated area (net necessarily paved)
- Now along the road are utility poles but those are going away
- Kevin – for reverse – you'd approach through the gap for the landing
- Prevailing winds come through the wind
- Alternate is to approach over the bay and track up the road to heliport
- Want a clean departure and a clean approach
- Ben – Could you rotate help parking and hanger? Rotate 90 degrees? You could.
- On photo – take off area is the white lined.
- Wheeled out to parking from hanger
- Maneuver away from other helicopters before taking off.
- Ben – issues with orientation with respect to material and personnel. Could rotate.
- From site planning standpoint – the box off to the side – that is the sling load area (cargo). Up – hover – connect. Right now it is congested.
- Needs unobstructed flight line.
- Requirements – 20 feet of clearance, 7 feet between center points, about 300 feet long by 200 feet wide.

- When we are planning do you plan on the 92 or the 212? (92 is bigger? - Unlikely to use a helicopter that is that big.
- Intention of leaving existing pads for smaller helicopter
- Optimum is to make room
- 9 parking spots incorporated into design
- Seems like a lot of helicopter ops next to the road. Not on the road – but close to the road.
- Shaggy – there is the real estate for this.

- There will be more open space with the new design
- Period of time where you are forced to fly through town.
- 70% of flying season they can fly out over the ice and wind is in your favor
- McMurdo's need for a new Helo operations. Move to Ballpark – have to pipe fuel. For 30% of flying season –
- MP2.0 includes new Helo plan. If we find this is not achievable in this proposal – will make an effort to redevelop the current site with everything it needs.
- Cost ratio of movement and re-building in the space? No.
- This facility needs to be operational while new facility is being constructed. This translates into cost.
- Shaggy – lot of demo – creates a lot of available real estate. Ben – DO we have the real estate? Don – current roadway to Helo field. Gym goes away and gives new access road taking access to Helo field.
- Ben – fuel line is running along runway. Currently flying over fuel lines. Does this make it worse? No. You are barely over the terrain when you take off. With an emergency you have altitude to work with.
- Where do you tie in fuel line? Fuel line follows the road. Currently pipe lines are above ground 3 – 4 feet)
- Ben – are you replicated the conflict you have on flying over fuel lines
- Point of being right over the road or up in significant altitude
- Need something to land on during an emergency.
- For best case scenario – are fuel lines buried? FAA would have an opinion. Ideally you build away from fuel lines.

Reference Photo on Board

Note FAA is going to rank order these options from a safety and operations point of view

This is the PHI Gulf of Mexico model so it is FAA compliant as they are about commitment to safety - beyond compliance with safety

Site Access:
This is in Phase 7
Strategic because we need this lay down space

Current Schedule:

- Come to town October 1 and fly 10 days out. Wrap up around Feb 12 and leave the 15th
- 3 mechanics come at winfly and get helicopters ready.
- They have 5 helicopters currently –
- Could have more in the future so need to be aware of expansion opportunities.
- Can't fly all winter – can fly minus 55 C on 212

- Jen – if winter flights occur, grantees would want to do science in the winter so at the very least longer operating season would be desirable.
- They do a test flight
- Pilots come in October 1 with a 10 day window to be ready to start flying
- Pilots fly both aircraft

Hanger Design

- Is gulf coast design and has been modified for Antarctica
- Set for 6 helicopters
- Kiwi helicopter is also there
- Double door system – pull helicopter into an airlock type of environment
- Ben – hanger question
- Tetrus type operation with storage – can move all 5 helicopters currently. Just 5 would fit – Kiwi helicopter doesn't fit.

- Parking for 6 helicopters with blades on – that is a lot of space.
- Does that space have to be heated? Yes (not during winter) heated to what temperature? Don't know.
- Better way to store these to avoid heating costs? Blades do come off – can you scruntch this space? Yes – you can.

- Often 2 helicopters are being worked on at the same time and there is plenty of room.
- Should you have to move them inside you could squeeze them in.

- Cara – grantees expressed a desire for staging at Helo pad.
- Not losing the heat in an airlock system. Radiant heating is a good option
- Store overnight? No. They stay on the line – except for the ones in nightly maintenance. 4 mechanics on staff at night – only one during the day.

- Moved with an old tug with a wheel system

- Daily operations – 4 helicopters on the pad – take off about every 15 minutes.

- Sometimes Kiwi's had 2. Italians were there before too – maybe coast guard.
- Parking on lower level. Fueling is on lower level also

- No tourists have ever landed here

- Would like a bathroom in their hanger

- Dispatcher in elevated 4 window tower to watch weather and traffic

- Cargo and passenger movement (Nick)

- Ben – Conceivable to have a 2 story facility? That would be fine

- Hanger door is opened for parts, gear, etc maintenance, all throughout the day.

- Parts currently stored in mill-vans
- Some parts of temperature sensitive (like batteries)

- Warm storage area in hanger would be good
- Look at seasonal storage needs
- Spare blades are in boxes up near mill vans (fork life – pickle product)
- Have to take blades to get pilot into hanger – dangerous – opportunity for damage, injury
- A door big enough the bring helicopter in without taking blades off – biggest wish

Daily schedule:

- Spaces inside support area – 20 people work at the hanger: mechanics, operator, coordinator,
- Preflight after arrival
- 7:30 meeting with scheduler – 12 – 14 people at that meeting (outside agencies come too)
- They need to meet somewhere in the facility
- All Helotechs are there paying attention to loads and when and then start loading. Have to prioritize and move cargo. Sling loads are built the night before
- Pilots are not in scheduling meeting because they are doing pre flight
- They aren't moving cargo but they are doing flight planning
- Pick up science cargo from around town – they package it – stage it – the morning of – they get assignments and they physically load aircraft. DNF is stored in passenger storage. Store on cargo line or carts if it can be frozen

- Currently all passengers and cargo come in through one door. New design has separation of cargo and passengers. Cargo never crosses passenger path.
- What's maximum occupancy – 12 passengers
- Have to be there 45 minutes before.
- Launches are staggered about 15 minutes apart
- Have one ATV to use for loading and have carts
- Cara – when flights get delayed – they'd like to be able to stay if there was DNF storage. Receiving cargo 24 hours in advance would be ideal. No earlier than 48 hours and no later than 24 hours – would be good. The more time ahead the more efficient this process would be.
- DNF is so limited – that's why they bring it down close to flight time.
- Helo Ops supervisor – schedule is run on predicted weights. Often they have heavier loads than planned because they get load the day of.

- Ben – is it practical to take it that early? Because it messes with weight numbers.
- Cara – would be good to have some parameters
- Load planning – having it there early – if ready to go – it could be delivered early on a flight of opportunity. This could eliminate some delays. Ben – if you do this – is there someone present to help offload equipment. If 212 yes – if an A-star pilot unloads. Would have to deliver to a manned camp – can't just leave it.

- Cargo only flights vs passenger/Cargo flights? Every sling load is cargo only. 25% about is cargo only.

- Helicopter schedule comes out the previous night.

- Passenger standpoint – is there a bag drag component? Hopefully gear has been brought to hanger and weighed. Person and hand carry is weighed right there.

- People are too unpredictable to weigh the night before. Need to weigh them the morning of their flight. They give preliminary numbers the night before – but these numbers are always off.

- There are a few night flights

- Shaggy – grantees with cargo moving back and forth with gear, instrumentation. Grantees said gravity moves in their favor (Helo pad is currently downhill) – but it's hard to get back uphill. Getting a truck is time consuming. Need to figure this out. Is it a cargo person? Is it a fork? Missing link in this process. This is getting to the hangar. After trip Helo techs typically drive grantees back. Contractually they are not supposed to shuttle them back and forth. ASC needs to figure this out operationally. If there is enough space, ideally grantees can drop gear – go shower, eat, and then come back to unload.
- They are staffed to deal with cargo. New cargo system could mean more people
- From a facilities standpoint – 13 people standpoint – most are in the field all day long
- Passengers bring box lunch from the galley – so no need for food area.
- Keith would like to combine locker rooms. Put shower in so we don't bring that function back? Just need water to wash hands – currently do not have hot water. Currently have no plumbing
- Want to keep personal laundry out of main laundry
- Helmets – get inspected 2 times a year – considered " light maintenance" which is done in the passenger terminal. Night Helotech does a weekly safety check
- They encourage passengers to stick around until they have their flight.
- How often do you wait for late people? Not routine but it does happen. Grantees left behind? Yes but usually the helicopter waits for them. Implications? Don't start fueling until flight is loaded.
- How big does it really need to be? 12 for now. Can grow.
- Want to right size this – not over size it. Meet need without over building it.
- Having a multi-purpose room would be good
- Don – paperwork to fill out after each flight? No after every shift.
- Have a flight planning room
- Safety briefing happens once a month (18 people)
- Conduct a class for ropes rigging that requires a lot of space.
- Every science groups come through HELO ops.

BREAK

- Pressure wash to wash aircraft. Need drains – they would wash the floors if they could wash the floors.
- Potential for petroleum lubricants so it goes into separator before going into sanitary stream? Generally just wipe aircraft down. But they don't wash the floor.
- New drains – for compressor washer and what leaks out. 4 tanks that capture 4 different types of "dirty" water. Will need to know this for design. Can share "corporate standards" on the

questionnaire

- Future of flight for helicopter ops that would influence operations at McMurdo? Try to make own cargo system wireless and integrated with load calculations – i-pad type technology
- Data integration – newer helicopters – may happen in the future

How do they weigh equipment and how do pilots get info?

- Groups pre-weighed and they tally it
- Some all gets weighed right there
- Goes into spreadsheet that techs and supervisor see
- Most is weighed at heli-pad
- Every piece is tagged with main weight and destination
- Do they spot check? Yes. Almost always accurate.
- Where would be scale be?
- Would like 2 one for cargo one for passengers – like for it to be in DNF room
- Currently have one scale and some hanging weights
- Sling loads are weighed before they come to helicopter ops
- At the field when you are picking up – how does that work?
- Major field camps have scales.
- If not, the scientists have the weight from when it was weighed in before.
- What happens if they have added stuff to the bundle?
- They have to keep track of all those weights.
- Tools are weighed and tagged.
- Have a list of items and weights. They have a list of standard gear and weights.
- In new scenario – what comes back gets unloaded and driven up the hill with passengers if they have time. Sometimes big cargo sits on cargo line for a while.
- Dave – questions about used oil and fluids? Go into a barrel and gets collected.
- HAZ waste form is filled out and delivered to waste site - hopefully in future gets picked up.
- 4 outdoor collection barrels over a catch pan.
- There is no plumbing currently.
- Aaron - water and sewer. Later will look into floor drain
- Compressed air, O2 is present
- Specialized power drop requirements? 220 (it's on their drawing)
- Communications needs – Helo ops talks to hangar (radio and antennae); hangar can talk to field parties.
- EOC – search and rescue needs? Comes through the pipeline and is communicated to them.
- Refueling process and challenges? Current system is adequate but would put fueling stations at ground level instead of elevated would be good. Piping is currently underground up to the pad and then it is above ground.

- Fuel is pumped underground – gravity fed to Helo Ops. Requirement? Pressurized? If put tank up – would have more than enough pressure.
- Flexibility from a design standpoint? Better control with a pump?
- Any metering of fuel? Yes.
- Need for redundancy? Yes – they have 2 pumps that both work fine
- If it's in the dirt – has the potential to get dirt in – must be sealed.
- 5 current fueling stations adjacent to heli-pads. They all have a fueling station next to it.
- Need tie-downs and electricity
- Currently use a block heater – more than 3 helicopters trip the circuit
- Emergency generator requirement? Not for heaters but for communication. Power outage doesn't affect flights themselves.
- Requirement for overhead crane – 5 ton overhead (2 bridge cranes). Could probably get away with one. Currently have one but can't support weight of a 212
- Ben – could do this with one line.
- How often do you use the hoist? About 12. Hoist serves as backup to crane.
- Anything else? Wind direction and velocity. Read is coming off of other building. Not official wind socks but have accuracy.
- Would Want a direct pull to heliport
- Would like to be back closer to the power plant where winds flatten out. They would taxi along the ice edge. Lot of sea ice activity happens right there. Wouldn't fly over them especially with a sling load
- FAA person is going to need to look at Master Plan
- Continue to engage. Have enough info to start design process. Need info on wind studies?
- What are actual requirements – get a list of requirements that are tied to a scalable hangar?
- Performance spec requirements. Have the FAA Report and then it can be sited. Will have not designed entire structure but will have requirements.
- Pave the way for potential site locations. Criteria coupled with questionnaire will allow presentation of conceptual design.
- Important to define a "requirement" in regards to efficiency

2.3.5 1:00-2:30 (Baker) Track 2: Communications, Computer Systems and Station notifications:

DC2.3.5.1 Personal communications (pagers, cell phones, other)

Included in Communications above

2.3.5 1:00-2:30 (Baker) Track 2: Communications, Computer Systems and Station notifications:

- *DC2.3.5.2* Types / placement of notification systems (screens, loudspeakers, other

Included in Communications above

2.3.5 1:00-2:30 (Baker) Track 2: Communications, Computer Systems and Station notifications:

- *DC2.3.5.3* Desktops/laptops/printers/faxes/other

Included in Communications above

2.3.6 2:45-4:30 (Baker) Remote Operations

DC2.3.6.1 Agency current and future plans

- What possibilities exist at McMurdo station for remote operations
- Remoting came out of necessity
- Need to have redundancy to relay communication (currently do not have this)
- 35-45% less on ice
- Products have increased
- 2 ATC on ice
- Staff rotates in and out to continually receive optimal service even though it is remote
- Cheaper to have every one in McMurdo and better to Co-locate everyone in the remote location in Charleston.
- Remoting operations are not cheaper in the states
- Contractor rates
- 54 hr work week on ice not charging overtime
- In the state 40 hr legal law , anything above this would be paid overtime
- What types of programs can you incorporate so you can shrink the entire program, challenge is not with paradigm shift
- Has there been any feasibility study ?

NASA-JPSS

- What the biggest benefit and biggest draw back
- Drawback is communication and community connectivity.
- People have become more used to the idea of remote locations
- Possible video conferencing would help significantly with remote locations.
- Charleston takes 4 people to run a watch and 3 people from the ice
- Fire/Life Safety
- Concerns to make sure this is a safe and viable option moving forward
- What is the rest of the industry doing (military bases)

- Air craft communication
- Does off ice communication have a cap?
- Think about the types of communications you need in remoting
- Can it have a delay, is this urgent does it need immediate attention
- Program wide messaging system

2.3.6	2:45-4:30	(Baker)	Remote Operations • *DC2.3.6.2* Operations current and future plans

Notes from week 2, Wednesday afternoon break out session led by Baker

Support Forces Antarctica (SFA) Office suite to be located in administrative area of Central Services requirements:

- Private Office for 13th AEG/Commander
  - Size: Space to accommodate conferences up to 6 people
  - Equipment: Wall mounted white board or monitor
  - Adjacencies: Proximity to Emergency Operations Center (EOC)
- Private Office for 139th EAS Commander
  - Size: Space to accommodate conferences for 3 additional people.
  - Equipment: Wall mounted white board or monitor, securable 2 drawer file cabinet
  - Adjacencies: Direct adjacency to RAVEN OPS
- Maintenance Supervisor
  - Size: Space to accommodate conferences for 3 additional people.
  - Equipment: Wall mounted white board or monitor
  - Adjacencies: Proximity to 139th EAS Commander
- Private Office for 1st Sergeant
  - Size: Space to accommodate conferences for 3 additional people.
  - Description: Basic office no special requirements
- Open office environment work stations
  - Workstations needed:
  1. Services
  2. I.M (I can't remember what it stands for) Locate close to 13th AEG Commander
  3. Office Manager
  4. Safety
  5. Executive Officer (could share space with 1st Sergeant)
- Personnel surge capacity for up to 3 additional workstations.

RAVEN Operations: Office suite to be located in administrative area of Central Services primarily functions in a highly collaborative, open office environment co-located with Command and Control consisting of the following spaces and requirements:

  - Administrative Assistant/Operations Coordinator workstation
  - Scheduler workstation
  - Support Forces Antarctica (SFA) Personnel workstation
  - Mission Planning Room or shared conference room 12 person capacity
- Personnel flow: Pre-flight pilots are briefed in Mission Planning Room and then go into field. Returning they deliver flight generated paperwork and to the Administrative Assistant/Operations Coordinator.

Helicopter Operations additional information:

- Helo Ops Supervisor Office and Helo Dispatcher needs to be located at the helicopter hanger

MAC Weather Office suite to be located in administrative area of Central Services provides weather information/briefings for the station, those traveling out of town and pilot operations (KBA,C 130's and Helos). The MAC Weather suite consists of the following:

- Briefing Room for up to 10 people standing. The briefing room is a walk-up space that has direct visibility to a wall mounted monitor located in the MAC Weather office space. An additional wall mounted monitor is located in the briefing area.
    - Consider providing acoustical separation around the Briefing Room and MAC Weather Office. Weather briefings could be disruptive to nearby people.
- MAC Weather Office: Located directly adjacent to the Briefing Room and Meteorology AGR/IT Support Office.
    - Provide 2 work stations within space
    - One workstation has a walkup counter capability facing the Briefing Room.
    - Provide a wall mounted monitor visible to the Briefing Room
- Meteorology AGR/IT Support Office
    - Provide desk height counter space for 2 workstations
    - Note: IT Support could be provided through ASC eliminating the need for a dedicated MAC Weather IT Support position.
- Site Manager Office:
    - Single person, hard walled office directly connected to the Air Traffic Manager (ATM)/SPAWAR Office.
    - Acoustically separated due to HR related conversations
- Air Traffic Manager (ATM)/SPAWAR Office
    - This space shall have perimeter, desk height counter space capable of seating 6 people.
    - The work stations are intended to be temporary touchdown stations.
    - Consider providing an operable wall between this space and the Site Manager Office as they have regular group interactions/meetings.
- It is acceptable to co-locate MAC Weather balloon launching with Long Distance Balloon (LDB) launching space proposed in the Sea Ice Support Building. Suggest segregating LDB launching area from MAC Weather launching area. MAC Weather doesn't want to damage any LDB balloons.
- MAC Weather currently has 2 servers in their space. The servers can move down to the co-located server room on the main level of Central Services.

Kenn Boreck Air (KBA) A single private office located in the administrative area of Central Services.

- Provide a single, securable private office
    - Size: Existing office is 10'x10' and is adequate for KBA needs
    - Equipment: Wall mounted white board or monitor
    - Adjacencies: Proximity to MAC Weather and Fixed Wing Coordinator
    - Requests securable, enclosed office space due to storage of sensitive material

The following notes are additional information on KBA's needs for the Air Field provided by Brain Crocker with KBA. Check with Don S on where to place the following notes (perhaps 2.2.3?)

- KBA is concerned about the co-location idea
- KBA and OZ discussed and diagrammed the proposed 2 story facility at the Air Field referred to as AGE/CARGO/KBA Option 1 in the Single Airfield Complex Masterplan.

    Discussion:

Lower level

- Provide a securable, 6'x6' cargo door at KBA Shops and KBA Cargo.
- The minimum width of KBA Shops and KBA Cargo is 12'-0"
- The proposed Common Area will be used as a PAX terminal and should be sized to accommodate 14 people.

Upper level

- The upper level diagram indicates a space for Cargo. KBA suggests co-locating Cargo with Cargo on the lower level. KBA would prefer labeling this space as KBA Sensitive Equipment Storage.
- KBA requested relabeling the following spaces on the second level diagram:
  - Change KBA Office to KBA Planning
  - Change KBA Office to KBA Maintenance

The following notes are additional information regarding the Central Services PAX Terminal needs. Comments provided by Pete Cruser with ASC

Central Services PAX: This is a space located in the core Central Services area where ingoing and outgoing personal "airline" baggage is processed.

- The PAX is similar to a small airport ticketing/baggage receiving area
- Provide a walkup, counter height computer terminal directly adjacent to a floor level scale. The scale is used to weigh personnel and their baggage.
- Support Forces Antarctica (SFA) Personnel workstation
- Ideally incoming and outgoing baggage would be loaded onto a baggage conveyor system (similar to what you'd see at an airport baggage claim). The baggage conveyor system would be between the PAX and an enclosed, heated baggage handling area.
- Incoming baggage- Palettes of incoming baggage would be offloaded into the enclosed, heated baggage handling area, broken down and baggage placed on baggage conveyor system for distribution to passengers located in the PAX.
- Outgoing baggage- The baggage handling area would have 2 exterior garage doors large enough for a forklift to pass through the baggage handling area. The forklifts would pick baggage and load onto an ATO palette.

2.3.6 2:45-4:30 (Baker) Remote Operations

- *DC2.3.6.3* Infrastructure and cost implications

2.3.7 4:30-5:00 Summarize Findings / Wrap up Outside Agencies

Charrette

Skipped

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics

For next day's sessions

Comm comments – 3 distinct areas – need to understand difference between summer and winter for communication

Bandwidth – ongoing discussion

Important to have the communications needed regardless of bandwidth. Expertise happens state side with boots on the ground at McMurdo. Allows for trouble shooting.

Wrap up slide for tomorrow – list: Physical Sec, Command and control, comms, remote op, Helo ops

AGENCY REQUIREMENTS

Helo Summary:

- Location of site to be established
- Operations of science cargo ATO with Helo operations
- Minimum facility requirements reviewed

Remote Ops:

- Agencies are open to reducing staff via remote operations if technology can't support it

Comms – Station Notifications

- Integrated mass communication system needs to be established - Adds efficiencies. Different winter needs.

Command and control:

- Greater understanding of adjacencies with agencies involved
- Remote operations from comms

Physical Security

- Understanding agency requirements for access control and monitoring
- Surveillance
- Bandwidth required to make it work

Crary:
Extend the spine to Phase 4 in Crary?

New ideas not included in Master Plan:

- Enclosed connection from IT Operations to Central Services
- Verification of site location for Helo Ops

Thurs July 23 (2.4)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

Summary of M-W with Allied Agencies

Notes: Raise a flag for things not in current estimate in summary to Ben

2.4.1 8:30-12:00 (OZ) NSF Review/Validation of Requirements

Dave – note that it was a successful week with great engagement and participation

Don – We gained a clearer understanding of operations

2 Different tracks: IT and Facilities

Powerpoint Presentation with summary of the week

Comments:

- Ben: Procurement cycles so they can place into their budget – timing so they don't do a major upgrade too close to new construction "Make before you break"
- Brian – external purchasing cycle. Example is NASA NOAA – look at replicating with a tech refresh. NASA NOAA main concern is budget cycle. SPAWAR – technology upgrades for planes that would have navigation components to match new technology at airfield. Operational discussions are happening
- SPAWAR – remote forecasting
- Brian – Bandwidth is an operational expense
- Ben – reinforce the need for requirements
- Pat – Remote operations, have to look at amount of bandwidth – also reliability and redundancy
- Brian – actual bandwidth is more money Pat – this is an OpEx issue
- Brian – Reset operational costs
- Pat – have to look for more opportunities
- Brian – recognition of not doing things in Antarctica that can be done elsewhere?
- Don – SPAWAR for example will be 66% stateside support – with proper bandwidth they feel they could be 100% off continent
- Pat – remote one dispatcher for Fire department
- Brian – design – reduce number of personnel. How do you identify functions as you go through requirements? If it can be done somewhere else it must be done somewhere else. For example, training? Drives how big the station is.
- Don – ability to interact with ASC on operations – can see what possibility is that would affect the scale of the facilities
- Shaggy – operations needs to be coupled with ComOps. Co-location of MacOps, Mac Center – can co-locate. Maintenance on new buildings is predictable as far as staffing numbers. Cargo numbers are hard to predict. Facilities staff can be figured out.
- Brian – why do each of those 7 people need to be in Antarctica.
- Pat – people covering for breaks for example – thought of in the way it is currently done.
- Ben – discussion on process to understand what the requirements really are.
- Pat – people hanging on to a notion of what is. Ben disagrees.
- Dave – remote sensing can save a lot of bodies – cameras in winter to look at buildings/operations
- Dave – get summer-centric but need to keep winter operations in mind
- Pat – video – people up north have to have real-time view of station.
- Dave – resolution issue

Comments –

- Pat – IT operations building at Airfield – why does this keep falling out of discussions? It is a need for re-configurable airfields. Shaggy – was not in single airfield master plan but see the need for it.

- Ben – Sea ice runway capability – what is that?
- Don – Airfield conversations – ever re-implement sea ice runway? Maggie said as we go into design for airfield structures keeping in mind capabilities of being able to move the buildings
- Dave – start on sea ice – move to Willie that move would have to happen quickly
- If you have to do it – you could to it.

Brian – having moveable buildings give flexibility

Comments:

- Brian – talk about distribution of function? Maybe separate locations of night location vs day locations? Dave – do maintenance on every night – so they tow to pad. Brian – efficiency with science consider bringing closer to loading and science support? Right now everything is taken to helicopter. Don/Ben – no did not talk about.
- Ben – talked about approach path for helicopters and avoiding conflicts of what is below.
- Pat – grantees want cameras at Helo pad to see what is happening there – thinking about the way things are running currently
- Brian – is it a huge touch factor for moving things around
- Ben – discussion on processes – loading/weighing/briefing, etc. Is there a practical location? Shaggy – there is the emergency landing pad there currently.
- Brian – have choices about where this goes.

New walkway connection slide – provide physical connection

Runway Science Building - Comments

- Set up 2 rack tents every year for grantees doing science out there
- Brian – we sent up a field tent nearly every year

Sea Water Intake - Comments

- Trouble maintaining sea water temp in aquarium – ben – this is a non-issue so don't let this drive the requirement
- Four pumps existing if one goes down you have to take down all four

Ben – if an item is urgent (new, replacement, repair)– unlikely we need to wait 8 years

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- Brian – important to say that these comments are captured this in requirements phase.

- Dave – one give back is the engine shop because it has been built already

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New connection – 2nd level to IT Ops building
New blocking diagram for IT Ops
Kevin – originally had a lot of mixing that wasn't optimal. Restructured building moves technical space upstairs, with other stuff downstairs – with little co-mingling

- Brian – field science support in there is compatible with nerve center ops? Critical facility – have to protect and limit what grantees do in there
- Shaggy – need to change the nomenclature on this
- Brian – is it clear that you are in a critical facility?
- Brian – have to control what happens there
- 100% certain of everything that goes on in there.

- Don – don't have to hard-wall each entity

- Brian – why are we putting bridge back? Don – winter situation, NASA JPSS has someone there all winter long, so need safe access.
- Brian? Cable distribution? Yes and utility routing
- Pat – space allocation for entrance for cable distribution

Command and Control:

- Provides staff efficiencies by co-located agencies
- Pat – EOC mobilization? Don – station administration is in Central Services, which is main EOC
- Don – this is back up EOC in Command and Control
- Ben – where is EOC space? Mike – Label as "Back-up EOC"
- Maggie – have it co-located with Ops and dispatch functions

General Comments

- Brian – feedback on other aspects of station?
- Don – group here was here to discuss their specific needs – not much time spent on design
- Pat – they did have input on dorms and social spaces – atmosphere/noise/levels
- Pat – hotel experience, quality of life discussion? Don – methodology
- Ben – card key access. Data center requirement – increases security.
- Maggie – recognize that technology changes may change the way this is done.
- Ben – storage needs – this is a management issue. Pay someone to manage storage/challenging staffing and space issue
- Brian – different issue for people that are contractual and come back. Issue for the seasonal employee
- Brian – Sea ice facility – Desire for connectivity to sea ice. (Dive services, Sea ice Support). SPAWAR's desired location for balloon launch
- Used heavily by grantee community – does it become a Crary Phase 4?
- Don – look at this further

Dave – Facility names:

- IT Operations
- Rename Crary Phases
- Brian – not naming buildings after people
- Dave – pick a name and stick with it. Brian – keep it functional

- Ben – social spaces – taking away bars and replaces with fewer lounges
- Brian – important for participants to know that they are ambassadors to the community
- Ben – next week we discuss other space such as dorms, food service, back of house with operational leadership
- Warehouse flow, operational zones – waste, etc.
- Followed by utilities, envelope, power generation and distribution
- Will start doing some energy modeling

Helo Ops:

- Hanger encloses Helo with support facility attached.

- Recognize the need to right-size this – but PHI drawing shows requirements
- Consolidate components into a single room
- Could consolidate to one wing (from two shown in PHI's diagram)
- Can do extended season but they do have temperature requirements
- Airlock entry included – energy savings
- Brian – code requirements? Discussed from a US operations standpoint. Discussed governing documents but not specific
- Brian – have to test facility, for example a hangar full of foam during a testing drill
- Ben – Brian's comment on dividing Helo Ops functions. How do you accommodate that? Mike – difficult, would have to consider issues regarding duplicating Helo-ops, such as another start and stop, ingress and egress, logistics issue?
- Get extra trucks or electric golf carts to take them to Helo Ops.
- Larry – kits stored at Helo Pads? Can you do cargo function/sling load and deliver bundled package to Helo location?
- There is flexibility needed at flight time; need control of that product and those adjustments. Don't want to add touch points
- Don't want anyone other than techs building the sling loads
- Pat – do you leave the Helo-pad where it is?
- Larry – kit up grantee items like sleeping bags and store it at Field Science Support and at Helo pad
- No fuel at the current Coast Guard pad site
- Mike – is it that big of a logistic issue for grantees? They would like a cart to put it on
- Dave 2 distinct operations – 1 for sling loads only and 1 for passengers and what they carry
- Mike – haven't done wind studies yet, but need to consider getting out of ground effect with climbing terrain is a safety concern
- Ballpark is good because you don't have to immediately fight the terrain

BREAK

2.4.2 1:00-3:00 (OZ) NSF Review/Validation of Requirements

Cancelled

11:00 (ASC /A-E Firms) Debrief, plan for next week, identify follow-ups, meeting minutes

Revise Schedule:

- Shaggy to do recap and provide how new design is going to work. Look at 15 minutes per point on scheduling with cross reference of how it is working now.
- Day 1 is presenting to them what we gained in weeks 1 and 2

Charrette Week 3

Denver/ASC, July 27-31

Mon July 27 (3.1)

	7:00-8:00	(ASC /A-E Firms)	Set-up and confirm day's objectives

3.1.1	8:30-9:30	(ASC)	Introductions and Objectives

Merrick – CEO introduction

Shaggy – Discussion on designing a smart city and intro on Master Plan 2.0

Goals of the charrette:

- Have buildings sited based on phasing and constructability so now we work on flow and adjacencies
- Week 1 - End users (Grantees) – gather information on how they do business
- Week 2 - Allied Agencies – find out how business is done currently and then how business will be done in the Master Plan footprint
- Week 3 - ASC Operations – Recognize that it is still diagrammatic
- Week 4 – Building envelope and utilities, power, sustainability

Schedule:

- Charrette report will come out 3 weeks after end of charrette
- Formal design review of charrette – ask questions, clarifications – answers will be provided
- Formally kick off design process
- Reviews at 30/60/90 – but unlikely to be able to make changes at that time

3.1.2	9:30-10:45	(ASC)	Overview of MP 2.0 including revisions from the DC charrettes

Dave Winkler – explanation of what is included in scope – See weeks one and two

Explanation of phases – see weeks one and two

6 Design Build:

- Central Core Facilities
- Outlying Facilities
- Airfield
- Ross Island
- Palmer Pier
- Palmer Facilities

8 Design Bid Build:

- Utilities and IT
- IT Primary
- Lodging - new
- Lodging - renovations
- Crary
- VMF Renovation and Addition – Baker
- Traverse Ops – FC
- Site wide IT&C Communications (Baker)

Rick – MP 2.0 Review
Weeks 1 and 2 – Grantees and Allied Agencies. Week three is to get into finer detail

Week 1 – learned requirements but also proved to be a validation of MP 2.0

- Grantees were engaged, provided valuable input, represented peers that were not there
- Understood configuration
- Additional input for Master Plan
- Understanding of flow and adjacencies
- Understanding of lifestyles
- Grantee appreciation

Week 2

- Start with broad understanding and review
- Recognize that charrette is in anticipation of what is going to happen in 35 years
- Confirmation of internal process and adjacencies of sub-functions
- Appreciation of ASC
- Airfield from single to 2 separate fields – Pegasus, Willie, and retain capability of a Sea Ice Runway
- Budget cycle consideration and transition
- Bandwidth – scope will help with infrastructure to use more bandwidth but it is an operational issue
- Emphasis on Efficiency

Common Themes Week One

- Reduced touch points
- Reduced time to field
- Streamline science support staging, both geographically and operationally
- Understand movement of goods
- Clear orientation upon arrival – new grantees, currently not intuitive
- Dedicated space for multi-year projects; balance between efficiency with needs of optimizing space
- Functional connection between Field Science Support and Crary for personnel and material – want a clear connection between the two
- Robust exterior pedestrian circulation system – want to be able to go outside
- Enclosed "getaway" spaces for groups to cook and socialize

Comments:
Orientation – regarding knowing what is where – the "dirt tour"

3.1.2 Overview of MP 2.0

- Recognize that this is a multi-year phased project as well as enhancing the logistical pieces
- Re-use what is working well such as lodging, where current structural systems are sound; and Crary which is a solid building that provides flexibility
- Consolidate warehouses so that they are adjacent to where the goods are being used
- Connect Field Science and Crary and Field Science (and associated warehousing)
- Safely separates vehicles from pedestrians
- Contingency Operations located in Recreation/Fire-Medical wing
- Main level is at 22 feet, which allows connection to existing grade in the back
- Looking at possibility of removing 3rd floor from plan and locating it at ground level
- Overall footprint will not change
- Snow modeling is under contract – looking at sloped roofs and wind for additional design – could affect shape and angles
- Connections between Crary and Field Science – entrances might change to enhance connection between them

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- Additional understanding and design of exterior walkways
- Entrance is the beginning of an efficient and logical sequence of orientation
- Steve – ramps? Yes - walkways will have ramps in addition to stairs
- 3rd floor open space in Central Services takes advantage of views
- Field Science may have a mezzanine – not decided yet. This is a high bay storage facility with volume that could accommodate a mezzanine
- IT & C Ops– formerly Building 004

BREAK

3.1.3 11:00-12:00 (OZ) Material and Personnel Work Flows and Adjacencies

Consolidated plan shows people, goods, material and waste

Sequence of people coming in from airfield (Need to improve bag drag configuration)

- Come in and go through gallery that will have changing exhibits
- Dedicated lecture hall (that is multi-purpose) where you have orientation lecture
- Pass hand wash, servery, dining
- Check in – get key
- Get bag
- Go to room
- Do the reverse on the way out

Comments:

- Grantees brought up how you weigh science cargo
- Every corner of every building will have an exit
- Day to day operations will happen here too
- Steve – running bags through building for day to day operations should be looked at – with shuttle stops
- Steve – think of a loop for shuttle
- Bags will come in as regular ATO cargo
- Can they label science cargo as science cargo in Christchurch? Bags go to room, science cargo goes to science
- Bill – hand-carry bags goes with regular luggage
- Try not to make hand-carry part of cargo
- Fleet in future same as today? Yes – based on fleet we currently have

Movement of Goods:

- Ice off-load to be further discussed
- Large area (multi-purpose yard) to accommodate incoming milvans that will be graded evenly
- Milvans are emptied into storage – which is accessible by forklift
- Food goes to warehouse area adjacent to the kitchen
- Food is also adjacent to Field Science Support
- Covered outdoor area between two buildings is not fully heated but is protected

Movement of Waste:

- Kitchen waste: out and staged and out
- Looking into waste heat
- Short direct staging and pick up from Crary – don't want to have to take Crary waste out through another building
- Other waste options to be considered? Yes, like dewatering
- Co-mingling – waste/recycling – to be discussed later in week 3

3.1.4 1:00-3:00 (OZ) Science Operations Overview (DC results)

- *3.1.4.1* GENERAL COMMENTS (Traverse did not happen today)

Review of Weeks 1 and 2 include results of questions that were given :

1. What is the type of work you do
2. Where do you see science going in the future
3. What keeps you from doing good science at McMurdo?

Laundry:

- Have a placeholder for central laundry – Erin – helpful to have them in the dorms
- Need to figure out the flow that includes getting linen bags
- What percentage is galley bags? Galley footprint is pretty small. Wash rags and aprons, BFC and fuels come in too on a weekly basis
- Shaggy – looking at putting laundry within work space to eliminate fuel saturated laundry in central laundry
- Centralize commercial laundry and have residential be separate
- VMF laundry – BFC – justify equipment installed in BFC. Bulk of that work happens at end of season (tent repair, etc). Want separated laundry washers and separate dryers for fuel soaked laundry
- Laundry chute in dorms? Current Fire code violation when you put blue bag out. Right now they physically pick up linen bags from all dorms
- Linen chutes into area for palletizing
- If there is a boomerang then it's hard to issue fresh linens
- Ben – what is frequency of boomerang? Field camps, C-17 are a couple a year, plus flight cancellations and delay contribute.
- Get it down the stairs – right now laundry sits in hallways. Having a chute to get out of hallway would be good.
- Time and labor intensive to turn around linen for one night
- Erin – happens enough to justify labeling the bags. 30% of on-continent flights don't go when they are supposed to, per Bill.

Phasing:

Follows Master Plan 2.0 phasing plan

Comments:

- Traverse ops to be figured out this week
- Building 189 is movable and could be flexible space
- MEC – Mechanical Equipment Center – snowmobiles, small generators, heaters, piston bullies – not sure where this is ending up
- Water tanks are one of first things to come on board – to provide robust fire protection
- Water loop is still being built in Phase 2
- Baseline of science support will be provided by NSF during this period
- Construction in summer? Core and Shell work in summer with interior work in winter but not set in stone. Population will be based on science support
- Need temporary home for mountaineers and equipment
- 2 floors of VMF material (Building 168) have to find a home. If combine traverse ops and VMF. Traverse can have own supply area – have existing building phased out before have location for that material.
- Note that Phase 0 is the clean out and consolidation plan.
- Recognize the need to have space to stage material
- Crary is returning to being what it was designed to be – lab space
- Ben – development of phases in Crary based on anything? No
- Housing demo? Number of beds staying static during construction? Changes in Phase 4 – bed number decreases.
- Should see a schedule to see numbers of beds during construction – currently at 1271
- External coolers take up a lot of galley currently – would be nice to have a staging area
- Recreation storage? Need readily available storage. Examples TV, humidifier. To be figured out.

- In the new facility you will be able to control humidity
- Crane accommodation – will be figured out
- Need to figure of new loading dock on Crary
- Primary IT is in IT and C Ops with Secondary IT is in Central Services. Primary EOC is in Central Services and Secondary

- NSF is working with FAA to figure out where helicopter ops will go
- Co-located fuels and Hazardous waste
- Geotech and Environmental testing will be happening this year
- Secured storage for National Guard? Yes
- Who determines bed space during construction? Our support is tied to the amount of science happening?

3.1.4	1:00-3:00	(OZ)	Science Operations Overview (DC results) • *3.1.4.2* Deep Field

Questions that were given were What is the type of work you do, Where do you see science going in the future and what keeps you from doing good science at McMurdo?

Deep Field:
What is the type of work that you do?

- Geology
- Ice change research
- Seismic ops

Where do you see science going in the future?

- Smaller equipment and more of it
- Telemetry
- Boat based research and activity
- Longer season will allow more work

What keeps you from doing good science?

- Lack of easy communications

3.1.4	1:00-3:00	(OZ)	Science Operations Overview (DC results) • *3.1.4.3* Local Science: Sea Ice

3.1.4.3 Sea Ice Recap
What is the type of work that you do?

- Field ops on the sea ice
- Water sampling
- Research involving animals
- Monitor impacts of science on the environment

Where do you see science going?

- Open water science research from McMurdo
- Field schedule reflecting science not logistics
- Higher frequency of staff transitions
- Greater collaboration efforts between different researchers

What keeps you from doing good science?

- Access to open water at McMurdo
- Frequency of sample deliveries leaving McMurdo
- Extending aquarium's operating time
- Increase need for meeting space
- Many touches for frequently used items
- No adequate tracking of stored items
- Need more flexible spaces

Comments:

- New layout with piston bully parking in middle
- Need to figure out ice services
- Added space for balloon layout
- Added 9 storage lockers
- Touch down work space at entry
- Enter into mud room and have laundry right there
- Piston Bully storage just needs to be kept above freezing
- Dive Services area is roughly 20 x 60 – remember this drawing is diagrammatic
- Could co-locate dive services with storage/office space
- Shaggy – having inside piston bully is good because they have spent a lot of time jump starting them
- A spot for grantees to keep their stuff makes sense
- Balloon layout needs to be in a dedicated spot and this configuration makes sense
- Available fueling towards the transition? Would make sense to fuel here.
- Creates time savings and wear and tear on piston bullies and on roads
- Steve Rupp – don't like vehicles idling when filling dive tanks

3.1.4	1:00-3:00	(OZ)	Science Operations Overview (DC results) • *3.1.4.4* Local Science: Dry Valleys and Helo Supported Science

Dry Valleys

What is the type of work that you do?

- Study the existing soil, atmosphere, glaciers, streams, lakes through sampling, scanning measuring and monitoring
- Long and short term studies in the field
- The grantees called themselves "vagabonds on the move" expressing their lack of permanent location
- Get to remote sites via heliport
- Move a lot of gear to the field back to Crary and back to the field

Where do you see science going?

- More offseason work
- Use of drones
- Better use of telemetry
- Helo mounted sensors

What keeps you from doing good science?

- It takes at least 5 days upon arrival to get to the field and 5 to 7 days to leave
- Storage space is limited
- Lack of storage at heliport
- Long term storage can take days to access
- Many "touches" for frequently used items
- No adequate tracking of stored items

Comments:

- Need more flexible meeting spaces especially for groups of 12 or more
- Some people are in and out every day – some out for whole season
- Size of group varies
- Different relationship with support services depending on length of time at McMurdo
- Biggest concern is movement of equipment
- Helo mounted sensors – still have to have someone on the ground but could do with remote science
- How much goes into Central Warehouse and how much on remote site?
- Need more storage – keep from one season to another?

- Meeting space isn't adequate

3.1.4 1:00-3:00 (OZ) Science Operations Overview (DC results)

- *3.1.4.5* Local Science: LDB/ Town Science

What kind of science do you do?

- LIDAR at Arrival heights
- LTER
- Ice Bridge

Where do you see science going?

- Ultra long duration ballooning
- Geospace at McMurdo due to its unique location
- Year round capacity
- Increased use of drones

What keeps you from doing good science?

- Bandwidth
- Transportation to LDB
- Lack of staging and office
- Vibration in Crary lab
- Food service for Arrival Heights

Comments:

- Should boating be on this lest?
- Vibration issues create a problem with calibration of equipment
- Calibration issues happen quite frequently – use gravity hut that has a slab that reduces vibration

3.1.4 1:00-3:00 (OZ) Science Operations Overview (DC results)

- *3.1.4.6* Crary Lab

Crary Review – Kim FC

Phase I

- From Central Services have a new access way for pedestrians
- Added office space for PI's which was lab space
- Added storage space

Phase II

- Additional labs in Phase II
- Field party staging has been added
- Collaboration space added
- Added computer stations
- Added office space
- Shaggy – field party staging material and instruments – but still do lab work in Crary that requires field storage/staging
- Always fields things moving in and out of Crary
- Can drop dirty clothes

Phase III

- Has new mechanical and Electrical equipment
- Adding holding tank

- Added a third lab and environmental room
- Looking at a vestibule entry to control temps

3.1.4	1:00-3:00	(OZ)	Science Operations Overview (DC results) • *3.1.4.7* Field Science Facility

- Rick – Trades and Field Science Support separated by a covered alley
- A place to co-located science cargo and ATO. Will keep grantees from ATO. This is critical to the improvement of McMurdo
- Mike – science cargo Bill – ATO
- Tempered storage – series of freezers and refrigerators
- SAAR operation has immediate access to outside
- Storage pods – currently not enough – shared space – climbing up and over others' equipment. Put in a proper storage system with daylight, ventilation, assignable, and large
- Central staging area – can layout equipment, test equipment, repair – functions as a multi-functional space
- Food that supports field science will be adjacent
- Bill – office space used to planned for mezzanine – still the case? RP – trying to get everything on the ground floor. Planner offices don't want to be right in the mix of their work. Need touchdown space that would flank science cargo and ATO.
- Bill – it's noisy in there so offices away would be good
- Bill needs 6-7 workstations together – not necessarily to Bija and Megan
- Field gear wash and repair with sewing tables , laundry, space to hang tents to dry
- Fixed wing activity would be loaded out of one area and helo from another area
- Enough rooms for 15 pallets to be built up with a lot of circulation space

Freezer/Food:

- Ben – reason why freezers are accessible from outside? Outside access makes it easy for loading/unloading. Could flip that freezer space and change access points and you get more space to utilize in the alley. Want access from both ends so would need a hallway
- Shaggy – South Pole freezer needs? Yes – but doesn't need to be dedicated space
- South Pole bound food will go through Central Services
- Freezer at Airfield for food would be good
- South Pole order has been separate than McMurdo – moving towards one order. McMurdo would pull the other and send it
- Turn it over to Bill, put it in a freezer.
- Ben – is it more labor intensive to pull it and palletize it? May not have distributer palletize food. Food is ordered 2 years in advance. Order goes into storage and order doesn't change – can create overstock. Ben – that's a numbers game. Need to figure this out. Ben – trying to limit the amount of effort that happens at McMurdo. Integrate Pole stock with McMurdo stock can reduce time on ice.
- Bill – pole food on vessel – stays in container it came in – or kept at McMurdo
- RP – how do you solve this?
- Bill – have frozen food containers for Pole. Where food is stored before palletized
- Ideal model is to tie it to recipes and population – send as needed
- Need up to 5 pallets for frozen Pole food
- One storage bay is only for frozen science samples
- Organics need to be separated. Carbon Dioxide can contaminate other samples.
- Potential process is: Central food storage – cargo pulls it – builds it – puts it in freezer
- Ben – can you pre-package critical mass and have them ready and then do condiments and oils later?
  Dan – working towards that but not there yet. Looking for standardized recipe plan so they can control inventory

- What are facility's needs? How many pallets – 5 20-foot containers last year. 8 crates on a pallet
- Warehousing – what would be the standard yearly South Pole requirement?
- In the past food has been kept in the ice at the airfield
- Bill – ideally send it when it arrives on the vessel
- Ben – Air Force pallets with food – about 10-12 frozen pallets and 6 or 8 dry food pallets. Dry food comes in container and can stay outside.
- RP – 10 milvans of food to pole per year = 100 frozen food crates. Would need 100 spaces in the frozen food warehouse
- Traverse food is separate
- Field Camp food (BFC)
- Dan – will provide numbers on food this week
- Steve – understand needs for inside and then deal with OSA needs. Main goals at end of construction is minimal OSA area and hire fewer GA's
- Early season – materials get staged by location (unless DNF) – Bill is concerned about space. Shaggy – we will figure these needs out.
- Shaggy – "build to requirement" not just food supply. Ben – "not going to be a container village anymore"

3.1.4 1:00-3:00 (OZ) Science Operations Overview (DC results)

- *3.1.4.8* Dive Services

Not discussed

3.1.5 3:15-4:00 (OZ) Airfield Redevelopment Overview (DC results)

- Overview of airfield master plan development.
- Various pallets discussed for ski-equipped runway—do-not-freeze and do-not-thaw requirements.
- Helo Ops—Don shows notional hangar.
- Comment that USCG is making their needs known for helicopter hangar space.
- Question on supporting Italians for helo storage.
- Ben: designing for US requirements and to meet them safely.

3.1.6 4:00-5:00 (ASCr) IT&C Overview (DC results)

IT Ops Building:

- Bandwidth is an operational cost and a constraint.
- Up to ops to manage the rationed resource.
- Bandwidth is not part of scope—it is an operational issue.
- Kevin covers the fiber optic rings—10 gigabyte system, 96 fibers inside to buildings, around buildings.
- Can pump info back and forth.
- Covers the station in a wireless cloud—for on station communications.
- Building is more than IT. Kevin discusses building organization and functions.
- Covers security and monitoring.
- Discussed video monitoring—some were unaware it was going on.
- Question is what is required? Some decisions to NSF for video monitoring requirement. Question on EOC space: also has additional assignable office.
- Mission Coms center is a duplicate of dispatch stations that are in Central Services. Backup EOC is fallback location plus occasional maintenance and testing of system.
- Kevin also covered morale services and will be woven into all facilities.
- Steps to give diagram more definition—need to collect info, type of equipment, number of racks
- Ben: L-M has listing of requirements already and cross-check the accuracy of the size of requirement
- Equipment does shrink over time with new technology.
- If they go to virtual desk tops, might need more rack space. Or if there's a requirement of on-demand

video, need more rack.

- Another unknown is number of future NASA/JPSS missions.
- Ben: architects to layout racks for determination of how much space is needed.

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics For next day's sessions

Tues July 28 (3.2)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

3.2.0 8:30-9:00 (OZ) Review previous day's work

Introductions:

Day one recap:

Laundry:

- Discussed centralized laundry and distribution

Tempered food:

- What needs to be accommodated for Pole in Field Science or Central Services Storage
- Four areas of food storage: Deep field, pole, town, traverse
- Dan in Food Services has cubic feet and food order numbers to submit to design teams

3.2.1 9:00-10:15 (OZ) Central Services: Entry Experience & Orientation

Entry sequence:

- Kress drop off – will study site circulation to select actual drop off point
- Through recognizable front door
- Area for coats and ECW
- Sequence of gallery displaying history
- To view of sea ice
- Restrooms at entrance – but not front and center
- Multi-purpose lecture room for orientation (multi-functional space to be used for large gatherings as well)
- Pass Servery and dining
- Will have an exterior way to get around station as well that doesn't conflict with utilities

Central Services Flow Comments:

- Bill – make sure that hallway is not a conflict in ATO
- Ben – reminder that this is confirmation of block diagrams showing spaces that support our mission showing rough layouts and square footages. Validating that needs are included in the Master Plan to determine design that meets everyone's requirements
- Post office will be in Central Services
- Comment: If you come in from dorms do you accommodate coats on both ends – at main entry and near dining?
- General size of kitchen dining and server and housing is equal to what is being used today. Central

warehousing is a space of true efficiencies. Can stack efficiently and higher. If designing for 850 then size requirements will need to be figured out

- Housing and Rec area – offices in there? Yes – could be.
- Main laundry in Contingency in master plan but might not be the right spot
- By the time you get your key, your luggage might not be there so you could get laundry while waiting
- Hallway configuration might not work due to space restriction – turning around and going back
- Newbie orientation – Having that point of contact is a very important aspect to this sequence. Practical but also symbolically important, Could be first time supervisor is meeting an employee. Always going to meet folks first day. This would happen after orientation. Need to make sure there is room for this.
- Pre function and post function space can accommodate people waiting for new people to arrive (and available for before/after events)
- Lecture space holds up to 126 (maximum number of people on a flight)
- Does it make sense to flip dining and server to accommodate arrival times/process
- Ben – look at total experience – not just looking at experience of first time arrival
- Maximum capacity design will be accommodated in certain situations
- Orientation space to be used a chapel as well? Designing for flexibility. RP – chapel needs to have its own space.
- All hands meetings? Ben – would happen in the gym
- Back up IT in contingency center? Joe H – IT concept contingency area is set up different. Take over SSC which becomes primary service. If something happens to SSC – then go back to Central Services. Consolidation by building 2 data centers

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Dining/parking comments:

- Do you put in a partition at server to accommodate larger space? We do have larger spaces for all hands meetings. Could design orientation space with sloped floor. People at meals are coming from lab, field science, etc. it made sense to design it this way
- What about people parking trucks at lunch time? Hopefully this doesn't happen as much and that people are walking.
- What about heavy vehicles and potential for large trucks? Have not designed for that – have areas on the site where we would require parking. Possibly park on chalet pad.
- Heavy equipment parking creates a lot of vibration next to Crary and diesel exhaust needs to be considered. Policy to park near heavy shop and shuttle people down for lunch. Management issue. If park by heavy shop – shortest point in through contingency building – so have to think about coat drop and hand wash. Health inspector says every entrance needs a hand washing area
- James – circulation on outside of dining when you are trying to capture views? Probably not.
- Servery into a thin line in front of kitchen with growth chamber on an outside wall?
- Don't want main drag through kitchen. MP connects kitchen to food supply.
- Can separate server from dining by stretching server out
- Separate main drag all together – and have hallway at a lower elevation than glassed area of dining – Could be a way to do this as well as follow the land
- When is primary food pull for next day? One day a week currently but will go to every day with new design. Pull during the day all week long – stack, prep, deliver once a week. With new design – there is no pull – it's right there and you reduce touch points
- Waste prep? Should have hallway between DNF and freezer storage to waste prep – connect kitchen down a hallway to waste.
- Where are dishwashers? Don't want dishwasher next to meeting space – too loud. Have to have a sound barrier at server too.
- Can you carry waste through food storage warehouse – no – have to have a hallway. Think of Costco design – can create these hallway areas.

Exterior Entrance comments:

- Crary might get a new skin

- Heightened use of corner at Phase I
- Walls in central services will be brought down to grade and drain away from buildings – to manage snow
- Likely to step up to a level that matches main courtyard of shipping
- Ascending stairs to the front door with a way to manage snow to keep it safe and minimize what is tracked in the building
- Connection from Crary and Central services needs to happen. MP shows it on second floor. When look closer at grades and evaluate if need to keep open to equipment – will figure it out.
- Try to find way to get enclosed location for utilities to go from one building to another
- Confirm day to day access to Crary
- Snow removal passageway and fire truck access needs to be accommodated
- Wind model study will also drive the design – try to make entrance with less wind
- Entry was designed with turning radius of Kress turning radius, which might need more space for snow management

Interior Entrance/Dining Flow comments:

- Coat drop in an alcove, fluid space that tells history of McMurdo with display or graphics, will meet with interpretive exhibit designers
- Capitalize on views
- Orientation is set up as 2-story, flat floor space. Mac Offices are on second floor that serves as overflow space
- If take second floor and put it below – could come into space at the high point from the back and go down a series of steps like a movie theater, would still have two-story space. Another benefit of putting administration below instead of above.
- Looking down main hall 10-12 feet wide, flanked by server and hand wash on one side and windows on the other. Where there are not windows there could be display walls.
- Pass server with dining to side. Option – lower hallway or move server. Want to keep views.
- Opportunity for warm interior – texture and warmth brought into ceiling area.
- Carpet? Bad idea. But carpet does cut down noise. Can solve acoustics in other ways though.
- Need proper walk off area
- There is a vestibule at main entry – and every exterior entrance
- Walk off space can be extended beyond 10 feet. Need a bench inside vestibule and a place to put mat tracks – spikes on shoes for ice traction. Not a lot of people and not all year. Built in bench or piece of furniture? Number depends on the time of year (mat tracks)
- Do they hand carry? – Some people do.
- Come from dorms for breakfast or lunch – where is the best place for coats?
- Pole does traffic flow well. Have handwashing on one end and dishwasher on other and flow works well
- Should have controlled entry to dining area and have hand wash at each point of entry.
- Grab and go function? Have not considered this yet.
- 3 modes:
    - go through server and sit down and eat
    - Come in and grab a box lunch
    - Get a tray and food and go to their room and then bring those dishes back
- Good reason to have dish washing at other end
- Pizza station would be in server
- Galley is a big space that is used during meal times so can you use for wi-fi space between meals? But then they turn into lounges and people are occupying tables with laptop instead of designated meal space
- If wi-fi is station wide than it won't be an issue
- 24 hour food service allows people to spread time out more
- Can we reduce size of dining since food is 24 hours? Not as many people in at one time. Holiday meals expansion capability
- 230 (current number) seats. It's full at peak times currently. Keeps people from not being tied to a specific meal hour – spread people out.

- Population last year was over 1,000
- Extending hours takes heat off surge time – could decrease number of seats
- People do get stuck at McMurdo from other stations (Australians) and you have to feed them. Don't forget we have surge capacity in contingency (food service there)
- Lunch hour is the driver in terms of capacity
- Question about separate dining for pilots? No – don't want to have executive dining
- Steve – multi-purpose room don't make theater seating because then it's not really multi-purpose.
- Hierarchy in dining – space within space – or alcoves? Bill – people define their spaces. Sit at same table with same group typically
- Social groups get in habitual eating patterns
- The ability to self-select is valuable
- Don't use best real estate for circulation
- Like option to maintain flexibility in table configuration (square to round – or push up against the wall)
- Round tables support cultural mix
- Still want to accommodate people that want to sit alone
- At Pole they have bar seating. Up against the glass? Inhibit the view? Bar seating allows for fast eating
- Can this be a coffee/bar lounge at night? When bar closes, people go to galley to get food and it's highly disruptive to the people that have not been drinking. Would have to have a much more segregated piece of this. Have a "cool down" area: food service in bar. Stop serving alcohol and have food available.
- Remember primary purpose is dining.

3.2.2	10:30-12:00	(OZ)	Central Services: Food Service and Dining

Summary:

- Dining, kitchen, servery
- Currently have 230 seats
- Associated with population of 1,000
- Ability to serve food longer through day so it takes heat off of dinner
- If 230 works for 1,000 then what is the number for 850? Decrease by 15%?
- Steve – if have 850 beds, there is structural vacancy so it would be closer to 800
- Large field science presence at McMurdo – occupy beds but head back out – Sometimes they hold their beds to accommodate plans
- Capacity – 20% drop
- Furnishings – variety of furniture that are both square and round – want flexibility in that space
- Maintain a variety of space within dining space while keeping the ability to dine independently
- Different modes of eating:
  - Through server and eats at a table
  - Grab and go
  - Hot meal on tray and eating alone in room and bringing dishes back

Comments:

- Ben – think of university – don't allow trays to leave the cafeteria
- Allow food and product back to lodging invites other issues
- Steve – put a fridge in room?
- People use it as a way to get hot food (better than cold food) and they take it for later
- NSF wants to accommodate dynamic dining environment that they are comfortable in food service delivery area
- Questionable practice to take trays and product back to room – shortage of bowls – (inventory, morale).
- NSF providing new model food service to all people who live, work and visit

- Can we provide the environment that satisfies this?
- OK if they are ill (would deliver not have them come get) – Management issue
- Some eat in private so people don't approach them – want privacy
- Customer service people do like to eat in private
- Accommodate for a variety of ages that live at the station
- Tracy – look at vision of project as well as balance
- Do you want people to have choices or no because it's too hard to manage
- Design reinforces the philosophy
- Would have to revisit capacity if you restrict room eating
- Look at cues to give an eater more privacy during dining
- Ben – not everyone wants to eat with someone. Design for completely retreat. Complete means different things to different people – but can do reasonable accommodation
- Always put this question in perspective of philosophy and vision
- This can create health issues by leaving food product in room
- Kim – possible to include a quite dining room?
- Have to get waste through storage of food
- Goals – capitalize on proximity of warehousing and use of food.
- Set up so you don't do daily pulls
- Take inventory from warehouse, and re-warehousing in kitchen area – want to avoid this, decrease touch points
- Take advantage of daylight and views
- In MP have dining up against t server and kitchen – could move walkway to a lower elevations
- Or keep it at same level and put dining against the wall
- Can you cross main circulation with food in hand?
- New diagram shows elongated server adjacent to kitchen with circulation through middle with Active stations, 2 hot, and salad – has a food court type of feel
- Joe H – That walkway is not just a food corridor – sees potential collisions
- People are often stopping in hallway having conversations
- Revisit dropped walkway
- JF – Too much traffic in that hallway- Highway 1
- Ben – nice feature is that areas in dining could be multi-purpose
- Envisioned as multiple venues/zones
- Steve – Galley meal – especially dinner – people eat and then hang out
- Interaction will be encouraged since rooms are going to single rooms

Walk through area in dining:

- Option to walk up walkway and over if enough height?
- Option to have main walkway go up and over from the entry
- Steve – main walkway below – especially if offices move to lower level
- Don't want people bringing outside stuff into inside space – this is a management issue
- Bar seating up against window

Points for Discussion

- Reaction to adjustment in floor plan
- Eating and socializing outside of dining area
- Growth Chamber

Character and re-use:

- Recognize the Importance of maintaining the heritage of McMurdo
- Potential building components to be reused, for example the bowling alley. A resource that is there now – tells the history but becomes a building product. Kim – this also supports vision of being sustainable.
- Ben – a lot of material is available at station (at BFC currently) Bija has hung material that is a display and

incorporates history. This can play homage to history to McMurdo and acknowledge the history of science done there. Would have to be selective in how that is used.

- BFC – special place showing years of heritage and culture. Sensitive marriage of heritage and mission to support world class science. Balance of want we want to replicate and what we want to be new.
- Bowling alley wood has been incorporated into stairs in newer building
- Will harvest some of these resources and integrate them into design

Growth Chamber (not confirmed by NSF)

- Brings green
- Brings humidity
- Brings fresh food
- Desire to grow leafy vegetables in winter and in summer
- Should it be allowed to grow vertically?
- Ben – this is a placeholder space? For example the store had not been on the plan
- Ben – there is a maintenance component to this
- Have to be able to support this activity
- There are self-contained units that you just add water and nutrients
- Joe – morale component – aside from just the food source
- Can this be run with volunteers?
- Having this for morale is priceless
- Could have decentralize these growth areas also – have them around the station
- Move it to the entrance? By the windows in a corner?
- South Pole has a very controlled growth chamber

LUNCH BREAK

	1:00-5:00		Break Out Sessions
3.2.3		(OZ)	Track 1: Quality of Life
			3.2.3.1 Central Services: Recreation and Quality of Life

Shaggy Recap:

- This is always been difficult to talk about because they don't want it to be too flashy because they are supposed to be down there doing Science. We have to be careful with outside perception. We don't want to add too much more than the existing space has, but we want to look at it holistically. How can you be better or more physically fit or mentally healthy while you are down there and come out of there better than when you got there? How can it work for the whole community? We need the multi/purpose flexible space. We want people to participate in these spaces so we need to make some changes from what is currently there

Why do we need this?

- Mental wellbeing
- Decreased stress
- Physical wellbeing
- Social connectivity within a group and across groups

What type of spaces are they looking for?

- Spaces are lacking smaller areas, quiet areas to read or do a puzzle. We need that as much as we need the social activities. A living room area where we can watch a movie with a small group or play video games.
- This is a social escape, but work is still happening. It is just a more relaxed work environment.
- Most of these spaces should be used the majority of the day by different groups working on different schedules.

What is most popular right now?

- Yoga
    - This got started due to a lot of injuries and they now do it every morning and have had fewer injuries.

But there are groups that don't have the luxury of space to do this. This is happening throughout the entire day for different groups. Some groups it is required.
  - They would prefer to keep smaller groups versus creating a large space for everyone because the stretches and poses are sometimes particular to the group.
  - 50-60 people is the larger group trying to lay out mats. But there could be 80 if there was enough room.

How is the recreation program currently run?

- All of these activities are volunteer basis due to budget cuts. So you get different social activates every year because different people are leading it. That is why the multi-functional spaces are so important. These functions could switch by the hour.
- All of the work centers turn into classes for extracurricular activities because there is a lack of room. And it takes a ton of time to set this up, do it and then clean it up. It is less than ideal because this isn't what these spaces were intended for.

Initiatives that have worked well at Palmer and South Pole

- The population is so much larger here that you can't just assume projects that have worked well at Palmer and South Pole, will have the same success at McMurdo.
- House Mouse
- The communities work in some areas within McMurdo, but not in others. There is a very temporary and transient population going through here.

Team Building

- There is a pretty good social separation between the contractors and the Grantees. Everyone is invited to a Contractor Social, but not everyone is invited to a Grantees department.
- They aren't there very long so it is sometimes harder for them to engage.
- Mixing the groups more would be a good byproduct, but not a design goal.

How are these activities managed?

- During the summer, there is 1 recreation manager. It used to be a larger staff, but now that 1 person is a glorified volunteer coordinator. That manager does schedule all of the rooms and advertise the events. There is an online form and a hand written born.
- Having computer monitors in more public spaces showing the different activities happening where would be a good thing. And an interface that is easy to update.
- If someone wants to schedule an event – they check the availability of that room and then have to get the event approved – especially if there is alcohol. Then they will get with the Rec manager to get it scheduled and advertised.

James: 1 multipurpose room is not enough. Right now they have a few and they are always booked. There is a bottle neck from 5:30-7 after work.

Acoustics

- Acoustics are a problem between multipurpose rooms. People don't want to hear weights crashing while doing yoga. If there is a wall separating a larger room – it needs to be sound.
- There is one band room on base and it is always booked.

Flexibility

- While we are designing the work spaces, we need to think about how they can be used in different ways. Can a conference room be used as a movie viewing room or travel log.

	1:00-5:00		Break Out Sessions
3.2.3		(OZ)	Track 1: Quality of Life

3.2.3.2 Physical Recreation

Weight Room and Cardio

- They have great weights equipment, but not enough room.
- They need more cardio equipment.
- Peak times are when it is tough.

Gerbil Gym

- Cardio gym
- There is a boxing room hooked on to this which is also used for stretching and some weights
- There has been some small spin classes

There is no ventilation in this room

Weight Room

- A walk from the aerobics room. A big complaint is that these two aren't connected.
- It is very cramped

It is right next to the exercise classroom. There is weights crashing and noise

Current Spaces and Uses

- Big Gym
    - Halloween Party – big party every year
    - Dodge Ball
    - Basketball
    - Volleyball
    - Climbing Wall – very popular
        - Could this ever be outside for nicer weather days?
    - Bathroom – Men's and Woman's
    - No showers – but it would be good to have – especially for redundancy and overflow
        - 25-60 people could get stranded and need facilities and a place to sleep
    - Is there a track anywhere? Could there be a suspended one over the big gym?
- Yoga/Fitness Room
    - Work house
    - Yoga
    - Dance
    - Crossfit – body weight
    - P90X
    - Non-alcohol dance party venue room
    - Ab classes
    - This is currently too small – ideally to fit 60-70 people
        - Is there a sound system that could help for instruction?

1:00-5:00 Break Out Sessions

3.2.3 (OZ) Track 1: Quality of Life

3.2.3.3 Skills Development

Craft Room

- Volunteer run
- 4 industrial sewing machines
- Screen printing station
- Craft storage
- People work on their own personal clothes
- They would love to have room to set up some easels or more sewing machines
- Currently it is in a room about ¼ of the room we are in right now
- There is one counter down the center and sewing machines on the outside

- Their supplies are included in the rec budget, but some people bring their own materials

What happens when you remove programs (what did happen)
- It starts a chain reaction
- It crams programs in rooms they weren't intended to be in and pushes other things out
- It is a deterrent for some people and then they more to other activities
- James feels that alcohol consumption increased when we took activities away

Band Room
- This is noisy
- Where do you locate this?
- Very busy – there is a wait list
- It can only be used in non-work hours due to the noise
- The band room will be signed out by individuals and it takes up the whole room. If there were individual smaller band rooms – it may help with the overall jam in schedule of the larger room. This could be multipurpose. It is sound proof, but could also be a study room or reading room.
- If you could locate the larger band room that could be open 24/7 – it would be booked the entire time.
- You can get a group of 7-8 people, but it is packed
- There is going to be a lot of vibration and noise coming from this room

Gear Issue
- This houses all of the equipment people check out: board games, snowboards, customs, gaming, kindles, climbing shoes, ski boots, and music equipment. This is for groups and individuals.
- Used everyday
- Roughly 12' x 20'
- A huge benefit of this is you don't have individuals shipping this to the station. You have it right here.
    - A lot of individuals ship their own personal stuff down. You just ship it to an APO like a typical military base. They currently ship about a half million worth of APO a year.

Bike Share Program
- The first program set up racks outside and people could come and take them anytime and there was no sign-out or deposit. But people would hoard them.
- Then they moved into a program where they were all locked and you have to go to Gear Issue to sign them out and can only have them a certain amount of time.
- Could a BiCycle or Divvy program work in McMurdo?
- Bike use may go down once the site is more consolidated as a lot of people take it to their work center and now that will be an easier commute.
- There needs to be a space to maintain them

Ceramic Studio
- There used to be an art studio, but it went away. The kiln is still down there and was pretty heavily used.
- There were people who came down there with the skill and some who just wanted to learn a new skill.
- Team thinks this would be a good addition. This needs to be vented

Library
- Quiet space
- Checking out of books
- Volunteer librarian

Radio Station
- Keep This
- This can't be combined with a social space as it is specialized equipment and the Navy provides the equipment. Because the air force is down there – the armed forces supports Defense Media. There is plenty of equipment that is old and retired and has extra equipment. They provide the radio DJ booth and send a technician down once a year to do maintenance. They also provide the satellite feed from two ships in the

pacific. McMurdo has someone there to run the equipment. During the summer – it is 1 contract person. In the winter – it is dual headed. The navy provides all of the movies, dvds, cd's vinyl records.

- This could be placed anywhere on station.
- Bandwidth would be an issue if they moved away from going with Defense Media.

Big recreational request :

- They want a bouldering cave – they would like to be able to climb on their own versus the climbing wall in the gym where you have to have a partner.
- Consolidating the gerbil gym and the weight facility

	1:00-5:00		Break Out Sessions
3.2.3		(OZ)	Track 1: Quality of Life
			3.2.3.4 Social Spaces

Shaggy Recap

- This is always been difficult to talk about as they don't want it to be too flashy because they are supposed to be down there doing Science. We have to be careful with outside perception. We don't want to add too much more than the existing space has, but we want to look at it holistically.
- How can you be better or more physically fit or mentally healthy while you are down there and come out of there better than when you got there?
- Want to allow people to maintain their workout regime while down there.
- Gym space will be like a Middle school gymnasium with retractable bleachers
- Will design it so different functions can be happening at one time
- How can it work for the whole community?
- We need the multi/purpose flexible space. We want people to participate in these spaces so we need to make some changes from what is currently there.
- This space doubles as the contingency operations.
- Lockers/kitchen attached to lounge

Why do we need this?

- Get social connectivity between grantees/ASC staff
- Reduce stress/physical and mental wellbeing
- Good way to mix grantee and staff. Builds sense of community.
- Need spaces for groups to go – do a puzzle/play a game/watch a movie/gaming
- Provide places/options for comradery and places to go for more quiet down time.
- Work happens before a volleyball game – they don't go off shift. In between they are talking about work problem. Work is continuing during recreation.
- Grantee sentiment – good operation mission meetings happen. Just in more relaxed environment.
- Need recreation/retreat
- Used to have large rec staff – 6 people. Used to be more institutionalized. Now due to budget cuts there is just one person. They are mainly coordinating volunteer efforts.
- Most of the things that happen are on volunteer basis. Mix of community changes so activities change.
- Multi-function space is critical. Flexibility is key. Could be dance or yoga.
- May have to shift between activities within minutes.
- Work Centers become huge rec centers at night.
- Not enough space currently.
- Yoga is most popular right now. Happens in work centers. Some don't have enough space to do it in. All are required to do yoga each day (as part of the employment contract).
- For example, dining staff have 3 different stretch breaks during their shift.
- PAE – requires that every worker must stretch each day.
- Stretching is different for different work centers (specific to prevent their injuries)
- Carpenters/electrician/….do stretching and give general direction for the day.

- Provide spaces that are flexible to accommodate different size groups.
- Most of these spaces should be used the majority of the day by different groups working on different schedules.

- McMurdo consider it a town vs. Pole is a post. Like a crew on a space ship.
- Lots of spaces are unused during the day like Gallaghers.
- Initiatives that have worked well (Pole/Palmer):
    - House Mouse – works for permanent populations.
    - Can't take all that what worked at smaller bases and apply to McMurdo as it is so much larger and more permanent population.
    - Peer pressure works at 20 people not at 1000.
- Grantees have an event just for them.
- Lectures allow all to co-mingle
- Grantee is like its own work center and work centers have their own events just for them.
- Don't force the mix – it will either happen or not.
- Build common spaces and that is about all you can do to foster this co-mingling.

Other Recreation Activities:
Planning for:
- Weight Room
- Yoga
- Zumba
- Baskets
- Middle school gymnasium (can be divided in half with net (volleyball/basketball?)
- Open up for large event/dance
- Multi-purpose yoga room/weight/cardio

What type of spaces are they looking for?
- I think the spaces are lacking smaller areas, quiet areas to read or do a puzzle. We need that as much as we need the social activities. A living room area where we can watch a movie with a small group or play video games.
- 1 multi-purpose space doesn't seem like it is enough. They have 3 spaces now and they are always booked.

What is most popular right now?
- Yoga
    - This got started due to a lot of injuries and they now do it every morning and have had fewer injuries. But there are groups that don't have the luxury of space to do this. This is happening throughout the entire day for different groups. Some groups it is required.
    - They would prefer to keep smaller groups versus creating a large space for everyone because the stretches and poses are sometimes particular to the group.
    - 50-60 people is the larger group trying to lay out mats. But there could be 80 if there was enough room.

How is the recreation program currently run?

- During the summer, there is 1 recreation manager. It used to be a larger staff, but now that 1 person is a glorified volunteer coordinator.
- That is why the multi-functional spaces are so important. These functions could switch by the hour. They don't want this happening in the gym – not the right environment for yoga.

- Ideal to have monitors in common spaces that tell what is happening. Wall displays for all kinds of information would be good.

- At rec office – now there is a computer monitor (power point by thumb drive). White board by galley that someone manually draws on.

- All of these activities are volunteer basis due to budget cuts.
- All of the work centers turn into classes for extracurricular activities because there is a lack of room. And it takes a ton of time to set this up, do it and then clean it up. It is less than ideal because this isn't what these spaces were intended for.

How are these activities managed?

- Having computer monitors in more public spaces showing the different activities happening where would be a good thing. And an interface that is easy to update.
- If someone wants to schedule an event – they check the availability of that room and then have to get the event approved – especially if there is alcohol. Then they will get with the Rec manager to get it scheduled and advertised.

Team Building

- There is a pretty good social separation between the contractors and the Grantees. Everyone is invited to a Contractor Social, but not everyone is invited to a Grantees department.
- They aren't there very long so it is sometimes harder for them to engage.
- Mixing the groups more would be a good byproduct, but not a design goal.

James said: 1 multipurpose room is not enough. Right now they have a few and they are always booked. There is a bottle neck from 5:30-7 after work.

Weight Room and Cardio

- They have great weights equipment, but not enough room.
- They need more cardio equipment.
- Peak times are tough to find equipment.

Acoustics

- Acoustics are a problem between multipurpose rooms. People don't want to hear weights crashing while doing yoga. If there is a wall separating a larger room – it needs to be sound.
- There is one band room on base and it is always booked.

Flexibility

- While we are designing the work spaces, we need to think about how they can be used in different ways. Can a conference room be used as a movie viewing room or travel log.
- Can work centers double as certain rec areas? For example, work center might be a P90X space or an area for band practice.
- 5:30 – 6:30 is the most popular time to work out – big bottleneck. How can we level out those peaks right after work?

Current Spaces and Uses

- Big Gym
  - Halloween Party – big party every year
  - Dodge Ball
  - Basketball

- Volleyball
- Climbing Wall – very popular
- Bathroom – Men's and Woman's
- No showers – but it would be good to have – especially for redundancy and overflow
    - 25-60 people could get stranded and need facilities and a place to sleep

- Yoga/Fitness Room
    - Work house
    - Yoga
    - Dance
    - Crossfit – body weight
    - P90X
    - Non-alcohol dance party venue room
    - Ab classes
    - Dodge ball games go until 10-11 at night because it is the only time the space is available.
    - This is currently too small – ideally it would hold 60-70 people
        - Is there a sound system that could help for instruction?

- Craft Room
    - Extremely popular – open to anyone
    - Volunteer run
    - 4 industrial sewing machines
    - Screen printing station
    - Craft storage
    - People work on their own personal clothes
    - They would love to have room to set up some easels or more sewing machines
    - Currently it is in a room about ¼ of the room we are in right now.
    - There is one counter down the center and sewing machines on the outside
    - Their supplies are included in the rec budget, but some people bring their own materials.

- What happens when you remove programs (what did happen)
    - It starts a chain reaction
    - It crams programs in rooms they weren't intended to be in and pushes other things out
    - It is a deterrent for some people and then they more to other activities
    - James feels that alcohol consumption increased when we took activities away.

- Band Room
    - This is noisy
    - Where do you locate this?
    - This is super busy – there is a wait list
    - It can only be used in non-work hours due to the noise
    - The band room will be signed out by individuals and it takes up the whole room. If there was individual smaller band rooms – it may help with the overall jam in schedule of the larger room. This could be multipurpose. It is sound proof, but could also be a study room or reading room.
    - There are technology options for some of this (headphones).
    - Currently people are practicing in the stairwells and work center.
    - If there was a band room that could be open 24/7 – it would be booked the entire time. Need more than one.
    - Currently you can get a group of 7-8 people, but it is packed
    - There is going to be a lot of vibration and noise coming from this room.
    - It should be isolated or close to the bar.

- Gerbil Gym
    - Cardio gym
    - No formal classes in here now due to small size.
    - There is a boxing room hooked on to this which is also used for stretching and some weights
    - There has been some small spin classes but this hasn't been really popular
    - There is no ventilation in this room – it is awful (Shaggy)
- Weight Room #155
    - A walk from the aerobics room. A big complaint is that these two aren't connected.
    - It is very cramped
    - It is right next to the exercise classroom. There is weights crashing and grunts
    - Ideal to have it connected with the cardio gym.

- Gear Issue
    - This houses all of the equipment people check out: board games, snowboards, customs, gaming, kindles, climbing shoes, ski boots, and music equipment. This is for groups and individuals.
    - This is used everyday
    - This is roughly 12' x 20'
    - A huge benefit of this is you don't have individuals shipping these types of items to the station. You have it right here.
        - A lot of individuals ship their own personal stuff down. You just ship it to an APO like a typical military base. They currently ship about a half million worth of APO a year.

- Bike Share Program
    - The first program set up racks outside and people could come and take them anytime and there was no sign-out or deposit. But people would hoard them.
    - Then they moved into a program where they were all locked and you have to go to Gear Issue to sign them out and can only have them a certain amount of time.
    - Could a BiCycle or Divvy program work in McMurdo?
    - Bike use may go down once the site and work centers are more consolidated.
    - There needs to be a space to maintain them

- Ceramic Studio
    - There used to be an art studio, but it went away. The kiln is still down there. It was pretty heavily used. There were people who came down there with the skill and some who just wanted to learn a new skill.
    - The team thinks this would be a good addition.
    - This will need to be vented and have a water supply.

- Library
    -
    - This is located in a lounge in one of the lodging buildings
    - Good for quiet activities
    - Checking out of books – there is a library tracking system.
    - Volunteer librarian

- Radio Station
    - Keep this – very popular.
    - Keep
    - Strict rules on how to use the space. Navy supplies and they have rules on how it can be used.
    - NSF has agreement with Armed Forces – Navy provides this since AF is down there.
    - Their media group provides radio and television feed and distribution equipment. This is provided by defense media.

- Navy ships them their older gear that is de-commissioned.
- They send 2 techs in each year to maintain the equipment.
- They are picking up Navy feed that sends out to ships.
- What is service delivery they will have in the future?
- Costs a body to maintain and run the equipment – summer it is 1 contract person and in winter dual person.
- Movies are shipped in 8 mm tape.
- All DVD/Vinyl records etc. are all provided for free. Saves quite a bit of $$.
- If another service provider – bandwidth would be an issue. Would need to find a service that provides digital hard copy via thumb drive. Load up server for content. Not streaming it.
- Television/Movie delivery – feel this is the best baby sitter on station. If move to other services – not getting full usage out of Navy service. All link together.

- This could be placed anywhere on station.
- Bandwidth would be an issue if they moved away from going with Defense Media.

* Big recreational request
    - They want a bouldering cave – they would like to be able to climb on their own versus the climbing wall in the gym where you have to have a partner.
    - Consolidating the gerbil gym and the weight facility

Social Spaces/Bars

* Review of reference images
    - 1st image: (wood wall with lounge furniture) the warmest coziest space currently at McMurdo is the coffee house is the nooks and crannies where you can go and have some intimate space. It also has historical artifacts that everyone loves and needs to come over. They do not want to see any wood on the floor due to maintenance. Stay away from Bamboo. In general, wood doesn't behave well. They reminded us that this will be down there for 50 + years – maintenance is the number 1 concern.
    - 2nd image: they like the white board wall.
    - 3rd image: they like a lot of natural light, but want the right coverings on these windows for the winter season. Does this go too far as far as outside perception?
    - 4th image: White Hallway with Orange Pops - too white and sterile, too stylized.
    - 5th image: too far the other way – to casual
    - 6th image: they think this could work in the gym or recreation area
    - 7th image: no comments on the google images – blank stares
    - 8th image: they talked about graphic images that were in the dorms and a lot of them had a lot of green in them and they didn't last long. Tracy suggested this could be a decal that could be changed out and is inexpensive to replace. Tracy asked - should there be a theme anywhere? There was no answer. One of them liked color as a way of way finding.
    - 9th image: (open office with lounge breakout and color in background) - Ben does not see this as warm at all. Sterile.
    - 10th image: (Think huddle room) – Ben likes the sense of transparency between the two rooms. You know you are under the influence of the smaller room, and you can retreat into there. He sees warmth in the wood vertical screen. The carpet isn't his favorite, but he sees the visual texture and what it does for the space. He likes light fixtures coming down to define a space.
    - 11th image: (red lounge chairs looking out to reception) –
    - 12th image: (yellow and black and white pattern) – he likes the volume change that the ceiling brings. He likes the fact that the floor grabs his attention, but doesn't like that particular color.
    - 13th image: (living wall with pool table) – no comment
    - 14th image: (succulents) they like it, but we can't ship those down there

- 15th image: (pattern on the glass) – they like the small pop of color and wood
- 16th image: (open to atrium) when seeing the texture on the wall, they brought up the Italian base and they brought out a mason to do some work. It was the feeling that someone took some time to come there and do something special. Ben brought up the point that the attention to detail is huge. They like the use of the technology as art/changing images. They see this as inviting. A great table and chairs and lighting and an inset of books and magazines would be a magnet.
- 17th image: (ottomans in the hallway) Tracy asked if a more casual furniture arrangement would be desirable or should we always have a table and chairs? The answer was yes and that in general – every bit of space like this is valuable and will be used. Cushions on benches would be a great solution.
- 18th image: (office space/lounge) Ben said this is too far - a little too loose.
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- Image with Conference room with Wood Screen – overall group really liked this image. They like the warmth, rhythm, warm colored floor, finished ceiling.

They would like us to explore seating outside. Is there a moveable solution that could be easily moved inside in the winter? McMurdo in the summer in the evening is when the sun is shining on you.

Comments from Ben:

- Ben said: people like to have their backs to the wall. People like to be anchored to something. People enjoy being next to things that give them a sense of security.
- Ben wants the end of a hallway to end with an event – could be a window or a lounge.
- Ben said: this facility should be of its place. It should be indicative of its location. It is the sendoff place to get to the pull. You are in Antarctica. This should be the reoccurring theme throughout the facility. This could be with use of the history and artifacts that re-inforce its sense of place. When you arrive and first walk into the facility – we should take our architectural and interiors que from the environment we are in. Wildlife, glaciers, always changing water + coupled with the science that has been accomplished there and science that is currently happening, but he also recognizes we should have some fun with it too.
- Is there a front of house feeling and back of house feeling? Ben thinks there can be a different feel in both, but not drastic. He wants to see the warmth too – he feels people need that. He does not need cold.

Other Comments from the group:

- Someone mentioned that what has always bothered him about arriving at McMurdo is that you don't see a lot of Science and he thinks we should see more of it.
- The people that have been there for years, they want to see more warmth and residential feelings. The people just coming in for the first time want to see more Antarctica.
- Having a connection to something living is fundamental. Even if people could just see it and not necessarily interact it. People would go up there to look at it, smell it or just feel the humidity. People miss the green space. They miss grass.
- They would like a fireplace - it could be anywhere and people would gather there. It would have to be gas.
- There isn't a lot of movement at all – so the idea that fireplace could provide movement or maybe kinetic art.
- In the winter – we set up a light room to help with seasonal depression. Could some of our rooms be able to change the lighting? Do we have specialized lighting that changes how the sun would change?
- The lack of stimulus can't be denied. Being able to look outside and see what is happening is necessary. Is something highlighted in this view? Maybe a geographic icon.
- Someone mentioned a ski-lodge type feel.
- They don't currently have janitorial services. - We need to keep this in mind when selecting interior materials.

5 words on how it should feel in these social spaces

- Warm
- Comfortable
- Fresh
- Clean
- Uplifting

5 words on how it should feel when a delegate comes through

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- Efficient
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	1:00-5:00		Break Out Sessions
3.2.3		(OZ)	Track 1: Quality of Life
			3.2.3.5 Lounge

Lounge at the Bar

- Adjacent from the gym
- Is one enough?
- Should there be sub spaces within the lounge?
- Hut 10 – still want to provide a place for smaller groups to reserve this for dinner parties (space to accommodate 10)
- Can Hut 10 be re-located? Maybe find a place for it somewhere in Central Services. Maybe tuck it down below/sheltered from the wind. People really like the view from the deck that this space provides. Need to duplicate.
- Does this encompass the coffee house function?
- We are taking two bars and combining into 1. At any given night – there are very full. It was asked if the square footage was comparable. Rick said the size isn't finalized.
- Capacity is reached. There is a band stand in there. There is a station for a DJ/mixing board. There is a bar. There could be 200-300 people in both bars combined. There is trivia there, bingo, DJ dance parties, Sunday morning mimosas. It is currently also used a training center. It is a day bar for night workers.
- To maximize space – having some built ins for lighting and sound would be helpful. Right now, it is a furniture item and has to be moved in and out.
- Having the stage be able to collapse would be great when it isn't in use. Murphy Stage??
- It is so loud you can't hear the person next to you.
- Do we need a place for big coats? Now that you don't have to go outside to get to the bars this may not be needed.
- A smoking shelter not too far away would be good.
- There are 2 bars currently and there are 2 very different types of populations that use these bars. Are we going to lose patrons by combining into one? Is there separation within the 1 larger bar that could house both functions. 1 has music/poo/games table and one is just a drinking bar.
- We need a dumbwaiter to get wine upstairs – would be challenging to have to haul this up the stairs.
- Do we have two separate rooms separated by the kitchen and beverage area
- Having the band room adjacent to one of the bars – for easy of equipment moving. Is the stage accessible to the recreation gym where the big Halloween party where it could be dual purpose. Is a big band night close off the gym?
- Sunday Night Science Lecture – where is this happening? In the Multipurpose Lecture that holds 150 people? Does there need to be more seating? What type of seating? OZ to confirm.

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3.2.4 OZ – Kitchen and Warehousing

Food types:

- Frozen
- Refrigeration
- DNF

Would consider a small area of warehouse just for refrigerated warehousing requirements
Ideally have refrigeration on edge of outside but nothing stays outside

Thawbox:

- Refrigerated
- same temp as fridge but needs to be separate from produce
- 5-7 day thaw time on proteins

- Often have to clean and replace trays

Process:

- Purchase through Maxima (order program)
- They crate it/ship it
- Ship arrives
- Container unloaded and brought to warehouse
- Scanned food from container
- Put into freezer
- Put on shelves in food containers
- Document in inventory program
- Galley orders what they need
- Goes to thaw box
- Walk into freezer and select items for thaw box

- Ideally pull week's box instead of individual items (kitting)
- This doesn't include condiments because that has to be handled separately

- Going to have to have a separation – cooks can't be running to warehouse

- Crates are for frozen food only. Designed to fit into shipping containers. Crates define racking system

- Can't use cardboard for shipping

- 40x40x40 crates – fit into a container
- Can you reduce one container to a half size – moving 2 containers filling container with 100% full. Kim – this depends on the vendor's packaging

- Have an inspector during packing/crating process. Can you get supplier to consolidate? Kitting will change crate size configuration

- Can you kit for one week's worth of supply?

- Minimize cube at warehouse, minimize labor on the ice, minimize time at the pier – all of this is important

- Would still have surplus for additional needs (outside of standard kit)

- Don't need to kit if we have a surplus of warehouse. But it is more labor on site.

- Need to figure out cubic foot need standpoint and space efficiency

- One weeks' worth set into a crate stateside
- McMurdo plans their own surge protection
- Current state with no kitting – 3 bodies dedicated in warehouse 35 man hours
- Beverage and retail is included in this dept also

Joe Levi

- Weeks supply (25-30 crates per week from freezer to the galley) Currently
- If it is packaged by kit – process – supplier component ie: cisco is warehouse – they provide order to kitchen – bulk
- 20 x 18 current refrigeration capacity
- Ideally bigger – bring in with a forklift on a pallet

- One physical spot – stored and kitchen gets as needed
- Currently come in a box
- Would like on wooden skids
- Delivery via plane – all food service is on its own
- Supply – drops air force pallet in cooler
- One person breaks it down and puts it on shelf
- Some things like potatoes don't have to be refrigerated.
- Freshies have to be brought in from the wind asap since wind will kill it
- Need another room – open up and deliver
- Right now everyone needs to be on same schedule
- Have to pull on coordination. This would allow this to happen at different times of day

- Thaw Box
- Freshie Box
- Kitting matters so you know how big to make the door – garage door on one door and regular door on the other

- Part of scope includes equipment availability
- Size thaw box – Dan will provide numbers, quantities to determine this size (one week's worth)
- Need 12 days of storage
- If you go to a day pull then kitting won't work – then you would only need 7 days of volume instead of 12
- From touch point standpoint – you drive it up
- Steve no galley freezer.
- Have freezer as part of kitchen plan
- Have a Volume of freezer space that is keep frozen until point of use? Benefit to this?
- Three elements of storage
    - Freezer
    - Refrigerated – produce and dairy
    - Thaw Box (have backed up to frozen food warehouse where theat crate is dropped into thaw box) Kitchen pulls it out to cook
- Refrigerated – clear access from dock to refrigerator – kitchen gets to it when it can
- Freezer – located adjacent to frozen food warehouse
- Need door for dry good drop
- Chicken – from freezer to thaw box, separated by day
- Different proteins have different thaw times
- Don – what should the average size of a thaw box should be. Dan will give current calculations
- In reduced population – figure out square footage requirement
- Separate BFC freezer – bulk storage for BFC
- 1200 slots for 40x40x40 crates of frozen product (heaviest crates about 1200 pounds)
- Will be a two story space
- 44 frozen food containers last year there were eighteen 40 footers frozen only
- Unload in 5 days
- Containers get backfilled with food waste
- How many loading bays do you need for ship unload – processing?
- Efficient to have a slot for every crate?
- Come out of container one crate at a time
- Aaron – Backed up on trailer – loading dock, unloaded, reloaded with waste
- 22 drivers come down to unload
- Grading is going to affect unloading and loading docks

- Challenge of lifting container off on to ground
- Already fighting the grade – lower the building not raise the grade
- Bill has to drive into the building
- Aaron – plan on dock and relationship between buildings being at same finish floor elevation = need to figure that out
- Bill – galley pad is 4 -5 day operations
- Drop containers on ground by freezers it would be quicker – out of milvan, on to the ground, on a shelf
- Intent is one elevation of process – Don s
- Food service warehouse standpoint needs aspect:
- Note – freezer food comes in same size packaging
- Dry and DNF do not come in same size packaging
- Can change request to have everything shipped on a standard American pallet

Drygoods:

- Currently 3 stories of storage – includes Pole food too
- 176 and 120 currently
- Milvans of dry goods and DNF – food service volume stored in shipping containers
- Dry goods come on standard wood skid pallets

Warehousing component of waste:

- Food waste has its own process – put in tri-walls, collected into freezer containers that go back on the boat – will still need outside storage area
- Centrifuge and de-watering – extruder that was discussed a while ago did not happen
- Daily collection point of base services – Inside to reduce visual clutter – reduces OSA
- Should be dewatering waste into tri-wall – out the back dock – tagged and moved
- Food waste – recycle waste
- Kitchen element of waste prep collection location that can be collected – removes visual clutter – waste handling operations comes down on scheduled intervals
- Will need large enough bins for collection
- Food waste will be a refrigerated space
- Need to find waste prep in right space
- Waste prep element – kitchen side function and campus function
- Dave – might not be waste collection
- Note – primary passenger pick up and drop off is going to happen at front door – but you have PAX at the back side. They need to be checked in on the outbound side – which is bag drop and bag pick up
- Bill – if people don't show up – there I s a lot of communication going on trying to find them – need a communication method. Have them congregate in multi-purpose lecture hall
- Central collection point for bulk of recyclables and standard trash and food waste. With storage and then taken to other facilities – looking at waste energy system – pallets to wood shipper – used for power
- Looking at co-mingled recycling
- Waste prep shown in central warehouse doesn't not include Crary or Field Science

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

Bill - things that co-mingling should be outside – maybe have chutes.

Recap:

- Officing – Centralize administration (managers) to be located on second floor – bring together to the extent that they can – recognize office requirements for these entities
- Probably not open space due to noise

- Having offices towards dock side would be better than towards kitchen side to be closer to offload
- Office requirement in future likely to be less than what it is now due to technology
- Vessel-off is a week out of the year
- Regular operations – seasonal operations – everything comes via plane
- How done now? Pallet once a week will come in by plane with freshies – pulls into yard – pick it – drop it right into warehouse. Pick off transport and ideally drive it in to its
- Ben – receive freshies from flight line but if arrive at dinner time they can't let them sit because they need to be processed immediately – Put in temporary location until it can be processed
- Ben – frequency determines process
- Happens often that delivery comes in during dinner time or night time and don't have to staff to unload
- Ideal to put pallets on reefers
- Can you drive it into the cooler and later break it down? Yes – this is the ideal situation
- Supply would have people on shift for inventory control
- If it happens at midnight – can goes into refrigeration at field science support or if there is space
- Operational change - ATO drives it into the cooler in Central Warehouse – tag it in system to be logged in and then kitchen can break it down.
- Bill – how much space do you want to have by kitchen – plus the room to work around with shelving – large space. Or put it into reefer space in field science and then move it over the next day? It would be fully intact – Ben likes.
- Kim – what size in Central Supply? Which is office supplies, excess medical supplies, gloves, large outdoor supplies – compressed gasses, empty 55 g drums. Don – gasses and welding – these are distinct storage issues to be figured out – will store close to where they are being used
- Propane isn't stored indoors
- Central Supply is for station supply and food storage. Need central storage for hazardous chemicals outside of Central Warehousing – like paint. Can't store by food or where people work, battery acid. Do you centralize it or decentralize it? Currently centralized.
- Housing chemicals housed there too – such as bleach
- Bulk storage vs daily storage
- Don't have mediation for spills
- Currently segregate chemicals as best as they can
- Hazardous material and bulk storage needs were not figured out in MP 2.0
- Central warehousing is 2 story storage
- Once a month they go out and gather quantity of supplies – consolidate requests – but you may have to deal with an immediate oil spill
- Don't want to pigeon hole the non-specific storage needs
- What needs to be a barrier between storage areas?
- Warehousing person needs an office – or some capability of customer service counter with work station
- Retail store – back of that should be against central warehouse
- Beverage storage – need to figure out if storage for store or storage for sales at lounge
- Dan – maybe have alcohol sales adjacent to bar. Would allow you to decrease the size of the store
- Bill – other things to go in: Store, Post office, Mail room. Back up IT is large
- Don - work to do on scaling these spaces
- Station services management and recreation person could go to gym, storage could be collocated storage and gear issue
- Direct access to the outside for gear issue would be good
- Plan for worst case scenario – surge capacity – is it standard operations
- Supply – consolidating space but still need customer service at every functional warehouse. Tablets would work well and have scanning ability. Warehousing staffs part counter inside VMF . Every component could potentially be viewed on a tablet – could see a photo of it. Saves user time and also saves warehousing staff time too. Having pallet racking will help – have central warehousing items in one location

- Food services – have a significant footprint with bakery. Warehouse allows storage of baked goods – so you could cut down on bakery and staff. More efficient kitchen equipment. Store has an opportunity to be an on-line option but if you put on intranet you can order it on line pick up from warehouse. May not even have to be a manned store.
- Sell beverages out of window connected through warehouse. Move a certain amount to the front for sale.
- Going cashless is a labor reduction.

Mail:
- Post office box
- Plan for surge capacity? Letter mail is lowest volume mail.
- There is a size limit to mail to McMurdo

Wed July 29 (3.3)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

3.3.0 8:30-9:00 (OZ) Review previous day's work

Danny Richtenstein – PDC Engineers working on Crary

Mike: Back of House summary:
- Kitchen storage directly connected to warehouse will provide greater efficiency for Kitchen and Supply staff
- Frozen food storage of 1350 for current operations 42x42x42 (or 40x40x40)– also need dry storage
- Waste collection operations needs to be determined – will impact design
- Determine hazardous material bulk storage method and location
- Central Supply warehouse in requires a customer service counter
- Locate store and post office adjacent to warehouse
- Beverage sales direct from warehouse
- Tech and appropriate racking layout will lead to increase efficiency for supply
- Ben – what is "appropriate" – plan on talking to warehouse consultant – thinking about Costco model; talked about using a tablet for inventory
- Frozen bakery products, new automated equipment, virtual store and cashless Antarctica will lead to greater staffing efficiency- can eliminate some labor by not making stuff by scratch - air force store not manned – just swipe your card
- Food service questionnaire tied to forecasting may/will lead to reduced waste – regarding dietary needs/requests

Mike Diagram review:
- Once a week order is made and brought into thaw fridge with 7-10 days of thawing proteins
- Don't want to mix veggies and thawing meat if possible (Todd)
- Freshies go into its own box
- Dock, enters inventory, frozen burgers stored in freezer, culinary manager places an order placed in thaw box, Peas would be brought into freezer close to kitchen
- Don't want vegetables thawing next to meats
- Support Pole and McMurdo – large amount of frozen goods. These are moved by forklift within the freezer itself
- Same operation as warehouse? Yes
- Two story warehouse with forklifts
- At offload – forklifts taken off container – inventory put on racks, stays there until culinary staff places a

weekly order. Reverence bin numbers, pull product, move it into kitchen area

- Have menu – now they order.
- In frozen food warehouse – someone has an order – how does he pick the right volume? Dan to decide if it is going to be in a kit. Kim – process flow is determined by Dan and GSC decides food process – if it's all kitted or if It's sorted by all chicken, all beef, etc. She referenced Cisco and how they have someone driving the lift and someone on the platform gathering all of the material to be more efficient.
- If it's individual – it may be 500 lbs – then just grab 500 lbs
- Ben – important to understand operations because other operations are working in that warehouse too.
- Request the pull – delver the pull – just have to set the process
- Have an inventory management but may have to have warehouse management – like an Amazon model, where a computer system is notified and an order is automatically generated when a rack gets empty. Warehouse consultant will help drive this.
- Central Warehouse – customer service point for public:
    - Not everything is ordered electronically, such as coming in to try on clothing, pens/pencils, small goods that are not delivered in bulk, have an interaction with customer, be centrally located to process order or call it in on a radio. Not a full time position.
    - Ben – Science support was going to use Central Warhouse for food storage? Redoing the BFC country store which will roll into GSC kitted food which will come from general supply function and then delivered through central warehouse into science and then becomes part of cargo stream. If so – customer service position should be in a different location (too front and center)
- PAX pick up – outbound pax drop off luggage night before, gets palletized and weighed. This is luggage – not passengers.
- Steve – could move post office near PAX to accommodate things like Christmas packages

- Beverage storage – sell out of beverage warehouse – same person who works in store and then goes to work at beverage warehouse. Steve – move store next to beverage so they can get both chips and alcohol at same time? Shaggy – have access to pallets of beverages instead of moving from beverage storage to store. Move t-shirts to alcohol storage and call it "Retail Warehouse".

Comments:

- Ben – where do bulk goods, such as furniture, tires – at offload? Shaggy – come to dock and put away right away as opposed to throughout the season - need room in the warehouse? Tires currently are outdoor storage that are shrink wrapped – at supply department Ben – can supplier wrap them? Not sure but this is labor intensive; utilize empty fuel tanks for storage;
- T-shirt example – container of shirts, delivered to loading dock, unloaded, put into warehouse
- Kim – faster unload then the milvans are available for other departments
- Ben – fabrication materials come in a container – where does this go? It goes to Trade Shop warehouse and not touched until it's issued
- Need to think about right-sizing trades warehouse – should quantify that by working closely with Kim regarding quantity of materials needed to run and maintain the station. Ben – factor in frequency in making these decisions
- One-off items are hard to predict – like a panel, or a window. How do you predict extra material? Rick – standardized building materials will be factored into inventory.

Rick Summary of Community Support Services

- Recreation/Skills Development:
    - Benefits of recreation opportunities
        - Stress Relief/Mental Well Being
        - Maintain sense of physical state
        - Social interaction
        - Extension of workplace – conversations about work
- Types of Recreation

- Contractor driven/institutionalized (ie: stretching) – decrease workplace injury
    - Elective

- Understand an evolution of volunteer lead activities instead of staff programmed. Now one that is a coordinator of volunteers, so there is a broader variety of activities per season, ie: salsa dancing;
- More emphasis for adaptability

1. Rec facilities:
    - Gym – more multi-purpose spaces such as all-hands, mass casualty, Halloween dance, can be programmed for middle of the night balloon layout
    - Yoga/Fitness – accommodate 60-70 people (will be sized accordingly for range of activity) – storage capacity
    - Craft
    - Cardio and Weight Room – co-located
    - Music Room – grassroots band practice time will be accommodated, will have smaller areas to reserve, but also be multi-purpose
    - Outdoor Rec/Gear – 12x16/20 will be appropriate
    - Library – have not yet defined location
    - Radio Station

2. Social Spaces
    - Flexible range of adaptable space – need room for small gatherings with appropriate furniture
    - Visual and acoustical separation

3. Lounges
    - Need for concurrent different activity levels and demographics
    - Suggestion of two spaces
    - Acoustical separation

4. Interior Design Character

Goals:
- Local population – warmth, comfortable clean, fresh. Uplifting
- NSF – professional, efficient, timeless, permanence; Steve: research focus photos –Words: "progressive, inquiring, state of art, discovery"
- Overreaching goal "of its place" – pick things inspired by what is outside of the window
- Reflective of local physical environment

Color and material:
- Base palette reflective of local physical environment (color and texture)
- Use of warm tones/textures enhance wayfinding and create a sense of place within larger context

Utilities:
- Ben – engineering focus – input on what has been brought up that is out of the norm regarding efficiency on movement – daylight harvesting, mechanical:
- Dan – electrical seems good. Skylights might not be right depending on R value. Reduce energy in these areas to dim lights or turn off - energy savings with daylight harvesting without poking holes in exterior. Warehouse – block off portions of warehouse where temp can drift so can provide less heat and light to those areas? Ben – capitalize on climate to reduce artificial cooling needs? Kevin – yes goal of mechanical system is to minimize mechanical refrigeration. Environmental rooms and sea water in aquarium will be specified.
- Mech challenge will be that it is a consolidated facility with many different uses and functions provides a challenge. As we move from station to science we'd like a mechanical system that responds so not heating everything at the same time.
- Ben – don't want systems fighting each other – using integrated systems for efficiency. If we can capitalize for

free cooling then we should. Energy expenditure, reduction of energy demand is ideal.

- RP – Dan – range of comfort levels in different areas. Warehouse may not need to have same comfort range. Bring in daylighting in Warehouse to alleviate artificial lighting – maybe have lower light levels – penetrate envelope with sky lights.
- Dan – change in seasons will require work closer with Baker to figure out where you can have savings.
- Joe Levi –Regarding skylights – those are great 6 months out of the year, but maybe for the next 6 months it's a solid panel that makes it more efficient in those times without solar benefit. Looking at combining systems that could be a show-piece to accommodate both seasons.
- Steve from a maintenance perspective – recognize storms per year (regarding penetrations).
- Kevin – daylighting vs mechanical. In states use as much daylight as possible, Could use artificial light as a heat source too.
- Bill K – northern slope is using LED
- Dan –looking at progressive but true technology

Feedback regarding dining (images):

Image 1 (Zebra Café looking into private dining)

- Tracy recaps that we want to create zones within the space so if someone wants to be alone they can versus a larger group that wants to sit together.
- Ben Comments: He likes the treatment of the wood ceiling, but doesn't see anything especial with the ACP. He doesn't think this is anything special. He does like the alcove in the back and thinks that is a good thing to include. It could also be used as a teaming area or an impromptu conference room.
- Tracy brought up the folding wall in the photo and do we see a need for that?
    - Ben brought up the current Galley area said there are 3 distinct zones between large, medium and small volumes. He thinks we need to achieve that same thing. He wants people to be able to anchor themselves to a wall or a small room.

Image 2 (Zebra Café Lounge Area)

- Someone commented that they like the idea of having a lounge zone off the café – especially for off dining hours for a quiet time or impromptu meeting zone or coffee shop feel.
- They love the natural light
- Upholstered furniture is nice to have, but it has to really hold up. People are dirty and have tools. It would be great to be able to easily reupholster.
- Ben likes the ceiling zones that are created with lights

Image 3 (Stadium Seating)

- They like this image of a small area with stadium seating.
- The grantees like this for the Sunday Night Lectures
- They like the Hybrid

Image 4 (images showing low seating and high seating)

- Someone commented on the graphic glass wall in the back and asked if it was easy to change out. Tracy said there are ways to accomplish this look. For example – could use decals that are easily changeable and not very expensive.

Image 5 (Booth areas)

- They like it, but they like it more off the lounge areas versus off the dining area.
- They like the idea if they could access it from both sides so no one is trapped in and as a divider from space.

Image (Café with acoustic baffles in the ceiling)

- Cold

- Like the mobile tables

Image (Emeco Chairs with wood ceiling)

- Ben likes that it is open to the structure with a drop ceiling. He really likes the dropped wood ceiling.
- The kitchen bar area is a good idea. Having an external kitchen would be nice for people to make their own food.
  -

3.3.1 (OZ) Track 1: Central Services

9:00-11:00 3.3.1.1: Administration (includes HR, Finance, Command & Control, Retail Store)

10:20
Central Administration

Command and Control Review:

- Encompasses Raven Ops, MacOps, Fixed Wing, Helo, Dispatch, Weather, Air Traffic control
- Supporting spaces Include EOC, 16-20 people to convene and deal with emergency; Private room 10'x10'
- Goal is to be able to respond quickly to any incidents

Tracy:
We think about workers in different ways:

- Resident Worker – at their desk every day of the week - @ least 50% of the time
  - Panels, more storage, more work surface
- Flex Worker – not always at their desk, but less than 50% of the time
  - Layout is more collaborative maybe. Less worksurface and less storage or storage is used as a divider
- Mobile Worker – someone's work is done outside of the desk the majority of the time, but needs a place to touch down
  - A 4'-5' desk where you can touch down. Minimal Storage. Small footprint/high density.
- Group Work
  - This might be in the middle of the open office. Screens are being used to help divide the space and give some degree of privacy, but it is open collaboration.

Density

- Tracy then walked through an example floorplan that shows how we can build in more collaboration on Day 1, but plan for added density where stations can just tack on versus having to move all of the furniture. She reminded that we need to plan for flexibility.

Workstation Review

- Tracy then walked through photographs of workstations that were shown in the 3D line drawings that show different sizes, different levels of openness and how storage can be used.

Private offices/quiet rooms

- Where do we need private offices or huddle spaces?

Steve recaps on how they work or would like to work:

- NSF Station Manager – helicopter people – not in the station
- Central Services
  - This is a group of admins and managers
  - IT manager
    - They are having private conversations a few times a week. Not always disciplinary. This could be in an adjacent conference room, but right now they have a private office for it. He feels

that this is how most people are operating right now. This would be a change for how managers work.

        - A lot of managers are on calls with other managers or the NSF in Denver. It is a common scenario that they are on speaker phone with these calls or it is sensitive subject matters that can't be heard by everyone. Or just a 2 hour call that would be disruptive to adjacent workers. The managers in general are very phone intensive and that is why he thinks being in a private office would be beneficial. Steve agrees. Ben said the NSF may not agree. Ben said he wants to look at other agencies and how they deal with audible and visual privacy.
        - Maybe make the manager's office smaller but keep private (give and take.) Could be around 80 SF.
        - Headsets may be another way to help alleviate some of the speaker phone issues so people can continue to work while on the phone, but the speaker phone isn't disruptive.
        - It is worth looking at the station overall to make sure there is flex/touch down space spread throughout the station.
    - OPS Manager
    - Construction Manager
    - Facilities Engineer
    - Logistics
    - ATO person
    - Science Implementation
    - The Supply Manager
    - *Shaggy - if you stay clean throughout the day – you need to be here!
    - There might be some synergy with putting these managers together.
    -
- Raven Ops – Airplane drivers, schedulers and admin function
- Support Forces Antarctica (SFA)– Operation Deep Freeze. Typically they have a commanders office, and admin, a safety officer, a first Sargent and typically they have another office for when a more senior engineer comes down
- Does the Senior SOPP – they are the weather guys. They have a senior site rep. They are not in the command center – they are pulled out separately.
- Command Center – air traffic control, weather forecaster. They also have people out in the airfield, people in the IT shops. They also have administration and overhead that would be on this floor.
- Next to, but not in Command on this floor are: Air Force leadership, NSF Leadership, SFA and SOPP
    - SFA has one admin
    - AFS has two admin positions (1 of those positions may move off the ice)
    - NSF has one admin
    - SOPP
- Where does NSF Office sit – currently in Crary, but do they move now?
- NSF Function – Senior Antarctica Rep Office, site manager office, NSF Rep (who is the senior US Representative on the continent – their day job is to manage the group). Steve asked if they keep 3 offices for them? Ben said we should have the NSF Rep office and Site Manager Office. That 3rd "office" should be a flex space that they can occupy when onsite, but when not onsite, anyone can use it. This is occupied 1 week/year.
- Military (SFA)
    - Admin
    - Safety
    - First Sargent
    - HR
    - Health
- AFC
    - Environmental office – several technicians and manager – open stations with 1 office
    - Safety office – 2-3 open workstations

    - HR – 1 permanent and 2-3 that come down 4-6 weeks
        - GFC – 10% of workforce – similar functions to PAE. 4-6 week duration
        - Lockheed Martin – program management responsibility – focuses on training activities. 3-5 week duration. Training and performance management training with Lockheed Martin personnel, not all station personnel. They use the time on ice to make sure all of the compliance trainings are met before the expiration dates. This is not specific to Antarctica, time keeping, workplace violence and harassment, import/export; it depends on the individual and their function that drives the training. They are not proctoring lectures, they are assisting in making sure they are all updated with their training.
        - Ben wants to know what the requirements are and based on the answers above, he wonders why this needs to be done on Ice. Compliance checking is different than compliance training. This could translate to another seat on a plane or an empty bed.
        - Steve doesn't think his answers about training result in extra square footage.
        - ATO Manager
- NSF
    - NSF Rep – a conference room for up to 8 people used 2-3 times a week
        - This should be a nice executive conf room that represent the presence of the NSF. This is a representative of the United States government. This doesn't need to be dedicated all of the time – other can use this when not being used by the NSF.
        - They are not there during the winter
        - Admin – Ben is asking if there needs to be dedicated space for them.

  - Building 175
        - 8 offices in Building 175 (doesn't need to be offices)
        - Cubeland – Building 175 – 9 large cubes – some are double occupancy – the users of this space are mixed – transient workers.
        - 6 office in Building 165 (doesn't need to be offices)
- ASC
    - Manager will be down there (Currently Steve) – private office, could be shared
    - 1 Shared Office that 4-6 people will come down for a few weeks at a time
    - Winter Site Manager comes in and overlaps with Steve during the summer to winter transition.
    - Where is GSC Management? They are transient Steve said. He is having trouble determining how many of these spaces they want to provide. They don't need a dedicated office, they just need a touchdown. They currently have 6-8 offices and some of them have 2 desk and they are currently in building 175.

Tracy said we will be putting all of this information into a matrix so we can look at the office to conference room ratio and the give and take for the most efficient floorplan.

Ben wants a series of workstations for:
- Flex workers – they have a desk for their whole stay
- Transient Workers – visitors that are coming and going - These are equally equipped.
- There are some workers that can be told they are working on of their room or the library, or the lounge space in their café. If we can put more spaces throughout the station for these needed – that would be idea.

Current Transient Workspace = roughly 48 desks
- 25% could get by with just a small worksurface, but there are others that come in with some equipment that would need a little bit more.
    - Does this storage have to be more robust than typical due to the gear and dirty equipment they are touching down with? Heartwork?

Internet Kiosks

- Steve sees these very under-utilized. With everyone bringing their own laptop and tablet, they might not need these. Maybe it is just a series of worksurfaces in different areas for this need. Right now, people will plop down in empty workstations for this reason.

Where do the engineers go that currently sit in Building 175? If they are moving to workstations – where are they going to live? There are 15 spots, but there is currently 4-5 at a time.

Construction Project Management – where is this happening?

Work Flow in a general sense

- Some offices are going to be co-located with their workforce. They are going to have to flex from time to time. Groups aren't necessarily going to be all grouped together – that is not critical. What is critical is maintaining the flexibility. There needs to be some dedicated storage areas for certain groups of people. You get what is issued to you, you get what you get.
- Tracy asked if we want to provide a couple of different workstation types or all universal.
    - Ben responded: At this moment, he would say the ones that are there for the entire season – have a resident workstation and the transient has the smaller more touchdown space with less privacy.
- Tracy asked how much collaboration should be taking place within these different groups. Should they be located next to these workstations so it starts happening naturally?
    - They have a combination need – Mixed In.
    - I think having a row or benching every so often would be good for either touchdown or for larger collaboration.

- Tracy talked through a flexible floorplan with neighborhoods of different types of workstyles and Ben was receptive and liked it. He wants to make sure everyone has Access to all of the office features.

- General Comment from Ben:
    - He prefers double loaded corridors versus single to maximize flexibility.
    - Be careful with placement of restrooms and visibility.

- General Comment from Joe
    - We need central storage of manuals for when the station's power is cut and they need to be able to fix it.

- Finance
    - We need a space that will hold two ATMs
        - We have people on the way to Pole that need cash and there is no way to support them without the ATM.
    - Room with a safe
    - Need a room that has a locked door where they can count checks or talk to employees about their checks or expense reports
    - Roughly the same size rooms as currently have – they need a room with a counter, safe, storage for receipts and then an area for the ATM.
    - Ben asked what is preventing them from going cashless
        - We would need to move to all credit cards. It doesn't take a lot of bandwidth to just run cards, but the security system to meet all of the federal security system would use a ton of bandwidth.
        - Due to the connectivity issues at South Pole, they use cash.
        - Someone said maybe the cost could be deducted out of their paycheck.

Conference Rooms – is there a couple of workstations that are stacked more with power/data that can hold a team of people if they are trapped or their schedules have changed and they don't have anywhere to go.

- PAE
  - Payroll issues
  - Disciplinary
  - Workman's comp
  - Recruit
  - Converting summer people to winter
  - Evaluations

3.3.1	(OZ)	Track 1: Central Services
11:00-12:00		3.3.1.2: Chapel & Multi-purpose Spaces

Did not happen

3.3.2	(FC/OZ)	Track 2: Crary Session

3.3.2 9:00 – noon: Track 2: Crary Session

Crary Phase I:

- Major feedback from the grantees the first week:
  - Need more space…
  - No central glass washing
  - Labs need more flexibility/scalability
- Kimmy Bowyer (KB): Daily grantee requests for items, space for materials/in coming cargo.
- Tim Briggs (TB): Can be general warehousing or some Crary items.
- KB: Maybe some in trade shop. Where will the hazardous materials bulk storage for the Crary Lab be? Need more chemical storage.
- Keith Johnson (KJ): Power outages may have been alleviated recently with Power Plant/wind power/JSOC
- KJ: Phase I boiler replaced with smaller boiler that is not operational. Fire riser in that area now (boiler room) up to valving upstairs. Will need to be relocated to the new MEP addition.
- The original boilers were steam and have since been replaced with a hydronic boiler which interfaces with the site heat recovery loop.
- Above water tank is main electrical panel. Relocate to new utilidor entry.
- Materials coming from/going to Field Science Support daily/whenever C-17 arrives/leaves at end of season.
- Proposed Phase I dock location may collect a lot of snow. May need to be covered or with a vestibule.
- Locate switchgear at storage (left) on mezzanine or maybe fire equipment.
- Outside deck and/or flags from Chalet (use open grating?), limit operable doors on that side.
- The freezer rooms/environmental chambers will remain in the middle of the phase 1 area outside the biology labs.
  - Condensers will need to be located on the floor above and the heat recovered off them.
  - How critical is temp control of the chambers? When the evaporators go into defrost cycle, the space temp can sometimes climb 1-2F. May need duplex evaporators.

Crary Phase II

- Proposed deck on coffee bar may be impacted by drifting similar to space between Phase I and Phase II.

Crary Phase III

- Supplies for mechanical room at new MEP wing.
- 75-85% of mechanical spaces may be consolidated but some will remain in the different phases of Crary – Danny Rauchenstein (DR – PDC). CHP would save a lot of space. Floor space is at a premium for science.
- Joe Ferraro discussed adding a new Sea Ice and Marine Ops Wing down the hill from Ph III (would be Ph IV?). General consensus that Phase IV (connection to Sea Ice Support/Marine Operations with utilities fed from Crary) is a good idea.
- Robert Posma – Power outages – localized or base problem? Both – in Aquarium and on Station. Station power outages may have been resolved.
- Bev Walker – Seawater line – One jetty for science and station pumps.
  - One waterline into sound for 4 pumps
  - Now the only back-up pump system is one deployable thru ice. When there is no ice it is not deployable. What are contingency plans in open water situation if pump(s) go down? Potential single point of failure for seawater, consider adding redundancy.
  - Storm two seasons ago there was significant erosion. Was pipe with pumps damaged at that time? Was dog leg more pronounced after this storm?
  - Science requirements for seawater – need to mimic sound conditions closer.
  - Different seawater system in Aquarium to mitigate issues with water?
  - Similar to Palmer? Two water lines: one filtered and one not filtered. Is filtered seawater needed in the future?
  - Also at Palmer: Two salt water lines so can back flush one while other is running.
- Insufficient Seawater Pressure due to usage.
- Need to monitor seawater temp.
- The Overhead Door is an issue when open during windy days. Add a vestibule or air curtain?
- Facilities Engineer (for Crary) – Typically specialized service techs.
  - Assist the Grantees
  - Handle general maintenance
  - Maintain Barber Coleman controls
  - Their office would include a maintenance area
  - ASC envisions less time needed by these techs to provide maintenance support after the renovation is complete
- There was an issue with the seawater heating up too much when pumped up from the sound. Needed to be chilled back down? Potential for heat recovery off of chilling process? Will increasing flow/pressure address this?
- The seawater intake/distribution system is considered a weak point.
  - Looking for more reliability
  - Currently only have unfiltered seawater at McMurdo.
  - NSF is reviewing the need for filtered seawater infrastructure (filtration would be a major add)

Crary General

- Will there be any modeling of the airflow on the site (RWDI)? Need to ensure Fume hood exhaust and turbine exhaust don't get re-entrained.
- The existing lab has many roof penetrations which haven't been too much of an issue, but we should try and limit them based on North Slope Experience. Also, there is some roof mounted user equipment for experiments.
- Matt Emerson (ME - PDC) – Regarding vibrations: From walking around or when?
  - Pick-up trucks and large equipment, when freezer doors slam, heavy carts in hallway, wind buffeting, environmental chamber doors shutting, helicopter takes off – biggest concern is in Phase I.
  - Phase I was reinforced in original design. If equipment is relocated to Phase II, may be an issue.

  - Carts/dollies/pallet jacks cause vibration. Can do vibration mitigation on small scale with anti-vibration tables (microscopes). Balances can't be used on a windy day. Will sometimes go outside building where there are no trucks/vehicles to do calibrations/measurements.
  - New road on the right of Crary may increase traffic – less traffic on left side? Relocation of helipad? May have to look into stiffening the building.
- KJ: Freezing in crawlspaces with specific wind direction.
- Grounding of the building is a potential concern due to dry soils. Most buildings are tied back to the transformer and ultimately back to the power plant.
- DR: If we were able to rewrap buildings – would be huge gains in efficiency. Vapor barrier is key.
- Joe: Designed to be R40.
- Loading docks get a lot of wind infiltration when open, resulting in rapid temp drop. Need to add a vestibule or an air curtain (more economical).
- There are some requests for decks on the 2nd story plan south of the phase 1 area, and off the coffee room in the phase 2 area. Could be tricky structurally.
- There are some exterior stairs that could benefit from a canopy (snow shedding, drifting, etc).
- There is a desire to add a road down the plan right side of the lab. This could prove trick considering the steep grade and the flat areas required for the loading dock at the plan east side of phase 1 and the plan east side of phase 3 Aquarium.
- There is a desire to have a pad outside of the aquarium for experiments that need daylight (diurnal?). Not sure if this would be like an outdoor wetlab or just a concrete pad.
- What are the humidity requirements for the labs? Typically they are 30%-60% which will be an issue with the envelope at sub-zero temps. Would they be willing to employ a humidity setback based on outdoor temp? UAF has successfully employed this with no issues, dropping as low as 10% RH when it's -50F outside. Reduces potential for envelope damage/failure due to frost.
- FCA is showing fume hoods and storage on the exterior wall of the labs. This will make keeping condensate off the window difficult (radiant ceiling panels?). It may also bring the freeze point inside the vapor barrier if not careful. Also makes heating difficult.

Nathanhoople.contractor@usap.gov (send seawater report by grantees) – KSC sent on 7/30.

Breakout Session Participants:

Kim Bowyer	Kimberly.bowyer.contractor@usap.gov
Nathan Hoople	Nathan.hoople.contractor@usap.gov
Danny Rauchenstein	dannyrauchenstein@pdceng.com
Aaron Seal	aaron.seal@merrick.com
Keith Johnson	keith.johnson.contractor@usap.gov

3.3.4 1:00-3:15 (OZ/Baker) Lodging and Associated Social Spaces

1:10

Andy White – OZ

Rick Overview:

- Of all areas on site, this is the one that has the most opportunity to custom tailor to our needs. We need to accommodate 850 beds at any given time. We want to standardize them as much as possible. They should not all be identical because we need to accommodate couples. We also need to accommodate some Distinguished Visitors which may be larger than our standard.
- The type of space and what it wants to accomplish is what we need to discuss.
- These rooms by in large want to be singles. This will keep a healthier population and privacy.
- We want to harvest the uppercase dorms. 3 stories of steel.
- The 4 existing structures get us 120 each so that is why we have two additional new buildings.

- This is a challenging site – pretty steep. Would it make any sense to elongate the existing buildings versus 2 new ones.
- We also want to incorporate lounge areas in each housing building. Does this work on the ends? Why on the ends – they could be semi-public/semi-private that is adjacent to restrooms which gives a better buffer to the quiet zones.
- Should each of these buildings have a different look and feel? Will that help create a sense of community?
- Ben is very aware people need to get a good night sleep and he doesn't want intoxicated people going through the entire building and past the sleeping rooms to the lounge. Keeping the sleeping rooms quiet is the top priority.
- Is there a phasing or mechanical reason why circulation can't go on the left versus on the right?
- These are Butler Buildings – they are like an erector set – we have flexibility.
- Joe brought up that the buildings are so close – can't we just have a roof over the gap? There isn't going to be much sun getting down there.
- Ben asked: What is the grade differential between building 1 and 4.   Answer – 3'-6". Ben asked if it is possible to connect them in the middle or the ends.
- Is the new proposed building to the south flexible? It would free up views down there. Could both new buildings be to the north versus one on either side? The phasing is very important to remember. Moving another building to the north would be a phasing nightmare.
- Ben is looking at how long the buildings are becoming. Is this going to become a challenge with the sleeping environment? Or just the aesthetic of a very long hallway.
- Room configuration
- Bathroom configuration
    - Ben asked how many people there are per floor currently vs. showers. Answer is 4:1
    - The current plan moves that ratio to 5:1
    - Someone commented that there maybe should be addition toilet only rooms. Or do we combine showers together on one side and toilets on the other.
    - Are these co-ed?
- Ben wants us to look at the length of the corridor. He thinks we should introduce access to daylight somewhere down the hallway or interrupting the hallway. Visual access to outside views.
- Have janitorial services more centrally located.
- The stair landings currently are big enough to easily carry someone on a stretcher from the 3rd floor to the 1st floor.
- Maybe move two of the bathrooms down at the end of the hall on either side of the stair. Then you could open up a window view at the end of the hallway.
    - Ben wants it efficient. Co-locating our utilities makes more since than dispersing.
- Have at least one bathroom off the lounge
- Ben said what is nice about the poll is it goes from Loud, to reserved to quiet. There is a clear delineation and it is respected.
- What types of codes and governing's do we have to follow
    - No formal ADA
        - To come to the ice, you have to be able bodied. So ramps and clearances aren't required.
    - The current international codes adopted by the NSF are what we will follow.
- Are we going to have some of these building go Cold in the winter?
    - There are items like phones and TV monitors that can't freeze. However – we could take them down to a certain temperature and still be OK. If it gets cold enough, they would have to take all of the equipment out and store it in warm storage. The existing buildings are very analog, but the new building will be very digital and therefore will have more items that need to be kept warm.
    - We will winterize them to some effect for sure – it is just how far will we take it?
    - We should look at a budget – what does every department have to do to winterize the building – and compare it with the energy cost to just drop the temperature to a certain level and see which one is more cost effective.

- Every room would have a digital thermometer that would need to be pulled out if the building went cold.
- Wet sprinklers – has to be 40 degrees or above
- Do you rotate the winter dorm so you don't get wear and tear with a designated winter dorm?
- Pole was not designed to be shut down
- Protecting LCD screens from cold

- Most of the buildings have Sauna's in them – is this something that needs to be incorporated in the new dorms?
  - Shaggy asked if this could be near the gym functions.
    - Steve agrees – he thinks it should be near the gym where it could take more volume. If the buildings are more interconnected – he doesn't see a problem doing this.
    - There is a lot of time spent cleaning these every week and lots of deep cleans due to the nature of the room so having 1 larger one versus 4 of them would be easier to maintain.
    - Ben thinks the most appropriate place is the gym.
  - Someone else said they like to use them before they go to bed so being conveniently located not far from the dorms or in the dorms would be good.
- Personal Storage
  - There needs to be thought into personal storage. South Pole combines a lot in the room with the dresser under the bed.
  - Sometime people have so much gear – especially in the winter where there wasn't enough space in the room and people moved stuff out into the hallway.
- Are there rooms some rooms that are bigger for winter overs?
- South Pole rooms are between 80-90SF
  - James said that if we could squeeze even 10 more SF in to the room for more storage – it would be worth it.
  - Rectangular rooms seem to work better than squares
- We need to think through the movement in the room – thinking of walking through it with big gear on.
  - Can we do a mock up?
  - Ben said to do a true assessment of what goes on in the room. Not just the area, but the volume.
    - Steve said we could generate a survey. We need to differentiate what people want to bring and what they actually need.
- The feedback for Building 210
  - Great improvement
  - They were smaller, but were single rooms
  - They had room to move around
  - Storage was good
- Could we loft beds?
  - We have to keep in mind that not everyone is as able bodied as others. We couldn't have all of the beds lofted.
- We need to design spaces for people to hang up a poster and a family photo. If we can design a space to do that without nailing into the wall – that would be great. Maybe a tack board or tack strip.

3.3.5 3:30-5:00 (Baker) *Security and Monitoring*

- *3.3.5.1 Department Requirements/3.3.52 utilities or other specialized spaces/3.3.5.3 Restricted areas such as helipad, Roof access, other (Combined)*

Physical Security and Monitoring – Lance

Existing –

- Most facilities are not locked

- Standard keys and locks are used for secure areas, which are difficult and costly to maintain
- Limited key card access – Crary
- Security Cameras – TMS
- IP cameras for video monitoring – Equipment, IT racks, SPAWAR and Situational awareness

Proposed:

- Not all areas require security
- Technology leading towards key card access
- Other technology in the future could include biometrics (fingerprints, iris scan, facial recognition)
- Areas that require secure access
- Data Center – Each Agency could have individual caged space
- Crary Lab (including areas with controlled substances) – currently key card
- Pharmacy
- Dispatch Center/EOC -
- Dorm Rooms
- Store
- Utilities (in each building)
- SFA/ANG Classified Documents
- Need for atrium so card reader can be indoors
- Looking for consistencies throughout the station
- Other possibilities include using access key card as a smart card to purchase things from the store

Additional Spaces?

- Cargo
- Trade Shops
- Any supply area
- Finance area – cash
- Management offices
- Tools
- Lock shop

Input of key card vs keys:

- Key card – sturdy ones though
- Steve – have had to re-key locks in the past. Ability to mass program locks rapidly is good
- Hard keys have to be replaced often
- ANG wants their keys as brass keys
- Cost difference? Based on Maintain system, put in infrastructure, program keys; typically card key units are 2.5 the price of a standard lock/ley unit, cost of card products differ; gives full level of programmability, in future you could use the RFID card for system wide use ie: Cashless Antarctica, check out gear, access to printer, etc.
- IT Joe – scope level – is it outside the scope?
- Have key card tied into mechanical system of dorm room
- Do you have to have training for the system?
- IT security boundary possibilities
- Would have to probably have a person somewhere – possibly off continent to work on control

Cameras:

Areas that require security cameras:

- ATM
- Alcohol – sold and consumed
- Pharmacy/Crary – for controlled substances

- Dispatch-EOC
- Antennas/Radomes
- Store

Comments:
- Monitoring activities
- Data Center
- Antennas may move to monitoring instead of security

Video Monitoring:
Areas that require video monitoring
- Exterior station wide cameras – at 4 corners of the site, weather, see airfield and heli-pad, personnel
- Equipment – Comms, radomes, instrumentation, off-continent troubleshooting (watch a video to see how to perform a repair)
- Remote locations

Comments:
- Monitoring is for Intrusion Detection – or door being left open
- Arrival heights camera would need video monitoring because they aren't manned 24/7

NOTE TO TALK ABOUT EXTERIOR LIGHTING (to tie into video monitoring) Joe – you can illuminate with infrared lighting

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Proposed Security – Misc.
- Secure lockers for personnel to store belongings off season
- Safes

Comments:
- Yes – would be desirable to have a lockable space for personal belongings
- Willi and Alpha airfields as well? Yes – can go to remote locations like airfields
- Camera monitoring being done over microwave currently
- Can pull up a camera view on the computer
- Joe – checks them currently after a big storm

END of DAY

5:15-7:00	(ASC /A-E Firms)	Designers and ASC review day's input and develop notes and graphics For next day's sessions

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Fire and Medical – OZ – morning

VMF and Traverse Ops is weakest part of our master plan:

- Traverse Ops building started as a warehouse up on the hill, was going to be a way for traverse to roll in and out
- And for winter it was meant to be storage
- As it moved on – decided to put admin and full facility options in it
- VMF to use to store equipment into it
- Morphed into what it is now

VMF:
- Old facility
- Cramped
- Ventilation system allows permafrost to stay cold

- Beams started to delaminate
- Footings shifted
- Structural engineer said to de-rate the floor
- Take tanks out of the building
- Take 004 to be IT Primary
- Build back half out to be IT Primary
- Square footage programming was not programmed in
- If Traverse ops is full facility – what do we do to make VMF and Traverse Ops as col-located combined facilities
- If so – what do we do to optimize space – it becomes light vehicle maintenance – with ANG on the other side
- Will have a phasing issue as well as a cost issue
- Recognize that now there are opportunities to address this
- Fleet Ops runs on its own – own warehousing, own food, own maintenance (maintenance happens in winter) in summer they are in field driving and maintaining
- Question – Are you going to have 2 traverses?
- Very expeditionary
- Currently maintain equipment in the VMF
- Currently have space constraints
- Added traverse tractors but didn't add space for them
- What about equipment coming down for construction – does NSF purchase them? Use them to self-perform? Questions we are faced with…
- Ben – heavy equipment is heavy equipment that should have mechanics/drivers – management issue

Thurs July 30 (3.4)

	7:00-8:00	(ASC /A-E Firms)	Set-up and confirm day's objectives

3.4.0	8:30-9:00	(OZ)	Review previous day's work

Chess Olsen – ASC
Jim McKeith – ASC Doctor
Erin Oliver – Pharmacy Tech
Mike Wendall – HR Medical Manager

Recap on Admin:

Located on one continuous floor of Central Services:

- NSF – small but critical component
- ASC – Half population
- FSA-SOPP Military

Accommodate leadership and admin support and leadership roles and office needs

Continue to go through org chart with Steve to determine operating style and how they work including privacy

Recognize acoustical separation between lecture space and work areas that include:

- 8x8 (approximately) open workstations
- 100 – 150 more private stations
- Combination of open and closed workstations
- EOC space for decision makers to gather quickly
- View and windows might want to be associated with a particular room

- Dedicated rooms may be up against the glass
- Conference rooms are present
- Important cross-roads for corner conference space
- Semi-casual collaboration space
- Have been conservative on footprint – shows we can accommodate our needs within the footprint and may possibly be able to decrease size

Comments:

- Steve: should co-locate EOC with Command and Control
- Put NSF exec in the corner space that has the views – can't be same as EOC – Ceremonial Area for 8-10 people
- RP – Command and Control – number of managers/admin support and leadership – 22 open workstations, so can move Command and Control down and become adjacent to EOC – this allows a decrease in footprint
- EOC – look at a screen throughout the day. Don't want to be around windows - have an interior window
- If C&C co-located with EOC with an interior window. No exterior window needed
- Looking at opportunity to decrease the size of the footprint
- Steve – Density – would hope for more collaborative space
- PR – easy access to shared conferencing
- Ben: Likes appropriate size. Maybe protrude into 2-story lecture hall volume as long as cantilevered out if you have to push into that space. Allows relief in workstation space
- Double loaded circulation – break up linear stretch shown in diagram

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Command and Control Diagram:

- MacOps
- MacCenter
- ATC
- Dispatch
- This will be applied to the Third Floor Admin Floor Plan space -

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Kim – Crary Review:

- Central spine with wings coming off central spine allowed flexibility in original concept
- MP shows Science Support Building at one end but still allows for flexibility
- Strengths of Crary and Opportunities were revisited
- Aquarium Opportunities

Phase I comments:

- Vibration is an ongoing concern – could be made worse by new road way
- Additional storage for lab supplies and grantee equipment
- More chemical storage space
- Possible enclose loading dock – if not enclosed it could affect indoor temps
- Area for packing science cargo
- Consider moving fire suppression and MSG to Storage – 2nd floor
- More storage at location of tank – 2nd floor
- Exterior deck off of conference area – view of sound – 2nd floor – Chalet is gone, replaces chalet deck (ASC generated request)

Phase II Comments:

- Concern with grading for loading dock areas
- Extend roof catwalk and more roof ports for cables

Aquarium – phase III

- Add storage for mechanical parts and supplies

Comments:

- Facility Engineer in Crary office – better located near main equipment. More of maintenance specialists – utility mechanics, spend most of the day maintaining Crary. Need to rename.
- Maintaining grantee requests like lab hoods, building issues, Barbara Coleman system where alarms come in and take care of there, equipment maintenance on unit heaters, VAV, boiler, Air handlers, Auto-claves, Sea Water Pumps
- Ben with a total rebuild. When building is done – not a full time position, would also be doing work at rest of station. In winter there is one person dedicated to multiple buildings. This person could spend time in Crary as well as other station repair needs
- Dedicated space for repair/maintenance personnel needs to be smaller than what is shown in diagram
- Steve – personnel assignments will be based on work order load, based in Trade Center and can use that as work area.
- Would like a small area in main building to work on kitchen equipment, ie: toaster, coffee maker
- Ben – be careful how much space that takes, also effects inventory control
- Major facilities are going to each need a maintenance space to support the facility

Potential Phase IV – Sea Ice Facility

- Extending down the spine
- Sea Water line upgrades and redundancy – back up planning
- Remove section of skin to investigate conditions
- Potentially re-skin or modify envelope

Comments:

- Joe F – grade supports expansion
- Steve – make spine longer? Take marine ops and expand Phase III? Have not thought about that
- Phase IV Marine Ops in new plan is closer to the sea

3.4.1 9:00-12:00 (OZ/Merrick) Fire & Medical

Neil – Fire Chief
Andre – Assistant Fire Chief

Review:

- Contingency Operations Wing where fire and medical is co-located
- Close to housing
- Wall separating fire and medical
- Recognize that Pharmacy is missing in MP

Joe Levi – Fire Requirements

Equipment:

- 3 bays with 2 full size engines and ambulance and 1 smaller duty vehicle
- Outside is a light vehicle
- Winter fleet – 6 medium to large size apparatus
- If you can park it inside that helps on wear and tear
- Comment – would vehicle needs change based on height of new buildings? Ladder truck might be necessary
- Can't do less than 2 vehicles
- Have to have at least one ambulance inside

Staff:

- Bulk of fire staff work at Airfield
- Here – 1 fire engine of 4 people
- 2 for ambulance or to be assigned as needed
- Same numbers for Summer and Winter
- 1 24-hour shift per day – Dispatchers are different
- 2 shifts
- Staff work in both locations (Fire house and airfield)– not just one or another
- Always 6 people on staff – shifting personnel
- 3 office personnel during business day –Chief, Asst Chief, Captain, +2
- Currently conduct monthly inspections of buildings
- Issue permits for welding – Note - will need a welding area
- EMT calls are the bulk of calls in a typical fire station situation

Turnout time:

- 3 minute response times within McMurdo
- Galley distance from Fire is a long distance away – concern of Neil's

Apparatus Support:

Bunker Gear

- Total staff of 54, 48 use bunker gear – don't know who staff is so have to have more to accommodate sizes, Double that number in gear for small medium or large
- Need gear to be locked up
- Bunker gear for active-ready need is for 48 people
- Need one storage area for inventory control
- Need one changing area for active –ready personnel
- Inactive gear doesn't necessarily have to be stored right there, convenient but not necessary.
- Better to have back-up in another location (100 off site)

Other Gear:

- SCBA Gear – storage room off main bay

Tools:

- Have spares ready to go
- Some repair work they do in the fire house, some is done in other shops
- Need a work bench
- Heavy engine work done at VMF

Comments:

- Filling and servicing fire extinguishers – messy so needs to be kept separate from breathing area
- Needs for this doesn't need to be large area – just separate as powder gets everywhere
- Need ready access inventory of fire extinguishers
- Need could change in new buildings because they will be sprinklered – plus fewer buildings means fewer extinguishers

Decon:

- Haz Shower
- Outdoor wet decon not feasible in current situation
- Probably have 2 decon areas? Yes
- Dr. comment: Not everyone comes via ambulance when they are contaminated, don't want them walking

through certain areas

Storage:

- General Storage

Laundry:

- Requirement for separate laundry for bunker gear
- Advantage to co-locate in Central laundry?
- Crew currently has time to do this themselves
- Bunker gear has to be cleaned before reissued
- Immediate need for cleaning gear after an incident

Comments:

- Ladder truck clearance is substantial for maintenance function, they do light maintenance in Fire station, heavy maintenance is done in VMF
- Need a warm environment because filled with water

Hose Drying:

- Need room for maintenance on hoses – and a hose drying tower (could possibly mechanically try)
- Tower is also good for training Ideal height is 53 feet; consider wind loads
- Currently use a rigged system going up through steel structure in the bay for hose drying
- Maybe an effective horizontal system for drying

Comments:

- Ben – In terms of physical reach; large building interior space will be effected y hose length. So will need hose mounts in buildings – cabinets
- Equipment needs for new plan – requirements for equipment will change
- Still need engines
- Need all 3 bay spaces – co-located medical is necessary
- Joe L – fire equipment gets bigger and more automated, but needs more training and more mechanics
- Neil's engines are 4 years old, automated equipment tends to fail in Antarctica so they like simpler equipment
- Floor drains would be great
- Vehicle washing station in town would be nice – Maggie agrees
- Use for Fire Equipment? Yes but have more than just washing needs
- Build a floor that could handle water but would be better to wash somewhere else
- Constant pooling of water will ruin the floor
- Pull through bays? Yes.

Ben – anything else needed in apparatus bay?

- Breathing air compressor – needs clean air source
- Storage for cylinders
- Can dive chamber compressor do double duty? Potential safety issue with different sizes and concern about being over-filled
- (regarding Compression chamber – not dive tanks)

Administration:

- Offices and admin – adjacencies?
- All personnel ideally at Fire – this is efficient for the Fire operation
- Fire Chief, Assistant Chief – need space for private conversation
- Shift Officer (in charge of main engine) – needs workstation (valuable to have a door)

- Ben – who needs to be there on a shift?
- Admin people are not on 24 hour days
- Captain runs scheduling function for Fire and for runway
- Fire prevention – record keeping – doesn't need closed door
- 6 people for each 24 hour period, + 5 others for day time
- How many people need a desk – the 5 day people plus the Lieutenant.
- Privacy needed to meetings, employee relations
- Can you pull into a separate shared room? Possible

What happens during an emergency?

- Comes in – dispatch sends ambulance/fire truck or both
- Responders are located in Fire Area (3 minute response time)
- Come back and file report

Training Room:

- Start of training is intense at start of season
- As it gets to middle and end of season, have recurring monthly training
- Weekly officer's meeting
- Morning shift t change for officers – every morning
- Crews train daily, practical and/or classroom
- Train for fire extinguisher and fire prevention for community – classroom setting
- 3 minute response time dictates placement of these rooms (could have others use this space when not in use, fire can't be far from apparatus, but others could come here)
- Questionnaires will be sent out as well to quantify number and frequency of meetings
- Also recall people after an event for debriefing
- Fit test for SCBA happens in SCBA clean room

Admin up front :

- Originally for shift lieutenant
- Point of contact
- Company officer's workstation near front door
- When no one knows where to go – first place they go is the fire house
- Functions at the front door

Training and Conference Rooms:

- Difficult to have a meeting when it is a class-room type of set up
- Furniture configuration could accommodate both needs

Dorm rooms (Call Rooms):

- Need 8 dorm rooms – will accommodate people from airfield as well
- Stay there after admin work day
- Each has a bed and storage locker and possible a desk
- Do like South Pole – clear out one and have another come in
- One bed one small locker and a desk
- Lieutenants needs a little bigger plus a phone and a radio

Bathrooms:

- Down the hall - shared facility
- 2 separate shower stalls in both men's and women's (not gang showers)
- Private bathrooms in office space (downstairs) can be a unisex bathroom

Kitchen:

- Needs to be close
- No mingling of lounge crowds so sharing lounge kitchen will not work
- If you could come in the back – would that work?

- Currently kitchen space is used as meeting room/break room
- Basic requirements don't require a full kitchen
- Backup kitchen is the one associated with the lounge – this one would only support function of fire house
- Prepare food as they can
- Need warming ability
- Can you combine dayroom and kitchenette?
- Most cooking happens after day shift
- At night they like to cook – morale issue – do it as a group
- "Kitchen is the heart of the fire house"

Day Room:

- Living room function
- Relaxing space
- Impromptu meeting space
- Plan to accommodate for 8 people
- Kitchen table to accommodate crew on duty

Work out in the gym

No washer and dryer for normal clothes – just for gear

Ben – workstation function will be downstairs – originally planned for time sheet function
Day room needs works station

Medical:

Process and Flow:

- Patient comes in through front entrance – unless they come in by ambulance
- Paperwork
- Vitals
- Go to room
- Doc comes sees patient
- Discharge to outside
- Unless procedure – then go to procedure room
- Sick bed = hospital bed
- Admin functions like a nursing station in the center so they can see all the rooms
- Ideally have all functions in exam rooms
- Need a waiting room
- Enter into waiting room – currently no staffing
- Having a nurse at the front would be good
- Paperwork can be done in exam room
- Record privacy – charting is done centrally and stored there (current)

Need 8 office/staffing positions:

- Physician
- Nurse admin
- Mid level
- Air Force Flight Surgeon
- Air Force tech
- Air Force Nurse

- Pharmacy tech
- Resident physician

Would need Desk, computer, telephone,

Patient process/flow:

- Doorbell
- Someone sees/hears patient
- Ideally desk person at front door is triage nurse (not nurse manager)
- Sit in waiting room and fill out forms (unless sick – then right to exam room)
- Ideally they go right into exam room for paperwork and exam
- Doctor comes in the room, X-ray if needed, necessary procedure (possibly in a differently room)
- Try to minimize patient movement
- Patient gets meds and is discharged
- Exit paperwork filled out somewhere else

General:

- EMS – comes into room from bay side and goes right into exam room (in MP layout)
- What if needs hospitalized? This isn't on MP diagram
- Can't have hospital in central bay like this
- Decision to hospitalize – move patient out of centralized area to quiet area
- Different than sick bays – you need designated space
- Hospital room needs: have 6 currently but that's too many. Most used was 3.
- They have quarantine needs
- 3-4 hospital beds is ideal and
- Don't plan for population – plan for event size, like a vehicle accident
- Exam rooms – driven by – people not sick can wait in waiting room; if sick – all hands will be on sick person
- Have 2 beds for resuscitation area – where you can get everyone and all equipment around the bed – ideally you have 2, best located close to ambulance entrance
- Have one combo gyn/procedure room; casting table; truly only have 4 spaces + waiting room
- Exam room needs 2-3 to 1, driven by population. 6 is ideal for number of exam rooms.
- 4 Hospital bed-rooms minimum
- Sick Bay = designed as hospital beds and hospital beds in MP 2.0 – originally able to isolate them from population.
- Sick Bays – mass illness – minimize transport and want to isolate
- Each hospital room needs a private bathroom
- Needs more bathroom space in Medical
- X-ray, needs lab space, radiology space, equipment storage, pharmacy, hospital, linen storage, special laundry, medical inventory, PT treatment, bio-med-tech, supply storage (central supply and day-to-day supply), field kit storage, O2 storage, HAZ mat treatment/storage, tele-medicine,
- Steve - Build in area for back stock in Medical? Yes – this is ideal. Good to be on a back wall, small bay door to bring materials, inventory system present that tracks what medical equipment is taken; currently use a dual-sticker system; ultimate goal is to have it scanned out;
- Move kitchenette away from patient area (have food delivered to medical)
- Hospital space needs to be quiet
- Hospital beds oversite by nurse, where they can see 4 doors
- Don't have enough staffing to watch all patients – so sometimes they use fire fighter paramedic
- At night they have people come in for a few hours
- Air force crew can jump in to help a patient overnight
- Air force tightly integrated on how the clinic ran on a daily basis

- Actively part of the call practice and will see non-military patients
- Variety of specialties that come done – psychologists, oby-gyn – work with what you have
- Ben – requirement for 6 exam rooms, 4 hospital rooms with bathrooms, whets non-ideal but acceptable – if you could have non-infectious or people with the same infection – but a bad scenario
- Need one dedicated sink for casting
- Bathrooms for exam rooms? Can share a bathroom?
- Handwashing sinks need to be in every room, alcohol outside every door
- Special needs: Fuel camp medical kits (40 small) 5 x 12 ammo box
- 4 – 5 major medical kits – large pelican case
- Need space to build kits – large table would be good
- Access to the gym for a mass casualty? Need one. Also need a bay door into the gym.
- Gurneys – need space to walk beside them.
- Hospital standard construction

Morgue
- Use Crary; used reefer vans, ice core transfer facility/freezers. Secure space.

Dive chamber
- When in use you can't use anything else in clinic – it's really loud (the compressor)
- Could remote the compressor and keep the chamber there

Pharmacy:
- Ideally tech stays in the pharmacy room with double locked room with safe – drop chart off, pull prescription, come back and pick it up. If nursing function they would have to prepare it for pick up. Ideally they don't' invade pharmacy space. Would rather have pharmacy tech filling prescription rather than doctor or nurse
- Write prescription on chart, pharmacy tech fills it, physician dispenses meds to patients and goes through consult/overview, then patient is discharged. Very little interaction with pharmacy tech
- Ideally pharmacy is located away from waiting room – ideally isolated but still accessible to physicians; adjacent to resuscitation bay
- At night – there is only one provider so the situation is different. Have to have access to pharmacy. Only pharmacy and physician have access to safe. Nurses - then techs for levels of security
- 3 levels of security at pharmacy
- Need a designated space for pharmacy back up – in a different building – note that many meds are temp sensitive – like frozen epi-pens;

Dentist:
- Need one exam room
- Adjacent Dental lab – workspace with autoclave, materials, etc.
- Compressor needs (prefer to be distant)
- What happens here – emergency dental; Dentist comes down for cleaning, pq, replace crowns, wisdom tooth removal, filling replacement
- X-ray is done in the chair
- Medical staff is dental assistant

Comment – where is technology going? Tele-medicine – ideally patient has privacy with wireless access, collaborate with NASA could provide video consults

PT:
- Hands on care is effective
- Takes a little specialized equipment

- Working with consultants to do tele-medicine wise
- Dedicated space because equipment is bulky
- Could do in an exam room but would move equipment out when not in use

- Medical gasses – currently wheel O2 tanks, ideally gasses are piped in
- An Air Force medical storage room would be great by ambulance (part of equipment storage)
- This is a large pelican box (4 feet tall). Has to be plugged into power source and ready to go (pump, monitor) when not being used. Shelf in supply room would be good – 6 boxes.

RP diagram comments:

- Adjacent to apparatus bay
- With a walk in component and connection to gym
- Need inventory supply location closer to back dock – fork lift accessibility would be nice
- Office space location doesn't matter
- Dr. Comments – hospital rooms need to be in a more quiet location
- Want to minimize steps in daily activity
- Hospital rooms are only used for a patient spending the night
- Exam rooms are used often
- Make sure sound is not an issue with hospital rooms adjacent to gym walls
- Air quality separation – need to make sure exhaust from apparatus bay doesn't get into medical
- Neil – consider stair locations/skybridges – have exit for patients on first floor

Missing laundry space

3.4.2 1:00-3:15 (FC/Baker) VMF / Traverse Ops

Phone:
Rick Campbell – Traverse Ops Coordinator
Maggie – NSF Operations Manager for the Program
Chris Clark – Baker – Project Architect
Jake Watson – Baker – Project Manager for Baker

Corey Howell – Traverse Manager
Tony Buchanan – Mech Equip Center Supervisor
Mike Spatter – VMF Supervisor

Rick/Shaggy – Background

- Currently occupy a couple bays for traverse
- Combined facility? Separate? Accommodate ANG and AGE
- MP shows footprint for traverse across from VMF with a small addition
- How to accommodate AGE and ANG
- Floor has heavy challenges with heavy equipment

Traverse Operations:

- Equipment:
- 16 tractors haul heavy load
- 2 radar
- Traverse modules:
- 2 platforms – 2 traverses, 1 goes, 2nd goes, 3rd goes and comes back
- Deliver 144,000 of fuel to South Pole
- Supply fuel and supplies to South Pole - Do 3 traverses
- 25 days to get to Pole, stay 2 weeks and off-load, check out equipment

- Come home empty
- 20 days to come back
- Get 1st traverse out by Halloween
- Wait 2-3 weeks
- Bring in Spot 2 and they pass on the Polar Plateau (for last 300 miles)
- 2 weeks at Pole
- Leave around Halloween arrive thanksgiving
- Returns 19 December
- 10-12 day turnaround
- Depart after new year to Pole
- Back to McMurdo
- 4 mechanics doing repairs in VMF bay at Pole
- With 3 traverses coming in – they do smaller repairs outside but certain repairs have to be done in heated area
- Articulated tractors – mix of models of tractors with blades on some, cranes on others, winches (not used much)
- 2 radar vehicles – what you would see at ski resort to groom – ground penetrating radar makes a radar map of what is in front of them = Goes forward about 60 miles ahead to map out crevassed areas
- Operators – split them in half
- Couple help the fuelies at Pole – keep 24,000 gallons per load moving
- Other 2 help South Pole do their tasks – could be digging berms for cargo, trash or science
- Dig out fuel tanks around the telescope
- Leave Pole – head back to McMurdo
- Pull tractors into shop – might be hauling a tractor that is coming in from the field
- Bay has been cleared out in anticipation of their return
- Need to know what they need to do for winter –
- Build berms
- Spot 1 does the 3rd traverse – leaves after New Years and come back at end of February, beginning of March
- The 3rd traverse is the new norm
- Mechanics – 3 per team, 2 heavy wrenches with one lead
- Building 183 is big player but use VMF plus 183.
- 183 is incinerator building

Corey –

- Team shows up
- Prepare for trip
- First thing they do –
- Head to 183 after training to do inside work, set tool shed up on a sled on air cushions, build wooden decks – need platforms ready to go
- Put them down and do inventory (staging)
- Build the sled that will carry the fuel bladder
- Build HMW – wide polyethylene sheet – lay down for inventory
- Then put tow plates on them with crell tool
- Prep for traverse
- Operators work out of here – they get food (have a cold storage reefer up there)
- Dry goods are in a milvan outside of 183
- Split food out for all 3 traverses
- Stage 3rd traverses food –
- Have to spread it out – put what they can outside in milvan, have a load in ballpark in reefer
- Put tow plate on and send into field
- Also patch bladders in there

- Pull bladders in from exterior berm storage
- Check for evaporation
- All gear is stored at 183 when they arrive at McMurdo
- People during winter for winter tasking – repairs, inventory, RFI it
- Same process for food – can't do fuel bladders and food at the same time
- Same staff doing this
- Unroll, create sled, attach everything together – then take individual pieces put on a trailer taken to wherever fueling and hook them up to crell, offload (roll up in cold)
- Fuelies help
- Fueling process:
- Spread people out to get tasks done at same time
- At that point they have 4 tractors – which are getting final checks
- Lot of time - Pre-traverse time checking tractors – happens in bay 1 and 2 at the VMF
- 1 tractor per bay
- Where do you park after? Plug in near the Safety Building currently
- Temps at Winfly are cold
- Send to Black Island and Marble Point – send Spot 2 platform first – where the ice opens up often. Radar the crevasses – hot water in the hole – blaster comes out and open them up and then bladed machine fills it up
- Will start generators, fire them up, take them up on ice
- Winfly is early arrival. Main Body is when everyone else shows up
- Vehicles are coming on line – so have be sensitive to available plug ins
- Generator provides electricity for platforms, including snow melting food, generator stays with them – 2 of them
- 48 bladders per traverse – 8 per sled
- Last traverse has living items
- HMW sheet is 32 feet long
- Each 183 then combine it by the fuel pits – component is assembled at
- Can't pull through town
- Pulls a generator, living quarters
- Maintenance on modules
- Currently use C model Cat tractors – have 8 per traverse
- Travers = 8 tractors, 2 radar vehicles (piston bullies) with ground penetrating radar
- Fuel bladder – rick – 7'4" 3- ' long
- 2 bladders fit on HMW
- Usual load is 4 across
- Can pull a little more weight on 2nd and 3rd traverse
- Staging is by sea ice runway (between Willie and Town)
- 10 on Spot 1
- 8 on Spot 2
- Mountaineer looks for crevasses in radar vehicle

- Things performed outside that would be better suited for outside:
- HMW:
- Roll it out and pin it down in a warm area because it rolls up when it's cold – want to do that inside
- Would like to roll out 4 at one time but 2 is more realistic
- Ideally would Manipulate them with an overhead crane 8' x 6' and two together are rolled up, each weighs 2,500 lbs each but currently using a loader. Double roll is 5,000 pounds
- Why put 2 together? That's how they come
- Last for 3 years. On average make 6 sheets
- Put them on a berm where they stay. Right from traverse, mechanics come in and operators tear camp up,

- Spot 1 is making the berm for Spot 2
- Don't roll them back up
- Unroll 6 per year
- Can you unroll in NZ? Don't have the air deck available and timing doesn't work
- HMW – if do 6 per year – what amount of time do you need inside space? 2 – 3 weeks to get them in, flatten, put tow plates, roll them out and warm up and become flat
- Need eyelets so you can't hang them
- Minimum 2 guys –
- Could you heat the alley? Crane – need an 80 feet ceiling
- Stage HMW – bring in bladders (which have life cycles as well) – construct new bladders if they need it
- Space for bladders (4 people currently)
- Want to unfold bladders and not fold or unfold again
- Well ventilated area – needs because bladders are full of fuel.
- Patching chemicals are bad – have to clear the area
- Then it has to cure

Personnel process:

- 175 – Use the conference room upstairs have an office with 4 desks – gathering for meetings, time cards, morning access, 30 minutes – 45 minutes. Meet every morning
- Meet all of winfly – 2 months – up until they leave around Halloween
- 15-16 people at morning meetings 20 Aug to mid-November
- Have pulled together personal gear - Not a lot of space in modules so a lot of stuff gets put in milvans
- Food – happens in 183 – for sorting and segregating and then divvied up for spot 1, spot 2, spot 3
- Take it from incinerator building to staging area
- Food storage is an issue (food for personal consumption)
- Food comes from town and supply (they store their stuff)
- Take to reefer up in the pad where it stays until they get the refer that is going on the traverse
- Frozen food coming inbound 6 milvans – get 2 for Oct/Nov (before science stuff comes in)
- Dry goods
- DNF
- Segregate for spot 1 2 and 3
- Done manually – not packaged
- Comes in bulk – get pallets of their products
- Segregate food
- They meet cargo when it comes in
- Milvans for storage – they borrow through November, then get pick-up truck – unload onto milvan take to Spotz to load onto module
- Space and configuration and time spans for velocity
- What does it look like in the winter –Pull in
- 2 positions in bay at winfly with 2 people for each tractor day and night – mid – august until Halloween when spot 1 leaves
- After Halloween – VMF position
- Spot 1 goes out then work on Spot 2
- Need 2 bays
- Are 2 bays enough? Wouldn't have to have a night shift if they have more bays
- Only 1 lead mechanic going back and for the between the 2
- Hire another person instead of building another bay
- Why don't VMF mechanics and spot mechanics separate? Because tractors are so different? Skill set? Only ones that have those tractors
- If maintaining equipment – you fix the vehicle assigned to you

- Bens take away – compressed schedule – have it ready to go a
- Mechanics go out on traverse also
- Work 2 people per tractor, 2 tractors at time
- 17 MT865 + 2 radar + 5 science platform (formerly "wizard")
- Also supporting black island, marble point, shear zone
- Tightly strung
- Winter – can any of this be handled pre-winfly? Yes, they have done this – and that helps
- Shared tools with VMF
- Needs: Food, Bladder repairs, things that have nothing to do with mechanics
- What if the capability of winter work – for vehicle maintenance only – add time instead of bays
- Winter work – break down on spot 1 or 2 – would have to wait on parts
- See a lot of same mechanical issues at the same time
- Currently spare parts are stored all over the station
- When tractors in bays are they being worked on
- Steve – what is optimum space? 2x the size of incinerator bldg.
- Need a smooth floor
- Can't stack HMW on top of each other
- 7 x 32 bladders
- Currently repair one at a time (while the glue dries) – better to work 2 at a time
- With 2 sheets of HMW they could fit 4 bladders at a time
- One full floor of bldg. 132 – also have Cat spares, Generator spares, Water Filters, bins of carabineers,
- DNF? No much? Radar and GPS and canned food
- Machines are stored outside over winter

Rick – space needs – throughout the station

- Building 183 location is good – it's close to the peer
- Can move HMW
- Building 132 is good space for warehousing – not work space
- Have radar
- Comms gear

VMF:

- Services 250 vehicles, 52 pick ups (25 stay in town – service older buildings and delivery from 22 different warehouses which will be consolidated in the future, 27 go to airfields for support), 24 passenger vans, rest made up of bulldozers, passenger vehicles, 2 flat beads
- Have 2 pull-through bays
- Terra Buss needs pull full
- Cress fits but tractor doesn't (have 2)
- Some vehicles are providing support for repair for these aging buildings
- Anticipate number of vehicles decrease? Yes.
- Right size the fleet for now and for the future
- Future might include electric vehicles
- Where would you charge ATV type vehicles?
- Steve – operationally – plug in around Central Services
- Trucks are being used for personnel transportation (grantees)
- Still needs trade trucks
- Think about weather protection
- Talked to Polaris about vehicles
- Maggie – loader fleet and light vehicle pool could be streamlined
- What else may change? Bulldozer fleet (Maggie – that's being doe regardless of new station)
- Passenger vans/shuttles would probably change (fewer people)

- Offload of containers – unloaded and returned
- Looking to move away from the big mass of stuff coming down and sorting out containers
- Cargo would be loaded as homogenous items within the container, unloading it until we need it. Goal is to decrease touch points
- Reduced population – requirements for re-supply will be less
- Number of containers, numbers in offload, reduced distribution

What challenges at VMF operations?

- Traverse Bays 1 and 2 are taken up for traverse ops
- Competing with bay space – too much equipment that is old and it breaks
- Enough mechanics, enough parts – just not enough space
- Some tasks just can't be done outside
- Parts availability – have to retrieve from one of many locations around site
- Track maintenance hours on vehicles? Yes – how many – have that and are 90% utilized
- Tire changing bay and welding shop
- During large construction projects – would have to be a separate discussion to figure this part out
- Have to move vehicles – rotate them to accommodate other vehicles
- Modernizing fleet. Are old vehicles retired? Yes – actively retro-ing vehicles every year
- Vehicle utilization assessment? Having that done – with loaders too - with cold weather. Maggie – summer only
- How efficient are you if only using electric vehicles for one season? Maggie – they are efficient.
- Maximize utilization of people and vehicles
- Trend to more electric?
- Joe Levi – less frequent drive time decreases maintenance time
- LBD – Airfield – Arrival Heights – all this activity stays
- Bulldozer piece being worked on
- Loader usage is probably not going to change
- LBD is probably going to stay the same
- Snow removal – stay the same
- Size still needs to be big because of vehicle usage – for these 3 things
- Joseph – Additional maintenance for road to Ross Island, science – want an additional traverse platform, potential for 5 heavy traverse , LBD probably not much affected by fleet
- Traverse to Black Island – designed currently so that you don't' have to go there all winter
- Fleet size right sized?
- Have to look at this

Break

- What is not working spatially? Bench stock and storage parts area (manned by 2-3 people)

- Mechanical Room – atmospheric tanks are present – under new utility plan will not have this
- 2 boilers; 1 boiler removed as part of microturbine project and understand it to be redundant
- If you go with microturbines, you don't really gain any extra space

- Engine transmission
- Don't do own re-builds anymore
- Have space in there for lockers
- Light mechanics

Machine Shop:

- Science support is done in there
- Machinist will help them out in there
- If had modern C&C in there, configuration would change

- Supporting science and vehicle
- As fleet modernizes they won't need to make parts for them

Hose build bench is a big deal for Traverse Ops

Clean Room – Cat Certified hoses have to be clean

Storage areas are full

Administrative space – VMF

- Technical library moved to bay area
- Want to keep tech data near mechanics
- Put computer kiosks near technical library
- VMF Supervisor
- VMF foreman
- Traverse office has 2 desks
- Work order admin – this is now being handled by service writer and mechanic –one person – service writer
- Privacy? Supervisor, Foreman yes
- Traverse – one office 2 desks – doesn't have to be private, but needs access to a private space

Tool Room

- Field tools are in here
- Want all tools to run through this space
- NASA tools are kept separate
- Move hose building function – one person will do this as well as man the tool room
- "Tool Room Attendant" co-locate tool attendant and hose build, and test hoses, ok to be adjacent

Parts washer are in the bay – just wipe them down

Library space

- No flammable space
- Stand up desks
- Run wi-fi in here so mechanics use tablets for write ups
- Flams are located in a closet off mechanical space
- O2 kept outside of welding
- 3 dispensers of fluids

Welding:

- 2 welders on station
- Much needed to have 2
- Undercarriage of light trucks need repair because of road conditions
- Dozer blades need to be repaired
- Grantee support – welders go out to fix things for them – they fill out a work order

- Need a Battery Charging Area

- Existing stairs are steep

- Cable testing? Yes. Crane certifier certifies cranes – but not sure about cables.

- Bays – only 2 drive through – long equipment like LBD or cranes – would need long bays

- Maintenance – how much programmed scheduled and how much emergency repair 40% programmed, rest ad hoc maintenance. Ad hoc repairs depend on time of season – lot of dead batteries and flat tires. Winter is more programmed repairs. Also depends on where the vehicle is driving
- Mack Track
- Piston Bullies
- These 2 are used for different things

- Mobile generators have to be worked on outside because they don't' fit in the building

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- Cress vehicle trailer fits – but barely. Have to work on it outside sometimes depending on maintenance needed, like brakes. Have to have either the trailer or the tractor – but not both

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- Crane – no boom out space – have to swing the boom into adjacent bays

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- Showers? Yes – need for a shower
- Need for industrial laundry

- Part storage 115 – supply folks 3 at day, 2 at night. Also serve multiple other places parts needs

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- How many employees on a shift? 15 during day and 10 at night

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- 3 females in the shop

- VMF is the "truck stop" of this area because they have the only rest room

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- Parts storage – velocity of repairs drives this need

- Oil filter is being delivered to the Power Plant from here

Requirements – what they need that they don't have

Modern vehicle exhaust system

Bridge Cranes

Dispensing and evacuation of fluids– (oil, hydraulic fluid)

Vehicle Wash – melt season creates a lot of dirt that is corrosive

- Also want to wash equipment
- Can we have a single vehicle wash elsewhere?
- Need to be able to store a fair amount of water
- Need a water/oil separator
- Centralized wash makes sense – otherwise it take up a bay
- Drainage is an issue (trench drains would be good), also have snow melt that you have to squeegee out
- Lighting could be better
- Radiant heat would be nice
- Pull through bays – have each technician at each bay with capability to do own diagnostics and work
- Doors could be higher – can't get generators into the building (16' – 18' wide)
- Fuel station currently is just fuel but would be nice to have air also
- Challenge space outside of bays 1 – 5 are staged out front. Areas across the street are waiting on parts – this area is always full
- Hard to navigate that area with vehicle traffic
- Need to look at where we would place vehicles outside
- Have fleet ops works closely to VMF
- Typical utility mix coming into the building
- Looking at different site options
- Fleet ops admin/breakroom – have them on mezzanine. Have them close by mechanics (up to 40 people)

- Have a safety meeting in the morning – up to 30 people for morning meeting, drop assignments, safety meeting, and then they are off to the field
- Building was originally designed to be 2-story
- A mezzanine is still possibility in this building

Shaggy –
MEC, AGE ANG needs to be determined

3:30-5:00 (ASC /A-E Firms) Debrief, plan for next week, identify follow-ups, meeting minutes

Skipped

Fri July 31
Overflow and Internal Management Meetings

- Priority – IT out of 189; NASA is a tenant to NSF and they need a flawless transition into Building 004
- Phase I kept MEC in there longer than they should
- 2 Opportunities – Move MEC and move field safety training program (which occupies SSC 2nd floor)
- MEC Equip Center
- Move to a smaller vehicle is one to be anticipated; mechanics that work on snow machines are the same ones that will work on the "side by sides" (smaller vehicles)
- VMF should be shrinking their fleet – especially front end Caterpillar vehicles
- Fleet that takes care of the runways will probably stay the same
- VMF – other than trucks – should stay about the same

Field Safety Training Program-= F-Stop:

- Science support function but also help the town
- One is dedicated to the traverses who calibrates with GPR looking for crevasse and would be the one who repels into the crevasse to get people out if something happens
- Remaining mountaineers conduct 2 full days of training (for new people)– basic survival skills training "Happy Camper" They run them continuously. About 30 people per class – inside training and then the outdoor survival training (includes combination of indoor classroom/skills and overnight field training)
- Mountaineer will run the trail to check on ice cracks, will take a piston bully out and profile the route
- Winfly to Halloween ins happy camper training
- Returning people take a refresher class – 4 hours of training, run them one after another
- They have one classroom so they can only do one class at a time
- Space for learning how to set up tents, set up stove, etc.
- Mountaineers can be requested as part of science information packet
- F-stop function will be in the field science building
- F-stop is phase 0 in the Master Plan

Traverse:

- Adding 5 new platforms for science traverse
- National Research Council discusses funding and science – read this

Jeff Huffman –

- In incinerator building
- Double loaded vehicle bay – holds 4 vehicles – picks up current traverse + science platform

- Allocating 2 half bays currently – new plan gives them 4
- Support staff gets the traverse to the science – not transporting the grantees though – then they bring the traverse back – traverse stays and then brings the whole thing back into town
- Meeting space holds up to 16 – used heavily at the beginning of the season
- Guys always have their gear bag with them
- Food – don't want to plan for the way that they are doing food currently
- But need to plan for getting it to their spot for them to load
- Parts storage – Separate Building
- Bladder repair can happen in same bay as HMW
- Utility requirement – heat and an evacuation system to address glue smell
- Bladder storage? Store on berms – need to be stored flat
- Need a month and a half to prep HMW – including flattening, put bladders down on them to help get the curl out – getting crell bars on them

Phasing:

- 1 – build out all of SSC so MEC and F-stop need space immediately
- Mountaineers (5 and a supervisor) train campers Little office space, gear storage and a classroom
- MEC needs to go somewhere immediately
- Look for synergies between VMF and Traverse
- Common needs: Crane, Bays, Meeting space, Parts Storage
- Field Safety Training Program-= F-Stop
- Science support function but also help the town – one is dedicated to the traverses that calibrates with GPR looking for crevasse and repels into the crevasse to get people out
- The rest – 2 full days of training – basic survival skills training "Happy Camper" They run them continuously. About 30 people per class – inside training and then the outdoor survival training
- 7-5 classroom 5pm pack up go to ice shelf spend the night and then back
- Mountaineer will run the trail to check on ice cracks, will take a piston bully out and profile the route
- Winfly to Halloween ins happy camper training (for new people)
- Returning people – refresh class – 4 hours of training, run them one after another
- They have one classroom so they can only do one class at a time
- Space for learning how to set up tent, set up stove, etc.
- Mountaineers can be requested as part of science information packet
- F-stop function will be much better served in the field science building - where they will live at the end of Phasing
- F-stop is phase 0 in the Master Plan
- VMF holds the most amount of risk
- Fleet ops (they just drive the equipment) – Office, room for 20-30 people for daily meeting
- Outdoor staging of vehicles
- Integrate Fleet Ops

Four options for putting them on site

A. VMF with Fleet Ops in existing VMF facility with addition for MEC with separate traverse ops building
    - Still need to F-Stop into classroom space, MEC still needs training space
    - This is what is currently in the Master Plan
    - AGE is here in this scheme but does not include ANG

B. Co-locates VMF and Traverse in a new building
    - Existing VMF has ANG and MEC in it
    - AGE has small footprint – all storage and small workshop – Currently in 157
    - Aircraft ground equipment is big generators – they prep ANG equipment using heaters (for equipment) and generators (for ground power units). This equipment has to be stored inside. 3-4 people on staff
    - 70% of equipment to airfield and the other 30% goes back and forth

- VMF repairs AGE's equipment
    - White elephant provides power for SPAWAR's landing lights
- ANG stores propellers, skis – replacement parts in general for aircraft in 156. They need bench space (Could be as simple as unpackaging and assembly) for town needs. Most people are in and out to airfield
- With outdoor vehicle staging

C. Co-located, outdoor storage are flipped from Plan B. Issue with this is the grade. Turning could be an issue in this plan.
   - Kim – L-shape would allow longer buildings straight in and shorter vehicles could make the turn
   - L-shape isn't great for snow drift
   - When 140 goes away – they like to park nose up the hill – so this will be winter storage for about 50 vehicles

D. Puts everything together
   - Addition for Traverse
   - MEC as an addition
   - Outdoor staging
   - Includes Fleet Ops
   - Not as much outdoor staging area here
   - Requires new floor for VMF
   - Has Mezzanine for storage
   - Have to keep operations going – so how do you phase this?
   - What is re-use? Everything but floor, needs office space remodel. Additional space for Fleet Ops staff of 40.

B feels right for re-use and function

- Footprint of interior works
- Classroom space can fit F-stop needs
- Can accommodate ANG, AGE , MEC, F-Stop
- VMF – all heavy maintenance of their assets and Fleet Ops (mechanics and operators) with bays and back-up and support
- Bays would be adjacent to Traverse Ops
- Ben – phasing
- Construct VMF/Traverse, then look at reqs for rest and check space needs
- Almost need to do a master plan of this area
- Recycle other steel structures – move them and phase them as needed?
- ANG and AGE functions don't need to be adjacent to anything during phasing.
- MEC doesn't need warehouse space if they move into VMF
- Aaron – flat space with – slab on grade, outdoor area – easy to get utilities to – this is good.
- Put this through the wind model
- Could step the building to accommodate the grade. Try to avoid stepping the bays.
- Joe F.– one simple structure that can be modified in the future.
- Monday afternoon will further discuss

Medical Revision:

- Rearranged to minimize amount of walking and create robust inventory/storage area
- Quiet area on one side, more active area on the other
- Connects to ambulance and gym
- Dental exam area with other exam areas and active space (mix with sick people?)
- Maybe switch Dental with PT? Ben agrees.
- Ben - Maybe switch X-ray and nurses room? For oversight purposes.
- Then can use front desk area for both medical and dental
- Dive chamber has to be co-located with medical.
- Transport from water – come in through ambulance

- Acoustic separation needed between apparatus bay and medical
- Use lights but not sirens

Fire:

- Put training, decon (with laundry), bunker gear together, tower (with mezz above)
- Put administration – offices on north side of apparatus bay
- Dorm rooms and kitchen and day room upstairs
- Apparatus bay may be too big – will use report with dimensions to right-size this

Schedule:

- First packaged submittal is Nov 1
- 5 weeks later have design review meeting
- Palmer facilities charrettes – mid October (19^{th} – 22^{nd})
- Palmer Pier would be up and running by then (no formal charrette needed for the Pier
- Ben – submit preliminary design instead of charrette?

End of Week 3

Charrette Week 4
Denver/ASC, Aug 4-7

Mon Aug 3 (4.1)

7:00-8:00 (ASC/A-E Firms) Set-up and confirm day's objectives

Dale Jacobs - Utilities Systems

FC – Crary Rehab and Traverse Ops

Design Schedule Input:

4.1.0 8:30-9:00 (OZ) Review previous day's work

Introductions:
Ken Bell – Waste/Recycling
Orlando Trujillo – Electrical Engineer with Merrick
Dale Jacobs – Mechanical Estimator with Lockheed

Ron Carpenter – manager of Facilities

Mark Furnish – HAZ Waste

Mark Bartrun – ASC

Tim Durham

Kim Christianson – Environmental Manager

4.1.1 9:00-12:00 (ASC)

- *4.1.1* Architectural Design Standards

Charrette Summary Week 3

1. Broad and consistent understanding, review and comment from ASC attendees
2. Confirmation of Master Plan 2.0 Guiding Principles, and facilities configuration
3. Understanding of Departments internal process flow and ideal adjacencies of sub-functions
4. True appreciation form Departments that they:
    a. Were given the opportunity to participate
    b. Saw real evidence how their input may be considered

5 Design Guiding Principles:

1. Reflects USAP Mission
    - Presidential Mandate maintain an active and influential presence – has to reflect that investment and the stature of this facility
    - What makes this distinctly American?
    - Scale and symbology will be reflective of the USA – placement of NSF logo, flag, reinforce on inside and outside
    - Cutting edge dynamic (evolving) science, ie: Crary – built to grow
2. Promotes Environmental Stewardship
3. Promote Wellness – should look like a place where you feel good and do good work
4. Project and image of stature, permanence and durability
5. Is of its Place - scale

Rick P showed Images of other stations

Strategy for managing OSA's to be factored into design

Inspiration for design:

- Science/modular/patterns/site sensitive/proportional/own identity

Ben:

- Focus on what we want to project to the people that live and work there
- Focus on constructability and logistics (modular – have ability to construct in any season; drives how constructed and the form, weather – climate drives the form; condition is reset every year;
- This is a US Federal Building – our design image sends the message that its permanent
- Skin (modulized – easy to ship, offloaded and assembled)
- Can draw attention to certain locations – portions that are hand-built rather than modularized (but still permanent)
- Corner spaces (as seen from water) can also be special select-design areas
- Understand the logistical challenges due to climate
- Rick – wind analysis may tell us certain things like how the roofline needs to be designed (referencing European design elements vs American design)
- Capture expression while using modularity

- Panels– may have material that needs to be protected, stored in a milvan (7' 2") – based on shipping and constructability with special design at entrance

- Maintain functionality (snow drainage/damage)
- Balance act – snow-maintenance (want to minimize maintenance) ie; exhaust pipe on one building doesn't work an another

- Norway – designed for wind. Joe Levi - Strategy is that they cut away the skin to make section stand out. Used copper.
- Angular chosen over curves (space-ship). Flat panels more economical that curved panels.

- Waste treatment facility with curved panels – would not fit in a milvan

- Prevailing winds from one area but snow comes from another direction

- Joe – flat panel modular units can be stored and easily replaced. Specialized materials will have to be repaired – no replacement)

- Bill K – Northern slope architectural design examples should be looked at

Design Comments:

- View from water shows the modularity of the skin. Glazing – self-cleaning? Should look at modern technologies for maintenance concerns
- Central Services – flanked by 2 sides (anchors – exterior and interior) with flat roof. Not married to flat roof design – depends on results of wind model
- Building needs to accommodate change,
- Windows current location in design are a response to internal function
- James – "an assembly" – "connecting a village"
- Ben – need to make buildings compatible
- Recta-linear approach has established order and proportion

- Making things intuitive – establishing a grid makes it intuitive
- Joe Levi- Scientific Approach vs Military approach of getting things done
- Steve – maintainability – with snow control/drifts/berms
- If you let snow stay then you engineer for it and keep it cold so it doesn't thaw and re-freeze/ Scour properly or design against it
- Buildings are currently damages with snow removal equipment
- Panels would be in containers – panel size will drive the structural bay
- There are milvans that are one foot taller than regular milvan – but we are referencing the standard milvan and flat-racks. ISO standard container
- James – multi=phased effort – this has to work for any given phase. Have to do multiple modeling? Dave – talk about temporary snow models that you have to deal with until the next phase. Dave – snow modeling phase by phase? There will be problems during construction.
- Ben – look at finished product
- Snow model will inform and drive the design. Alternatives to imagery? No. Currently establishing functional requirements.
- Skirted or open at the bottom? Skirted buildings have damage from snow equipment.
- Have to critically look at skirting vs not skirting. Look at snow modeling
- 7-10 foot tall walkways and utilidors – have to be tall enough (big enough – double high walkway to accommodate utilidor) – factor this into design. Widen the corridor and put them on the wall? Need continuous access to utility – and how does it affect snow modeling.

Common Areas

Chapel:
- Ben – currently shown as too big.
- Have chaplain's office near there – they have a one-on-one counseling function, AA meetings
- Should be removed from rest of Admin space
- Make it multi-purpose area – hard to justify that volume of space for a limited amount of time
- Capitalize on views when it's not being used as chapel – have storage for furniture/chairs
- Vocal minority that this place is really special to
- Use space for reflection - cross denomination – make it multi-functional
- Keeping separation adds to sacredness
- Could also be used as quiet reading room/library

Chaplain:
- Military chaplains and New Zealand Chaplains come down – not at the same time form New Zealand – update – not any more
- Military usually has one person there all season

Hut-10 function
- Social space that would be reserved
- Have a small serving function
- In summer – current Hut-10 is reserved every night
- Mutli-purpose overlook – place to take DV's; a Hut-Tem type of place (would need a warming kitchen type of thing)
- Could have an alcove/alter area that could be closed off from rest of room (15 people max – don't want to over build)
- Will need to manage the glass
- Might be more equivalent to Chalet functions rather than Hut-10
- Management issue with vandalism
- Exclusive and prime real estate space

- Perfect for wine bar social spot, “not alcohol focused but alcohol enhanced”

Comments:

- Flip Coffee house part move over here in Multi-Function Overlook Area and Hut-10 function in the Contingency/Lounge area? Hut-10 function tends to be louder
- Would have access to kitchen as well
- Shaggy – takes away from the “removed” part of Hut-10
- Can design for separation

- Hut-10 is scheduled by management for after work events – would they feel like they are robbed of another lounge?
- Add deck into working area with space to cook burgers
- Can’t replicate “home” feel but trying to get same function
- Ben – main building is a series of work spaces. Zoning and perception issue with alcohol fueled behavior in portion of main station
- Maybe put on 3rd floor?
- Will be able to achieve its isolation – environment is different by design
- Corner spot – once every couple weeks for a NSF reception
- Put coffee house in contingency area. Keep recreation activities together
- Make main space an alcohol-free zone
- Make it a true coffee house – not a wine/coffee bar and continue to have this as a reserved reception space

- Tim Briggs – not a lot of collaborative space for grantees. Introduce opportunity for collaboration this way.
- Chapel space is closer to Crary
- Flip Chapel/Library to other side (also allows for a good Sunday morning space)
- New name for Chapel space

Entry:

- Be sure to showcase things for first-time arrivals. Should be greeted with something of substance that reminds them of where they are.
- As walking towards the water, want to see something indicative of the entire program
- Control that environment
- History/Location
- Screens/Displays/Video Monitors
- Make an interesting and exciting space
- Be reminded that it’s Antarctica – focus on science – focus on the people running the show down there
- Dynamic views
- Hide the behind-the-scene things, like coat storage
- Using finishes that mask the dirt and debris that gets brought in
- Internal competition to get posters displayed
- This concourse is an opportunity to highlight what the Program is all about, without feeling like a museum

Look critically at where workers come in from work station – don’t want to bring in debris (from field, work centers, dorms)

Preserve and feature the history – and educate
Joe Levi - How didactic do you want it to be?

4.1.1 1:00 – 3:00 (ASC) Supply

Noon – Rob Wilsie - Warehousing consultant

Paul Sheppard – NSF
Maggie Knuth – NSF
Gary Cardullo- ASC

Requirements for materials handling from boat into station:

1-3:00 – materials to the buildings

3:00-5:00 – Supply – Internal

4.1.1.1 Warehouses

- Goal is to locate storage of material adjacent to work centers using that material to reduce touch points

- Comment – Need a flow diagram for waste going out
- Want to move waste from the front to the back instead of crossing paths

- Central yard is staging area for incoming and outgoing, with dedicated hallways to move stuff in and out
- Waste comments – different containers than incoming – don't want them in the same lane of traffic
- Ben – a lot has gone into development of this which was driven by Phasing to keep McMurdo operational
- Take a hard look at traffic flow of material
- Do not intend to park containers indefinitely – this is a seasonal workspace

Rick – Have Kim describe goods getting off of boat and how this might evolve

Shaggy – don't quite have a handle understanding off-load

Understand relationship of building to the ground – keep on same level for forklifts to be able to move about on same level?

Kim:
Offload overview:

- Boat – offload, load, back away
- Cost of boat is highest priority
- As things come off boat – prior to boat's arrival make decision with Waste Management and Cargo to plan a schedule for each container being called off the boat
- Do best with port to co-mingle items going to same locations. Have to be careful with HAZ goods and fuels though
- Food freezer, dry, DNF food that is staying on station (Cargo deals with Pole food)
- Miscellaneous (unless it's a Pole item)
- Pole items go to MEC cardo yard, de-van it, palletize it

Process:
Off pier – food to galley pad – unload 24 hours a day to get it where it needs to go (4-5 24-hr/day shifts). GSC food inspector is there verify compliance with frozen food

400-500 containers on the boat
Empty containers go to waste management

3 areas where they open:

1. Cargo
2. Galley Pad
3. Ballpark

Fuel Drums

- Don't unload containers related to empty fuel drums because they can't be out in the environment – they are managed on a pad.
- Kept in a sealed milvan
- Container comes off the boat – don't open the container

400 – 500 containers and 25 don't get opened

44 Freezer containers
46 DNF Food containers (both 40' and 20')

Galley yard:

- 51 containers last year
- 126 to ballpark last year (rest of station commodities – facilities, operations, tp, paint – basically all supplies that are not food)

Cargo:

- 9 containers last year – everything that is going to Pole (numbers for South Pole vary depending on projects going on there.
- Average is 20 – 25

These numbers depend on all projects – including field projects

98% have fork pockets, they collapse crates

Waste:

- 2 destinations:
  - Waste Barn – glass aluminum, food waste – everything that is not hazardous – goes into a sea container;
  - HAZ Waste – processed as it comes in (chemicals, batteries) goes into sea containers
- Have drops for regular waste all over town. Waste folks pick it up. Sea containers that are full go up to Fortress Rocks (non-HAZ) 380 containers of non-HAZ waste. 15 containers of HAZ-waste
- Food waste is stored separate

Comments:

- Ben – look at dewatering? Reduces storage space and material. Yes – sewage tank is overloaded currently. Dewatering would cut weight of food waste down by 50%. Food waste is required to go back to US to be incinerated.
- Requirements? Meters, heat to keep it from freezing,
- There would be a cost savings if they could do dewatering. Should be estimated. Want dewatering in place even before Phasing begins.
- Different system 2-3 years from now with fewer containers
- Currently make 200 trips a year to pick up cardboard boxes to take to Fortress Rocks (on a front end loader)
- Could save 3 bodies if you had bailing ability
- Currently moving it up to Waste Barn – bailing there – and then to Fortress Rocks. More than 4 touches including pre-staging and staging
- Bailer at back end of galley is best spot.
- Waste energy with cardboard to happen in the future as well
- Bailer located near loading dock. Alternative is using a compactor.
- Where does cardboard go to be compacted? All still goes to the waste energy plant. Cardboard from work centers to loading dock – what is most effective way to get it to waste energy plant
- Compactor unit marries into container – container goes on a truck – truck takes it to waste plant and truck ejects it out of the back of the truck and then a new clean container backs up. Swap a full one for a clean one.
- Incinerator feed system exists which also feeds wood

- Sits in roll off container until they tip it
- Liquid material that would go into treatment plant – Food Issue
- Need a tank to collect this
- Can pick the size that you want to come out of compactor
- Moving towards a co-mingling site
- Mixes recyclables and trash
- Food waste
- Pick up in mixed recyclable containers – bigger and more compatible – will be phased in over time.
- Cheaper labor to separate off continent and put it in the biggest container they can (can still compact it)
- Will have a strategy for each facility
- Milvans off the boat – 300. 100 empty Sea Containers – not a mil van
- Waste has empty containers.

BOD – Biological waste:

- Would like have chutes that go from the source into a container
- For example at each dorm building
- Just have to put a top on it and put it on the boat
- Custom issues? Food waste has been an item that need to educate population on

- Ben – We don't have a "front of house" and "back of house" so everything is exposed. Want to maintain a nice neighborhood appearance (containers change the look).

- Courtyard is Working Zone – separate from pedestrian zone

- Could design a bay with roll down door – could make it work.

Chutes:

- Could get dirty quick and would have to steam clean often

Dumpster

- Unsightly dumpsters.
- Instead of 4 different containers there will be 2.
- What does that physically look like?
- Centralized drop off in more spaces. Bring things to drop off as you would in a commercial or residential area. Work center bins would decrease to 2 – trash and mixed recyclables
- Collected today on a loader with a fork, or a pickle.

Supply continued:

Numbers:

- 170 Sea Containers off the boat
- 126 to Ballpark
- 50 to Galley yard
- With ATO over there – South Pole containers need to be there too – 20 or so
- 200 total containers.
- 136' x 200' space approximately of packed in containers
- How much room between pairs? 40' each – have to have truck radius to drop these

- Bring truck up to work area – fork picks it up, drops if where it needs to go, picks up from truck again
- Ground level vs dock level – mixed opinions

- Process is to get it unloaded and then process materials after boat leaves (except for food)

- Turnaround of the boat drives the process

- Hope to get to a point where we don't have empty food containers – potential with waste energy. Food waste processing could be a huge money savings if processed differently
- Staging of waste containers are at Fortress Rocks. Will still need this space because it's a huge flat area (and it's a good space for them)
- Maintain enough space for daily operations even during vessel
- 2 touch points at front end saves touch points after. Sea containers come off boat and into courtyard area and then they are unloaded and put away
- Other supply chains – receive direct put-away 80-100 containers
- If you can receive in a way that allows for direct put away then you do, if not have to look at a different approach
- Ideal situation is direct put-away
- One option; depends on how you process – one box vs one pallet (drives receiving efficiencies).
- Allow for central area of quick depository of wheeled containers
- Science cargo is packaged separate from town supplies
- Winter staffing processes off load
- Unload as much as possible and then stage it – then winter staff receives (in Maximo) offloaded onto a shelf
- Can staff help receive it and put it away? They are busy. Scheduled work slips, but can plan that into the schedule
- Priority is Pole, Frozen Food, and DNF
- Day to day operations can't be compromised
- Have to find out what pathways that are required to support and what residual space is available – develop that for offload work yard staging area
- Store as shipped? Or store as consumed?
- Trying to avoid building additional space
- Science containers are going to be unloaded at Crary
- VMF containers will be unloaded at VMF
- This means that a lot of these won't even be in the Central unload area
- Sea Container – Not an Air Container
- In theory all containers for Pole are together
- All Pole goes into same area and then it's palletized to go to Pole
- Could designate laydown area in Central Work Space area
- Kim has a plan for every single container and knows where it is going to go when it is unloaded off the vessel
- Ben – re James comment on temperature of storage – maybe some of the containers are storage that don't need to be temperature controlled. Conceivable that some of the containers could be storage. How do you draw from that? Not really a reason to empty. Stay dry and clean in there. Container number is location number
- Move empty containers to waste
- Manage inventory level of need
- Inventory is mapped to the pad that they are located in
- Assign a space to each container outside
- OC&P – container management plan – a yard plan

- RFID readers – GPS grids, tracks every container. Potential productivity benefits
- GPS on containers may be good for waste – so they would know where every container is on site
- Can't keep up with entire offload of boat

2:45 (ASC) Supply

- *4.1.1.2 and 4.1.1.3* OSA's and Airfield

Pole :

- Can Pole goods stay at Airfield? Can we palletize in States? Palletize at Airfield?
- Containers maintain 40' in between – park them up against the building
- May or may not be against a dock
- Central Staging Area – 140 containers with 18 at loading areas – handful to VMF, handful to Crary
- Most are 20', handful of 40'
- 360 containers? Average and last year = 201 – 360 + 80 empties
- 220 in ballpark that includes flat racks
- Can get average number of containers for the last 5 years
- Remember reduction in personnel and maintenance
- Cannot store Pole containers at Airfield
- Alley Space – 65' across and 200' long – can schedule that space for a wide variety of activities

AIRFIELD:

Airfield:

- Loading and unloading airplanes
- Build pallets
- 10 NDF and 5 Others
- Build Pallets and store them on cargo sleds
- HAZ Waste Storage? Store a sea container out there all season.
- Separate containers for food waste and HAZ mat waste
- Pete – some pallets are built with all Pole material
- Need space other than a sea container to house central waste collection
- Some place to keep the snow away

- International Guard Maintenance Storage? They were going to go back and get info on that volume. Skis will be stored in town and taken out as needed (need to be temperature controlled). Need access to parts in the flying season
- Better efficiency to store it there instead of having it stored in town and sending someone to go get it

Warehousing in Buildings:

- Temperature range to store goods

- Frozen/DNF/Unconditioned/Room Temperature
- Build conditioned space for individual items? Protected space but not necessarily a conditioned space
- Ben – if unconditioned then unconditioned but have a skeleton that you could go back later and make changes

Will need amount of inventory that needs to be Do Not Freeze, Do Not Thaw, unheated, etc. Can get a rough idea of space needs based on number of unconditioned containers that come down

Interior Warehousing:

- Racking Perspective, stacked, piping, cantilevered stacking, full pallets, half pallets, SKU profile, how much volume and velocity?
- Consider material handling like forklift has a lot to do with space.
- Standard vs Specialized forklifts take up different sizes and are different costs – dictates isle width – but also means more height – costs more to heat the space

Break (BK notes)

- After break, Rick shows central loading yard with 200 containers. Numbers remain in debate—maybe the number is up to 400. Discussion on variations on pallet sizes, different sized fork lifts to make adjustments to aisle widths.
- Ben: we currently have 3 warehouses in Master Plan—business analyst says consider an alternate model where one person or crew is responsible for all movements in this one gigantic warehouse—is there a case to be made in costs of crew and equipment? Yes, possibly, but analysis has not been done yet.
- Ben asks about trade shops and fabricate. Shaggy states that a lot of their product is for grantees of some variety—science. A lot are put into the field—into dry valleys or deep fields. They're preparing anything that isn't commercial, off-the-shelf.
- Example: a dormer, backbone of a plumbing system. Always have the town-side projects requiring work. In 136, not a lot of fabrication, some welding. Hands on with HVAC, heating systems, kitchen systems. Can't say volume of work—varies from day-to-day—might be a blower requiring 15 items to repair. May go 2 weeks without requiring plumbing at all, and then be swamped by work. Stocked once a year when ship comes in—it's not a 3 or 4 times of year turnover of inventory—an annual restocking.
- If you treat the 3 warehouse areas as distinct, you need to manage them more closely. Some 2/3 of items are used for planned repair, about 5% percentage is emergency repair. There are small allocation bins for nuts and bolts. They do not keep shop stock; they have to keep track of items against work orders. They have preventive maintenance to perform—may plan to take parts, but the crew may or may not need some parts.
- There is cross utilization of supply staff—in Crary, 136, 191, Central Supply and Food—now currently support specified work centers. No need to heat bond strand, lumber, insulation. Gases to be stored outside. Any consideration for outside storage to have covered canopy? Too much blowing snow to work.
- They have one building for a fab shop that will be used for warehousing—there may be some additional capacity for unheated, long-term, otherwise outdoor storage areas.
- Ben: where is best location for Grantee long-term storage? Phase 2 of SSC. Ben: not suggesting where it needs to go. Dig out is only certain times of year.
- Rick: looking for efficiencies in layout, height. Range in height? If equipment wasn't an issue? 17' high on cheaper vehicle; more expensive vehicles can reach to 40 ft.
- Need to talk about equipment and racking.
- Suggestion of energy efficient volumes—more cubic. There is no one solution—several types of solutions for storage—bins of washers versus rolls of toilet paper. Look at layout, and cost for vertical. Cost for going up goes higher—esp for equipment.

4.1.2 3:15-5:00 (ASC/OZ) Facility Operations (Warehouses, material handling Equipment, Adjacencies, Shop Space

Covered above

5:15-7:00 (ASC /A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

Not held

Tues Aug 4 (4.2)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

Mark Neeley – Construction manager McMurdo
Nate Williams – Environmental Engineering – ASC

4.2.0 8:30-9:00 (OZ) Review previous day's work

Mark Neeley – Construction manager McMurdo
Nate Williams – Environmental Engineering – ASC Environmental Compliance with the Treaty
Kim Christianson – Environmental Engineering – ASC

Recap of orphan Spaces (not assigned to any particular work space):

Social Spaces on Third Floor:

- Workable space with no alcohol
- Chapel
- Hut Ten

Hut-10:

- A reservable place for small groups to socialize/cook/hang out

Contingency Operations Lounges

- 2 different areas
- Maintain a range of settings – choose between activity levels
- Both flank a kitchen
- Integrate hut-10 entity – off the beaten path "speakeasy" feel

Reception-Collaboration (not Coffee House)

- Social hub close to Crary
- All staff/scientists can come together in this space
- Central hub

Chapel/Reflective Space

- Holds 15 people
- Prime Real Estate

Comments:

- Multi-denominational vs non-denominational? Don't know.
- Plan for 20 people
- Include Chaplain's Office – need a private space

- This function could be designed somewhere else – lot of investment to build this small space
- Could re-locate it behind Reception-Collaboration Space

Warehousing – Receiving
- Sea Containers in the Yard
- Can fit Sea Containers in Alley
- Could extend alley from 60' to 90' if necessary
- Need to maintain daily operations of Cargo/Science Support
- 40' pathway to maintain daily operations

Comments:
- Ben – how many containers? 225 in Yard, 30 in Alley (based on current operations), Few go directly to VMF/MEC/Fleet Ops/ANG/IT&C and Crary
- Is this layout a short term phenomena? Worst case scenario.
- Kim – Depends on how fast they unload and put away – hard to determine, but it would not stay that full for more than couple weeks, with half being gone in 10 days, longer term ones would be full of fuel and 55-gallon drums
- Process – offloaded from ship, go to Yard, Over 2 weeks they go away.
- Temperature controlled sea containers would move within 4 days because they have to be turned around to backload waste
- With new system – if not filled with waste – they would still be put back on ship empty
- 6 months after ship leaves there would be about half the number of shipping containers left in the yard
- Note that this diagram shows containers parked in front of Fire and Medical

Waste:
- Put in a space to bail
- Collection Stations along lodging and other allied work-centers

Internal Warehousing:
- Efficiencies operational and resources – have it controlled by one entity, not controlled by flanking work centers
- If have frozen peas or pipe there is one governing body that stocks that and issues that – controls that
- Continuously available landscape – forklift can come from one area to another – all on one level

Inventory System:
- Keep it adjacent to where it needs to be
- Provide different environments for what needs to be stored
- Opportunity to save resources by having unheated space
- Ice drill might be stored in an unheated area instead of near Field Science Support

Comments:
- Ben – good diagram showing actual numbers, zones, waste vs supply with same equipment to service all areas of warehouse
- Management understand that what is seen in front should be given priority to remove containers
- Challenge – getting equipment across the concourse – from ATO to unconditioned warehouse – can be overcome if looked at carefully
- RP – lot of forklift activity – have to control this with doors
- Should these buildings be at same grade of have loading docks? Want floor to be at same level
- Implies shipping containers are on the ground so that everything is on the same level – have to have a continuous flow
- Ben- red dash line implies a circulation path –
- Have to keep this path clear so containers can go anywhere.

Comments:

- Putting everything on ground – not the best situation where slab is on permafrost – but looking at architecturally solving that issue
- Dan H – as season moves forward – partition off warehouse and move goods more towards entrance
- (change energy usage per space)
- With natural attrition – don't heat empty shelves, compress it down into smaller warehouse space – but this might increase touch points by having to relocate items
- Less requirement for a forklift by servicing a smaller space
- Dan – maintain same size of racks but service a smaller space
- Might change ROI on equipment having a smaller space
- Aaron – back bone for forklift activity – could still put a loading dock off on the corner with grade around it to provide that function, if having a loading dock is still a desired function
- Laid out with 40' aisles you have to pick from the ends of the containers and then move them out in order

Science Cargo:

- Outside storage will continue
- Don't want to bring it in to heat it
- Flat area next to SSC
- Call it "Grantee Cargo"

4.2.1 Track 2 Airfield:

- Discussed 2011 Airfield Complex Master Plan. Wheeled run way , ski equipped runway
- Propeller building will be in service this season, replaces one building at airfield. Still needs storage area for materials , not accommodated in the propeller building
- Program additional requirement was discussed yesterday for food waste storage area
- Structures for wheeled run way needed – head unit, power plant unit, consolidated ops building (see email sketch),
- Weather Person needs office door to exterior, air field manager office
- Kitchen and dining separated, AGE office, ARFF storage immediate adjacent, Flight ops storage, general maintenance storage
- Need bathrooms available to staff and passengers.
- DNF storage for in bound. Local storage to main station. Needs to keep materials frozen while it sits
- IT hub structure?
- This facility is used summer and winter
- Can we put PAX on second floor. Option to relocate weather observer to second floor also. Need to confirm what requirements they have for access to outside. Might need stairs to exterior for weather observations.
- Doors on both sides of storage
- Passengers are held on plane if weather turns and need large area to hold them during inclement weather.
- 50 passengers are the average number of people cycling thru as flights arrive and leave. Can max out at 100 beginning and end
- Plug –in to get power to block heaters for 15 pieces of equipment, can be 2-3 plugs per piece of equipment.

- Joe (diagram) number of staff requirements
- Kitchen will serve the airfield staff. Needs to be separated, keep some privacy. Dining table to serve 8.
- This building might be able to use waste heat, check viability. Not setup the way LDB is done.
- Comms will be handled by radio phone – over internet. Needs separated power source. Separate generator for comms.
- Data drops – 2 per person (Merrick) Wifi connectivity
- Are the current LDB structures too large to move them?
- Buildings will go cold during off season, orientation of buildings will be based on direction of runway. Could be heavy wind loads on structures for orientation. Generator location discussed. Exhaust concern for blowing back into town
- Concern about moving three story structure across ice. Need to confirm the AFF and Maggie. Nothing larger than LDB. Option to get rid of third floor. Need to confirm for reg's for the air traffic control

4.2.1 9:00-10:15 (Merrick) Waste Operations, HAZ. Waste, Fuels (Track 2 is Airfield)

CE – DM – RP

Waste and Fuels

Requirements and criteria to support waste operations

- Waste Handling and Recycling is shown on the way out to on-load with a potential for a waste-to-energy plant
- HAZ Waste and fuels storage is located up on hill – out of town

- Where does scale need to be?
- Needed for way out to pier
- Don't know where "back yard" is at this point

- Big yard for sea containers – waste into containers based on regulations
- Storage waste tanks are there
- Secured/fenced in space

Method:

- Collect HAZ waste at satellite work stations ie: Crary – have materials that end up in a container.
- Waste crew comes to pick it up, loaded in a truck to processing center then offloaded outside (currently can't drive in)
- Taken into the facility and determines what type of waste packaging it should be in (barrels, boxes, crates); then it is labeled; then placed into a container at that location with a forklift, that container gets filled, shut and sealed, labeled, before vessel it gets picked up.

Currently sorting for different classes of waste.

Back yard is currently located in waste tent

- VMF, Fuels, Crary, Facilities maintenance (and demo) are the most amount of waste
- Picked up currently with a pickle
- Taken from work center to waste center

Deep Field:

- Science cargo takes it to waste facility and drops it off
- Could be drums, crates, etc.
- Human Waste goes to solid waste site not to HAZ Waste
- Same with Pole – dropped at doorstep
- They don't know when it is coming
- Comes in through Mike and Science Cargo
- Field camps – Cargo pulls that apart
- Need a yard for 3 tanks 15,000g
- Don't have to be stationary tanks (collects waste fuels)
- Waste-to-energy would only be for wood and cardboard, not fuels
- Have waste oil burners (Clean-Burn)
- Already have the Clean-Burn – Don't have enough Clean Burn units – maybe put them at the source ie: VMF
- Clean-Burn is in full environmental compliance
- What about waste fuel at field camps? That has to just be shipped out – too many unknowns
- Field camp fuel waste isn't a huge amount

Process:

- Tanks collecting fuel – have unit near the source – Has to be inspected first to make sure it's 100% oil
- What about waste fuel at field camps? That has to just be shipped out – too many unknowns
- Most of this is used motor oil that is mixed with waste fuel in order to burn
- VMF (greatest source of waste oil)– if have microturbines – will not burn as much, goal is to minimize burning in VMF
- This is where it is generated but might not be the best place to burn it
- Different burner for the boiler – close to the space – need a heated space for burner
- Would burn fuel somewhere near VMF to heat VMF
- Need indoor space to process: ie Crary – small items come in that are all different types, aerosols, flammable – segregate different classes of waste – package it up when it is full (in a drum).
- Process drum – weighed, labeled. Ken has a drawing of this that ASC can get to OZ.
- Radioactive processing is necessary (dirty room)
- Storage tanks will have same segregation rules, including spill containment, showers, eye wash, fire protection

Requirements:

- Need a lab – hood lab for basic testing
- Need storage for spill response (local and for entire station, could be small spill or large fuel spill)– emergency supply. Have to be on site
- Supplies – absorbent pads, decontamination tools – currently in 3 sea containers (ok if frozen)
- Need running water, which they don't have currently – needs to be near lab
- Need a bathroom, shower, safety shower, safety eyewash, drain (will need to be collected), changing room, lockers to keep ECW for spill response or for PPD's – don't want to put it on in hot zone, don't want to put it on in office either
- Tent – consolidated oil filters, batteries, fluorescent light tubes – doesn't have to be heated but has to be permanent
- Can be part of back yard
- Needs to be a clear isle between consolidation and building (enough space for a forklift)
- Also have a spill response vehicle (truck) doesn't need to be heated
- Ken - Big liability space – this is where things can blow up, catch on fire
- Need a detection system of some sort. Ben – we will be in compliance.
- Size needs – could build walls where you can have concrete walls or some sort of separation to segregate

- Not counting radioactive waste is about 400sf
- We will not undersize this space
- Need containment? Tanks will contain it. Prevailing wind one way and storm winds another way helped decision on where to place this building
- Need secondary containment
- Excavate with a sump and backfill with fines for two 15,000g tanks (make sure they are double wall steel – so they have secondary containment)
- If we have milvans taking these containers – do we need secondary containment? From drum into sea container you don't need secondary containment but storage areas do. Need enough room for 20 drums awaiting processing (waiting to be put into a sea container)
- Block and brace within the container. Once you close it and seal it then the container is done.

Office Needs:
- 4 technicians
- 1 supervisor
- Need an office for supervisor
- 3 computers, lot of paperwork done here
- Labeling printers
- Paper printers
- Place to keep paperwork
- Regulatory factors make you keep hard copy paperwork (keep for 7 years) – only keep one year's worth of paperwork because it is shipped off
- No privacy needs

FUELS (Alex)

- Size of the building ideally would be over 100' long
- If HAZ and fuels are in the same building – engineering code thing with how much space they can share vs need – up for discussion
- Need proper training to go into HAZ area
- What are advantages of being together?
- One building for 2 departments with constraints as to how much they can mingle with other areas. Put 2 "problematic" work centers combined under one roof
- 100' length – size of hose that they need to test indoors needs to be stretched out to full length. Hose gets pressurized.
- Also store fuel hose for airfield indoors

Requirements:
- Lab with running water to clean glassware
- Explosion proof
- Fume hood (to draw vapors out)
- Plug-ins – 10'x10' to accommodate testing machines – as the lab (what they have now).
- Counter space – counter top machines, dishwasher to clean the glass, place to stage samples
- Need a mechanic shop

Office needs:
- Labor intensive
- 20-24 people
- Locker for all
- Leave clothes at the fuels barn

- 3 offices:
    - Foreman
    - Supervisor
    - Admin
- Morning gathering space for up to 24
- Could share meeting space with HAZ Waste
- Have a private office
- Separation between lab and offices

Fuel testing:

- Testing at fuel pits at airfield and heli-ports, test at a transfer. 4-5 tests per day
- Do dormant storage testing also
- Could have 30g of fuel in the lab waiting to be tested. Can they sit outside? Don't want to keep them outside any longer than necessary because they have to stay clean. Need a controlled environment.

General:

- Fuel-laden equipment should be segregated in warehouse. Fuel smells.
- Do maintenance on them in the winter
- Not inventory items, reusable items. Warehouse isn't for replacement parts.
- Will need to k now what needs to be stored for space requirements
- Have a segregated area like a lab with shop one area and storage another with exhaust down to storage area

OSA Pads:

- 2 areas currently:
    - Pad 2
    - Pad 3
- Process drums through Pad 2, and boxes, bladders 31' x 31'
- Pad 3: 4 milvans storing larger items like pumps, hose sections, filters,
- Currently Pad 2 and 3 are sufficient sizes; consolidating space would be great
- No security at these areas needed

Hose reels:

- Have 60 with 24 bases takes a lot of space. Bases have to be brought in to work on. Have to get loader in and out. 60 hose reels can be kept at pads (8'6" reels).
- 8' sleds deploy the hose on HMW (platforms on HMW), which are kept at Willie, Pegasus, or Mile 7 on berms (very temporary space)
- Use the HMW that Traverse no longer can use
- Deploy hose for summer months and then bring it back in
- Space for decon area increases the cost – would need a space to decon 100' of fuel hose

HAZ Waste - Contaminated soil cooker :

- 20' sea container with attached generator with a melting system – could increase usage of this as buildings are remediated?
- Physical laydown space for cooker is not big enough for the amount of soil that needs to be cooked. Include a pad where the soil is laid out 20'x30'

SOLID WASTE (Ken)

- Collecting from fewer places
- Comingled
- 20% trash
- 20% food

- 20% wood waste
- Rest of misc makes up other 40%
- Will be cut down if dewater

- Human waste (comes back from field frozen)
- Tires, sludge, medical waste
- Cardboard (waste-to-energy candidate)
- Mixed recyclables (10% combined) glass, aluminum, paper, plastic, cardboard not from a mass source (no advantage to compact this) – could compact in a packer truck which is similar to US –then you could go around the station and pick up, routing, would be efficient for small population
- Mattresses
- Scrap Metal (9%) – makes most money of any waste that is brought back)
- Roll-off containers can't be reused. So use sea container model

Bailer:

- If not dealing with cardboard then take away a lot of labor
- Right size bailers and have bails put directly on a flat bed and on to boat then they don't have to touch it again.
- Bailer in separate location – save a step
- Cardboard coming out of supply – could use same bailer? 4 semi-trucks filled with cardboard – 100 tons.
- Right proportion of wood to cardboard? Cut down what is brought to the ice.
- For Kyle – cardboard would need to be shredded
- Why bale if we are shredding?
- Can bail in precise amounts for measuring what to burn
- Could shred and then send to Kyle.

- Ken – would put a compactor in – way to get the most weight moved. Put if in the bay close to its source. Then compacted material is taken to where it will be burned. Pull container out with a roll off and take it to where it's going to be used, container goes back to compactor. Someone manually operates – or use a conveyor system.

Ken staffing/office needs:

- One waste person in charge who has an office – supervisor
- Fleet ops would bring containers - they pick up 2 different streams
- Currently 11 people

- Ideally mingled recyclables would be compacted in the container – likes the idea of a chute in the dorm and into an open-top
- Skip the solid waste building all together
- Goes to Oxnard
- Take solid waste area and make it a waste area container for people to deposit their own materials. Goes up to Fortress Rocks (ideally with a compactor)
- Strategic collection points – compactors in roll off containers, including mixed recyclables
- Sea containers are not typically dumped

- Ben – with one compactor in one location, goes into a container, kept at Fortress, loaded on boat
- Can it go somewhere else? Need the real estate. Will have a reduction of requirement to move the container

- Ben concerned with labor, distance and number of container we have. If reduce number of containers, reduce touch points, reduce number of hours people take to move containers
- Containers are at Fortress Rocks now because it is sheltered and out of way

Labor needs:

- Treat wastewater sludge
- Treat Medical
- Tires
- Mattresses
- Urine
- Grey water
- Feces
- Metal
    - Taken into scrap metal places in California need a ferrous/non-ferrous sort. Can make good money on this scrap metal. Simple magnet and crushing it to ship efficiently. Metal containers that are seaworthy that they are looking into. Sorted at the source with magnets that have been given out.
    - If not sorted on ice then you don't get return.
    - Business case has been made/approved
    - This is a component of a person's full time job – this is not a full time job itself.

Office could be anywhere – probably near Mark in HAZ Services. Could be in Central Services.

Number one issue is Food Waste – as it is a violation of protocol; Make it easy to dispose of food waste.

4.2.2.2 VMF and Traverse

Traverse Ops Recap:
Corey – Traverse Supervisor, Mike – VMF Supervisor

Master Plan 2.0 allocated footprints for separate facility to serve a growing Traverse Ops with an addition to VMF for MEC. Looked for synergies with ANG/AGE/MEC/Traverse/Fleet Ops

Traverse Ops:

1. Vehicle maintenance – 2 full bays
2. HMW unroll and prep – 2 bays
3. Bladder Repair – can happen on top of HMW (4)
4. Tool Assembly for triangle – Crell
5. Food Sorting and segregating

VMF:

ANG/AGE:

- ANG: Storage for large items – props, skis with adjacent bench
- AGE: Storage for heaters and generators with work stations and office

Concern with morning meetings starting at the same time

Site Plan options – 4 versions
With outdoor staging to support Fleet Ops also

A. Follows the master plan – with a renovated floor system – could add on and accommodate MEC – MEC does a double move in the Phasing Plan
B. Combines the two – existing VMF with light duty floor takes light duty vehicles for maintenance and can accommodate winter storage – this one has grade concerns.
C. Combines the two with more challenging grade issues and the ability for drive through. Maggie – might be advantageous for snow accumulation and removal
D. Consolidates everything in one building – have ruled this one out

Comments:

- Could have traverse on other side
- Shaggy – spatial allocation but more importantly Phasing
- MEC and F-Stop have to stay functional
- MEC movement has to happen first

- Have to have space for construction equipment that comes down
- VMF is the most expensive and contingency-laden building right now
- Move VMF and Traverse – one of first buildings to build
- ANG – AGE requirements would be met – with MEC
- Option B makes the most sense
- Pete – where does his operation go?
- Pete's staging stays in the same spot
- B is better flow getting vehicles through town and into bays

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- Other functions here? If need swing space – can you use this space? HAZ Waste and Fuels? Shaggy – doesn't seem like the right fit
- Construction equipment in current VMF? Old VMF has space – not the new
- AGE can stay put for a while – can be one of the last to go
- Maggie – where is warehousing? Shaggy it's in the current bench stock space is currently
- Ben – high volume in new MEC/VMF space – could do a mezzanine, smaller space, or could high-bay rack it

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Phase 0

- Didn't account for MEC movement – 1st thing
- First move is MEC – not all of their warehousing but the work center – becomes area where you'd bring in piston bullies into existing VMF
- Put up a temporary structure for a year or two? Tough to do.
- Steve – SSC was built to accommodate MEC originally
- Shaggy – understand baseline science support – and what kind of science is being put into the field. Science planners will help with realistic support

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4.2.2.1 10:30-12:00 (OZ) Sea Ice Support - Kiley

- Reviewed sketch of Sea Ice support building and layout

- Dive Services operation
- Shower stall to rinse gear – (try to get salt off) 10x10 drip dry area not enough room currently for drip dry area for suits

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- 18 divers (typical) max 32 divers. Trending to dive services doing most of the dives for grantees. 5 staff other grantees
- Others are Grantees.

- Early Oct start of dive season thru mid Dec.

- Dive support for ship offload and construction support

- Need hanging area for drying, need locker space for each driver. Dry clothes, personal effects (2'x2') needs to be secured.

- Grantee divers get checked out for the season then they act as independent teams. ASC is independent of these teams. Support for equipment maintenance, etc.

- Regulator servicing sink. Part of shop function? Very limited.

- Decompression chamber – needs to be in medica. 4 hrs 40 min per treatment. Can be multiple treatments. They use the chamber for multiple other tasks. Need access. Test gauges, equipment. Etc.
- 2 compressors – one high compression, one low compression
- Locate with Medical ***
- Gases stored – compressed air storage bottles (12), oxygen (3 bottles) for treatment, Nitrox
- Hyperlight stretchers need setup or breakdown space. Ability to wheel a patient into the chamber. 7 ft clear at door. 14-16 ft long. could reuse the existing
- Dry regulator storage
- Tank filling area
- Laundry, training video area (conf space)

	1:00-5:00		Break Out Sessions
4.2.3		(OZ/Merrick)	Track 1: Trades (Equipment and Layout)

- Missing fab shopper for welders. Overhead door to outside. Needs to have exterior access. Venting of fumes to the outside. Welding shop doesn't have to be immediately adjacent to carpentry. Use mobile unit for the rare occasion. Group with sheet metal fab and plumbing. Largest size of materials upto 20' in length. Sheet metal 5x10 max size.
- Covered staging area. Shaking out wiring harnesses, cabling, stoves, tents. Conflict could exist with forklifts with common laydown space.
- Segregation of ATO and Science cargo to the western edge of the buildings. Most circulation this side.
- New station with have specialized technicians rather than laborers preforming tasks.
- All materials coming out of this area go to cargo stream or helo. May need to have access to exterior on both sides
- Control technicians might need space collocated near other trades. currently done from monitor in office monitoring equipment. (Mike Casey)
- Locate offices near the shop areas rather than all offices centralized.
- Sheet metal needs close proximity to bench stock, rolling rack
- Plumbing needs rolling pipe rack.
- Riggers may need exterior door for loading materials. Close to metal fab shop. Need access to heavy welding equipment
- Pipe fitter, insulators,
- Lineman will have a smaller presence.
- 97 total staff now, exclusive of supply. 35 carpenters, 20 utility tech, 5 elec, 3 rigger, 3 fire tech, 5 insulators, 6 plumbers, 6 elec, 3 alt energy techs,
- New station will reduce numbers.
- Volume of trades supporting science is 80% for field, 20% in town. Population of carpenters varies. Early summer (winfly) season, most out of carp shop working. Project repair. Amount of trades will be reduced once MP 2.0 is completed. Need to right size for new facility.

- Determine standalone equipment per work area. Need specific layout for each area.
- Lockers for storing coveralls, tool box, and personal effects for every shop.
- Electrical – bench stock, wiring bench stock, rigid conduit on rack, uni-strut, assembly space for putting things together.
- Utility Technicians – use stand about the same size as an engine block stand.
- Riggers need some space but not dedicated area for assembly. Usually assembly happens in the field.
- Complexity pf project will change, some large some small. Trades Assembly Area will have to change with the need that comes in. Driven by tools and availability. Will need to be scheduled.
- Carpenter input – plenty could be rearranged. Need to include a few more tools that aren't included.
- Need more tool storage than what is shown. Current tool room shown would only serve Carp Shop. Safety equipment, harnesses. Need secured storage for field kit - Survival gear, tent, sleeping bag, these are for the field carpenters.
- Currently store a lot of camping equipment.
- Use drop power from above. allow for versatility
- Locate dust collection near the outside of building. Needs to be inside the environmentally controlled enclosure.
- Wide range of items produced. Rock boxes, specialized crates, pedestals for equipment, crating for components of an instrument.
- General construction usually keeps 5 carpenters busy, repair doors, weather stripping,
- Shakedown on stoves, tents, camp components are down by carpenters. Fish hut also done. Do conversion for fuel sources. Repair damaged components. Volume can vary and carpenter staff numbers varies and responds to need.
- Bldg 171 Haz flammable storage – needs to be defined and accommodated in the Programming phase. Need to identify area for localized storage of hazardous materials. Flammable cabinets near user.
- Paint booth – all items that go to field is usually painted before it goes out to project it while in the field. 10x12 dimensions
- Size of offices for each work area needs to be 80 SF. Needs to support private conversation. Need access to conf room
- Grantees come back to discuss requirements for things being built. Can't have grantees coming into the work areas. Needs to walls to separate noise and sound 6 total for carp's.
- Grantees need to able to access lobby to Const Admin. Who will call Foreman or superintendent. Office environment for admin staff.
- Sound separation between carps and other work areas needed.
- Conf space needed for weekly foreman's meeting. 12 people bring together super's for scheduling.
- Other meetings occur that occur 3-4 x a week bringing together other outside work centers, can be 20 people, location TBD.
- Break room for this area. Regimented break schedule. 10-12 people
- Restrooms needed. Male and female distribution needs to be 75%\25% or half and half.
- Zone areas for heating based on requirements. 65 degree. Storage areas above freezing.
- Fire separation for zones of buildings.

- Welding large project 1-2 times a year, needs for ability to vent locally to outside. Moveable snorkel.

- Volume of waste – trash and recyclables. Waste to energy still being considered. Co-mingled recycling.
- Bins outside for waste. 8 containers (smaller) of waste each week (size – 4'x4'x4')

1:00-5:00 Break Out Sessions

4.2.4 (OZ) Track 2: Field Science Support

CE, RP, DM

Tony – ATO – MCC – Cargo – PAZ
Bija – ASC

VMF and Traverse

- Consolidate cargo and ATO next to each other with synergies between the 2 – sufficiently feeds BFC
- Backed up by storage and warehousing

- Not a point where we can back a truck up to offload – maybe down the road

- 80-90% docks are at grade in this design.

- One scenario: Slab re-radiates the heat, can run 180 degree glycol to heat facility – and floor vs Overhead. Don't want to heat goods and air – want to heat people
- Concourse (formerly known as "alley") can accommodate overflow

- Aaron – best to have one foundation system

- Vessel – 5 to 7 day process

- High rack shelving – how is it retrieved?

- BFC supported camps vs large established camps – These will require carpentry so may want to consider adjancency
- When vessel comes (mid-end of Jan) – a lot of outdoor staging has already happened – most staging would be broken down to return to BMC. How does it get returned?
- Steve – smooth load out – stack up BFC outside and shift some of BFC labor to winter? Bija – some stuff comes in and is issued back out again.
- ATO moves as much to the airfield as it gets built

Pallets:

- Bill – pallets are a mixed bag of materials
- Need to store the equipment that makes the pallets – need space for that (TD = Tie Down equipment)
- Need pallet racking
- Keep 250 pallets (have 900 in the program – some are in Christchurch, Pole, they are in constant rotation).
- Active pallets at McMurdo? Close to 100 pallets built at beginning of season
- Built in this space and then will stage at Airfield if they can be frozen
- 30 pallets of fuel at any given time (don't send it to Airfield until later – need to know where it is going)
- Where are they building pallets? Depends on your needs.
- Requirement for storage nearby – bring them in – build them
- During offload the Yard will be packed. When it comes to building and storing pallets – this occurs before ship offload. The yard before the ship arrives is open

- During offload the Yard will be packed. When it comes to building and storing pallets – this occurs before ship offload. The yard before the ship arrives is open
- Turn 90 degrees the upper right corner of activity. Ben – or swap with SAAR. You want ready access to ice cores. Reefers want to be adjacent to exterior.
- How do you off load? Come in on Air Force pallets and put on a skid – temperature monitored.
- Ice Core's need to get into temperature control quickly – that's why originally said to be close to outside. Ice core samples are very important and things with forklifts have been known to happen.
- Want to optimize outside all in concourse
- Will have drainage in Concourse for snow meltoff
- Bija – Gear storage – how are scientists able to access it? Would use a lot of staging area – and need space to teach – a lot of activity going on there making teaching there tricky (all while helping scientists get in and out of field)
- Potentially drying and repairing tents at the same time.
- Mezzanine – bring tents up there?
- Need a quiet space out of the way for training
- Important to know the flow of cargo going back
- Pallets from the field have a mix of things that would have to be broken down and delivered to where it goes
- Bija –
- What happens when material gets returned:
- Bill unloads, BMF inspects, goes to storage in appropriate place (maybe in a bay in colder storage)
- If a tent comes in – clean, inspect, fix zippers, etc.
- Washing – Scott tents – Kiwi's have a good system – a space with a sloped floor and drain – enclosed where you can spray it down, let it dry and repair it. Sitting on the ground. Could you hang it? Bija – if you could spread it out
- Can get as many as 15 tents being returned at the same time
- Put it on a frame? Goal would eliminating opeing/closing/opening/closing… Can take 30 minutes to locate, open/close/open /close. 100 lb tent
- HAZ/Waste process in here? Waste from Pole goes to waste. Waste from field camps it is all mixed up. Need an area in Science Cargo – need an area to process HAZardous cargo (inbound). Outbound – they take to HAZ Waste
- HAZ Waste from camp – get the paperwork for it – take it to HAZ Waste (paperwork needs to accompany the waste)
- Don't bring HAZ waste inside – it stays in the Yard
- Bill – concern about separating between activities
- Bill needs 8 stations – doesn't include shuttles

Shuttles:

- Shuttle hourly schedule out to Airfield.
- Dedicated LDB shuttle in the morning/evening
- Grantees calling saying they need to get stuff from one place to Science Cargo

- Arrival Heights

- Dispatch – dispatches vehicles – 3 PAX Deltas, 1 TerraBus and the Kress, 4 – 5 vans
- Calls shuttle operators
- Driver's needs? People are rotated into Dispatch and into a workstation for paperwork
- Supervisor
- Bus station close to dorms, close to galley
- Air crews stop by galley and grab food, coffee, water and that goes on the bus with them to Airfield
- Shuttle stop – shuttle coming through often
- Street crossing? Is ok

BREAK

- Moved ice core storage from outside wall – but still adjacent to SAR
- ATO Tie Down staging will be inside and outside
- Increase staging area in BFC
- Storage of netting and webbing to tie down pallets

- Handling of cardboard – empty box – receive material (not just at vessel – throughout season)

- With food storage – cardboard comes wrapped on dry goods and beverages, continual process going through season, will wind up where the rest of the cardboard is going to go to be compacted

- Cargo doesn't unpack boxes – they deliver to supply location. Larger warehouses are where large quantity of cardboard would be generated.

- New items – ball park, in to Kim – scans it in (not sure where), her project code could be a container that needs to be pulled in, on a pallet within sea container, unload containers on outside of perimeter faster than inside, forklift deliver them to supply area

- Steve – space is doubling – is there room for space for inbound BFC materials in Science Cargo
- Want an inbound – Outbound space in new configuration
- Food will become part of Central Supply
- One point of responsibility for movement – aisle way has to be maintained – needs some sort of management of control in this area
- Need to look at what is going in and what is going out and minimize conflict

Cardboard:
- Ideally cardboard is outside on Yard side
- Two cardboard areas – Trades area also
- Food compactor also
- Mail room
- Often reuse good cardboard boxes for Grantees (for while they are on ice and afterwards) – often it is BFC gear that is inside the boxes (can be GPS units

- Where should compactor be? Need more than one for redundancy?
- VMF is a huge producer of cardboard—and should be located there as well. Is there a way there could be at the end of the concourse—that could be on wheels or onto the forklift and move the trash to compacter?

- Want a helo door that doesn't get in the way of Cargo – separate entrance for scientists to get to Helo

- Frequency and volume to Helo – BFC equally deep field/helo (food, tents, sheltered and dry, survival bags)

- SAR needs dedicate access to outside – Ben – make sure doors are not blocked. Keeping a Piston Bully inside is good to get it started – similar to Fire House response time

- SAR – just enough room for Search and Rescue gear and a Hagland piston bully (combustion engine – so this is not good – park outside with engine warmer? Doesn't work. Integrate into Fire House? SAR uses gear stored in BFC.
- EOC calls it over – debrief, determine how you get there – pull gear from storage area, includes medical gear, might have to grab stoves. Inefficiencies with separation. Ben – way to have SAR have their own equipment from which they pick and pull? This was inefficient. SAR is tailored to the incident. "Live with what we got" – Keep small specialized gear that does not get issued to scientists.
- Could have a warehouse having contingency emergency operational gear
- Lot of space in SAR
- Maybe put the vehicle in the concourse – ventilated area for it to be on call – have a door to access it

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- Can you move SAR to Fire?

- Have access through Hagland Garage or a shared entrance into facility – much more desirable.

- Office space in diagram can/will change

BFC Office Space:

- 3 office spaces (Bija needs a closed door office)
- 5 camp manager spaces
- McMurdo Implementation Manager – Liz Kaufman
- Continental Field Manager – Ryan Mollus – closed door
- Science Cargo – 3 Admin in office office
- HAZ Cargo person (not HAZ waste person)
- Supervisor – closed door
- Bija needs a classroom space with ability to darken the room for a projector
- Could use lecture hall
- 13 people in BFC
- ATO needs 25
- Have to have a place for morning meeting
- Ben – shared conference?
- Supply has a weekly meeting, plus training requirement. Bill: some kind of common space in this area is important. Break room for people to warm up and have a cup of coffee.
- Makeshift emergency helipad for SAR—reserve some space in front of medical. Now lots of transfers happen. If space available, have an H painted on the ground so that it could be used a couple times a year.

- Why is this building getting loaded with a garage function? Maybe it goes in a concourse.
- People in the offices: 5 camp managers—horizontal space to put laptops.
- 1 closed office for HR or discussions with grantees.
- It would not be ideal to have a work station and do counseling at an office on a space available basis. Not so much with regards to conference calls, but does end up closing the door a lot
- Bija Could use a training room; don't have to have a space. Ben: should there be conference capability for morning meetings? She has meetings once a day plus a meeting with the science group. May be a group of 10 to 12. For Field Support and Training (FST)—needs 12/13;
- Does not need dedicated classroom.
- A mezzanine level with conferencing might help: Rick says let OZ solve that problem—may not need a mezzanine level. Supply has a weekly meeting, plus training requirement. Bill: some kind of common space in this area is important.

5:15-7:00 (ASC /A-E Firms) Debrief, identify follow-ups, and meeting minutes

Did not have

Wed Aug 5 (4.3)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

Set Up

4.3.0 8:30-9:00 (OZ) Review previous day's work

Introductions:

Anthony Angrady – ASC utilities
Mike Casey – Control Systems – ASC
Eric Bratt – Merick

RMI – "Think and Do" Tank
Industry experts
Hutch – RMI overview

Laura Joe - phone

Rick Petersen – Tuesday Recap:

- Separation between louder cargo area and quieter training area
- Don't want the Hagland combustion engine parked in SAR area, so it will stay in the Concourse
- Training area needs to be accommodated and be multi-functional spaces
- Revised diagram shows 32 storage pods with elongated staging area
- SAR has moved to exterior wall near storage of Hagland
- Update shows One space that flows between Cargo and ATO
- Double loaded corridors – more efficient circulation – big enough for forklifts
- High bay storage (Kim to provide volume requirements)
- Administrative and office area has shared workstations and handful of offices with acoustical privacy (enclosed)
- 2 large conference rooms – possibly 1 – with training and collaborative space
- Calibration space is available

Comments:

- Ben – Concern – access to ice core storage directly from outside – additional penetrations now. Take advantage of entrance from the Concourse
- Training room – what is adjacent space? Don't know yet
- SAR protruding into Concourse?
- Mark – extra space could be Mech/Elec
- Maintain air quality – certain areas will have vehicle traffic
- Electric vehicles? Looking into
- May have to revisit size of office spaces and see how space can be shared
- Still need to flush out ANG fuel drums that need to be in a controlled environment
- Steve – parachute rigging space need (MEC)
- SAR mobile equipment in the "garage" area
- Gear is shown adjacent to mobile equipment – SAR needs a controlled environment
- SAR personnel are scattered around town but core of them are in this area
- Have a place to dry 50 barrels at a time? Not yet shown

Phone – Jake Herrick – estimator utilities - ASC

4.3.1 9:00-10:00 (Merrick) Utilities/Facilities/Operations

Aaron Seal

Overview:

Overall site
Master Plan review
Waste water, water treatment, power generation facilities remain
Domestic and Fire:

- Facilities are in good shape – cost savings
- Current concept has hub and spoke type utilities – dendritic
- Proposed concept – overall intent is a looped system with a couple interconnections will be able to back feed – will be able to maintain station ability in case of an incident
- Biggest addition to water is 2 storage tanks – 1 million gallons combined between the 2, capitalize on gravity – use gravity head on tanks to provide pressure and input into the system
- Combined domestic and fire
- Main fuel line from tank farms around and to the ice pier – this current line is not part of scope
- Potential for some of that fuel line to go underground
- Also fuel line comes down and provides fuel to Town
- Day tank concept? Back up ability in case of contingency
- Day tank – building supply tanks
- Tanks on high enough elevation?
- Fire pump will be at base of pumps
- Understand HAZard classifications and floor plans will help dial these details in
- Ben – concern with providing additional pump. Redundancy requires additional cost, additional maintenance
- Pump up and use gravity?
- Steep slope is a benefit
- How is temperature being maintained to prevent freezing? When have the ability and have ability to distribute adjacent to the building they will
- Latent heat from reverse osmosis treatment in water will provide/maintain heat
- Tanks are heavily insulated
- Ben – through put as anticipated? Domestic and Fire protection? Piece of design is to determine this. Warm enough to get bacterial growth? Not very active below 60 degrees. Consumption rates/Flow rates – population at 850 high, 150 low. Flow rates – usage rates are going to be variable
- Split fire and domestic system? Decision to combine the 2.
- Usage and Flow rates to be determined
- Water disinfected method? Chlorinate the water. Inspect tanks once a year – clean them every 3 years.
- Current production – one million gallons = 36 days to fill tanks
- Use about 50,000g a day in the summer currently
- Mark – can one tank be drained and left empty during winter? Would allow for annual cleaning.
- Glycol heat recovery tank up to tank? Could heat that loop somewhere else? Plan was to put an electric boiler not glycol heat. Do you need big electricity up there?
- Dedicated fill line from water treatment up hill – with typical distribution happening downhill from there
- Can take off line for maintenance once tanks are full
- Air out and water in – have loop of pipe – can add water and supply loop at any time. Kevin - Wanted to keep

looped system separate from pressurized system. Make them an inline system would have to have pumping ability at treatment center to maintain pressure

- Elevate tanks to provide fire flow head – have gravity feed to buildings
- Fire pumps will not run all the time – will have a jockey pump that would kick in during a fire event
- 2 R.O.'s 24/7 (Anthony) 27 gallons per minute
- Rather than many fire pumps tried to centralized as much as possible with larger/fewer pumps
- Ben – balancing act – mech equipment = labor cost with maintenance – get what we need and maintain on a cost effective basis
- Dave – not going to solve this today
- Current storage tanks are being kept (200,000) – which may come into factored into Phasing
- Have to maintain contact time for chemicals used to treat water

Fuel distribution –

- Main utilidor –contains multiple utilities
- Fuel into town – not modifying outside area of influence
- Helo Ops fuel systems will be made more robust
- Steve - Current design – most pipelines are patrolled – control the lines during transfers
- Maggie – looking to monitor in a more modern tech way
- Currently - Fuel goes up the hill once a year using temporary pumps
- Why not getting double duty out of existing pipe for distribution? We could – but things not on pipeline are being fueled by trucks
- What functions need a constant supply of fuel?
- Secondary containment?
- Leave fuel in the system all the time would require line be monitored (which it is monitored during transferred) or have secondary? Code requirement?
- Have to have a risk assessment
- Hope to lower fuelies time fueling
- Secondary containment might lower the cost on this
- Multiple types of fuel

Sanitary Sewer

- Gravity
- Understanding elevational relationships will determine how it is routed

Sea Water System:

- New mechanical room on Crary
- Sea Water feed would be effected by potential Phase IV
- Intake still needs to be vetted
- If a Crary pump goes down you have to take down the whole system
- Pump hut on jetty – those feeds go vertically into the sound
- Crary to remain being fed from Sea Intake
- Ben - Look at chillers for maintaining temps – look at alternate solutions

Utilidor Strategy

- Self-contained system – underground maintenance will be difficult
- Above ground utilidor:
- There will be some that remain above ground – cost and maintenance – pedestrian conflicts
- Volcanic rock is a good insulator at that level. Ben – that has to be determined
- Water main breaks in underground utilidor would be a concern
- Above ground utiltidor is currently high maintenance

Break

Heat Recovery – Kevin

CHP Plant and Heat Recovery – microturbine units – recover heat from exhaust

- Backup boiler
- More fuel generated heat than fuel generated power
- Boilers can be electric or gas-fired – some other form of heat – cardboard/wood
- If one heating pump fails then a back up one kicks in
- This is stand alone
- Turbines – ability to change recuperation? Modulating them. Speed does change.
- Running micro turbines and boilers? Conceivably.
- Armory – virtual trail shafting – turbines have fairly flat efficiency curve (amount of fuel it takes)
- Distributed plant concept
- Augment or replace what is generated at power plant? Intent is for each plant to ability the size that it is in
- Could lose the power plant and system would continue to run
- Options are not confined to system being described
- Wind and solar could be charging a battery bank
- Island mode - Loop injection valve controls access to site loop
- Stand alone mode
- Loop backup mode – assume plant isn't working – all equipment is off and rely on bldg. heating pumps , valve opens and pumps will bring in fresh water and distribute – open valve allows it to go back to the loop
- Serves building and loop at same time (controlled by valve)
- Maintain and trouble shoot?
- Temperatures – want to cool things down a bit – optimize heat efficiencies. Right size based on lower temperature.
- Increase radiant surface areas
- Mark – glycol is whole system. Understand that heat recovery loop and every building is connected to glycol loop.
- Neil – prep for this included looking at Pole power production.

- Heat demand will drop in new facility
- Electrical lode might not drop as much
- Use excess heat where you need it
- Excess heat should be stored (so it's not an excess)
- Still need to bring outside air into buildings
- Optimization of loop

Going Forward:

- Prioritization
- Will have to figure out what to do with excess heat
- Will have forced air, outside air, coils
- De-coupled loop has controlled heat

Freeze Protection – Tank Heating:
Heater water that goes up to feed the tanks with return loop connected to campus loop

Domestic Water Heating:

- Instantaneous - such as to dorms
- Storage Domestic
- Both systems have recirculation that keeps systems hot

- Desalinization:
- From pump
- From treated to effluent system (from waste water treatment)
- Pre heat Sea water
- Heating glycol supply and return

Thermal Storage:
- Million g of storage – store at 70 instead of 45
- Eliminate/reduce heat trace

Ben – based on our ability to generate electricity and capitalize on waste heat. Introduce outside power source – still capable of producing adequate heat?
Distributed plant concept means you can add it anywhere
Goal is to buy less fuel

Going forward:
- Maintenance
  - Equipment strategy needs to be cohesive through phasing and design bid/design bid build
  - Continuity of staff
- Which buildings should be on the loop
  - Will that change over time
- Future uses for process heat
  - Wastewater Treatment – see using sea water intake to cool it down
- Level of automated control – big on power and heat recovery side. Plan for robust loop with multiple tie-over
- Lessons learned from other micro turbine projects

Comments:
- Ben - Back up power and generation
- CHP's don't gen up quickly – potential for a lag between loss of power and gen up
- On critical buildings have dedicated back up. If MT went to a critical building – can't do away with stand by generator because of pick up limits of MT
- Alternate generator/solution that is right sized and appropriate would be ideal
- Optimize and reduce fuel consumption – but could run one for systems stabilization
- Steve – only a few functions that are critical – more inverter-based – more renewables
- Identify critical operations

Electrical utility distribution:
- Improve reliability
- Maximize system flexibility - runs heavy on power consumption – target is a 58% reduction, opportunities to take advantage of sun and wind power
- Maintainability
- Renewable energy
- Optimize fuel reduction
- Improved aesthetics

Target usage is 550,000 – gets us to 3 year fuel storage

- Permanently Islanded Micro-Grid
- No other utilities provided outside out of what is provided locally
- Will have to look at Micro-Grid Controller
- Maintain system stabilization
- Could probably run site on one generator for back up if new technology fails

- Central plant upgrades is not in scope

Energy utility Distribution - Local generation
- MT's at different locations throughout
- Comment – have MT's at IT&C, Medical-Fire
- Dan - Need to determine hierarchy of buildings discussion – area criticality

Electrical Utility Distribution – Looped utility
- Isolate critical loads within the building
- Operate as a loop – but if there is a failure to the system, system protection would isolate the fault
- May require an independent generator at a critical site

Site Telecommunications Distributions:
- Need pathways – will follow utilidors
- Use fiber
- Baker Design Guide will be used to coordinate this

Outside Plant
- Primary Nodes include IT and Central Services
- Secondary Nodes located within facilities
- Cabling will need to resist intrusion of snow/ice

Physical Transmission, Reliability, and Redundancy:
- Bi-directional loop that is self-healing and you don't lose service
- Buildings will be dual-homed to increase reliability
- Dual-homes typical to data centers – within that loop you have another pathway out on to main loop – redundant access

Phased Implementation:
- Microwave links as needed for phased/planned outages
- Joe – Phasing – IT Cable plant integrated into specific buildings
- Have to get cable plant out of buildings on to some centralized facility
- Start O&M effort on how to separate data plant from facility – results of that design will feed into Phasing Implementation
- Operational transition working group from an IT perspective – they have started that process

Comments:
- Factor water tanks, fuel tanks into design and loop
- Have to ask what is the redundancy you need on buildings
- RF impacts science
- Cable plant maintenance – reduces most maintenance issues
- Main issues – thermal expansion beats up long runs
- Basket tray

BREAK

4.3.3 1:00-2:00 (Merrick) Environmental and Demolition

Phone - Pauli – NSF
Nate Williams
Laura Jo
Best Recycling

- 104 buildings
- HAZ material register – documentation of what remediation has been done – but there are holes in that

register

- Register showing asbestos material with non-definitive comments
- Techs deploying to do a true assessment this season
- Could affect budget and phasing
- Invasive testing
- Sampling for any hazardous material in the buildings – Lead paint, asbestos, anything that may have to be remediation, Navy materials
- Testing for biologicals? Not in scope

- Geotechnical testing will follow
- Known areas of petro-chemicals – areas where there might have been spills
- Working with Environmental to know what we need to mitigate

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- Ground penetrating radar included? Yes

- Will have to consolidate to get space to work – need flat space to stage construction
- Easy buildings to tear down – the demo process is straight-forward

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- Pauli – EIA process:
- Decisions on what's included in supplemental environmental impact assessment – whether it is included – has to go to the treaty (meets every June), would have to be in 4 months before the treaty, comments are taken, incorporating comments to questions, 3 months before action can start
- Ideally EIA starts with scoping of process
- Ben – more than McMurdo included, for example pier at Palmer.
- Pauli – If Pier work involves noise in ocean – marine mammal protection act (managed by NOAA) could take 4 - 8 months for review – an incidental harassment – other reviews could take up to 18 months (Ted)
- Pauli – lay out a timeline
- Dale – can you do anything prior to survey? Environmental baseline survey? What's in the buildings – a facilities assessment- such as concrete
- Asbestos Risk assessment – financial report done
- Assessment documented if it was present or not present
- Brandon – a true assessment of what they have and cost
- Environmental – lead paint drywall a concern if it is being demo'd?
- Lead paint disposal could be an issue
- Keep stock of materials from existing buildings? If it is economical – then it would be advantageous

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- Ted – 24 months to get authorization to proceed. NOAA authorization could take up to 18 months

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- Package it as one submittal or separate Palmer? NSF decision.

- Design Build RFP – set up requirements that contractor is going to have to comply with? Contractual requirements when then they do construction.
- Pauli – NEPA requires that we submit EIA/Evaluation following public comment timeline for major federal actions underneath us.
- Submit t EPA – goes into public register – comment

4.3.4 2:00-3:00 RMI

Presentation – no notes taken

	5:15-7:00	(ASC /A-E Firms)	Designers and ASC review day's input and develop notes and graphics for next day's sessions

Design Schedule

Submittal date followed by review period – internal review

Thurs Aug 6 (4.4)

	7:00-8:00	(ASC /A-E Firms)	Set-up and confirm day's objectives
4.4.0	8:30-9:00	(OZ)	Review previous day's work

Phone: Laura Joe
Dan Rawlins – Mechanical Eng – Baker
Joe Ferraro

Rick Padloski = Lockheed martin – Smart Grid
Chris Light – RMI
Nicki Jody – RMI
Kara Carmichael – RMI
Nancy Clanton – RMI fellow, Clanton Associates – Lighting
Hutch – RMI coordinator

- Looking at alternative energy options
- An opportunity to reimagine design
- Bring RMI in to ask people on the cutting edge
- A-E's have an aggressive design schedule

Recap Wednesday – Aaron Seal:
Robust looped utility system vs current hub and spoke system
Running utilities wherever able to do so – having them in conditioned space helps with maintenance and cost
Domestic Water – Fire protection – tanks on the hill taking advantage of gravity

- Fuel
- Sanitary Sewer
- Comm
- Sea Water

Utilitdor – very little burying due to permafrost – somethings will have to be buried so there is no pedestrian conflict

CHP Plant and heat recovery – loop:

- Stand-alone mode – valve is closed
- Loop Back up mode – heating system has been shut down for some reason – valve opens up – pumps bring in fresh water
- Loop Injection Mode – loop needs extra heat – turn on as much as we need and pumps plump surplus heat to campus loop to provide heat

What to do with surplus heat:

- Radiant heating
- Freeze Protection/Tank Heating
- Domestic Water Heating

- Desalinization Preheat
- Thermal Storage – any extra latent heat could be stored as energy in the water

Electric Distribution:

- Some buildings will have a redundant system
- Some will have straight system

IT&C –

- Baker
- Outside plant loop matches overall utilidor concept
- Can back feed itself if a segment goes off line

- Electrical is all current AC
- How many CHP units/diesels?
- MP tenant is that utilities – power plant, water treatment, waste water – not going to relocate utility distribution. 5 existing generators associated with power plant that will remain. CHP units depends on how we reduce load (CHP will be diesel)

4.4.1 9:00-10:00 (OZ – RMI) Building Efficiency

Neil – ASC:
Rick Peterson
Define Performance Goals – Certification Goals

Power Summary:

- Power and Fuel-
    - Everything ties back to fuel – Energy values = fuel
    - Generator production – diesel – 10 Gigawatt hours per year – Electrical demand is 12 gigawatts
    - Heating – don't have meters – how much fuel goes into day tanks – 600,000 g = 18 gig wat hours per year
    - Harness jacket water and exhaust = 5 gigawatts hours per year
    - Summary 36 gigawatts per year
    - 2/3 energy is used for heating – what kind? Fuels database shows fuel being distributed to a tank for a furnace or boiler
    - Proportions: Gallons of fuel to produce electricity
    - Can measure gallons – can figure out gallons saved by wind system, can measure heat recovery from generators
    - Generator heat recovery – runs at about 54%
    - Generators could be running at 80% with higher heat recovery
    - Normalized – by area – gallons/SF = 2.3 gal/sf

What is the best industry measurement?

- Hutch - EUI is useful for building, but for a city – there are a lot more modes, so no good capstone metric. Have a water grid, control grid, electrical grid, etc. Needs a metric set. If do simulations and decide seasonality and heat and electric from fossil sources – may be assets on your mini-grid. Overall efficiently per sf is important – but how you use it as an asset for certain buildings

- Mark – 350 btu's/SF is an average
- Crary is good, but hard to define current state – some buildings are plywood with little insulation
- Steve – step function logistically that is a hard target. Assume aircraft is fixed, reduce these numbers, allows bringing tanker every other year.

- One threshold – great potential goal

- Work backwards from the technical threshold

- Fuel degradation happens slower than in other places

- Any exterior utilidor will be heat traced
- Thermostat control it and it can kick on in the winter
- Above ground – insulated pipe; carrier pipe/arctic pipe
- Still want heat trace – don't want stagnant water freezing

- Band of controllability on heat trace? It will become variable
- Looking for modulation on demand side
- Potential to do a sequence – variable frequency on plumbing – flexibility to modulate between heat trace and pump system
- Build in as much flexibility early and often
- Look at where flexibility can be built in

- More flexibility = more cost? Not necessarily
- Differential between mission related energy vs non mission related energy. Operational load vs science load.
- Would only be able to do that by breaking it down by building
- Current hierarchy priority sequence?
- Critical failure – like to have hierarch established so critical operations stay up
- Have some building load info… Some have power monitors.

Neil – slide 2:
Values:

- Cost of power plant 2009
- Operational goals in $ - Fuel + operations (maintenance – utilities)

Vision:

- Every other year supply vessel with a year supply
- 500,000 – 300,000 (if 300,000 is peak – can't do that with current generator)
- RP – not committed to 400,000 sf – challenging this by looking a multiple and robust usage of space
- 82% reduction is realistic
- Shaggy – balance – how much do we pay to get this level of efficiency?
- Ben – baseline is a terrible starting point – looking at 1965 facilities that are poorly insulated that make up part of this site – have a lot of opportunity move forward.
- Have to look at it top-down as well as bottom-up
- Look at power generation within power plant?

Will see loads go down slowly over time

Power generation – waste heat generation:

- Ideally fuel powered power plant produces 35% energy into electricity and 45% waste heat. As we produce more electricity it's all renewables. Heavy electric need and wind goes away – have to pull up a power source to restore electrical need.

End of Neil

Kara - RMI – Innovation Center Building overview – Basalt Building = passive strategies

- Capture Winter Solar Gain
- Aggressively insulate
- Control Glare
- Engage Thermal mass
- Create Air-tight weather barrier

- Minimize windows/doors/corners

Comfort factors influence:
- Condition people instead of air – 6 factors: airspeed, humidity, air temp, clothing level, surface temp, activity level
- Modulating surface temperature

Aggressive heat recovery

Certification:
- LEED has requirements that may not be applicable in Antarctica
- Passivehouse –requires contractors to keep construction quality high and certifiable
- NetZero is feasible, have to be realistic with our climate

Battery storage supplied by rooftop PV

Chris – RMI –
- Invest in envelope efficiency
- Switching from active to passive system
- Lifecycle – if done right it will not have any moving parts
- Can get to Net-Zero with a lot of expensive equipment or you can get to net Zero with an efficient envelope

Dan Harrington – Electrical
Production – Distribution – Consumption
Renewables – noting that part of the year all sun and part all dark

Distribution:
- Optimize distribution run lengths/paths – minimize the length of the loop
- Upsize the conductors for decreased line losses
- Investigate size standardization
- Keep bench stock down
- Distributed generation and control

Consumption:
Lighting load is large – look at artificial lighting LED
- Dimmable
- IP addressable?
- Define correct light levels
- Control systems
- Standardization of technologies –
- Consideration for circadian rhythm

Electronics – plug loads

Lighting – Natural
- Options:
  - Windows, skylight, solatubes, fiber optic collection
- Solar angles consideration
  - -top light, side light
  - extreme for this latitude
- Static vs dynamic
- Balance of light and heat transfer
- Be cognizant of light pollution
- Integration with artificial lighting control

Users – interior distribution

- Dry type transformers
- Conductors
- Plug load control – using sensors
- Relay control on select distribution panels

Extra Power?

May have extra power that can be used for:

- Heating loop
- Charge electric vehicles
- Electrical storage

Comments:

- Could use excess to charge batteries? Yes
- But want to right size it – not necessarily end up with excess
- Hutch Question – what is in the system that handles the variability?
- Look at Central Plant – right size that
- Safety – if something happens to CHP – you have to have proven back up power which will be the Central Plant
- Right size a future generator
- Energy store – wind blowing, sun shining – energy storage is full in morning – then generator would kick in only when you reach below a certain level, fills back up and generators go off
- In the future when generators need to be replaced, this would be the time that the size of the generators may change
- Peak load shifting
- Currently have one butterfly wheel
- Don't want to do a lot of battery maintenance
- Less about load – more about variability
- Steve - Core critical load isn't that big
- Huge flexibility and storage potential
- Diesel cost vs battery cost
- Could install monitoring devices? Yes – but Not sure if that is included in modeling process.
- Crary would be good to model – but modeling current activity might not be feasible
- Collecting data can show trends
- Neil - Recently installed some monitoring devices that can pinpoint where the loads are
- Ben – make sure there is value to monitoring

Kevin – Energy Model

- Focus on geometry and building materials
- Fine tune how it's used – like occupancy
- Drives scope
- Could monitor sub-components of existing Revit model
- Input will fundamentally drive the design

4.4.2 Working Lunch – Nancy Clanton

Daylighting and Electric Lighting

- Lack of blue lighting needed for sleep
- Melatonin only works if you are in darkness
- LEED Daylight requirements don't work outside of the lower 48

- Can redirect the glare to make it useful – different passive technologies
- Look at lighting surfaces – personalized lighting vs overhead lighting
- Wall lighting is the ideal lighting
- Solatube has a design for low angle light (they have daylight dimmers) – can be installed in walls
- Optimize sleep and optimize circadian rhythm
- Can have IP address for each light – GPS Device controls

4.4.4 1:00-3:00 (Merrick) Waste-to-Power/Heat Generation

Kevin – Merrick

HVAC and Plumbing

Coil Selection:
- Size for 150 degree F heating water supply and 60 degree F Delta T
- If extra capacity is needed, coils can accept 180 degree
- Capacity vs Water Temperature
- Flow vs Water Temperature
- As water temp rises flow goes down
- Could we go to 100 degree Delta T? Depends on what the system can reasonably handle
- People wear more clothes - this is a factor
- Can you get that temp closer to the radiant heat?
- Some places will need more heat – domestic hot water, entries
- Can temper water temperature through whole campus – this is a flow issue

Pump Selection
- Have to be able to service them
- N+1 Redundancy
- Minimum of 3 pumps for systems greater than 400 GPM
- Smaller pumps – but more of them
- Multiple pumps with total flow sized for 30 degree F Delta T – may be times you are forced into a "below designed" day condition, have that extra pump in reserve if you need it
- Redundant pump needs won't change
- Operate pumps for 60 degree Delta t – 50% flow = 15% of power

Efficiency vs Water Temperature

Loop Operation
- Loop is sized for higher flow at lower temperature
- Can boost up temp if needed
- Reduce pumping energy
- No effect on low temperature systems
- Reduce heat loss

Optimization

Ventilation Systems
- Heat recovery for all outside air intakes
- Demand-controlled ventilation

(Can control the building based on where people are)
- Low static duct and fans
- Variable speed fans

Domestic Water Systems
- Low flow fixtures – reduced heating load, reduced water processing (RO plant)
- How can we thwart the innovative process of "changing" low-flow showers?

- How do you instill the ethic? Depends on who is in the dorms. Upper case dorm usage was low.

Heat Reclaim on effluent

- Local reclaim at dorms and galley
- Site reclaim at water treatment plant
- Seawater preheat/brine preheat
- Greywater Treatment?
- Eliminate RO plant?
- Can combine the loop – use it 3 – 4 times for 1 time of energy input
- Potable shower/dishwasher/laundry requirements?
- Bulk of water usage is in galley (galley clean up) – second would be showers, followed by laundry
- Surplus power heat injection –
- Introduce electric heat into the system
- Heating system will be glycol
- CHP Plant and Heat Recovery – input?
- Humidity? Condensation due to difference in temperature between inside and outside is a current problem.
- Active humidification on mechanical systems – J-Soc (??) and T-site and Radar
- Air barrier/Vapor barrier – would do a liquid barrier on the interior of the wall
- Static electricity is an issue
- Low static carpet – flooring need to be static controlled

WASTE TO POWER:

- Recovering heat goes against treaty?
- Ground temp is -30
- Main benefit is reducing the waste – not creating power
- No burning on site currently
- Need for environmental assessment before burning anything as part of demo
- NSF has funded a waste to energy project (depending on grant funds) for wood chip boiler
- Look at food waste – dewatering? Re-look at MP plan
- Sticking to clean burn is most cost effective
- 95% reduction rate
- From shipping standpoint – saved money Huge ROI
- Take garbage – burn it – produces steam – becomes power
- Steam is an issue – steam boilers become maintenance issues

BREAK

4.4.5 3:00-5:00 Ray Thom – Michael Baker Smart Grid

- Smart City – micro-grid controller that balances power sources to existing facility loads
- Power Sources
- Meters/Sensors
- Can monitor and/or control and analyze loads required and making sure only what is necessary is being powered
- Comment: Add Water and water temp in this

Questions:

- What systems to monitor?
- Wind (one grid)?
- Water temp?

Comments:

- Dave – charge the back end but the front end never sees a dip

- Control system is a Siemen's system. McMurdo uses Rockwell system
- Would have to figure out an integrated system
- Not starting from scratch
- Technology currently being used is working and it can be controlled remotely (ideal goal)
- Intent to connect into Ross Island wind system? Control is already there – new system would integrate into this.
- Remote monitoring can be done – remote manual control (no computer server - Palmer has oldest generator systems but most reliable – no one monitors them.
- Monitoring and controlling could be anywhere but makes sense to put them with emergency control area
- Dedicated monitor – merge monitoring with other station monitoring
- Command and Control Center – need someone to take charge and shut a building down in case of an incident
- Concern with that level of control – would be nice to have levels of control
- Comment – can you do weather forecasting? Yes
- Smart City Logic Loop – has a structured demand where they can drop load – load sharing
- Someone has to prioritize , set up and schedule rolling – figure out what is going to be off-loaded
- Prioritize station requirement levels
- Reliable power delivery system – would load shed in the case of emergency

Kim – Energy dashboard for building occupants? Station wide implementation? Make sense to tie it into system or keep it specific to buildings. Yes – tie it in to master control

- What systems to be controlled?
- From a community standpoint or from a component level

- Where will main controller be located? Command and Control?

- Do you want off-site monitoring and/or control capabilities

- What do you want the Dashboard to look like?

- Integrated base – New Zealand and McMurdo – there is a demarcation, a meter.
- Think of as one grid – control the grid and the wind turbines inject into it
- Fed into McMurdo and distributed from McMurdo
- Steve – 20 electric vehicles

5:15-7:00	(ASC /A-E Firms)	Designers and ASC review day's input and develop notes and graphics for next day's sessions

Weekly Wrap Up:

Rick Petersen

- Discussion on waste water and water and power plant things that could be done different to gain efficiencies. Is it completely out of scope?
- Ben – look at scope, cost, schedule, quality, and safety. In this case scope is an issue. Tremendous amount of investment already in these facilities. But can look at options that are the result of compelling arguments for adjustments.
- Remember that this is a long term project
- Collectively recognize clearly stated goals

END OF CHARRETTE

Michael Baker International Charrette Notes

2015

Charrette Report

PREPARED BY BILL KONTESS, AIA, PMP, F.SAME

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Contents

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Executive Summary

As part of the McMurdo project, Michael Baker International is responsible for the design of the IT Operations Facility, the Vehicle Maintenance facility, two dormitories, and the requirements and design of the station's Information Technology and Communications (IT&C).

This document presents the portion of the month-long charrette that directly or indirectly pertains to Michael Baker's the Scope of Work. The notes include sessions that directly discussed facilities assigned to Michael Baker or IT&C issues. Additionally, notes are presented that discussed aspects of the Michael Baker scope within another session, such as discussions on architectural schemes, collaboration areas, etc. These indirect aspects have a bearing on the form of the facilities and their programmatic requirements. Finally, there are additional notes included that provide some context for the day-to-day operations of the facilities and IT&C components that fall under Michael Baker.

The charrette notes are presented in four sections, corresponding to each of the four weeks of the charrette. At the beginning of each section, the reader is presented with a brief executive summary of findings, followed by a table with highlights that pertain directly to each facility or to a component of IT&C. Following the executive summary and highlight table, notes from pertinent sessions are presented from each day of that particular week.

The Michael Baker Charrette Report will be integrated with the notes from the other three A/E firms to generate a master report for submittal.

Section One: Charrette Week 1
Washington DC/NSF, July 13-17

Objective: To solicit input and consensus from *Scientists/Grantees* on the current master plan and to advance the design for McMurdo Station, with a focus on understanding Deep Field, Sea Ice, Dry Valley and Helo Support, and LDB/town Science requirements and logistical support for *programming* Crary Lab, Field Science Support Building, and Central Services Building.

Executive Summary Week 1

The project is an *efficiency* project, reducing McMurdo from 105 buildings to 17, with a reduction in square footage from 600,000 SF to 380,000 SF. Currently McMurdo has 1250 bed spaces, and the modernization effort will reduce that to 850, with less during the Austral winter.

There are five guiding principles that are part of the master plan and were emphasized every week of the charrette:

1. The new station will reflect serious state of are science.

Michael Baker INTERNATIONAL

2. Promote environmental stewardship—reduced footprint, improved skin to volume ration; better envelope.

3. Promote Wellness and collaboration—illness can quickly spread throughout the station.

4. Reflects the US, permanence and durability.

5. Should be of its place—responds to local climate functionally and aesthetically.

Week 1 activities with science grantees. After the first week there was a general consensus on the overall master plan:

1. Broad and consistent understanding, review and comment from grantees and non-profit peers
2. Configuration of Master Plan 2.0 guiding principles, and facilities configuration
3. Additional input to consider for master planning: identification of future potential boathouse; identification of alternative balloon inflation area.
4. Understanding of grantee internal process flow and ideal adjacencies of sub-functions.
5. Understanding of grantee lifestyles priorities
6. True appreciation from grantees that they: were given the opportunity to participate, saw real evidence how their input may be considered.

The overall site configuration is generally set, along with the general relationship among the buildings.

In order to maximize the amount of science the grantees performed, they emphasized the following requirements:

1. Reduced touch points
2. Reduced time to field—do training virtually, grantees got great support from contractor—concern about retention of support staff after infrastructure modernization
3. Streamline science support staging: geographically and operationally
4. Understanding movement of goods
5. Clear orientation upon arrival—bewildering experience, course of season—what can we do to make access to people supporting grantees intuitive—efficiencies toward interaction—temper designers for admin area
6. Dedicated space for multi-year projects—grantee assigned and managed space with a deposit on it, so that if they don't return, there's money to send stuff back
7. Functional connection between Field Science Support and Crary Lab for personnel and material
8. Robust exterior pedestrian circulation system—people like to walk outside
9. Enclosed "gateway" spaces for groups to cook and socialize

Highlights

Week 1 **References**

IT&C	• **Not discussed during Week 1**	
Facility Requirements		
• **General**	• **Facilities require extensive walk off areas and grates to remove gravel**	***1.4.1***
	• **There should be walking areas around buildings/site**	***1.4.1***
	• **Daylight views are desireable; warm/natural interior finishes balanced against durability and maintainability; confine wood to ceiling surfaces; provide corkboard for personalizing spaces**	***1.4.2***
	• **All facilities will require wind modeling to minimize energy expended for snow removal and improve site safety—may impact corners and roof lines**	***1.5.1***
	• **Site utilities will run through the buildings and skybridges to provide conditioned space, ease of repair, and avoid outside buried utilidors or raised utilities with avoidance of energy costs with heat trace**	***1.1.4 and 1.5.1***
	• **Site utilities will be looped versus current hub and spoke configuration**	***1.5.1***
	• **Geotech report not yet issued, but will provide structural basis of design**	***1.5.1***
	• **Acceptable amount of site grading has not been established**	***1.5.1***
	• **A general desire to take advantage of light and views**	***1.5.1***
• **IT Operations**	• **First mention that Bldg 004, SSC, becomes the new IT Ops facility, and is the First Building of the First Phase to be undertaken for renovation and conversion**	***1.3.0***
	• **Discussion about battery charging function located out of Bldg 004**	***1.3.0***
• **Lodging**	• **One new lodging facility is part of the first phase to provide capacity**	***1.1.4***
	• **Final phase provides the second new lodging facility at north end of site**	***1.1.4***
	• **Lounges may have different themes or activities**	***1.4.1***
	• **There was a suggestion to provide “warm rooms” to dry clothes versus dryers—similar to S. Pole Station**	***1.4.1***
	• **Both food and alcohol are consumed in rooms**	***1.4.2***

	• **Acoustic privacy is a priority**	***1.4.2***
	• **Lounge area proposed to be at West end to take advantage of views—but has the disadvantage of having maximum foot traffic in sleeping quarters area to reach it, plus longer sky bridges**	***1.4.2***
	• **A desire for smaller TV areas, suites of rooms mentioned by some**	***1.4.2***
	• **There is a desire for outdoor activity areas at lodging, such as BBQ areas.**	***1.4.2***
	• **Some double-occupancy rooms required for couples**	***1.4.2***
	• **Transients need hanging areas, shelves and floor space for their duffle bags.**	***1.5.1***
	• **Dorm lifestyle with transient people—presentation of Oz dorm concept showed that inboard, windowless rooms are not problematic and possibly preferred.**	***1.5.1***
• **VMF (Baker)**	• **Structural deficiencies in VMF floor first mentioned**	***1.1.4***
	• **First mention of potential VMF functions located at Traverse Ops in a collocated facility**	***1.1.4***
	• **Fist mention that exist'g VMF may only provide light vehicle repair**	***1.3.0***

Mon July 13 (1.1)

1.1.1 10:30-12:00 (ASC) ASC Science Support

10:00 am program overview and schedule. D-B-B 9 months schedule. Emphasis on listening to science/grantee community. Get requirements and priorities. Wellness is an emphasis area. Also point is to encourage dialogue among scientist and they will play off each other to build requirements and capture details.

NSF staff scientists join meeting and making intros and stating their motivations for their Antarctic work—teaching, learning, science logistics, help make the science happen, seeing the big picture, loves variety of science hosted in crary lab, match facility resources to science needs (Beverly), from "bench monkey" doing samples to real science—how difficult it is to do science in the Antarctic—complexity, (planning group last three inputs)—interest in learning and supporting science, deep field and near field ops—what remote science is all about; Dunbar's job is resolving resource conflicts, meet resource requirements—goals be safe, communicate and integrate among silos—fostering comm and decreasing silos, and be good stewards of taxpayer dollars; Bill Turnbull vehicle terminal ops—air trans back and forth from Christchurch, cargo planning, shuttling.

Shaggy: What are we looking to gain? Master plan is set; know where the buildings are sited. Not recreating the wheel. Programming to do: what is needed? What has to be done on the ice, what can be done elsewhere? Scalability—35 year time horizon—how can this space stay scalable and support future science—be broadly useful for as long as possible. This week is for grantees, NSF to be reference library for what grantees say. Want grantees to speak freely. No ego in this room. Looking for big requirements and constraints; don't focus on what's there now but how things need to be laid out to support the broadest range of science. Avoid acronyms in discussion and "McMurdo talk." Don't assume everyone knows how everything works. Walker: won't redo bubble diagram so much, but it's about gathering requirements and why and how many. What's behind what's needed?

What is process a grantee goes thru to get lab space? Fairly complicated. Once NSF decides to fund and infra dept can support, planning team will look at all aspect of proposal—where, bio aspects, all implementation considerations—to come up with a plan—generally 2-4 year projects. They come up with and operational notice to describe how science project will be executed. Then, in season when deploying, they fill out a support information plan, which is very detailed. Planners work with scientists—SIP gets filled in during April to work out details and integrate plan. A research support plan is generated outlining the exact support—outlines exact support NSF is providing. Changes happen even while scientists are on the ice. Plan includes material goods, logistical support to and from sites within continent, how many rolls of toilet paper, how many snow machines, etc. Amounts available, amounts to procure. Problems—like drills & equip get left behind and impact footprint. Learning to consider backhaul to remove stuff—capture resources needed to get stuff out—expectation that there will be funding hoping they'll get funding—tricky to decide what the break point is to ship stuff out. Inventory control isn't there yet—starting to bar code—but not at modern warehousing standards. World is moving to the cloud and McMurdo isn't there. There's a world of stuff that's in an in-between world of "inventory" and junk to trash. Taking time for grantees to make determination based on hope for future funding…Need for more closeout plans up front. Can't build a huge warehouse for stuff someone might need someday. Retrograde process, inventorying process coming together. Thoughput to South Pole station considerations plus warehousing. A lot of science is deep field and they need a staging area to check and test prior to deploying. Classes and training requirements; do not freeze (DNF) equipment. Winter science with winter flights? Likely so—from a specific part of the science community—sea ice, seal research, no demand now, but anticipate a need if capability exists. Long range aircraft flights in the dark? Shoulder season interest as nature shuts down and starts up. May never be able to level population—summer likely to have same numbers of folks, winter may go up. Countered by selling program as an efficiency and cost saving effort—trying to drop down from 850 to 600 people. A reinvention of how we're running the Antarctic program—effectively telling the story of how they're streamlining the program—flexibility, reconfiguration; going in with higher projections doubtful. Can you move fuel in to S. Pole Station. McMurdo infra is partly there because it supports S. Pole. Can grantees get science done thru autonomous systems—drones? Trending, could be growing—a global hawk from Australia—reduces footprint on McMurdo. Also have staff do some work—but McMurdo exists also to train scientists and post-doctoral students. Won't have a generic pool of technicians assigned to do sampling. Walker: smart city vision—less a large standing army of technicians; end state is good monitoring technology among facilities.

1.1.2 1:00-1:30 (ASC) Introductions and Objectives, Rules of Engagement – All Attendees

Continuity of operational design—may need to change the way things are done. What can be done to improve throughput and velocity of system? Perception of project is good—will get into design $600M for project—it's a lot of money. People recognize the importance of program and like it; receptive to program. Perception is built as an efficiency program. Cost re-set from facility and operational changes. Set up for the next 35 to 40 years. Tough challenge in next 18 months is what needs to be done—design to lock in scope and cost—achievable. Target is to get request into 2019 budget; should actually get it into budget for 2016. Questions: Palmer included? Timeline later. McMurdo charrette is first opportunity for external shareholders. Question: Economic Case? Working on it—costs $258M annually. Need to benchmark operations. Need to reduce number of touches in current logistics systems. When they go back in for PDR must benchmark the program. Once facilities are designed, they will be able to state the savings in energy. This is not a profit center, but needs to be a sustainable. Must have a business case. Scott says NSF is here to listen.

1.1.3 1:30-2:00 (ASC) Review and Confirmation of MP 2.0: Goals, Assumptions, Parameters, Building Siting – All Attendees

Dave Walker presents the slide show of the master plan. First phase of conceptual design nearly done and almost ready to go to preliminary design.

Shaggy talks about the charrette process: designers work with end user. Conversation between grantees and architects and engineers. ASC staff will act as SMEs to fill in gaps. Trying to figure out relationships, adjacencies, requirements.

Question: Grantee surprised master plan so developed. Process? Another question: what are expectations from grantees for input? Master plan resulting from science support community—this is first opportunity to get input from grantee community. Understand current and evolving needs to create framework to support needs. Buildings will outlast our careers. Listen and engage. Overview and background: program reflects emphasis of efficiency—improve logistical and resource efficiency. Buildings leak heat—improvements in building envelope and systems to make efficiency to help get better and more science. Last is improve quality of life: happy, healthy and inspired to be there.

Is it all baked in? No—have the framework, but need the inner workings that grantees can provide insights on. Instead of 105 buildings, there will be 17, and 600KSF to 380KSF. Green is existing to remain—capitalize and reuse as much as possible. Reviews 7 primary defining parameters: Support population up to 850. Scalability a key tenant. Uninterrupted service to Pole and to science. Two other tenants—don't move power and wastewater plants—work around them. Crary remains. Contingency plan—life boat—if no access to main source of cooking, can be duplicated and supported in second location in a separate location.

There are five specific guiding principles:

1. The new station will Reflect serious state of are science.

2. Promote environmental stewardship—reduced footprint, improved skin to volume ration; better envelope.

3. Promote Wellness and collaboration.

4. Reflects the US, permanence and durability.

5. Should be of its place—responds to local climate functionally and aesthetically.

Shaggy explains evolution of master plan 1.0 to 2.0. Phasing pushed evolution to 2.0. How can Crary remain viable and collocate trade shop and field science support and cargo. Crary is a solid platform to adjust and adding to it. Warehousing is spread across site. Minimize and consolidate warehouse. Locate it adjacent to where it would be used. Strategy for outdoor storage? Consolidate and reduce footprint.

IT-field science support area—has cables, wires, tech support, collocated w/electronic parts shop. Question on testing field equipment that would shipped out by science cargo. Field science support is different from science… Describes where buildings are located. Bldg 155 goes—creates a larger, efficient material and staging yard. Creates better wayfindng overall and entry experience. Question: all seems interior oriented—where's exterior spaces? We can provide efficient ways of getting around campus outside—raised sidewalks, manage snow. Question on vehicle staging. Discusses separation of vehicles and people. Question on location of dive services and vehicles. Question of logistics of central pad—vs ship offload. Daily logistics ops? Looks small? Shaggy: still defining site programming.

Could you put cranes in loading area to off load connexes in that area? First plan had huge building with attached dorms—not buildable—had to tear everything down. Not viable. New plan does what blue ribbon panel wanted. Work centers—it's a new space that grantees will define. Science has to say how it's going to work. NSF is going to be accessed in Winter—push construction into winter so summer is reserved for science. Different OPS tempo with new layout.

1.1.4 2:00-3:00 (OZ) Material and Personnel Work Flows and Adjacencies – All Attendees

Must work with topography. Trying to loop all utilities so you have two ways to feed facilities. Create rings of utilities for uninterrupted services for flow. Robust fire protection system with monitoring. Data Center allows for ring of IT services—nodes. First new bldg. is traverse ops—previous to structural assessment to vehicle maintenance facility—need to figure out steel for VMF. New lodging then Crary lab addition—get utilities in utility room for Crary, then just distribution. Phase III remodels aquarium at Crary, renovate old dorm 209—pre-engineered buildings. Where does bldg. debris go (Bill K)? Have to do full assessment for Asbo and LBP—was it encapsulated, needs lab analysis. Demolished and retro. (suggested tub grinder to cut volume). Site to be returned to grade to allow traversing. Phase IV—construct central services and keep 155 functional as long as possible. 2nd floor at VMF/Warehouse—continued discussion w/Traverse Ops. Frozen food facilities go away. Phase V, fire and medical get constructed. 155 gets demo'd. Chapel function moves into central services. Chapel gets demo'd. Phase

VI, demo fire house and medical, construct recreation and lounge, remodel dorm, and new waste center. Phase VII, constructs trades shop and field science support, helicopter ops and PAX terminal; demo 203 dorm. Helipad may move—an open water flight concern—cuts payload—full of fuel and gear. Relocation avoids maximum performance climb. Enviro consideration of hydrocarbon impact at new location. VMF and Traverse ops collocated—zoning. Last phase of Crary remodel. IT gets final remodel. Last phase is remaining demolition plus new lodging if needed. New dive service, sea ice and balloon inflation facility.

Evolution of utilities and loop system important. Entire campus is loop with intermediate loops. Skybridges keep utilities in a conditioned space, plus cuts down on wear and tear, dust. Snow studies to be done. Looking to save on snow management. Plus drainage. Grantee discussed EM interference, laser interference with helo ops. How to assure vehicle access to Rival Heights for LiDAR, winter over office space for grantee ops, and faster network service? Suggestion of setting up Rival network. Automating is good, mostly for monitoring—but researching pushes capability of equipment—must be done by people. Concern about driving thru the whole town site. Question on transition of facilities scheduled for demo—want them demo'd as quickly as possible—Phase VIII takes advantage of vessel capacity that opens up. Elaborate on addition to Crary Phase III fire protection? Space could be reclaimed for aquarium space remodel. Snow modelling to confirm configuration and will also allow adjust angles of room and walls within aesthetics and constructability; adjust rooflines, etc. to reduce snow drifting. Snow study to be released in a couple of weeks, and finishing in October. Discussing energy and fuel—burning wood from debris? Energy sources being considered. Dave Walker—examining micro turbines.

Tues July 14 (1.2)

1.2.0 8:30-9:30 (OZ) Review previous day's work – All Attendees

General discussion—where is science going at McMurdo? One challenge in answering question is group at Nat'l Acad of Science is laying out big picture of science—but unavailable. One person thinks it'll be similar—deep field leads, etc. Proposals are written around Crary's capabilities sometimes. One person's focus is dry valley eco system—mentioned helo support. Another person mentions another study soliciting Antarctic science needs from the international community. In biology—everything is going genomics and molecular—collecting samples and analyzing them at home. Another person talks about emphasis on conducting the core sciences. Also mentions the short seasons—and how there can be improvements to facilitate conducting field work. Crary should be a good field research station—majority of work is done back home.

Another person talks about more and better science—trend is a growth curve—consider what anticipated work in the next twelve years—can be supported by Crary—volume of field science will grow. How can we grow amount of science within a fixed footprint? Oz talks about scalability…Next person—growing area of science is airborne science by UAVs—based out at airfields—look at LDB track. Another person brings up meteorology—future is more sophisticated—deep field and around

McMurdo—acquiring data with. Possible expansion of field season. All controlled by money—if funding not available, no science. Mentioned a shortcoming at Crary—benches weren't designed to carry weight of an equipment item—needed retrofit. So highlights need for flexibility.

Impact and ramification of winter flight? Better opportunity for meteorological science in winter—UAV ops. NSF report on winter science at McMurdo. Even trade ops could happen in winter and free up labor for summer…

Tension between doing more science at home versus constraint of minimizing field time. Will see uptick in through put and reconnaissance science. Opposing views on how science should be done in Antarctica and how it will be funded. Scientists want to know they collected what they came for—which is push on Crary—vs packing and shipping items home for analysis. What's distinction between reconnaissance and real science? Validation that you captured what you sought to capture, versus the scientific analysis of items which goes into the publication of scientific findings. There are time sensitive analyses that need to be done before samples degrade before it gets home: chemicals in water, live nematodes in soil, for example.

As technology advances—for example GPS—units become smaller and use less power—now scientists want 20 systems that are deployable—smaller, lighter equipment…allows for more science…

1.2.1 9:30-12:00 Break-out Sessions - Science

1.2.1.1 (OZ) Track 1: Deep Field Science

Question #2: What is impeding you from doing good science at McMurdo?
UNAVCO, IRIS, AWS—lack of dedicated space, with capability to share. Often using space used by others; lack of availability. For bench testing equipment. NSF reluctance is grantee being able to move out of space at the end of the grant period with regards to permanent dedicated space. Will need to be multifunctional spaces to support other grantees down the road. Lack of staging and storage space. Having to move cargo way too much—receiving, staging and shipping are not the same point—maybe addressed by new plan. Hard to move from one space to another. Where does it gone done—Crary lab was not designed to be a staging area. Lack of ready access to handling equipment. Need consolidation but also separation of staging for the different activities. Need space that promotes interaction and ideas—collaboration—synergy in shared space. Lack of communications capability is hindering science—can't quickly or easily communicate with team members.

Could collaborate more if there was a shared staging space. Working your way around Antarctica is all about experience and sharing. ASC rigging – maintain comm towers, setting them up, etc. being used by grantees for repeating data—an example of collaboration—this function breaks silos. Another good example is carpentry field foreman out of carpentry shop—helps grantees in advance of deployment. Camp management are helpful to grantees.

Where do you see your science going in the future? Miniaturization allows for more science. Smaller drones, greater endurance, autonomized, worked from McMurdo, bandwidth, save on deploying to the deep field. More telemetry. More drilling requiring traversing. Few small groups deploying. Solid voice video and telemetry bandwidth—can send rovers to do drilling like Mars….Boating program at McMurdo. Mix of aircraft.

Describe how your team currently works at or interacts with McMurdo Stations?
Iris/UNAVACO: Arrival and training; receive gear; unpack gear; test gear; re-pack gear; take to helo pad; ship downfield; wait for weather. Moving stuff up and down hill, lots of touches. May need to swap gear out depending on whether or not items are palletized for fixed wing or going by helo. Once palletized, helo is option is out. Can't track cargo. Asks for individual process flow maps—from grantee perspective.

1.2.2 1:00-5:00 (FC/OZ) Debrief of Break-out Sessions and Confirmation of Requirements

All Attendees

How does McMurdo currently assist you to do good science?
Sea Ice: McMurdo provides a unique opportunity to bring back samples to aquarium—phenomenal support capability. People who fix equipment, people who feed the teams. Allows scientists to focus on science. Crary allows for staging and experimenting. Great if it could grow and provide more flexibility. Like the informal interaction spaces—the coffee area, and in other odd corners of McMurdo—over darts or other recreation. Research proposals have come out of interactions at the coffee house. Flow works from field to lab. Flexibility of support staff is key. At lab, pieces of equipment aren't missing. Lab function. Adaptable as teams move in and out at Crary. Office space, sharing lab space.
Deep Field: Support. Interaction of all scientists. Close community. Balance between SIPS and being ready for contingencies—Antarctica happens! Missing items have been made available. 24-hour access. Air support has worked very well. May be in conflict with greater efficiencies envisioned and reductions of inventories. Galley is open to feed people at different times.
Helo Support: Believes McMurdo has devolved to support science in an organic, evolutionary, complicated and expensive way (sarcasm). Everything is prepared for teams prior to their arrival and staged. Lets groups get out of McMurdo faster. Walking and carrying gear—hard to get a ride to helo pad, but when you return, there's a truck waiting to meet the crew and team. "An unusual conservation of mass that's not well explained." Nice mix of office and lab space at Crary. Like the fact that labs allow for cross-pollination of ideas. Informal training and improved safety occurs when grad students can learn something from more experienced—informal benefit to students—not the same intermingling at universities. Like the happenstance meetings, share of things in common, learn a lot. Crary lab allows for interaction of different disciplines arising from flexibility of equipment. People make it work because they respect each other's work.
Town Supported Science: Simplicity of life—allows to focus on work & research

What is impeding you form doing good science?
Sea Ice: awkward space at aquarium for moving species; staging area—hard to push things up the hill—some staging space; mud room where you have lockers to leave gear—movement is challenging. Movement of gear, samples and people. Making sure cargo is available—sometimes gets bottle-necked. Environmental rooms become sample storage rooms—need to be scoped correctly. Improved access to sea ice at shoulder seasons. Remote teaching and class capability can extend seasons. Environmental controls for improved research.

Deep Field: Lack of easy communications—finding other members of your party—antiquated pagers. Ability to use phones. Lack of staging space—open space, open to sky. Collaboration space. Tracking of cargo. Reduce training time—virtual training. Doesn't have to happen—could happen in advance of deployment. Sleeping schedules. Orientation—optimize the number of folks meeting others.
Helo Support: Lots of interpersonal relationships because every mission is different; need places to speak quietly in a professional way—good for mission, good for safety. Flexible meeting spaces—chance meetings at coffee bar is not the place to talk about developing a research paper. Short term staging and timeliness. Impression that ability to accommodate stressful situations—slowdowns are more noticeable—should be more ways to pack and ship gear.
Town Supported Science: All the same similarities; internet band width and management; limited flexibility of transportation. Staging for lay down and shake out of equipment. Ex: laying out cable down the spine of Crary. Office space—need for adequate space—5 people in an office. Sound and vibration isolation to take research to the next level.

Where do you see your science going in the future? How will change alter your process at McMurdo?
Sea Ice: potential for extended season or year-round—open water work, zodiac-based—requires equipment and logistics and facilities that don't currently exist. Add'l helo support. Longer term experiments and in the aquarium—sea water running longer in aquarium. Field schedules governed by logistics, not science—seasons would need to be longer. Do seasons differently—spread footprint on station across the season—shorter durations of teams, larger teams for shorter period, or combination—can reflect science goals better. More collaborative efforts. Impacts to staffing and heating facilities; change of dive lockers; operations of zodiacs; sending samples out more frequently. McMurdo looks like a box factory. Shelf life—could do more science back at home station.
Deep Field: smaller platforms, smaller batteries. Telemetry data—satellite methods and iridium. Fewer smaller groups and consolidation to fewer deployments. Fewer scientists going with traverse teams—less people doing that activitiy—would be increased need to communicate with scientists. Autonomous vehicles—marine and aerial. The unknown unknowns makes people nervous. Ice core drilling with more instrumentation. Implications are less frequent visit to sites by having data via telemetry (could improve safety—less exposure to risk). Bore holes could be instrumented and create a network of subsurface observatory space. More systems means more testing. More optimization to collaborate. More sophisticated instrumentation means more sophisticated science.
Helo Support: More, better, faster—robots doing science—more antennas more, spectral management. Launch and retrieve. Shoulder season work; get more data back and telemetry; remote sensing. Helo-mounted or manned and unmanned sensors. Sampling and measuring and why—not reduction in number of people—but more payload and bandwidth. Increased off season use; access to high mounted antennas. Basics of field work don't change, but tools change. More time in field less at McMurdo.
Town Supported Science: Long duration ballooning. LiDAR network observatory—greater coverage. Expansion of long term environmental research—drones to capture samples what satellites can't. Molecular level analysis—drives new equipment. More stringent management of electro-magnetic interference (phone in). Antarctica is radio quietist place on earth, except for McMurdo. In terms of design, architect to add to list and manage radiated emissions from devices and equipment to preserve radio quietness—only get background noise from the galaxy.

Question on international cooperation and collaboration. Should it be something to be thinking about?
Scott: planning on having less allocatable assets—equipment and FTEs. A balance issue—can't shoe

horn too much in and will need to say no to some folks—an important continuous dialogue. Safety issues also come up—hounding of having consumables in lab spaces—was it a mistake to build in office space—coffee is an exception. Bringing coffee in is a problem as is having it next to a bench. Creating a partition to make it more difficult to having consumables in lab spaces—corrupts biology experiments. Unanticipated that Crary became a place for equip space prep and function test with conversion of classroom space. Program has a capacity: office space, beds, vehicles and availability—all describe capacity issues. Program officers want to support as much as they can; but there are funding limitation—25 to 30% of proposals are funding. Lots aren't supported either due to money or other shortcomings for field support. Risk of overstressing capacity. Can't keep deferring maintenance and facility upgrade. New needs to be maintainable and configurable and utility of space. Plus capital planning for when things come due—which may come at the cost of science—because deferred maintenance is unsustainable. But from scientist community, they make it work despite shortcomings, too, so there's flexibility on both side. Scott agrees and identifies it as part of the tensions and balance

Wed July 15 (1.3)

1.3.0 8:30-9:30 (OZ) Review previous day's work – All Attendees

Common themes: reduced touch points, reduced time to field, streamline science support staging both geographically and operationally, understanding movement of goods, clear orientation upon arrival, dedicated space for multi-year projects, ASC support.

Adds: front face of Crary is accessible—a strength. Flexibility of Crary is a strength, coveted, has been working over years, fostering and supporting interdisciplinary work; a rare item. Concern about historic preservation—but Shaggy says "we are the culture, we're what makes it weird." Some argued the coffee hut or the chalet was best on campus—but buildings have to be modern and efficient envelope. We can recreate the interior feel in a modern building. Want to maintain cultures and subcultures—richness of personalities who make better science. Avoid antiseptic factory.

Shaggy: today is rubber meets the road. Today want to talk thru the logic of the buildings—particularly Crary and the Field Science center and front end of building 004. Shaggy: entry/arrival experience—shows seriousness of US presence in the Antarctic—front door—buildings on 3 sides—you're flanked by science. Right away concerns that the drive has no cross walks for pedestrians—safety issues. Shaggy regains control of discussion to lay out logic of plan. Crary was never intended to stage deep field staging; was intended for lab work. So proposal is to take staging out of Crary. Someone says that distinction between cargo and science is artificial. Rick says that in new field science captures both functions. Joe says Crary was designed for some staging, but not the amount it has now. Provides covered shakedown space. Goes thru floor plan of Field Science. Walks a first time person thru. Goes thru first floor layout. Questions on 1 story or 2, and floor to floor heights, 25'—double height—in layout areas. Question on functions on freezers—who they're for. Food storage location centralized to support galley and field deployments. Understands the need for more cage space to overwinter items and personal affects and have items secure. Question about daily in and out science—sea ice, helo, dry valley research. Goes back to bigger plan—where 155 was is outdoor yard to shakedown, shows covered staging. Someone says it's not convenient from Crary. What percentage of lab stuff is from Crary—someone says 1000s of pound, and 80% of their gear. How do I get my stuff from Crary to Field Science—being developed. Labs are controlled environment—a safe place for $100K spectrometer. Controlled, secure center. Samples go to the lab, not directly to a freezer. Avoid putting things on a truck from Crary—wants to cart things back and forth. Bldg 004 becomes a comm/technology building. Becomes part of cargo stream with its own loading dock. Someone comments that 004 shouldn't be just for UNAVCO, but other big science—deep field, and dry valley. Shaggy: more instrumentation, tech items. Snow mobile storage: will be elsewhere, but brought in to FSS. Trying to keep everything in the rack system—out of weather and UV. For day trips: is it inefficient to drop high use items off at FSS vs. Crary? One individual is her own cargo stream—she doesn't use the "cargo stream". Goal is no connexes outside. Crary supply is confirmed to be at FSS. Challenge—where is grantee access in FSS? Things that are in Crary warehouse—glass ware, beakers, etc., are they in FSS? Connection doesn't seem clear. May be resolved with renovation of Crary. Mezzanine presented: offices and work stations—hotel work stations/hot desks. Want to get as much on ground floor as possible—may want to have mezzanine function on ground floor. These are grantee offices. Break out sessions at 10:15. 3 tracks. Track 3 is sea ice support. Crary morning session focused on what it has now and where to take it in the future in the afternoon.

1.3.2.2 (OZ) Track 2: New Field Science Support Facility Programming, Part 1

Part 2: Afternoon session. Discussion begins with food. Where do pallets of frozen food go? Bank of freezer supports cargo stream. Access to freezers is from the north and the south. Freezers for samples will remain dedicated for samples year-round. Thought about an upper level catwalk above the alley at one side for assembly or layout of cable. Leverage the volume. Add winch to lift items; needs to be tall enough to clear loaders going into main part of building to the south. How many cages needed? Also need to provide good illumination for cages. John—doesn't like the cage concept—dislikes the chicken wire access—wants visual screening. Call them storage pods—moveable? Modular uni-strut system w/mesh? Looking at ideal organization of the various storage requirements and movement of cargo, adjacencies to each other and exits to loading docks. Combination of 3 buildings along with grantees is a very high activity—need a barrier for safety of grantees from high activity areas. Joe Levi: add many garage doors for flexible future layouts. Need for dedicated access for different users. Move wash area to east side for its own access and move storage all the way across along south side. Need receiving area for non-cargo system stuff can be dropped off at odd hours—it could be thru alley to one's pod. Alley becomes the place to dump gear—field party staging. Wanting to avoid walking thru a labyrinth to drop samples off to Crary after dropping gear. Needs to be an easy way to get field party gear from FSS to Crary in an easy enclosed direct path. Stuff is stinky gross stuff—like Penguin poop. Don't want it to go thru a high visibility VIP corridor that's part of the entry experience. Seems like depending on helo-techs to move stuff in trucks, but what if they changed the way they did business? Could ATO move it that night—a management solution—but if they have samples, might need to truck people to Crary and others deliver gear to FSS. Discussion on process of fixing items. Can't have mechanics in FSS. Gaining efficiencies in 9 areas for FSS, but an inefficiency for mechanics and MEC system. VMF is light duty repair. Concern about snow machines going down for repair because there's no dedicates snow machine repair mechanics, might imply time lost for science. There's an internal mechanism, per Jessie Crain, to assign urgency/priority of work orders for equipment repair. Why not have a small trade shop for small item repair? Keep efficiency of supply and repair. Jessie says one of the goals was to minimize back and forth of grantees, but wants to avoid adding complications for others, Organization does not mean reduction in reliability of snow mobiles.

Non-lab transient office space need some secure office and locker—not necessarily private office. So for them, it doesn't need to be at Crary is good. Offices: as science changes, the offices can be flexible and change. Some occupants in Phase II of Crary can move to FSS—can things be more lab like? Data intensive science belongs over in Bldg 4.

4:20pm Recap from both Crary and FSS group: FSS revisions described first. Relationship of adjacencies that need to have outside access. The "Alley", and ATO. Talking about pallet storage and vehicle movement. Storage pods replace cages, and not have shared cages anymore. Approx 30 of them to store project needs. Staging area is where deep field, helo and others take stuff from pods into an open area and lay it out. Adjacent is a field gear drop off holding area. On east side is SAR entry plus entry for field gear wash area. Controlled rooms for samples in freeze—not accessed by grantees. Some for South Pole, some refrigerator/freezers, some for Air National Guard. Need to locate HAZMAT still. Most area is open, but science cargo might be walled for safety. Accessing Crary via relocation of entry to SE corner, aligning with Crary dock at east side, providing cart access, and keeping carts out of pedestrian walkway at entry. Offices provided at SE corner. Customer service desk over at science cargo area. Forklift accessible. Field gear at south side along with light mechanical storage. Second floor mezzanine to put offices in a cubicle array as well as offices along the edge that could be closed. Will include conferencing space and battery charging space versus in Bldg 4. Soldering could be accommodated upstairs and reduces pressure on Crary and allows more capability in Crary. This allows consolidation of work centers. Distinctions between functions are going to be blurred and there will be expanded hours of availability of equipment. Inventory of field radios might come to this building. Storage is high pile storage—stacks. Gantry crane in the "Alley".

Thurs July 16 (1.4)

1.4.1 9:00-10:00 (OZ) Central Services: General Overview – All Attendees

Layout of Central Services—review of master plan: Circulation from entry, covering dining and overview to outside. Discussed baggage pickup and drop off. Describes arrival and departure from McMurdo. Question of daily flow from dorms to galley—relocation of coats. Also ease of circulation to Crary—2nd floor bridge…bump outs for social spaces/mini lounges. Not an airport concourse.

Question on weighing travelers' gear, personal gear, etc.—staff answers what the process is. Some internal work to ensure a single bag drag to meet a flight—distinction between types of cargo drop off. Dorms anticipated to retain their own laundry. Where to park vehicle given drop off at front. Shaggy promises Arrival Heights will not be forgotten. Joe Ferraro concerned too many entries to Crary. Is there truck access to baggage? Shaggy says flow is being figured out. People will want to be outside during some months and won't always want to use the covered walkways. Multiple exits from buildings to outdoors. Ben reminds everyone that this is very diagrammatic—need to express what is needed—what absolutely must be considered? Structured walkways for outside plus walking on grade. Concern about shedding gravel off boots, plus industrial washers and lockers that allow people to leave things at the workplace. Cole discusses how dorms become micro-communities. Lounges at dorms can have distinctive activities. Suggestion for dorms: Warm room to dry clothes vs. uses dryers—used at Scott base. Looking for buffers for noise. Rick covers the recreation wing. Concern about consolidation of 3 distinct bars to one. Can segregate all day-sleepers in a dorm. Shaggy highlights the need to work with topography, that site work is very expensive. Question on helo ops and dropping people off—maybe new ops is to drop people off directly at the dorm versus FSS.

1.4.2 10:15-12:00 (OZ) Central Services: Recreation and Quality of Life – All Attendees
DC4.4.1 Physical Recreation

Looking for ideas on a range of recreation, opportunity for social spaces, then diagram dorms. Rick re-emphasizes the purpose of the week is listening to grantee desires. 2nd Floor of Contingency wing: support for fire—dorms and kitchen. South of that is a 2 story volume for gym, and gym/cardio south of that. Gym has been used for plays, prom parties, Halloween party, training for mountaineering. Have a climbing wall. Bouldering/caving. Non-recreation uses—like UAV-testing, aerial balloon testing. But that might be more appropriate with the helo hangar—need to share space for UAV and balloon. Do all-hands meetings occur here at gym? Area of refuge, too. Lounge is an important location for social interaction. 3rd floor spaces multipurpose and chapel spaces. Importance of little intimate spaces, but also advocate having a coffeehouse and a Gallagher Southern place—quiet refuges, quieter activities. Some places for more noisy activities. Need a coffeehouse kind of affair. Conflict with use of chapel—control of space—chapel can't be used for coffeehouse functions. Need space for ministerial staff—have a counseling function which needs privacy. Will windows from current chapel be moved along with other historical elements? Yes. Regarding serving alcohol, where it is, have the capacity for plumbing for full wet bar. Location for store may be collocated w/beverage storage location. Where do people go after purchase of alcohol—convenient to dorms, but not necessarily for field science parties. Discussion on fire hazards of kitchen ventilation/hoods. Will have gear room and music rooms. Community radio room is desirable—special from a heritage and local flavor. Opportunity for DJ to be with friends. Advocating for chalet as an out building.

Discussion on social spaces: creating well-being, mindfulness, belonging, and autonomy. Can you express yourself? How much do you have a sense of control over space? Happy with environment? Daylight views, warmth of materials balanced with durability and maintainability. In dorms, lounges originally faced the bay, now they'll face the buildings—that gets lost to gain acoustical privacy. Someone says they want it to be dark when they sleep—but what about lounge—should we give up lounges for acoustical separation? Regardless, constant traffic going to rooms. People go to lounge to do an activity, not necessarily sit and watch the view. All would also be nice to have outside deck for BBQ'ing. Suggestion to move walks to other end of dorms to have both view. There's an issue on perception of privacy within lounge—circulation should not cut space in half. Compromise might be to have a mix of where the skywalks are located. One person mentions they never close their shade.

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Discussion on image—negative reaction to concrete; they do like light and warmth. Veneered wood surfaces don't endure. Perhaps wood at ceiling or something that has its warmth. Looking for something that feels less institutional than images shown—need corkboards. Someone commented they liked the bright color. Avoid white, brown and blue. Need very aggressive acoustical treatment of lounges. Need to find ways to accommodate pairs of people or three people. What else to avoid? Some images looks too much like a hotel. Smaller TV areas so you don't have to take up a whole lounges—something for a couple of people. Suites of rooms so you can keep teams together. Primarily will have single rooms all similar to each other. Scientists view looks at room as a utilitarian place to sleep—and would trade a smaller room for larger lounge. Window is preferred, but could live without. Another doesn't like interior rooms and darkness. Rooms are places to sleep, not usually to think—but others disagree. Some people entertain in their room—they haul in sofas. If that doesn't exist, need more or bigger lounge spaces. Question on rooms—some like light. Ensure internal rooms are well ventilated. South Pole has external and internal rooms and all types like the variety: variation among introverts and extroverts. Lounges get used on weekend mornings, people look out window looking at bay reading a paper and having a coffee. Rooms in dorms—stated all rooms are similar, or can staff have slightly bigger rooms—long term versus smaller rooms for transients. Transient could also be a couple weeks—so needs hanging area, shelves, a flat spot for duffle. Any double occupancy rooms—yes.

Discussion on video camera surveillance: safety and accountability per one person.

1.4.3 1:00-2:00 (OZ) Central Services: Entry Experience & Orientation – All Attendees

Summaries: Last 4 days: Oz rec'd very strong engagement, voicing sense of what they do, spoken up for colleagues. Have ideal diagrams and can apply to specifics of site and ACS's needs. In a good position to get basis of info from allied agencies, ASC and other consulting group; exploit opportunities for energy resource management. Shops, lodging, waste, VMF, traverse.

Fri July 17 NSF Internal Charrette (1.5)

1.5.1 8:30-10:00 (ASC/A-E Firms) Overview of MP 2.0, MREFC process, and current status

7. Broad and consistent understanding, review and comment from grantees and non-profit peers
8. Configuration of Master Plan 2.0 guiding principles, and facilities configuration
9. Additional input to consider for master planning: identification of future potential boathouse; identification of alternative balloon inflation area.
10. Understanding of grantee internal process flow and ideal adjacencies of sub-functions.
11. Understanding of grantee lifestyles priorities
12. True appreciation from grantees that they: were given the opportunity to participate, saw real evidence how their input may be considered.

Additional comments on transience. Number 5 is a challenge for the dorm—some people only sleep there; others meet people or write and do some work. Rick says having range of types of rooms—going to provide rooms, that have mostly same standards, but some variation—inboard rooms without windows and outboard with windows. Window covering solutions. Rick: inboard room idea is not a killer according to what he heard. There was some attachment to chalet and chapel and some of the bars—emotional attachments, but those facilities will not remain.

Common themes of grantee requirements

10. Reduced touch points
11. Reduced time to field—do training virtually, grantees got great support from contractor—concern about retention of support staff after infrastructure modernization
12. Streamline science support staging: geographically and operationally
13. Understanding movement of goods
14. Clear orientation upon arrival—bewildering experience, course of season—what can we do to make access to people supporting grantees intuitive—efficiencies toward interaction—temper designers for admin area
15. Dedicated space for multi-year projects—grantee assigned and managed space with a deposit on it, so that if they don't return, there's money to send stuff back
16. Functional connection between Field Science Support and Crary Lab for personnel and material
17. Robust exterior pedestrian circulation system—people like to walk outside
18. Enclosed "gateway" spaces for groups to cook and socialize

1.5.2 10:15-12:00(ASC/A-E Firms) NSF Review/Validation of Requirements

Science needs to happen at the front door, not at the back 40. Opportunities for light and views to capitalize on where this is located. Topography at bldg. 155 had a 6 foot drop. Looking at cut and fill and know can't blast entire hill sides; site can't entirely drive function, respect grade, try to fit as much as they can; snow removal concerns. Crary cascades down the slope. Wind modeling: working with CPP Wind to do modeling to ensure operational costs decrease with the new campus. Snow removal must be removed substantial. Buildings are sited logically, but may need to change corners, roof lines, and other elements. Doing virtual model first, then an actual model on a turntable in a 60 ft wind tunnel with crushed walnut shells. Scale model placed in wind tunnel, model normal winds and nasty winds, and storms, plus 3 other scenarios. Utilities run through buildings, too, and avoiding or minimizing utilidors; eliminating utilities on poles. Two new water tanks at top of sites can provide fire protection via gravity flow. Will feature a loop system for utilities, much like any municipality—can feed from either side of system. Regarding contaminated soils, there is a report all locations, which have been monitored over time. But cut and fill may encroach contaminated soils, and will be key to understand that for the design-build teams. There are registers for asbestos and lead based paint. Need to characterize, mitigate costs, and develop demolition strategy. Need lessons learned from other nations' new stations. Most stations are very small in comparison to McMurdo, per Joe Ferrero, but there could still be lessons learned. Aaron talked about avoid legacy dump site; geotech report will give structural basis of design, and identify ice lenses. We will have to discuss an acceptable level of grading—ground rules to be established: some thoughts include is there an ability to fill—can foundation go on grade and then bury it so it becomes part of permafrost. Drainage issue in face of mud season. Referenced the "CRREL" report (look it up)

Section Two: Charrette Week 2

Washington DC/NSF, July 20-24

Objective: To solicit input and consensus from *Outside Agencies* in the advancement of design for McMurdo Station, with a focus on *programming* and *concept design of* Air Operations, Command and Control, and Information Technology & Communications (IT/C)

Executive Summary Week 2

Week 2 activities with allied agencies. Like the first week, the Allied Agencies in week 2 provided a general consensus on the overall master plan:

1. Broad and consistent understanding, review and comment from Agencies
2. Confirmation of Master Plan 2.0 guiding principles and facilities configurations
3. Understanding of Agency internal process flow and ideal adjacencies of sub-functions
4. True appreciation from Agencies that they:
    a. were given the opportunity to participate &
    b. saw real evidence how their input may be considered
5. Airfield planning will be for 2 separate fields, wheeled and ski-equipped.
    a. Building need to be designed to be moved quickly;
    b. Need to retain capability of Sea Ice Runway
6. Agencies need an understanding of construction schedule to allow for budget process and transition planning
7. Expanded bandwidth off continent was discussed frequently
    a. Reduced staffing, increased reach back
    b. Expanded situational awareness in CONUS

Several open issues remained, but did not pertain to Michael Baker's scope (see 2.4.0).

Week 2	Highlights	References
IT&C	• **Morale Services: general discussion soliciting feedback for various features: internet cafes; video on demand; digital displays for information and for health (winter sun stimulation); continuing education for certification requirements; availability of You Tube for technicians to fix things; public affairs and studio space; Armed Forces Radio and Television and National Public Radio recordings; video teleconferencing and telemedicine**	***2.1.4***
	• **Physical Security: General requirements and locations enumerated to include CCTV, access control, other monitoring**	***2.3.0***
		2.3.1

	• Physical Security: additional discussion on command and control requirements for active monitoring at Emergency Ops, Mission Communications, and Station Ops.	*2.3.5*
	• Station Notifications: Mass communications systems discussed.	
Facility Requirements		
• General	• Think about applications of innovative modular furniture, such as 270^{o} systems furniture in IT Ops	*2.1.4*
• IT Operations	• Sky bridge required to connect from Field Science Support to run utilities and provide a means of moving personnel to IT Ops during Condition 1 Weather	*2.1.0*
	• Some cargo is received into this facility—need for loading dock, exterior access, overhead doors	*2.1.2*
	• Building contains a variety of functions; main function is IT Ops (Primary)	*2.1.2*
	• Antennas: NASA has one 10M antenna, and needs space for two antennas; NOAA potentially requires a second dedicated antenna	*2.1.4*
	• Facility is to be call IT Ops Facility	*2.2.1*
	• Requires additional 1,000 SF of cold storage for items that can freeze, but must be kept free of snow and ice. Should be located on East side for access to helipad.	*2.2.1*
	• Requires 400 SF of warm storage. Needs access to overhead door	*2.2.1*
	• NASA/JPSS: Space for 2 people year-round, with additional 2-6 people for summer season. Need about 764 SF for offices and 799 SF for data. Master plan shows separation of office and data center for control of cooling load. Preference for collocation of both, per plan in Appendix—reconciled in bubble diagram in Appendix. Provide a separate room for bunk space in order to have a 24/7 response-still desirable even with sky bridge connection-bunk is size of walk-in closet.	*2.2.1*
	• NSF Office: 6 people in open office configuration; no enclosed office required—use backup emergency operations room for meeting space. Wall monitors. NO meeting or layout area. Provide 7-8 workstation and tech library. Locks: same as data center—key cards. No special	*2.2.1*

acoustic reduction requirements. Ceiling is typical suspended acoustic tile for office space; open to structure in data center. *2.2.1*

- SPAWAR: Their back-up control requirements may be located at the Ops Co-Lo data are or in Assignable Office space
- Requirements and finishes outlined for NSF are similar to other allied agency space, unless noted otherwise *2.2.1* *2.2.1*
- Consensus to collocate all racks in a common collocated datacenter on 2nd floor (see bubble diagram) *2.2.1*
- Cages must extend below floor and above ceiling to hard deck, or have their own cover
- Finishes throughout similar to current building 004 standards *2.2.1*
- All 2nd floor functions on raised floor. All power from floor *2.2.1*
- Overhead cabling to meet current industry standard for cable tray *2.2.1*
- Roof Access via full stairway; provide vertical chase for raceway access to roof. Roof to have landing at top of stairs; provide 10-foot wide catwalk and two 30ft x30ft platforms for radomes and antennas *2.2.1*
- Utilities will come in through the new sky bridge *2.2.1*
- Second floor is also accessed on North side by loading ramp—see topo and site map *2.2.1*
- 1st Floor contains industrial functions. Functions include IT&C Comm and TELCO Electronics, IT&C PC Electronics shop, Shared Battery Charging Space, Field Science Support, IT&C Offices, SPAWAR offices, Customer Service Counter, Toilets, Mechanical, Electrical, Comm and Sprinkler. Provide Assignable Office Space in remaining areas. *2.2.1*
- Provide card reader capability between office space and data center *2.2.1*
- Entire building is secure; security cameras to monitor equipment *2.2.1*
- Fire extinguishing—2 phase approach—non-water system first in Lo-Lo data center, then water system with presentation of high temperatures. First preserve equipment; then preserve the *2.2.1*

	building	
	• **Rack requirements: NSF: 20; JPSS: 10; NASA: 0; Science: Unknown**	***2.2.1***
	• **IT Ops to be an open building with key card access within it**	***2.3.0***
• **Lodging**	• **First dorm envisioned to provide swing space for demolition**	***2.1.1***
	• **Confirmation that couples will also live in the dorms**	***2.1.1***
	• **Concerns expressed about dorm rooms being too small (S. Pole Station x)**	***2.1.3***
	• **Potential to provide digital displays in dorm rooms to include content such as weather, events, flights, ice dock, ticker tape, etc.**	***2.1.4***
	• **Potential Wi-fi internet in dorm rooms**	***2.1.4***
	• **Potential for video on demand in dorms**	***2.1.4***
	• **Key cards for dorm rooms**	***2.3.1***
	• **Public Address system in dormitory for general quarters alarm**	***2.3.5***
• **VMF (Baker)**	• **Structural floor problems may require an alternative approach for this facility**	***2.1.1***

Mon July 20 (2.1)

2.1.0 8:30-9:30 (ASC) Introductions and Objectives, Rules of Engagement

Shaggy—cover master plan 1.0 and 2.0 and establishes rules of engagement. McMurdo must remain operational at all times—rule No. 1. We are called at this time to design a new, efficient and sustainable city; that embraces new technology for energy efficiency. Figuring out adjacencies and collocations. Bigger than bubble diagrams, but not facility design. ASC is here to support and connect dots upstream and downstream. Last rule is keep it fun. Covers Master Plan 1.0. It was the first rethinking of McMurdo in a long time. Easier to heat big building volume than a bunch of little buildings. Going from over 100 building to under 20 and from 600,000 SF of space to under 400,000 SF. Master Plan didn't do everything, but created an organic vehicle for change. Master Plan 1.0 yielded to 2.0; mission statement stayed very similar—second master plan sharpened the pencil—energy and operationally efficient station—need to know operational costs to predict resources and capital improvement projects. By preliminary design review (PDR), must know operational costs. Flexibility and scalability are key ideas. Reliability, walkability, standardization—among the parameters; flexibility adaptability, adaptable social spaces. Strategic redundancy—two ways to do things for critical items. Wellness, well-being—figure ways to maximize a pleasant place to live and work. Guiding principles: facilities should be fitting to the

science being done and the presence and prestige of the Nation. Looking for proven technology. It needs to be "of its place"—the buildings need to fit with the site, not vice versa. Shows before and after site maps. Covers helo ops as being an open item.
Question on connected walkway from Bldg 004 to SSC? Covered walkways double up as ways to run utilities around campus. NASA speaks up says it would be in best interest of all parties have a sky bridge connecting bldg. 004, particularly during Condition 1, so they don't have to sleep in bldg. 1, and keeps people off roadway.

2.1.1 9:30-10:45 (ASC) Review and Confirmation of MP 2.0: Goals, Assumptions, Parameters and Building Siting

Plays video. Talks phasing of campus. A flaw was found in 1.0, 2.0 answers the phasing questions. Phase I is data center—utilities and data in a looped system to feed facilities from two sides. Two water tanks on top. NASA suggests a multi-agency transition plan to insure everything is operational. Will have conops set—all a part of the master plan. Traverse ops is in phase 2—but there may be new requirements and issues that have come to light with the VMF. Structural issues with floor at VMF. Covers Crary—put an addition that would house major mechanical equipment. It'll allow for distribution of utilities. New lodging—100 person construction crews—new lodging provides swing space to allow demolition of existing dorms. Phase 3 start remodel of dorms—209 first. Standardization of rooms—all equal. If all bars go away in this phase where to people go? No answer yet—does discuss lounge space in dorms. NASA commenter: try to leave one bar to the end of season; does dorm allow for couples married or cohabitating: yes. Phased Crary remodel commences. Phase 4 has Central Services and dorm remodel #2. Dorm demo at north end of campus. Crary lab remodel continues in next wing. Equipment ops remodel and expansion. Phase 5, 155 is demolished. 2nd floor of central services has command and control—emergency ops. Fire, medical starts. Crary phase continues. Bldg 175 goes away. Phase 6—rec/lounge completes contingency ops building; dorm and Crary Lab renovations continues. Firehouse and medical go off line. Phase 7: helo ops relocation, haz waste and fuels new building, remodel bldg. 004 for science support center for field science; new field science support facility; Crary remodel; add'l demolition. Phase 8, last new dorm, new dive services and sea support facility; demolition of remaining vacated structures. Question on how to get trash to Fortress Rocks—road network seems unsafe with grades. Shaggy discusses how to handle waste stream—particularly from construction and demolition. Seems that master plan still supports the overall vision.

Working on snow modeling—it's expensive to move and personnel intensive. Want to avoid having more snow to move. Consolidation of buildings and warehousing removes a lot of snow removal effort. Modeling allows modification of building shapes to make for more efficient snow storage. Wind tunnel testing with 3-D models. Should have results by September. Question on Phase 7—trade shop and field science support. Ben: at what point will folks be engaged to get requirements for facilities—Shaggy—process is ongoing. Team will be reaching out on a routine basis to get input. Commenter needs to be able to communicate to partners for sustaining commitment—needs some idea of schedule to figure our assignments, personnel rotations. Kevin Gibbons—talks about a detailed transition plan—to cover staff, levels of duplication, timing. Will be worked out in the nearer future. Not asking for detail, but stating that some endpoint on a calendar to work for detail. NASA commenter adds that is a budgetary issue as well for new equipment order or planning for transitional equipment. Reminds that new equipment is on a 3 year budget cycle with Federal Government. All agencies need to understanding projects with life cycle replacements. Scheduling becomes very important; so is unification—can't continue to run separate IT departments. ASC hiring a transition manager. So, when do we start the detailed building planning—funding in 2019, move in 2020—refresh planning cycle in 2017—for building 004. What's expectation for this week? Commenter wonders if this August—first design milestone is when to lock in on requirements—first charrette report—should know helo ops. Ben Roth: to Shaggy—take time to engage this group, as execution is key—how do we get there and move forward, to develop recipe for sequence of events—a lot more to discuss than we had last year.

2.1.2 11:00-12:00 (OZ) Material and Personnel Work Flows and Adjacencies

Dan Miller covers flows of material and personnel. Shows various drop off points—at central main entry. People move on the outside of the building; goods on the inside. Materials to centralized receiving area. Creates safe environment to separate pedestrians from vehicles. Access to bldg. 004—periodically receives shipments of cargo. Don from Oz explains cargo from C-17 is on pallets, processed thru field science support—and could get to bldg. 4 from there. Dan covers waste flow. Clarification question on staging.

Presentation of 3-D model of facility. Shows blocking diagram to orient folks on like functions. Starts with field science. Shaggy: McMurdo lacks a front door. Crary evolved from a lab to a place for the logistics of field science—that will be separated out into field science support from Crary and give proper space for field science cargo. Field Science building houses freezer unit, search and rescue; central covered staging "alley" and trades function to the north of the "alley." Works for storing completed USAF pallets, traverse modules, fish huts, etc. Field Science adjacent to central warehouse. For arriving personnel, gallery space to convey culture and history; multipurpose and galley to take advantage of views. Kitchen/dining/server all collocated. Windows and views should be democratic and available to everyone. Contingency Ops building—fire ops and medical, next to recreation—gym, lounge area, laundry, kitchen (can eat and sleep on cots). Bldg 004—IT Primary, back up IT center in central support. Second Floor: mezzanine in field science support has additional admin spaces. Central support—admin plus command and control building. At contingency ops—lists functions. Third floor of Central Support—chapel, lounge, multipurpose….

Shows 3-D model fly thru. Questions? All admin spaces on second floor: All ASC and AFNG, KVA, SPAWAR (Space warfare) and others up on 2nd level. Command and control plan is enlarged for display: Shaggy says notionally this is what command and control would have. Primary EOC and get as many as possible into this space. Ben: diagram shows the initial components for the space plus the mechanical, electrical, plumbing. Ben:--spaces shown notionally in space—next step is to adjust spaces within the area for adjacencies. Bldg 004 floor plan: Level 1 enlarged. Question—how much constrained by exterior space—concern about locking in space and trying to integrate electronics—is there a physical constraint? Shaggy highlights grade and utilities to the north, but some issues become moot. This is a logical shape—but is there a plan for future expansion. 2nd Floor view shown. Command and Control. Back up IT is on the first floor of central services—thinking about transition of bldg. 189 to 004—might be desirable to have backup IT center for NASA JPSS in central services. There is no interim back up IT Center—comment back is that final end state is to have back up IT center for NASA JPSS. Don from Oz—intent would be to have it in central services and account for space.

2.1.3 1:00-2:30 (OZ) Central Services: Review most current concepts

DC2.1.3.1 Entry Experience & Orientation

NASA comments that they think the master plan provides space for JPSS and NASA but not both.

Aspect of social space—don shows images from master plan: furniture arrangements, other elements. Ben would be interested in hearing how allied agencies collaborate with each other agencies or internally with each other? NASA has two contractors and other summer people—people getting lost in the shuffle—keeping people from getting isolated and get them integrated with rest of group.

Dan: what's typical day for NASA or JPSS? Joe asks Mark from NASA if a bunk is needed near NASA data center—yes—so they can take action within 5 minutes. From JPSS side normally sends 5-6 people for 6 weeks. A sustainment mission for maintenance at different sites. Schedules are not routine. Most of work is done in 189 or in office spaces squatted in within bldg. 175. 2018-19 is another block upgrade. Every 4 years is an upgrade mission. Warming huts are provided by NSF, all preplanned as part of deployment. NYSM: NASA does send a couple of riggers and may send various other sized teams for different activities. JPSS-—s far as collaboration—teams stay together, socialize with NASA. Do some things at rec center. But as long as they have their own office space, collaboration will happen—daily telecom with Goddard space flight Center, Colorado and internal staff.

Sees a lot of public spaces—seeing little spaces for small groups not on display in an "airport lounge." Dorm rooms getting too small. Is there a place to get away? Joe—collapsing work centers into one area will take care of collaboration. Need space for late shifts.

2.1.4 2:45-5:00 (Baker) IT&C Morale Services: Present Concepts and Solicit Feedback

DC2.1.4.1 Common areas

Nick and Lance…new technologies and solicit feedback. Heard about operations—now talk about down time, heard about flexible space. Dive into the technology and functionality. Internet cafes—check mail, flip side is it's a hot spot—bring your own device—team can bring their own tablets and laptops and connect to web for work or social activity. Hotel experience…video on demand—what you can get. Limitations on live video. Being creative using storage device with comments brought in. having music iTunes—what does it look like at McMurdo—how do your bring in music. Digital displays—info centers—provide for flexibility and interactivity. Teaching and business application to recreation. Weather, events, flights, ice dock—ticker tape, multi-window in common areas, rec spaces, into dorms, rec rooms. Remote teaching—a talking point from last week. Community engagement—facetime events w/high school and elementary school skyping. Officially prohibited, unless specifically permitted. Ben Roth—conveying an item that was a desire coming from a single grantee—has not be vetted. Seems to be a want. NYSM says not many PhDs that are in camp long—can't think of surge in demand. But thinks if nice to provide to schools on an option basis—doesn't see it. From an IT perspective—get lots of requests for outreach—Skype—can be control. There are requests for continuing education to maintain continuing education needs. Try to facilitate as best they can. See it as a private space—both live and interactive request about half the time. Studio requirements for Public Affairs—press do come; some want to do live broadcasts—how do you do outside live broadcast. Has happened over the years—any place now for TV studio, but not used for there—it's dismal space—used for equipment storage. Not necessarily a top priority—live remotes—film crews are outside; an anchor indoor to have a talking head inside. Could be done in a multipurpose space. Ben Roth—studio space—Brian Stone mentions efficiency—space has to justify itself and a studio is a dedicated space and requires demand to justify usage of any size. Weather briefing area could be in a setting like this. Ben—look at other means of communications—have to look at if the requirement is really there. Joe—mentions that based as land jack—and could be supported by NSF. Nick: Video Wall Displays: functionality and versatility—can run tickertape, operations, movies, productions, can be as small or large as desired. Not worry about having it in one big room—could be in multi-purpose, gym, coffee house, can utilize as big or small a display—helps support community via communication. Visualization of communications do wonders. Utilizing wall display for winter stimulation—live fees of sunsets, balloons—watch sun rise and set in a panoramic view—combined with heat lamps for noontime sun, or combined with aromatherapy. Efficient use of space in common areas serving multiple uses. NYSM: bets 95% of people have iPad or laptop—have a functional web page to find out weather, events after work. There is a public display outside galley area. It's pointed out that content is important—needs to be pushed. Is part of scope looking to increase bandwidth on and off the ice? Otherwise adding frustration to residents—everything is saturated now. Where doe saturation happen—most came from Facebook. Bandwidth is based on availability and cost. Nick—talks about use of microwave in Gulf Mexico—microwave may not work in ice but works over long distances. Has relationship with Sony that has a microwave relationship throughout South America. They've priced fiber optics cable to New Zealand--$200M. Nick goes back and wants to hear needs on internet cafes in dorms, common areas, pathways…Someone says factor in a space for training for IT. Joe: Bldg 155 kiosk. Space-wise works, environment no from an operational perspective. Internet café—may go the way of a pay phone. Nick adds maybe from a sense of community. It'll all be mobile tech. NYSM: saw people doing at kiosk, checking personal email before or after meals. JPSS person sees internet café is fluff—may be bad optics to Congress. It's a remote outpost, but need something to keep people coming. NYSM says increase CD library versus live streaming. Joe—what do we think about what we see—as long as spaces have multi-functional capability. Gen Raven has comments on internet café—need a place for foreign participants to communicate—for example the Australian group to communicate back to their base. Regarding people checking personal email—many employees have no computer access. Having access is pretty important. Regarding hotel experience—have hotel TV broadcast flight information—a way to check in. Nick's take away – how much is ops dependent on email—Gin—varies widely between groups. Dave Winkler—don't let a capability be a deal killer—capabilities for MWR have changed for DoD in Saudi Arabia. A technology worth investigating—no cell phone capability. May be worth investigating self-trunking capability? Satellite back haul. People talking about high definition voice. Looking for alternatives off ice. Microwave stations between South Pole and McMurdo—25 relay points with fuel to service—ROM cost approached cost of launching of satellite. Email needs by entity: everybody. Does everyone have access to computers to access to computers—or limitations? At McMurdo—everything is wired—looking to a wireless cloud based communications capability. Places in McMurdo are underserved by wired system. What is bandwidth draw for email? Joe says we rely on email in part because there's no other communications capabilities from a central location. Anticipated new levels of LAN and wireless capabilities. Lance: looking to increase email speed. Thought about joining 21st century—dialogue, info push or pulled. Info server any place you want—need for alternatives—app—developed by…? Self-serve data. How much email off continent? Joe: less than 7%, definitely less than 10%. Nick: hotel experience. Video on demand in every dorm room—what does the experience look like now? Some limited Armed Force TV; some movies for re-broadcast. Scheduled movies on 2 TV channels. Content is flown in. Station radio—DJ—play content provided by Armed Forces Radio & TV—but it's a large library—lots of content. All equipment is owned by NSF. Anticipates a "save the vinyl" campaign—takes up a lot of floor space. It's the old AFRTS library abandoned—last library like it. They also broadcast NPR via Los Angeles AFRTS studios thru Colorado onto internet. They are going to isolate private network from ops network. Multi-function space—digital displays, connectivity, heavily utilized by multiple entities—variety of space. Any use of smart board?—Don from science on teaching side. Recording environment—NYSM—dedicated conference rooms, sized appropriately, teleconferences, video, be able to move the furniture—be able to reconfigure rooms. If business side only—requirements for video teleconferencing? Joe says 50% of the time—many requests for technical trouble shooting with a technician offsite—if they could see the device, they could guide a repair—kind of like telemedicine—radio, TACAN, NAVAIDS. Already doing it with transmitting photos—further enhanced by video capability. Joe tells me they do telemedicine already. McMurdo—it's nice that people actually talk to each other rather than text. Morale Service—displays out in more spaces—requires content. NYSM—likes the idea of apps, and then duplicating transmitting effort—pull up info on your own tablet. Lance—do bring their own devices? Many do, but usability of smart phone devices problems. Static is a problem for those devices. Form factor—don't work long and cold; not compatible for mittens and gloves. Teaching spaces could be combined into conferencing rooms. Video Wall Displays: can go from the sky's the limit—but important to community—structure cabling. Anything we missed from morale topics?

Don—a little bit of discussion for bldg. 004. Go thru a level of information—from a building requirement standpoint. Find out unique requirements for facilities: workshop requirements for scope of business? Restriction on size of load on bridge—no use of bridge for server—it's on level one. NYSM: want to have technical equipment on ground floor only? Base concern if not enough adequate technical space, going back to get additional space will be impossible. NASA has 1 10M antenna, but needs space for 2 NASA antennas. NOAA is talking about another dedicated antenna. Need to have enough technical floor space in plan from the get go. Ben Roth responds: NSF cannot build to unknown future requirements. Of all the agencies—are there other adjacencies missing? Greg: Last place you want heavy equipment is on second floor. From master plan perspective—missing some electronic build and weather center—second floor IT&C Comm and Telco electronics shop. Additional unique requirements? Comment that not seeing NASA/JPSS data center—separate area for racks—test bench area of 400+ SF, plus a further area for offices. Skybridge. NYSM: required for Condition 1 and for quality of life, so they don't need to bunk over. Could go to lunch and get a hot meal. NYSM: talk about making it better—only two guys are NASA guys who have to 004; get them off the road network. Gyn Raven (?sp) add linemen and emergency ops would benefit from skybridge as well. Specific needs for shops on second floor: lead acid battery charging, loading dock equipment, both warm and cold storage—captured elsewhere. Kevin: what might battery charging might look like? Batteries vary from 6 to 70 pounds. Turns into a 250 pound box—you don't want to carry down the steps. Question on where is USAF equipment stored—skis, air drop, aviation supply warehouse—nose and main skis, life support for parachute and parachute rigging—joint inspectors office, parachute packing, air drop storage. It's currently in 140 and 156. Will dial in with airfield break out sessions.

Kevin reviews Tuesday schedule: add as deep a dive we need to go into bldg. 004 as we need to go.

Tues July 21 (2.2)

2.2.1 All Day (Baker) Track 2: Co-location Center Requirements
DC2.3.3.1 Primary

Note: this item was moved from Wednesday to Tuesday into a day-long session.
Facility to now be known as Data Ops facility. Covered building organization between first and second floor functions, organization within space, adjacencies, architectural requirements, electrical and environmental, and communications needs. We covered items required for the roof, and looked for applicable items for the back-up Data Ops facility.

Free-wheeling discussion on co-lo data centers being a large volume, on a raised floor; that there's a relationship between all agencies. Offices have additional functions within them. NASA comments included need for bench work space with racks; electronics shops and need for cooling—recommended elimination of hallway separating office area from data center. Need for key card access.

Discussion on reorganizing building organization by having all industrial functions on floor with access to loading dock areas, and data centers and tech on second floor. Gained consensus; comment to have roof access to antennas via stairway to roof (not ladder and hatch).

Additional requirement for 1,000 SF cold storage and 1,000 SF (verify) of warm storage on ground level. Cold storage is for items that can freeze, but want to keep snow and ice-free. Would like access to cold storage on East side to have access to helo pad.

NASA: has 2 people year-round with additional 2-6 people for summer season to perform maintenance or perform system upgrades.

Kevin Gibbons to reserve last hour to discuss transition planning with agencies.

Discussion of a potential large duplicate storage area at the helo hangar to use as a phase for transition

NASA/JPSS NOC (Network Operating Console) and Data center—prefer to see hallway down a side of the building than currently dividing the spaces. Want both offices and data center collocated. Separation in master plan was based on 2 thoughts: separation from noise of data center, and HVAC issues—heat recovery not working as anticipated, problems with louvering. Would like key card into control area. Want double door (6'-0") opening from data center to hallway.

(Above discussion was free for all—regained some order and started a more structured discussion)

NSF Office—has 6 people, should be in an open office layout; no enclosed office required. There should be space for wall monitors; no meeting or layout area required. Provide 7-8 work stations, and a space for a tech library. There is a "test bed" requirement. Meeting space would make use of the common EOC meeting room, during routine conditions. Locks: same as data center—key card requirements. Acoustics: no special acoustic reduction requirements for office suites—fabric on system furniture walls will be adequate for office noise. Painted gypsum board walls adequate. Provide visibility into office and data centers for VIP tours and other tours—wall glazing and vision glass for doors. Floors: raised floor for both office and data center **(Note: consensus is to have all functions on 2nd floor on a raised floor system)** Ceiling—typical suspended acoustic tile for office space; data center to be open to structure. Finishes for NSF seemed adequate to standardize throughout facility.

Discussion on Co-Lo Data center—the concept of one large volume with all agency servers in one space, with each agency's servers caged with limited access. After some discussion on pros and cons of separately walled in data centers versus one large co-lo data center by Nick, consensus was reached to go with one co-lo data center, so long as each agency's racks were in secure cages.

NASA/JPSS: NASA states that surge of people in the Assignable Office space. Suggest swapping the 764 SF for Data with the 799 SF Office space. Encouraged accounting for rack space with test bench function per their diagram. NASA has a requirement for a bunk in order to have a 24/7 response—a separate room is desirable. Originally, the bunk space was for Condition 1 weather to assure response time, but with earlier discussion to advocate for sky bridge connection to IT Ops, requirement for bunk is mitigated—but still desirable. Bunk could be the size of a walk-in closet. Discussion on overhead cabling: go with industry standard for cable tray, and power under the floor. Some discussion on a pressurized air plenum—covered hot aisle/cold aisle issues and discussed a common air return. Some mention of data center humidity requirements, but no real numbers discussed.

Separate discussion on roof access: requirement for stairway roof access for ease of technician access to roof w/toolbox. Request also for vertical chase for raceway to access roof. Roof to have landing at top of stairs; requirement for a 10 foot wide catwalk and 2 (two) 30ft X 30ft platforms for radomes and antennas.

NASA JPSS suggests that the office spaces think about innovative modular furniture, such as 270^{o} systems furniture for more efficient work environment.

SPAWAR (Navy) states they may not need back up control space and are wrestling with where it goes—could go at Ops Co-Lo and Assignable Office space.

It was noted that utilities to IT Ops building will come thru the sky bridge.

No other architectural inputs on 2nd floor.

Lance Mackie took over to discuss power, lighting and environmental. Card readers discusses. Asked if card reader needed between office space and data center—provide capability but perhaps have it disabled until required.

Entire building should be secure; security cameras to monitor equipment and look inside the data center remotely.

For Co-Lo data centers, cages would have to extend below floor and above ceiling to hard deck or have their own cover, if high ceiling condition.

Fire extinguishing—talked about a 2 phase approach—non-water system first within Co-Lo data center, then water system when higher temperatures present themselves. First stage preserves equipment if possible; water system to save building.

Nick took over to re-verify rack numbers. NSF—20 racks; OPS Co-Lo—10; NASA/JPSS—25 racks; Science—20 racks; Science—20 racks. We will eventually need weights for specific equipment. Not expected to be heavier than 800 pound battery packs.

Then discussed rack requirements for back-up Data Ops: NSF—20; JPSS—10; NASA—0 no requirement; Science—unknown.

Question on ASC Terrascan—relatively small area—could be in Contingency Ops.

Discussed loading platforms and first floors. Located functions as shown in diagram. Added 400 SF for warm storage and 1,000 SF for cold storage. Locate Assignable Office space in remaining spots.

Wed July 22 (2.3)

2.3.0 8:30-9:00 (OZ) Review previous day's work

Recap Notes (7/21/15)

IT&C

- Transitional planning and continuing collaboration is critical
- Co-located data center facility was confirmed by group
- Group consensus of revised blocking diagram
- Confirmation for Backup Data Center Requirements

2.3.1 9:00-10:00 (Baker) Physical Security (incl. video monitoring) – special to agency needs

DC2.3.1.1 Departmental requirements

Lance Mackie (Baker) presents: Start talking about physical security for McMurdo—expanded discussion for the entire station. Joe give description of current physical security—physical locks, keycard access at Crary Lab; other elements: we do use cameras for SPAWAR, and to look at weather; IT uses cameras for IT racks; monitor Black Island; ATM has a small cameras; winter Rival Heights observations. All separate systems.

All systems are independent—Ben asks—if monitoring or recording. Only ATM is recorded, rest are monitoring only—IP cameras. ATM is CCTV. Ben asks is this for info or physical security? Joe says more for info versus traditional sense of physical security. Pat says Brian Stone wants a consolidated, integrated system that could be available for 24/7 ops center, plus transmittal to offices up north. Mentions there's monitoring at power plant, airfield, and tunnels—provides safety and situational awareness.
Lance: let's talk about access control? Card key? Locks? Understands most building open all the time. Joe says main IT Ops building—key card access within building—shows logs of who came into building. IT looking for controlled (key) access to equipment lockers. All radomes, utilities (power and water)—restricted access. Ben—also understand rationale. Not needed for NASA 10-meter antenna. Dispatch requirement and EOC together. Lance: dorm buildings and dorm rooms: Ben—there might be need for key cards for dorm rooms—improvement over lost keys. Lodging software comes with card keys. Fire Department need to get into buildings—override card key—usually left in Knox Box. For dorm rooms—key card maintenance costs—are they considerable? In long run, cheaper than maintaining keys. Joe says there's a process to go thru—need to understand a visitor's need to access to various facilities—how does housing person know if a person needs to get into various work centers. Hard keys take much more time to manage. It would be nice for whole station to be consistent. Scientists wanted key cards for their labs to assure the integrity of their science. Kevin: in the future, the same card could be used for rooms, to purchase things at store, for deposit, may be a smart card for the station. For SFA and ANG—they have a requirement for lockable doors—has classified safe for GPS codes; room with safe must have lockable doors. Key cards allow for logging in and out. Safes and lockables: Joe says need for fireproof safes for back-up tapes. Warehousing function in campus to have their own lockable cage for personal gear to be left over winter—versus rat holing items everywhere. In the old days, Naval personnel had lockers for their personal affects. There was a struggle with fire issues—storage of oily clothes. T&L (Transportation and Logistics) group has a need for securing high value items—either key or card. Cargo prep should also be a secure area. Fire Department runs with a huge key ring—card key would be better. Medical would need locked safe for controlled substances and need a camera. Crary lab needs lock for controlled substances used on animals. Storage/lockers for fuels/waste VMF. Seems like a consensus for card keys for campus. Radomes need video monitoring. Radomes have kill switch, klaxon and flashing red light. Nick—design of intrusion detection system, not everything needs key card—magnetic locks, can reduce costs, etc.—importance of detecting access, not just monitoring access. Airfield requirements for lockability—life support building, supply building. High sensitivity areas: post office and point of sale functions. Ben: wants clarification on radomes: requirement is safety, prevent damage, security—prevent unauthorized access. Key lock sufficient. People have gone into buildings at T site. Some buildings were designed to have an open emergency survival shelter area. Survival shelters in the hinterland only need keys—card keys not supportable for remote areas. NAVAIDS at airfields are lockable. Roof access—monitoring or access control. Usually intrusion detection. Joe—control to catwalks on IT Ops

Cameras: Alcohol stores, ATM, antennas, pharmacy. If going to integrated, station-wide camera system, include access to radomes. Nick asks if there's active monitoring, or post-mortem monitoring. People also want to see local weather conditions—situational awareness. Seeing when the helicopter comes in, so you can start moving your gear. Joe: camera on 165—very good for situational awareness on Sea Ice, and hi def to Pegasus airfield. Helpful to have display of views at weather and other places for pilots to see situation. Monitor personnel going to downed power lines and to the power plant. Lance: exterior cameras at corners of McMurdo to give full visuals of the station for monitoring by command and control. Ben: which areas need to have recording capability? Clearly ATM, pharmacy, and select sensitive storage areas. What about others? Question is how much band width does this all take? Joe: everyone wants to see that camera, once they know one exists. A lot of cameras have a loop system—48 hour loop capability. Lance: other thoughts on cameras or general use cameras? In future, security for airfield—more tourism. Fences, cameras—multiple level of security—something to keep in mind for future. For a lot of imagery, don't need a lot of high definition. Kevin: recap by facility/groups.

2.3.1 9:00-10:00 (Baker) Physical Security (incl. video monitoring) – special to agency needs

DC2.3.1.2 Utilities or other specialized areas

Nick states command and control has wall displays, active monitoring. Command and control consists of Emergency Ops, Mission communications, Station Ops—currently physically segregated—desire is to combine into an integrated function. Shows masterplan of command and control, and command and control ops room—with 5 station—fixed, helo, fire and ops. Video wall display—flight info, weather, video feeds. Sub offices for EOC staff—comm, library, private office and meeting room. What are the needs of the three agencies—fire, MacOps, and MacCenter . Fire: first and foremost fire and ops could be combined from 3 to 2 stations, other stations—helo and fixed may be seasonal. Stations need to be 24/7. Inefficiencies—fire fighters are cross staffing to MacOps room. Question of location versus fire station location—does it create efficiency with collocation of fire personnel. In summer time fire fighter cross trained as a dispatcher—not called upon frequently to provide the service. Less volume at night during the summer. Winter time goes to a much-reduced staff model, and fire fighters are called on much more to staff command and control. As consolidate MacOps, there's an opportunity for consolidation from 12 to 7 people in summertime vs. winter, provided firefighters are trained to jump in as dispatchers. Nick: is there a concern that fire and life safety that another agent couldn't handle fire—if fire and ops are fully cross trained ok. Concern of physical distance from where fire truck is stored to get back to fire truck. MacCenter is airfield—2 position—route position by an air traffic controller, and/or FRO; second position is Helo—staffed by FRO—flight radio operator. In winter, they cross-train and elect. tech to the FRO level. Farther Command and Control is from Fire Station, the more reluctant to staff the ops station with a fire fighter. Any discussions on where routine dispatch functions will be? Flight dispatch for helo ops is at hangar—request they stay collocated at the hangar. Discussion on remote operations for dispatch—fire chief has real concerns, even if it is possible. Shuttle ops and fleet equipment—there's a radio function there. Radio ops for Guard. Confirmation of shuttle dispatch operations and fleet operations—shuttle doesn't need to be at Command and Control, particularly in non-emergency situations. Logistics also has lots of radio chatter for flow of supplies and terminal ops. Logistics has radio stations to control their departments. Fuels, waste stations, have their own Bay Stations—there's 5 to 6 departments sharing radio bands. Channeling capabilities in the future. Acoustics in the room; quiet the space down to facilitate emergency operations; quiet it down visually, too. MacCenter communicates to pilots with iridium phones. Share lines with Helo Ops and MacOps. Need more lines available for aviation ops. Pilots and other communities need access to video info—weather.

2.3.5 1:00-2:30 (Baker) Track 2: Communications, Computer Systems and Station notifications:

DC2.3.5.1 Personal communications (pagers, cell phones, other)

Nick: presentation starts before lunch. Understands no mass notification on ice—a potential life-safety concern. A collocated unified systems tie together—messages via panel controls, robust visual displays scrolling info. Mass notification is not just emergency situation, but also day to day communications thru laptops, radios, tablets, etc. Needs and requirements—wanting to know tie-ins and understand what requirements are: Joe: IT has no need for mass notification. Multitude of systems requiring lots of interface to get message out: email, television displays, VHF, intranet, none integrated. Communications to people in an office behind a screen do not work for people in the field; doesn't work for a muster to account for the entire station and know where people are. Major musters are problematic in emergency. Flight movement reports problematic—flightline, logistics, transportation impacted. Everything is cobbled together and stove-piped. An idea is to wipe slate clean and take advantage of all media outlets. Current state is a disaster. Aviation ops would welcome automation and public display of info—flight schedules for example. Those go to specific people—often emailed; but can be viewed thru website address or logging in. All info is manually entered—welcomes new infrastructure that could flow and be displayed. Need for general interest announcements, and tie in speakers in dorm rooms, and mass mounted PA system as shown in slide for a general quarters alarm. Comment—as long as it is zoned—some areas don't want to hear chatter—crew sleep for pilots; need a CONOPS for communications. Control could come out of command and center previously discussed. Joe discusses muster for McMurdo proper—messages are going to be tailored; remote locations not tied in. Comment on winters: Search and Rescue are a joint effort between McMurdo and Scott base—Joe adds that's true for summer. Fire supports Scott Base—they have their own internal fire and medical capability, but backed up by McMurdo when capacity is exceeded. Acoustics is important to avoid dead zones, echoes, etc. Kevin: today is last day of general sessions—some are departing today—thanks people for attending. Reminded about the "Mock Report" and lots of energy that went into the report and will be referenced, work flows, mass notification requirements, etc.

Thurs July 23 (2.4)

2.4.0 7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

Charrette Summary:

8. Broad and consistent understanding, review and comment from Agencies
9. Confirmation of Master Plan 2.0 guiding principles and facilities configurations
10. Understanding of Agency internal process flow and ideal adjacencies of sub-functions
11. True appreciation from Agencies that they:
    a. were given the opportunity to participate &
    b. saw real evidence how their input may be considered
12. Airfield planning will be for 2 separate fields, wheeled and ski-equipped.
    a. Building need to be designed to be moved quickly;

   b. Need to retain capability of Sea Ice Runway
13. Agencies need an understanding of construction schedule to allow for budget process and transition planning
14. Expanded bandwidth off continent was discussed frequently
   a. Reduced staffing, increased reach back
   b. Expanded situational awareness in CONUS

Issues not included in master plan:

1. Enclosed connection between Crary and Sea Ice Support Bldg
2. Enclosed connection between IT Ops and Field Science Support
3. Airfield IT Operations building
4. Additional facilities and infrastructure for wheeled runway—only single airfield was estimated

Decisions Needed:

1. Site location for Helo Ops?
2. Is a building to be provided for runway science?
3. Does Sea Ice Airfield capability need to be retained? Asked and answer was Yes.
4. Replacement of sea water intake?

2.4.1 8:30-12:00 (OZ) NSF Review/Validation of Requirements

Presentation of above to NSF. Brian Stone: regarding band width, do you think there's recognition…Pat: if we change how we do business and do more off-shore, need more capability. Brian Stone—sounds like to throw more money at band width—reset operational costs through AIM. Pat: more energy into finding more opportunities. Brian: was there recognition of trying to do more off continent. Don: SPAWAR—66% support of continent—and could go 100% off continent with increased band width. Pat: big win would be on base operations; small wins on one or two positions—dispatcher. Brian: can you all (A/Es) identify positions to move off continent? If it can be done off continent, then it must be done off continent. Can NSF be convinced savings over 50 years can offset costs of increased bandwidth. Don says he thinks they can assist ASC in reducing work force. Shaggy: facilities could predict manning. Cargo is based on velocity of cargo—sets manning level. Ben Roth: focus is on process to understand the manning requirement and see efficiencies. Pat thinks the discussion on manning was incremental and not radically new ways of doing business to impact manning. Ben Roth disagrees. Dave: Remote sensing can save bodies—cameras can save labor. Sea water intake is new to Ben Roth—not part of scope—if critical, it's a separate funding requirement—don't wait 8 years to implement. Some discussion on IT Ops building and organization. Brian Stone wants assurance that operationally, no activities on lower floor add fire risk to data center on upper floor.

Brian: feedback on masterplan—Brandon: zero interest on development of interest. Agencies wanted to talk about their issues. Some quality of life issues discussed—coffeehouse has quiet atmosphere, compared to other social spaces. No original thoughts. Pat asks about hotel experience discussion. Ben: lots of discussion of card keys. Data Center was a requirement. Outside of there, not much is locked at McMurdo. IT concerns of maintaining a card key system. Ben: Guard had requirement for lock and key, and Radome.

Pat: outcome of personal storage areas? Ben: leaving things across the season—providing cubbies, with deposit for mailing boxes out.

Brian: connectivity with Sea Ice center from Crary. Don discussed findings with NOAA for balloons. Looking at linking to Crary.

Ben: really got good info on social spaces. Replacing bars with 1 or 2 bars in contingency ops areas.

Brian: what do you get for the next 2 weeks in Denver: ASC and NSF drill down. Week four: utilities, building envelopes, etc. We will be able to understand R values, energy distribution to get an idea of energy costs. Charrette attendees need to be ambassadors and part the army of the willing. Shaggy: no other meeting would have accomplished this.

Ben: next week—discussion of other spaces—dorms, food storage, etc. Beginning of 4th week will re-hit airfield items. Dave says there will be some re-arranging of schedule. Brian brought up something that caught Ben by surprise—subdividing helo ops. Creates another start and shut down the helos would have to do. Idea is to bring helos to logistics.

Section Three: Charrette Week 3

Denver/ASC, July 27-31

Objective: To integrate the *NSF Science community* and *Outside Agencies* input with that of the ASC Leadership, in the advancement of design for both MCM and Palmer stations, with a focus on *concept design* for **Facilities.**

Executive Summary Week 3

Week 1 – learned requirements but also proved to be a validation of MP 2.0

- Grantees were engaged, provided valuable input, represented peers that were not there
- Understood configuration
- Additional input for Master Plan
- Understanding of flow and adjacencies
- Understanding of lifestyles
- Grantee appreciation

Week 2

- Start with broad understanding and review
- Recognize that charrette is in anticipation of what is going to happen in 35 years
- Confirmation of internal process and adjacencies of sub-functions – talks about budget cycles
- Appreciation
- Airfield from single to 2 separate fields – Pegasus, Willie, and retain capability of a Sea Ice Runway
- Budget consideration and transition
- Bandwidth – this will help with infrastructure to use more bandwidth but it is an operational issue

Week 3

1. Broad and consistent understanding, review and comment from ASC attendees
2. Confirmation of Master Plan 2.0 Guiding Principles, and facilities configuration
3. Understanding of Departments internal process flow and ideal adjacencies of sub-functions
4. True appreciation form Departments that they:
    a. Were given the opportunity to participate
    b. Saw real evidence how their input may be considered

Sequence of people coming in from airfield (Need to improve bag drag configuration)

- Come in and go through gallery that will have changing exhibits
- Dedicated lecture hall (that is multi-purpose) where you have orientation lecture
- Pass hand wash, servery, dining
- Check in – get key
- Get bag
- Go to room
- Do the reverse on the way out

Comments:

- Grantees Brought up how you weigh science cargo
- Every corner of every building will have an exit
- Day to day operations will happen here too

Michael Baker INTERNATIONAL

- Steve – running bags through building for day to day operations should be looked at – with shuttle stops
- Steve – think of a loop for shuttle
- Bags will come in as regular ATO cargo
- Can they label science cargo as science cargo in Christchurch? Bags go to room, science cargo goes to science
- Hand carry bags goes with regular luggage
- Try not to make hand carry part of cargo

Movement of Goods:

- Ice off-load to be further discussed
- Large area (multi-purpose yard) to accommodate incoming milvans that will be graded evenly
- Milvans are emptied into storage – which is accessible by forklift
- Food goes to warehouse area adjacent to the kitchen
- Food is also adjacent to Field Science Support
- Covered outdoor area between two buildings is not fully heated but is protected

Movement of Waste:

- Kitchen waste: out and staged and out
- Looking into waste heat
- Short direct staging and pick up from Crary – don't want to have to take Crary waste out through another building
- Other waste options to be considered? Yes, like dewatering
- Co-mingling – waste/recycling – to be discussed later in week 3

Laundry:

- Have a placeholder for central laundry – Erin – helpful to have them in the dorms
- Need to figure out the flow that includes getting linen bags
- What percentage of galley bags? Galley footprint is pretty small. Wash rags and aprons, BFC and fuels come in too on a weekly basis
- Shaggy – looking at putting laundry within work space to eliminate fuel saturated laundry in central laundry
- Centralize commercial laundry and have residential separate
- VMF laundry – BFC – justify equipment installed in BFC. Bulk of that work happens at end of season (tent repair, etc). Easier to justify – want separated laundry washers and separate dryers for fuel soaked laundry
- Laundry chute in dorms? Current Fire code violation when you put blue bag out. Right now they physically pick up linen bags from all dorms
- Linen chutes into area for palletizing
- If boomerang then it's hard to issue fresh linens
- Ben – what is frequency of boomerang? Field camps, c-17 are a couple a year. Plus flight cancellations and delay contribute.
- Get it down the stairs – right now It sits in hallways. Have a chute to get out of hallway would be good.
- Time and labor intensive to turn around linen for one night

Highlights:

Week 3		References
IT&C Guide	• IT&C elements mentioned as being to dispersed	*3.1.1*
	• IT&C support for video training and financial transactions (ATMS)	
	• Physical security required for:	*3.3.1*
	○ Cargo and Supply	
	○ Trade shops	*3.3.5*
	○ Finance Office	
	○ Pharmaceuticals at Health Clinic and Crary	
	○ Management Offices	
	○ USAF and NSF Site Manager Safes	
	○ Lock Shops	
	• Magnetic Strip key cards for lodging	
	• RFID cards for all non-lodging facilities and as part of making McMurdo a cashless station	
	• Monitoring requirements:	*3.3.5*
	○ Data Centers	*3.3.5*
	○ Radome	
	○ Antennas	*3.3.5*
	○ Possibly utility rooms	
	○ Remote areas, including airfield, and Arrival Heights	
Facility Requirements		
• General	• Social spaces are scarce and in high demand requiring scheduling; they are run by volunteers. Socializing may also happen in work centers	*3.2.3*
	• Acoustical separation of lounges from other functions (applies to lodging)	*3.3.0*
	• When disease breaks out, people are treated in their dorm rooms	*3.4.1*
• IT Operations	• Re-cap of IT-Ops building functions	*3.1.4*
• Lodging	• Should accommodate couples with larger space	*3.3.4*
	• Should accommodate distinguished visitors with larger space	*3.3.4*
	• 850 beds total requirement	*3.3.4*
	• Standardized rooms desired-singles for health reasons	
	• Sleeping quarters a quiet zone to foster sleeping—not comingled with other activities	*3.3.4*
	• Avoid long “bowling alley” hallways. Pole station room dimensions of 9’-8” x 7’ too small	*3.3.4*
		3.3.4

	• Attempt to maintain current ratio of 4 people per shower per floor	*3.3.4*
	• Provide private shower rooms separate from private toilet and sink rooms.	
	• ADA compliance is waived	*3.3.4*
	• In-board windowless rooms okay	*3.3.4*
	• 100 SF per person may be more appropriate; 70 SF is too small	*3.3.4*
	• Need daylight access in hallway to see weather conditions	*3.3.4*
	• Provide tack board within room	
	• Provide place for storing duffle bags/suitcases	*3.3.4*
	• Card swipe entry; can also control lights/heat	*3,3,4*
	• No sauna requirement for dorms	
	• One laundry room per building—more dryers than washers	*3.3.4*
	• Bathroom locations at ends of dorms are insufficient measures to protect against the spread of viruses—bathrooms are a touch point for spreading disease	*3.4.1*
• VMF (Baker)	• Current VMF is challenged by floor system regarding heavy equipment	*3.4.2*
	• Currently services 250 pieces of rolling stock, 52 pickup trucks, and 24 passenger vehicles	*3.4.2*
	• Heavy vehicles include small to large bulldozers including the D9, weighing up to 90,000lbs, along with the 40 passenger terra-bus, the Kress trailer.	*3.4.2*
	• Bay 6 is the lift bay; oil goes in bucket	*3.4.2*
	• Needs to capture snow melt—trench drains	*3.4.2*
	• Improve lighting	*3.4.2*
	• Radiant height	*3.4.2*
	• Verify need for tech library in reconfigured “Scheme B”	*3.4.2*
	• Consider removal of atmospheric tanks for installation of micro-turbines	*3.4.2*
	• Hybrid ATVs to replace some site vehicles; fewer overall	*3.4.2*
	• Facility lacks vehicle exhaust system—site staff makes use of portables to remove fumes.	*3.4.2*
	• Provide break area for safety meetings, crew break and lunch—for 15 to 21 staff.	*3.4.2*
	• Provide office privacy for foreman and supervisor; open office for other staff with access to private	*3.4.2*

space
- **Provide locker storage for flammables** ***3.4.2***
- **Reconfigure stairs with lower run to rise aspect** ***3.4.2***
- **Provide clothing changing area, locker, shower and industrial laundry** ***3.4.2***
- **Washing function for light vehicles with OWS** ***3.4.2***
- **Existing VMF to house ANG, AGE, FSTP and MEC functions with minor workshop and bench space** ***Friday***
- **Reserve 2 bays for construction equipment** ***Friday***
- **Scheme is to collocate heavy vehicle repair at Traverse Ops in a combined facility** ***Friday***

Mon July 27 (3.1)

3.1.1 8:30-9:30 (ASC) Introductions and Objectives

Rick goes over Master Plan 2.0 and covers the 1st 2 weeks of the charrette. 1st week was to meet the Grantees and understand their world to develop the basis of design. 2nd week was getting input from allied agencies. Now we're going after finer granularity as we go thru design. Rick covers the charrette design and the re-validation of the master plan from grantees and non-present peers. Shaggy covers summary of week 2 with ancillary support agencies, who are tenants at McMurdo. IT&C is in too many places—a hodge-podge. NASA, polar satellite, SPAWAR. First thing they wanted to know was budget cycle. Airfield study showed need for retention of 2 runways. Construction plans need to allow for budget process and transition planning. Bandwidth: can be an operational issue—more bandwidth can be bought—need to be smart about how bandwidth issue is resolved. Dave re-emphasizes that Congress looks at this as an efficiency project.

Rick summarizes common themes of grantees to include reduced touch points and time to field; streamlining science support staging. Clear orientation upon arrival; dedicated space for multi-year projects; functional connection between field science support and Crary Lab; robust exterior pedestrian circulation system; enclosed "getaway" spaces for groups to cook and socialize. Consolidation of warehouse spaces; organizes central services positioning; efficiency and connection between field science and Crary Lab. Separation of vehicle routes from people routes on site. Southern new dorm may have its rooms re-allocated to other buildings based on topographic drop off. Another driver of design is snow drift—which will affect the shape and angles of buildings. Building connections can accommodate ramps—which would help people who are bound by wheel-chairs coming from medical.

3.1.4 1:00-3:00 (OZ) Science Operations Overview (DC results)

IT Ops Building: Bandwidth is an operational cost and a constraint. Up to ops to manage the rationed resource. Bandwidth is not part of scope—it is an operational issue. Kevin covers the fiber optic rings—10 gigabyte system, 96 fibers inside to buildings, around buildings. Can pump info back and forth. Covers the station in a wireless cloud—for on station communications. Building is more than IT. Kevin discusses building organization and functions. Covers security and monitoring. Discussed video monitoring—some were unaware it was going on. Question is what is required? Some decisions to NSF for video monitoring requirement. Question on EOC space: also has additional assignable office. Mission Coms center is a duplicate of dispatch stations that are in Central Services. Backup EOC is fallback location plus occasional maintenance and testing of system. Kevin also covered morale services and will be woven into all facilities. Steps to give diagram more definition—need to collect info, type of equipment, number of racks, questionnaires need to go out. It'll go out as a questionnaire. Ben: L-M has listing of requirements already and cross-check the accuracy of the size of requirement—equipment does shrink over time with new technology. If they go to virtual desk tops, might need more rack space. Or if there's a requirement of on-demand video, need more rack. Another unknown is number of future NASA/JPSS missions. Ben: architects to layout racks for determination of how much space is needed.

Tues July 28 (3.2)

3.2.2 10:30-12:00 (OZ) Central Services: Food Service and Dining

Rick summarizes the discussion: the entry flow; the flow thru the server. We heard you could serve 230 and is associated with a population of 1,000. With mid-rats, can serve food longer thru the day, and take some of the driver off dinner. Lunch is the big crunch daily. Can get food to people in different ways and longer. So, what's the number for 850 people for dining? 15% to 20% less? Talked about different ways of dining and eating. First way is everyone comes in and sits; second is grab and go to work or room; third is a hybrid getting hot meal on tray and eating alone in room. Requires proper placement of dish collection and washing. People taking food to rooms impacts inventory of bowls, dishes, etc. Ill people should have food delivered, and should eat in their room. People also go to their rooms to get away from interruptions from work day. People in IT stuck in a cube all day probably do go to the galley for the social interaction. If room eating banished, need to revisit and up the galley seating count. Rick: look for ways of designing an environment that allows for social participation or for quiet privacy. A retreat—private dining. Goals are to capitalize on proximity of warehousing of food. Dining was also located to take advantage of views. Circulation could be lowered to not interfere with views. Another suggestion was to stretch the server and run the hall between the servery and dining. Shows a reconfigured diagram depicting that situation. Joe states potential for many collisions as people drag bags and everything thru main hallway. People also meet in the hallway and stop and have conversations going. Walkway can get congestion. Joe suggests circulation at back of house behind kitchen—proposal has too much traffic thru dining area. Suggestion to decouple walkway with dining level—if offices drop down a level, move main circulation down to lower level. Re-use of resources—such as wood from old buildings. Ben Roth: Express heritage of McMurdo and the mission of science. Wants selective use of re-used materials in selective places.

Brings up the "growth chamber"—has a threefold purpose: brings green, humidity, and fresh vegetables and herbs to eat. Ben Roth states that the "growth chamber" is a place holder space—maybe for the store. Points out that there is a maintenance component to hydroponic growing. One person attests to importance of having fresh greens—"priceless."

1:00-5:00 Break Out Sessions

3.2.3 (OZ) Track 1: Quality of Life

3.2.3.1 Central Services: Recreation and Quality of Life

Mike Santos introduces himself and is in charge of recreation. Rick intros the design team. From 1-4 we want to cover physical rec, skills development, social spaces, and lounges. Goal is answering if they have the right stuff in the right place and the size of items. Rec: what they have now is continuation of current services: gym, weight room, multipurpose yoga room, but not spread around the whole Station as it is now. Rick wants to know if Oz is on the right track? Shaggy says this is a hard thing to talk about concern about bad press. Once it works into contingency space it makes sense. We want to look at it holistically in terms of wellness, more physically fit and active while down there. The original thought was modelling it on a middle school gym with retractable bleachers, could be used for plays or other activities. Rick adds the goal is morale, health, retention, to be able to do your best work. Mike says it's important to also provide quiet areas to read a book or put a puzzle together—that's also part of recreation. Another says to think of a living room size space for small gatherings. Joe adds that there used to be a rec staff of 6 coming from Navy days of MWR, it was more institutional and organized. Because of budget cuts, it's 1 person and it's all volunteer based. Program changes year by year. Might have a salsa dancer one year, but not the next. Space needs to adapt to changing personnel. Are there things that could not be accommodated? Joe says work centers become rec centers. A network of rooms that could be used for a cooking class, a photography class, a party space. Mike: one of the big aspects is the amount of time for turning rooms over—and the need for storage for equipment. Shaggy: carpentry shop does morning stretches with a yoga instructor and injuries are down. Mike: lots of vying for 30 minute slot to do before work fitness—some work centers are not large enough. Some work centers have multiple stretch breaks during the day. Could it all be done at the gym? Joe compares S. Pole vs McMurdo as a space ship versus a town, and the need for multi-multi-purpose spaces at S. Pole. Population at McMurdo is so much larger than S. Pole that you can't simply emulate what's going on at S. Pole. Different people will have different levels of care for the dorms—house mouse concept among permanent party versus transients. Rick summarizes that there's institutional rec—PAE requires stretching for each worker every morning. Not mandated by NSF—a contractor's choice, per Ben. Rick—there's an expectation of institutional rec and lay on the elective rec. Grantees and support staff do comingle, so build community. Others say there's a definite distinction between grantee and staff events. Grantees will have socials just for grantees. There are departmental events—IT events for the IT work center. Rick: overall goal to mix the two groups more? Mike and Joe—can't force the mix more than is naturally happening. Ben: how are gym activities scheduled? Mike: the one person no longer schedules events—the one person is a volunteer coordinator; schedules space and supplies and publicity. Lance: how is schedule displayed—Mike: manual display—wants to see computer monitors throughout dorms and common areas—Lance: did anticipate wall displays. Comment was that the two Merrick rooms were insufficient for the amount of yoga going on (2 36'x36'). Yoga is most popular activity. Mike as much as we want to make multi-purpose space, it may not be conducive for yoga—for example basketball adjacent. One multi-purpose space is not enough—they have 3 now that are fully booked with very popular timeslots right after meals. Weights and cardio are single purpose. Weights and cardio should be adjacent. Mike: weight lifting room is far too condensed—all jammed on top of each other. Needs more cardio equipment. Noise is a big issue—weights make noise and interfere with yoga. Salsa class next to yoga is incompatible. People want to finish work, recreate and work out, eat and then relax. Need to expand in certain areas at peak times. Work areas become rec areas for an hour at a time. For example the BFC or Carp shop—might have yoga, band practice. That's how McMurdo absorbs peak demand. Not all work centers can do it, but consider how a work space can have a rec component and take pressure off multi-purpose areas.

Mike covers types of spaces and activities: In big gym, biggest event is Halloween party, dodgeball, basketball and volleyball league, climbing wall; has bathroom; no shower. Desires showers for contingency ops purpose. Gym is also overflow lodging—Italians, Australians on cots. Gym also has organized fitness classes as overflow. Could also have low level bouldering. Yoga fitness room—is the work horse of the rec program: P90-X, Cross fit, Dance Class, non-alcohol parties, abs classes. It's too small for the uses now. Needs to fit 60-70 participants. Space is open and unlocked during duty day and is used by other work centers for work outs. Some lunchtime classes. Spaces are self-leveling—if activity is full people will go elsewhere. Craft Room: has 4 industrial sewing machine, screen printing, people work on their own clothes; would love to have room to set up easels, more banks of sewing machines. BFC will not allow use of their industrial sewing machines, designed for canvas and thick materials—can't be used by general use it. Currently in a room that's 18'x18'. Supplies provided by rec budget. Loss of other activities (bowling, ceramics, etc.) with demo, one person says there was an increase in alcoholic consumption. Joe confirms, and says more activities in dorm lounges, which kept people awake longer, which created policies of less lounge usage, causing further pressure. Question of how will single rooms, creates elimination of space for private gatherings, and more pressure on social spaces. Is there a need for individual sound proof spaces for music playing, studying, and individual yoga. Gerbil Gym: cardio, has a boxing area, stretching, spin classes. Weight room—currently very cramped. Also next to exercise class—very noisy. Gear Storage: is sized of a janitor's closet but houses all the equipment that's checked out snowboards, skis, electrical items (play stations), etc., climbing shoes, ski boots—used every day. It's 12x20. Bike program: back racks—take and leave a bike—there's only 15-20 bikes and then stash them in rooms or in work center waiting for a sunny day. Then policy change and were locked and need to go to gear issue. No accounting of where bikes are; particularly if non-functioning—often get abandoned. With consolidated station, might improve bike situation. Less places to squirrel them away. There used to be a ceramics studio; there is a kiln and is in a milvan. Was heavily used by some individuals who churned out items all season—some demand for it. No mug and bowl shortage. Bouldering and cave is now gone and most demand to have it return. Bowling is gone—seldom asked for because people know it's gone. Building was condemned and activities went away. May be desirable to bring back bouldering and ceramics. Library is popular and was moved into a lounge in a dorm—will host art showings, too. Quiet space with books to check out. Also used as a puzzle space. There is library tracking software plus a voluntary librarian. Mike also mentions the radio station—grantees mentioned as a benefit as a social space doing the radio activity. Radio equipment is Navy supplied—thru agreement with AFRTS—all provided thru Defense Media.

Wed July 29 (3.3)

3.3.0 8:30-9:00 (OZ) Review previous day's work

Social Spaces

- Flexible range of adaptable space
- Visual and acoustical separation
- Need for small groups resulting from single occupancy lodging

- Use of moveable furniture

Lounges
-need for concurrent different activity levels and demographic
Suggestion of two spaces
Acoustical separation

Interior design character
Goals:
- Local Population: warmth, comfortable, clean, fresh, uplifting
- NSF – professional, efficient, timeless, permanence
- Overarching goal – to be "of its place."—reflective of local physical environment

Color/Materials:
- Base palette reflective of local physical environment (color and texture)
- Use of warm tones/ textures to enhance wayfinding and create sense of place within larger context.

Ben Roth: wants to know if there's something out of the norm for mech/elec, daylight harvesting, from engineers: Merrick: electrical: lighting sensors and daylight harvesting without poking holes in the exterior. Concerned about skylights. Wonders if there's a portion of warehouse that would allow temperature to drift. Is there also a way to minimize the amount of artificial cooling required? Goal is to eliminate as much as possible the need for mechanical refrigeration: process cooling for the aquariums, freezers, data. Challenge mechanically is the large facilities with different loading requirements and flexibility. Ben Roth: buildings are biggest culprits for energy expenditure—wants to reduce energy demand and carbon footprint—how to introduce into the facilities energy savings and energy reductions. Rick: introduce range of comfort levels. Idea of energy in warehouse—comparison of having some natural lighting as compared to costs of lighting. Smart city to come into play (Baker). Joe from Oz—combining systems—where there's a skylight when you have light, and a panel when there isn't. Ops: reminder there's 4 to 5 **hurricane force storms per year**. Ben: our designers can design around that. Discussion on incandescent lights to add heat; Bill: LED lights installed in North Slope because of high energy costs.

3.3.1 (OZ) Track 1: Central Services

9:00-11:00 3.3.1.1: Administration (includes HR, Finance, Command & Control, Retail Store)

Presentation on McMurdo staff/ops org chart. Includes: SPAWAR with 3 divisions, NSF at top of org chart. Below next tier is ASC services including: Trans & Logistics, Tech Mgt and Administration, Science and Tech Services, Infra and Ops. There's also the USAF mission, USCG has a presence. Discussions on environmental and safety functions—can be open office. HR offices discussed—functions for discipline actions, recruitment for follow on summer or winter season, workman's comp issues, etc. L-M has a training function of 3-5 weeks: ensure compliance training are met before expiration—what is size, needs of presentation? Training includes compliance in a wide variety of areas: timekeeping, workplace violence and harassment, import/export. Depends on individual and function. Not proctoring lectures of large audiences. Much is available on line, but not easy at McMurdo to scroll thru presentations. Ben wants to find out what physical plant requirements are—and can it be done remotely. There is a need for HR to have a physical presence at McMurdo with the employees. There should be no requirement for additional build-out of space to support HR—done thru scheduling. It may be one office and two touch down spots—space would be used by others at different times of the year. HR prefers physical separation from top end leadership.

Discussions on visual and audial privacy—some technologies exist. There would be paradigm shifts to change operations. Smaller manager offices to recognize their work is telephone based. If office with a seat—80-100sf.

Transients in flex offices to fit 4.
Finance: Leslie to talk about finance needs. Currently need similar to what they have not. Need space for 2 ATMs, plus room to count cash and talk to employees about payroll issues. Cannot solve cash problem. Joe says can't go cashless because you need all credit cards—credit card processing and security requires lots of bandwidth and infrastructure for federal requirements. South Pole is not cashless. Palmer is. ATM—transients have some need for cash for purchases as they're headed to S. Pole, etc. Office size: 10x10? Same size for ATM; need space for receipts. Can credit card receipts be stored electronically? Possibly if secured, and policy on paper copy requirements.
Tracy wants to know if laying out assignments to cubical world, or creation of neighborhoods of varying levels of activity, collaboration, loudness.
Ben Roth highlights that southern walkway should move north to create a double loaded corridor and have more people enjoy the views.
If totally paperless, then need added server, backups, etc., in case of power failure and no way to access electronic documents.

3.3.4 1:00-3:15 (OZ/Baker) Lodging and Associated Social Spaces

Rick Petersen begins presentation: intros Andy White principal at Oz for 20 years, multi-family thru resort. Rick: of all areas on site, it has the most opportunities to tailor to needs, meet 850 beds at one time; standardized rooms desired. Should accommodate couples. Accommodate DVs—need for some small amount larger than standard. Space, attributes, functional requirements. Rooms want to be singles, healthier population. Harvest and reuse structural system of upper case dorms. Shows master plan with 4 re-furbished and need for a couple more dorm space. Southern dorm was challenged by site and reallocate space to other dorms—shows diagram of their proposal. Shows fluidity of planning. Orange space shows lounge areas. Keep at east end or move to west end. Located at end with bathrooms to create a quiet buffer zone from sleeping quarters. Each lounge has an opportunity for theme.

Does it have to be either or? Split lounge? Ben: cognizant of the need for a good night's sleep. Doesn't want people walking thru sleeping quarters to get to lounge space. Wants to make sure they are sleeping quarters. Agrees there are dynamo views, but can be enjoyed by other Oz created spaces in the central buildings. Dave likes the idea of some small spaces at end for quiet activity. Ben: any advantage to having sky bridges on west from a phasing perspective. Transformer is easier to add to new building—discussion on additions at east end facilitate that. Concern about southern dorm creating a canyon—too close to Central Services. Dave: maybe that dorm doesn't have a lounge, to have more separation. Comment: Make rooms as same as possible. Joe: formed a courtyard—make it covered? Snow won't melt, per Joe, but maybe more wind—not a Frisbee throwing place. Why not just link dorm wings to central service—was part of master plan 1.0. Ben asks what this difference in finish floor elevation between dorms—Aaron says there's a 4' difference between northernmost dorm and southernmost dorms. Rick asks is it not possible to raise buildings or lower structure? Answer—not an easy prospect and much money. Only 18 inches per building for ramps. Ben: this configuration was discussed—do we know southern building is not achievable? No they do not know yet—maybe more for substructure and retaining wall—not off the table yet. Southern dorm would experience more noise from power plant. Someone asks add the two dorms to north? Rick: it has been suggested. Shaggy: a phasing problem. Comment: Might be able to phase another way. Shaggy: need to figure out how to handle 150 people displaced. Ben: is there a reason the additions are increasingly larger? Rick: to line everything up nice and neat. Ben: We were at 6 dorms and now at 4, likes it because it's more compact. Rick, could maintain the stagger; keep a new dorm to the north. Ben: a challenge as to how long the buildings are becoming—a bowling alley effect, length to bathroom; could be nodes along the way. Rick: we have not been thinking about the limits of the length. Shaggy: all about the phasing right now.

Rick: let's talk about room configuration. Been talking about S. Pole. Some talk about suites where rooms share baths. First shows 209 with shared toilet shower with sinks. Next image shows 210 renovation where rooms converted to two bedrooms, with gang baths down hall. Third image of S. Pole winter room—9'-8" long and about 7' wide. Is there reason to get rid of suite? Shaggy: space, noise. Ben: scenario discusses bathrooms that are completely your own for the time that you use it. So 8 baths for 40 people getting ready in the morning? Rick: a guess—could provide separate toilets and showers. In upper case it is 4 people to 1 shower. Scenario shown is 5 to 1. Joe: from his IT perspective—function that happens more frequently is bathroom vs shower, so more density of toilets. Add rooms for just toilet and stalls. Room with showers; rooms with toilets and sinks. Joe Ferraro: major circulation at the end—lounges off hallway—bisected by major circulation. Ben: lounge may be on different floor, too. Rick: trying to get as many similar rooms as possible with structure, creating outside and interior rooms. Trying to **keep things as democratic as possible**. Lodging rep thinks inboard windowless rooms ok. Shaggy: been round and round on the issue. Lodging rep—some people want interior room who have challenges dealing with 24 hour light. Ben: challenge of length of corridors—an unpleasant experience. Suggests introduction of natural daylight along pathway—at far end. Comment on living in 207—in the canyon—it's dark already. Ben: not for daylight but for visual cues—snow is blowing. Joe Ferraro: could a single loaded corridor work? Don, no ended up squishing interior rooms. No idea which floor sky bridge is on. Lodging: concern that too much traffic having to go across all the rooms—could baths be split. Ben: inefficient to bring utilities all the way down to the other end. Dave: mixing drinkers from lounge and people from sleeping quarters. Kim: would it make sense if bathrooms shifted to inner core? Allows for utility core for outboard rooms. Question on ADA, and DoD UFC regs? No ADA. Question: any intention on buildings going cold in winter? Walkways thru all buildings, so will need to be partially heated. New technologies in buildings are all do not freeze. Lot to move out if technology in every room. Standards for wet or dry sprinklers? May be cheaper to leave buildings at 40 to 45 degrees? Saunas are now in all dorms and liked by some. Would saunas be in new dorms? Shaggy: does that need to be in a dorm function or in a gym function? Maintenance and Ben: locate near the gym. Easier to keep clean. The winter over dorm is configured differently because they want more room and matrimonial. Lodging: getting away from winter versus summer distinction. Square footage wise—70 sf too small. 100sf would be enough if storage under bed—staff architect stated. Also stated that shape affects utility—rectangular is better than square. Movement of people in the room dealing with gear and furniture—challenging. Joe Ferraro suggest building a mock-up. Bill asked to have a discussion on what goes in the room. Rick: knowing the room requirements will be very important as we go into design. Must ask what is needed and what activities happen in a room. Tracy (Oz) says she wants to take a crack at writing questionnaire. Design in ability to leave wall space for personalization. Ben: provide tack board on wall to limit and control any damage happening to wall. Storage needs for suit cases—long term items.

3.3.5 3:30-5:00 (Baker) IT&C Morale Services

- *3.3.5.1* Common areas

Lance's presentation is actually "Physical Security & Monitoring" and is designed to summarize findings from last week's meeting with the Allied Agencies and elicit new requirements from the ASC/L-M on site staff. After some intro remarks from Joe and Ben, Lance was able to ask what other spaces required physical security. These were highlighted:

- Cargo and Supply—needs restricted access
- Trade Shops—only qualified equipment operators in the space; no hobbyists. Want controlled entry into shops. There was also a discussion on a lock box or a lock room (Lance—fill this thought in).
- Finance Office
- Controlled areas at health clinic and Crary Lab for drugs
- All Management Offices
- Safe Requirements for USAF and the NSF Site Manager
- Lock Shop

After the spaces were identified, the issue of keys/key cards was discussed. The current brass key system does not work. Master keys are floating around. There was a clear preference for key card systems, and a realization that McMurdo might benefit by having two systems: Magnetic Strip cards for dorms—and possibly designed to control mechanical and electrical in each room within lodging. (It was noted there's a smart phone app to enter hotel rooms, but questions arose about what happens when smart phone batteries die.) Then for everything else, use an RFID card to provide a full level of programmability for access to various facilities as well as taking a step toward a cashless McMurdo. A small comment was made that biometrics was susceptible to the cold.

The presentation turned to monitoring requirements. Joe mentioned the data center required monitoring, as did the antennas and radome. There was a suggestion to update the presentation to include those changes.

Lance asked about intrusion detection. (Need more notes here, Lance—radome?)

Additional video monitoring requirements include the areas that were remote to the main station, the airfield, Arrival Heights. Joe asked maintenance if they needed monitoring in the utility rooms. Answer: maybe.

Discussion turned to coordinating building exterior lighting and cameras. It was noted there are two factions of people: those who like no light to observe the stars and aurora activity, and those who like site lighting to see where they're going. McMurdo does have low light black and white cameras, as well as cameras with dual visible and infrared capability.

Thurs July 30 (3.4)

3.4.1 9:00-12:00 (OZ/Merrick) Fire & Medical

Fire chief at McMurdo introduced, along with assistant fire chief. Rick presents master plan and Joe Levi runs the discussion. Diagram shows separation between medical and fire in master plan diagram.

- Equipment: 2 pumpers, 1 ambulance/EMT, 1 airport rescue—6 med—large app
- Staff: 4 people truck, 2 EMT- both SEAMS, 3 office personnel—Chief, Asst Chief, Capt, plus fire maintenance and fire prevention seasonally
- Turnout:
- Response: expectation is 3 minute response within McMurdo complex. Concerned that chow hall response in new master plan is a far distance for fire fighters to come from to get to the fire station for the response.
- Apparatus support: also needs drying tower or other space—Ben asks if there are other means of drying hoses? Yes—there may be more that will need to be investigated
    - Bunker Gear: how much gear to store: total staff of 54, and 48 are using bunker gear. Need to provide more than that because staff varies year to year and need to have enough sizes available. Locked up inactive storage in locked bunker gear storage—store 100. Bunker room is for active fire fighters totaling 48. Bunker gear room is a changing room. Inactive gear doesn't need to be stored in that location, its convenience.
    - Other Gear: SCBA—storage area off main bay
    - Tools: Bench, servicing fire extinguishers—must be kept separate from breathing air equipment. Involves a fill station a counter, compressed nitrogen air bottles, inventory of fire extinguishing material. Should be separate from other areas because of powder.
    - Decon: Shower, etc. Concern about shower location shown—put it on the wall behind the exam room (to the south) for shorter distance.
    - Storage:
    - Laundry: co-locate with site laundry—Ben asks if any other function overlooked? Chief: need space for breathing air compressors and storage for cylinders; storage for SCBA.
    - Admin: various: FC, Asst FC, Crew Chief, Capt, Fire Prevention, +6 fire fighters. Some offices can be shared; need some private for meetings, employee conferencing.
    - Living:
        - Bedrooms: 8 total. Shifts? On shift 24 hours—they are call rooms not dorm rooms. Usually 2 people sharing a room with desk. Chief says do it like at S. Pole—small: bed/desk. Chief would have phone and radio. When off shift, the go to dorm. Beds?
        - Kitchen: hub of the fire house and key to morale and camaraderie.
        - Dining: 1 table for 6
        - Day room: it's the living room; a place to relax and near the apparatus; some impromptu meeting—sized for 8 people
        - Workout

- W/D: washer/dryer. Don't need it for normal clothing.
- Bathrooms: Ganged? Shared? M/W? What's ideal? Down the hall shared bath with showers and W/Cs. 2 showers in each of men's and women's. Could be unisex bathrooms.
- Training

Work Station—to fill out forms, work on laptop, connected to day room, not a separate room.

Medical: Joe Levi continues, and shows the racetrack layout. Asks what is process if a person is sick? Normally come in thru the front door, unless an ambulance arrival. Go to initial exam room, and if procedures, move to procedure room. Sick bay presumed to have beds. Admin wants to be in center to see all rooms. Waiting room is needed when exam rooms not available. Waiting room is where entrance is. No staffing—doorbell arrangement. Forms are completed. Charting/records function is centralized w/nursing station. Need 8 office/charting station—resident physician, nurse administrator, flight nurse, air force personnel (docs, flight nurse), pharmacy tech, addl—desk computer phone and storage. Currently office space—USAF is very picky—currently positions very close together. Need a biomed tech to service equipment—closed room. Ben asks for patient perspective and professional perspective. Discussions on virus outbreaks (neuro virus outbreak recently)—treated people in their dorm rooms. <u>Question on sufficiency of baths at end of lodging halls and disease prevention: doc says inadequate when viruses break out, and are a touch point for spreading disease.</u> Radiology is not there, equipment storage; kitchen away from exam rooms; need linen washing and drying, storage. "Hospital" function needs to be quieter and can't fit in current suite size—an adjacent space that is quiet. No announcements no movement of equipment, etc. Separation between USAF and McMurdo staff? Yes, but preference for flight surgeons to work with air crews; USAF does see non-active personnel. They're there to help clinic, but some specialists aren't family practice and have more limited utility, such as psychiatrists and OB/GYN. One specialized sink for plaster casting. One shared bath for exam rooms; sinks everywhere and alcohol hand cleaners everywhere. Question on morgue function: environmental lab, freezer vans, ice core freezers. Special baths for people suffering from viruses—need multiple. Pharmacy has medical kits taking up space and need space to store drugs and build medical kits. Doc continues: linen storage, laundry, bio med tech, supply storage (central supply and day to day supply), field kit, oxy tank stor, haz mat, telemedicine, conference room (share w/fire dept). Should we build in back stock for medical in new facility? Doc: that would be ideal. Concerned that one event could take out all medical. Back stock should have access with a bay door to receive boxes and material. Use a sticker system to account for supply usage—would like electronic accounting of supplies in the future. Dive chamber—needs to move—very loud—can't do anything—it's really loud—compressors are the issue and could be moved to a remote location. Question to mass casualty event—is there easy access by gurney to gym. Need a day door into the gym. Doc: need designated space for back up pharmacy cache for stash of supplies—in a different building. Needs to be secure. Many meds are temperature sensitive. Example: epi pins are freezing are up against the wall—trigger mechanism won't function and administer drug. Doc: halls are too narrow, need to be at hospital standards. Dentistry: need chair, working area, attached dental lab, compressor needs (distant), and dental X Ray. It's emergency dental. Dentist treated 80 people in 6 week period—wisdom teeth extraction, PQ, broken teeth from cafeteria, sheared teeth (bone in sausage), cleanings. Dental exam room is different from the 6 exam rooms. Medical staff are the dentist's assistants, so they all need to be collocated. Question: where is technology going? Doc: consults happen regularly. Physical therapy—position does not exist: but hands on part of care is very effective with returning people to health—trying to do that telemedicine—

how to prevent having to send patients off ice. Equipment is bulky; takes up space. Question on medical gasses? Doc: oxygen wheeled in. Would be nice to have special area for medical flight crew equipment—need designated room so they USAF staff can get out fast.

Rick shows bubble diagram summarizing what was described. Doc says keep all business in one area—swap hospital rooms with exam rooms—less walking for docs.

3.4.2 1:00-3:15 (FC/Baker) VMF / Traverse Ops

Rick—we're here to get your requirements for VMF and Traverse and get AGE requirement (USAF) as well. Shows master plan where facility locations are. Are they best separated or collocated? Challenge on floor system with VMF for heavy equipment. Shaggy: goes over work flow. Starts with Travers—number in fleet, people, time schedule, plus general and discrete activities? 16 tractors hauling heavier loads plus 2 for radars. Traverse modules is what is pulled. From McMurdo to S. Pole delivering up to 144,000 gallons of fuel—300,000 gallons of fuel in three traverses—supplies and fuel to S. Pole. 25 days to get there, 2 weeks on site, and no backhaul on the way home—15 to 20 days to get home—empty. First traverse at Halloween – 1st week of November. Second traverse two to three weeks later. Run on the Ross Ice Shelf for 700 miles, then climb up glacier to 9,000 feet and last 300 miles on plateau. 8 tractors, two with cranes and winches and blades. Articulated tractors—models are older B and new C model—Cat tractors 8D65. Are capable of doing repair in the field. Two radar vehicles—similar to ski grooming equipment—has ground penetrating radar to look for crevasses—runs at 6 mph—are out in front, single track. There are 4 mechs on a traverse and 4 operators and mountaineer (rides in radar vehicle watching the screen) on traverses. 10 on spot 1 and 9 on spot 2. Maintenance happened in BMF day and night shift. Take up lots of S. Pole bay space. Bigger repairs happen inside in a heated space. Operators can go help the fuel people and others help S. Pole digging out berms for science equip, trash, dig out fuel tanks, etc., various projects. S. Pole capitalizes on their presence. Once you leave S. Pole and head back, what's first thing done once arrive at McMurdo? Winterizing equipment. Pull into shop, a tractor may break in field, effect repairs. A bay or two is cleared in the VMF. Spot 1 does the 3rd traverse as well and leaves just after new years and make it back just at the end of February. Spot 1 returns in Dec, a couple of weeks to turn around. 3 mechanics per team, two wrench turners and one foreman lead. Uses VMF plus 183 as well to do their work. Cory continues—incinerator bldg.—get food for all traverses, has dry good foods and frozen foods—a big task to collect and disperse food. Stage 3rd traverse's food. Guard stores fuel, so can't have all the space. What does team do when they arrive at McMurdo—and fueling and equipment prep process. After all training done, inside work includes making tool and parts sleds by fabricating wooden decks on air filled pontoons. Build HMW—high molecular weight—polyethylene sheet—put tow plates on them—preparing the sleds to carry the fuel bladders—inside bldg. 183. Patch fuel bladders. Bladders are stored outside on a berm. 183 is where repairs happen. Winterizing happens in the field. If the bladder has a leak, it gets rolled up and stored outside 183. Mechs fix tractors, operators work equipment. There is also winter activities. 2 people. Each individual 8X40 HMW is taken to fuel pits, hook up to CREL tool and unroll them—have to pin them down so they don't want to roll back up. Fuel up back four bladders then front 4 bladders. Fueling process discussed. Once tractors are started they have to stay plugged in, so they only start 4 at a time. Only 2 tractors at a time being worked on in VMF; park them down at 192 to keep them plugged, and the next two get repaired. At beginning of run, examining crevasses 32 miles from McMurdo, prepping the trail, setting off explosives to fill crevasses, and blading it over. Generator provides power for tools, cooking, and tractors every day and snow melting. Big generator is staged with the sleds. 48 bladders

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taken per traverse, by 6 tractors, remaining 2 tractors taking housing and other modules. Bladder is 7' wide, 30' long—two bladders per HMW. C model Cat. 4 bladders across on each pull behind each tractor.

Shaggy: what do you do outside that should be inside? Cory: HMW rolling it out and pinning it down in a warm area—lets HMW last longer—that will take up bay space and require overhead crane. 2 is realistic. 2 are rolled up together. 2500 lbs per roll—two rolls it's a 5,000 lb pallet. 2 together because that's how they're shipped by mfr. Life cycle is 3 years. Once unrolled the HMW is stacked after season on a berm. Only unrolled once; never re-rolled up.

Shaggy: on HMW, if you do 6 per year—what is amount of time you need indoor space? Cory: 2 to 3 weeks to get them in there, pulling them apart, adding tow plates, unroll, and get flat. Takes minimum of two folks. Suggestion to do it in the alley. Bladders should be unfolded once—not re-folded for winter. Bladder repair has to take place in a well-ventilated area—bladders contained fuels; patches off gas some noxious fumes.

Ben: process of personnel? Food taken is for personal consumption. Food delivery is manual—comes in bulk quantities, delivered in pallets to 174 dry goods, and then they'll pick up with a pickup truck and then break down the pallet by the crew. Containers are borrowed and returned to waste management. Food comes from McMurdo stock, and New Zealand—5 different sources—for dry goods and other products.

Shaggy: it would help us understand the space needed for the velocity and timespan on working on tractors in winter. Usually get bay 1 and 2. Only 1 direction. 24 hours for 2 tractor positions from August to Halloween. After Halloween, what does footprint look like? Working on Spot 2 and 5 other allocation—including science traverse. Then it drops to 1, Spot 1 comes back and needs 2 bays. Are two bays enough? Four bays would be sweet. Could avoid the 24 hour sessions. 14 hour days for one mechanic minimum. Needs a night shift to keep tractors moving. Lead mechanic keeps the shifts moving. Having 4 bays does not necessarily reduce personnel. If only two bays, hiring another mechanic would possibly be cheaper than building 4 bays.

Shaggy: why are VMF and Spot mechanics separate? Is it because it's a different skill set? Equipment? Traverse is the only ones that have this tractor and training. Operationally makes sense to have those mechanics intimately familiar with the equipment they're taking to the field.

Ben: out of the box—VMF if repair—people could be trained to work on multiple vehicles to the minimum standard. Amount of work from August to November has to be met on a compressed schedule. Ben: must have throughput to be ready to go on specific dates. Mechanics are going out on traverse and come back to work on them. There are no shared tool sets—some hand tools are similar as to vehicles. If VMF had 4 more bays, would that work for you—yes but may need more space for set up requirements—fuel bladder, HMW processing, food. Equipment prep: synergies for VMF. Equip repair may happen in VMF, but other functions could happen somewhere else? Yes. Ben: what if the capability for additional winter work for vehicle maintenance? Instead of more bays, adding more time? Maybe. They have new equipment—single concept fleet—yet to be determined for how much work is needed for new equipment. Have had winter mechanics; some years not needed. Anything that makes it less efficient to do work in winter? Only thing to hold up winter work is if can't get parts in winter—there'll be a gap. What if they had an extra set of everything? Possible. All equipment was bought at same time so all are having the same problems simultaneously. Winter parts will be critical. Does VMF have space for parts? Spare parts are spread through 3 buildings, oil products stored as well—tanks. Collocation of parts so there's no down time with a mechanic—Ben—it's very inefficient. If they find an alternate space for layout of food etc, what kind of space needed? Need twice the size of the incinerator building—24 x 75 for HMW. Need a smooth floor. Need bladder repair space—would like to do more than 1 bladder at a time—two minimum; 4 bladders optimal. Bays for HMW can do double duty. Square footage for assembly of food… Shaggy: for spare parts, how much of one of the green buildings would you take up? Half of a floor? One full floor. Bladders, nets, straps, all Cat spares, Generator and module spares, all the loose bits. All of the bottom of bldg. 132. Only some GPS, GPR, food product is do not freeze.

Shaggy asks Cory, Rick or Maggie if anything was missed? Cory says nothing more to add. All machines stored outside way up high during winter. Rick; thanks everyone for time; next current space occupied—office in space in 175, bays, warehouse space, product in tanks, oil product, bldg. 183 is good location—can move HMW in and out of 183—it's a good location. Maggie Knuth: all sounds good. Bldg 132 is 3900 SF—warehousing only; not work space.

VMF discussion: Services 250 pieces of rolling stock; 52 pickups. Bay 6 is the lift bay dedicated for going up and down. 24 passenger vehicles. Heavy vehicles—bulldozers, small up to D-9, 90,000 lb. 40 pax terra-bus, weighs nearly as much as the D-9, takes two bays. Kress trailer barely fits in bay. There are 2 flatbed trailers and 1 tractor. Ben: some are providing facility repair support—would number of vehicles diminish somewhat? A great point and working toward to right size the fleet. Some pick ups being replaced by side by side ATVs and electrics. Some pickups go out for airfield support. Vans are part of shuttle fleet. Supply only has one pick up to deliver items from warehouse; rest is delivered by aging forklifts. Every work center has a forklift. Looking to bring that number down. Hybrid ATVs can be plugged in to a 110V outlet or similar; operationally should be more near the trades building.

Ben: what challenges are you facing now with VMF and work arounds? Back of house warehousing. Bays 1 and 2 are taken up most of season (Traverse Ops), leaving Bay 3, 4, 6 and 7. Major constraint is through put in the shop. If summer is decent, mechanics will work outside as much as they can. If science was spread more thru the season, less strain. Parts availability is next major constraint, and if they have it, it's in one of several locations. VMF runs on 24-hour cycle. They track vehicle maintenance hours and equivalent dollars—bays are more than 90% utilized. Discussion on light repair and airfield ops.

Post break: Shaggy go thru plan and talk about what challenges they have. Parts storage is chock full, floor to ceiling and manned by 3 during the day and 2 at night. Low bay, low ceiling, light duty. It's for bench stock.

- The mechanical room has big atmospheric tanks and are still currently used. Might gain top of mech area with change out to micro-turbine.

- Engine and transmission shop—no longer do that function. Space has small gantry and is now a bay for light vehicles, pisten bullys, and lots of clean work. It is effectively a light vehicle bay. It also is used as a locker area for changing—to be retained. Hose rebuild function also for CATs. Needs 12 feet of wall for hose bench. Stock and fittings are in another warehouse.

- Machine shop: do a lot of science support there—machinist helps scientists with their widgets. So if you had a modern C&C machines, would take up less space than the current lathes in there. 70-30 vehicles to science support.

- Haz Storage is pretty full—needs to be right sized—it's in engine transmission area

- Break area—functions for safety meetings, crew break; does not fit everyone—fits 15 to 21 staff. Doubles for lunch.

- Administrative Space: only for VMF, not fleet ops. One office for Traverse Ops. Library was moved out of office space and tech data is now in middle of bay area. Tech library space now has computer kiosk for Travers Ops and other mechanics. Next office from right is manager; then shared by 2, next moving left is 2 traverse ops positions. Then an admin spot. Do people need privacy? Yes for foreman and supervisor. Travers Ops could ask one to leave. Ben: in final build out, may not have all private offices, but access to one.

- Tool room: moved field tools into this spot; looking to move all tools thru that one position. Separate because it's a valuable asset. Want to move the hose building function into this space. Position is tool room attendant, who will also build and test hoses. Parts washing is out in bay.

- Flams 124—tech library; no flammables—now an open walk thru area; no doors; lined with books; has wi-fi and work on tablets. Flammables are in Haz storage and in two lockers at either end of the bays. Oxygen outside welding.

- Oil/lube dispensary: 3 dispensaries for oil, grease and

- Welding—two on station—one at VMF and one w/Facilities. Lots of work—can't go down to one welder. Lots of cracking—breaking axles; vibration on hard packed snow/ice and vehicles get fatigued and crack. Cut edges on blades and buckets—welding plates onto buckets, etc. Welding standards have gone up from a 4G to a 6G welder. There is also some grantee support with portable machines.

- Battery charging—for all batteries on station; fully explosion proof.

- Stairs up to mezzanine—very steep angle; and mezzanine was not rated for hose repair. Many safety issues.

Are bays all the same function? Yes—do whatever they're available. No vehicle exhaust system—use a portable to get fumes out. Lift bay in bay 6; oil used to go into bucket, or use machine that sucks oil out and dispose of it in central area. Vehicle washing happens in the bays. Do not do pull test on cables. Bays 4 to 9 and 3 to 8 are only drive thru long bays. Between tire changing bay and bay 4, there's a 250 gal tote for waste oil. No re-processing on site. It would be good to have a dedicated spot.

How much is emergency repair versus programmed maintenance? 40% PM, remainder is ad-hoc. Of the ad-hoc, is it largely welding, windshield repair, truck beds? Depends on seasons: dead batteries, flat tires; in winter, lots of PM repair. Are there repairs that can't be performed? Buildings with generators can't fit in the building and have to be worked on outside in cold and dark. If there were larger doors, that would be better. Cress trailer just barely fit; tractor would have to be outside. Can't have hydraulics exposed to cold.

Clothes changing. Do you need a shower area and industrial laundry? Yes.

Parts storage 115—take care of fire house, fuel, AGE, water, waste water, S. Pole traverse—volume of work coming thru. Do these stay in VMF per master plan? Cannot say.

15 people on day shift and 10 at night. Current M/F ratio—3 females. Only working restrooms on that side of town.

Nothing heavier than D-9. A new D-8 has more power; lower floor loading.

Shaggy: shift gears on requirements for end state: Modern vehicle exhaust system; bridge cranes to remain—have two and haven't seen capacity issues. Dispensing of fluids. Want to retain car washing function. Vehicle washing in central area—sediment going into OWS—dirt goes to trap and is cleaned out. Drainage is a big issue—just a few located to spots; as sediment happens, ponding happens; could use trench drains along the way…otherwise you work in a lake and having to squeegee snow melt to drain. Lighting in shop could be better. Forced air handers (4) provide heating. Consider radiant ceiling heat. Pull thru bays—working toward a wireless work station platform to do diagnostics. Doors could be wider and higher. Blades on tractors are huge. Generators are double wide: 16-18 feet wide. Doors are currently 16' wide. Hopefully get new generators for airfield and hopefully will use renewables and distributed generation.

Shaggy: info provided is absolutely crucial. Didn't get to phasing and flow diagrams yet. Really needed to hear requirements. Will allow us to look at parts and pieces. Did not touch on other requirements like AGE, MEC, Air National Guard. Next step: Oz says we can look at different options for synthesizing 4 facilities, look for opportunities for collocation; too soon to come to conclusion. Oz will put into options to evaluate benefits. Shaggy—will they see that prior to charrette report? Shaggy will need to figure what are the next steps. Maggie: fleet ops was not included, plug in lines that need to be somewhere.

Challenges outside building—bays 1-5 staged out front; across the street are vehicles down for parts; area is very full. Vehicle staging site plan needed. How much real estate needed? No plug ins or bull rail—often running an extension cord out to vehicle with waning not to drive tracks over it.

Asks Merrick if they have enough info for utility info—need to know civil data.

Question about fleet ops—which was originally designed to be on the second floor. 40 people. Need computer area; drop assignments, safety meetings. After that, field work. 2 full time dedicated office personnel: supervisor and foreman/dispatcher. Fleet ops should be integrated into VMF. Mezzanine could be assigned over bays.

Fri July 31
Overflow and Internal Management Meetings

Discussion on Phasing by Shaggy. Need IT Ops first to consolidate first. MEC—mechanical equipment center needs to consolidate and move—some of that truck fleet will need to go away. Move to side-by-sides and smaller vehicles is likely; mechanics that work on snow machines will work on side by side. VMF should be shrinking their fleet in terms of pickup trucks and front end loaders, but also know that fleet that builds snow roads, runways, etc., will stay about the same. VMF will stay about the same. Traverse: added 5 new platforms for science support. There will be a report on remote sensing that will set the requirement for traverse—links will be sent to all. Jeff Huffman who spoke mostly yesterday—looking for streamlining and efficiency. Regardless, where the footprint goes, still need spaces—yesterday learned about the HMW and sled assembly and timing deal. Not as complex as first thought. May not need as much space as thought. Two full bays would suffice for Traverse Ops function. Meeting area for 15-16, heavily used initially, then empty. Food—don't want to do food same way they do now—they want quick, open, eat, sleep. Even if they pull food from galley, they'll want to drag it back to finish staging. Priority is having sleep gear and food—it's ok to give up a touch on food because of its importance. Critical food, critical supplies require more than one touch. Food for SPOT 1 will be split at SPOT 2. Parts storage missing from diagram: 4,000 SF. Bladder repair could happen in HMW build area. Discussion on storing bladders—could it be in a vehicle bay—trench drain is a potential snag point. Where are new bladders stored? Outside in cargo until issued.

Phasing: first step is build out all SSC, MEC and FSTOP first—no adjacencies in particular. It's the mountaineers—5 and a supervisor—busy but gone a lot. Need office, classroom and storage.
Rick: looking for synergies between VMF and Traverse, meeting space, crane, parts storage, bays. Commonality between Traverse and VMF—looked at 4 different options. Look at 4 broadly. VMF holds the most risk—the way it's phased, etc. May just be a business case analysis. Fleet ops—room for supervisors and 30 –integrate into one or the other building. Plus need for outdoor staging of vehicles (to include fleet ops vehicles). Schemes:

Scheme A: Based on Master plan—VMF/fleet ops with addition of MEC, plus mezzanine for storage of snow machine. This says we need to do something to the floor. Then separate traverse ops building with functions. FSTP would require meeting Field Safety Training Program (FSTP—pronounced F-stop)—need lockers, classroom, gear storage. Science support functions, plus supports town—see discussion on mountaineers above. Also calibrates GPR—reads it for 700 miles at 6mph—also pulls people out of crevasses. Other mountaineers provide Happy Camper training for folks who want to go out of town—2 day survival class. 40 people per class, run continuously—inside class and outside basic survival training. Happens from WINFLY to Halloween. There's also 4 hour re-fresh class, and one after another. Does not have full synergy between everything. Traverse Ops has difficulty adding bay. VMF doesn't have flows they would like, but no real big complaints—needed improved infrastructure. ANG AGE is in VMF too.

Scheme B: Collocate VMF and Traverse Ops. An obvious advantage—same crane, break room, baths, etc. Big yard available—a new building. Existing VMF becomes for MEC and ANG—lighter vehicles. ANG—Air National Guard and AGE (air ground equip)—it's all of their storage and a minor workshop with bench space. AGE are big generators and heaters—helps engines get going—can never be stored outside. Takes up 1st floor of 156; staff of 3 to 4 people. Could be anywhere in town, but synergy between MEC and ANG. If only those two in VMF, VMF is too big. ANG stores propellers, skis and big replacement parts for C-130 (bldg. 156). AGE goes out to airfield in flying season—seasonal storage need. There is a shop building at airfield for repair work. Bench space, not shop space—unpackage and put two components together, for example. Minor assembly versus repair. Generators are Ground Power Units (GPUs). AGE would get started/ops checked at VMF and any minor repair takes place next door at MEC.

Scheme C: Similar to B, but different location of Traverse Ops because of grading. Could be solved by design configuration.

Scheme D: Puts everything with VMF. Everything collocated. Requires new floor for VMF. A big kink for phasing. May not be a business case for scabbing everything on a sub-par building per Ben.

Shaggy: scheme B works best. Joe: you could add a mezzanine at VMF and pick up floor space. You could knock walls out and make offices more collaborative. In B new building is VMF, Fleet Ops in orange space with bays and adjacent to bays in Traverse Ops—shared admin office. Across the way ANG, AGE, FSTP, MEC. Could leave two bays for construction equip, conceivably. Ben: loves re-habing buildings, but if it's too big or too costly, maybe look at other steel structures that could be recycled to the VMF location. Shaggy: one step further, likes the re-hab, maybe MEC goes to trades area. MEC would need no warehouse space in the VMF—no addition needed—fits within footprint; no admin addition. Maybe re-skin and mezzanine; but maybe not either. Merrick (Aaron): from a site servicing perspective, scheme B works best. Easy to get utilities to, and makes all end users happy. Will have to run the new facilities thru the wind modeling. If building is rotated 90, you could step the bays to work better with contours—but Ben wants to avoid—but you weight that against cutting and filling and retaining walls. Scheme B meets al of Maggie's concerns.

Medical Clinic: Rick covers reconfiguration of medical and dental area.

Fire Station: Joe shows reconfigured fire diagram.

Discussion on next week: energy strategies, Amory Lovins, LEED.

Palmer charrettes in October 19-22.

Section Four: Charrette Week 4
Denver/ASC, Aug 4-7

Objective: To integrate the *NSF Science community and Outside Agencies* input with that of the ASC Leadership, in the advancement of design for both MCM and Palmer stations, with a focus on concept design for Facilities (Cont.) and Infrastructure Support (utilities, energy, roadways, IT/C)

Executive Summary

Week 4 solidified the general scope of facilities assigned to Michael Baker, began an exploration of developing an appropriate architectural vocabulary for McMurdo Station, and covered the day-to-day operational flow of activities among different work centers, providing a more integrated look of how McMurdo Station works.

Attendees were exposed to Mr. Amory Lovins and his colleagues at the Rocky Mountain Institute and their thoughts on achieving "Net Zero" for sustainability, as well as incorporating various fenestration, lighting and other building systems into the designs.

Week 4	**Highlights:**	**References**
IT&C Guide	• **IT&C Outside Plant System – broad goals enumerated**	***4.3.2***
Facility Requirements		
• **General**	• **Architectural standards broadly discussed**	***4.1.1***
• **IT Operations**	• **Solid Waste Strategies**	***4.2.1***
	• **Direction on Utilities**	***4.3.1***
	• **General Energy Conservation Ideas (building components—ie, windows)**	***4.3.4 and 4.4.0***
	• **Lighting Ideas**	***4.4.1***
• **Lodging**	• **General Discussions on Architectural Standards**	***4.1.1***
	• **Solid Waste Strategies (no chutes for Lodging)**	***4.2.1***
	• **Direction on Utilities**	***4.3.1***
	• **General Energy Conservation Ideas (building components—ie, windows)**	***4.3.4 and 4.4.0***
	• **Lighting Ideas**	***4.4.1***
• **VMF (Baker)**	• **Will need to validate if Baker will maintain scope of new VMF or if transferred to Ferraro Choy**	***4.1.0***
	• **Revalidation that old VMF will contain ANG/AGE,**	***4.1.0***

MEC, FSTP

- **New preferred option** ***4.2.1***
- **VMF is a heavy collector of waste oil, which could be a source of energy; need to confirm if old VMF will also collect waste oil with its new functions** ***4.2.1***
- **VMF is a big producer of cardboard waste** ***4.2.4***
- **House emergency air bundles in with MEC at VMF** ***4.3.0***

Mon Aug 3 (4.1)

4.1.0 8:30-9:00 (OZ) Review previous day's work

- Broad and consistent understanding, review and comment from ASC attendees
- Confirmation of Master Plan 2.0 guiding principles, and facilities configuration
- Understanding of Departmental internal process flow and ideal adjacencies of sub-functions
- True appreciation from Departments that they: were given the opportunity to participate and saw real evidence how their input may be considered.
- Central Services entry, wayfinding and circulation pathways were discussed and options developed
- Warehousing behind kitchen discussed—functional requirement diagrams, and right sizing.
- Fire station layout exploring all functions and locations need to be.
- Medical suite synergies with fire department; internal organization of medical with adjacencies.
- Traverse Ops/VMF/Fleet Ops/ANG/AGE/MEC looking for synergies and phasing—four or five options explored; one option recommended. Option B—existing VMF accommodates ANG/AGE, MEC, FSTP

4.1.1 9:00-12:00 (OZ) Architectural Standards

Rick: a synthesis of architectural requirements, engineering and client desires. A process of exploration. Start w/master plan guiding principles.

- Reflect USAP Mission—evolving, cutting edge, dynamic—Shaggy: presidential mandate—reflects a geopolitical statement to reflect the investment put into science and stature of US's involvement. What makes it distinctly American? Scale and symbology will be reflective of the USA—placement of the NSF logo, flag, reinforced inside and outside
- Promotes Environmental Stewardship
- Promote Wellness—should look like a place where you feel good and do good work
- Project an Image of Stature, Permanence, and Durability
- Is of its place

What makes it distinctly American? Is it simply the size of the infrastructure? Ben: stellar architecture becoming indistinguishable from an international perspective, but scale is an apparent issue. Rick also mentions functionality and practicality, pragmatism. Symbology: Ben—application of material, planting a flag, placement of logo—may not be the thing that identify us, but there are things that might make more sense. Continues:

- Focus on what we want to project to the people that live and work there
- Focus on constructability and logistics (modular – have ability to construct in any season; drives how constructed and the form, weather – climate drives the form; condition is reset every year;
- This is a US Federal Building – our design image sends the message that its permanent
- Skin (modularized – easy to ship, offloaded and assembled)
- Can draw attention to certain locations – portions that are hand-built rather than modularized (but still permanent)
- Corner spaces (as seen from water) can also be special select-design areas
- Understand the logistical challenges due to climate
- Rick – wind analysis may tell us certain things like how the roofline needs to be designed (referencing European design elements vs American design)
- Capture expression while using modularity

Reference images: Neumayer Station, then Belgian site (claimed to be net zero and requires no energy to heat in winter), India—made up of modules; S. Korea; Brazil, UK; images of things in Dubai, swoopy images of facilities in Saudi Peninsula.

Dan: ideas that inspire architecture: natural shapes, panelization, repetition, site sensitivity, wind, wrapper. Panels– may have material that needs to be protected, stored in a milvan (7’ 2”) – based on shipping and constructability with special design at entrance

Discussion on skirting building.

Other points:
- Maintain functionality (snow drainage/damage)
- Balance act – snow-maintenance (want to minimize maintenance) ie; exhaust pipe on one building doesn’t work an another
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- Joe – flat panel modular units can be stored and easily replaced. Specialized materials will have to be repaired – no replacement)
- Bill K – North Slope architectural design examples should be looked at
- View from water shows the modularity of the skin. Glazing – self-cleaning? Should look at modern technologies for maintenance concerns
- Central Services – flanked by 2 sides (anchors – exterior and interior) with flat roof. Not married to flat roof design – depends on results of wind model
- Building needs to accommodate change,
- Windows current location in design are a response to internal function
- James – “an assembly” – “connecting a village”
- Ben – need to make buildings compatible
- Rectilinear approach has established order and proportion

- Making things intuitive – establishing a grid makes it intuitive
- Joe Levi- Scientific Approach vs Military approach of getting things done
- Steve – maintainability – with snow control/drifts/berms
- If you let snow stay then you engineer for it and keep it cold so it doesn't thaw and re-freeze/ Scour properly or design against it
- Buildings are currently damages with snow removal equipment
- Panels would be in containers – panel size will drive the structural bay
- There are milvans that are one foot taller than regular milvan – but we are referencing the standard milvan and flat-racks. ISO standard container
- James – multi=phased effort – this has to work for any given phase. Have to do multiple modeling? Dave – talk about temporary snow models that you have to deal with until the next phase. Dave – snow modeling phase by phase? There will be problems during construction.
- Ben – look at finished product
- Snow model will inform and drive the design. Alternatives to imagery? No. Currently establishing functional requirements.
- Skirted or open at the bottom? Skirted buildings have damage from snow equipment.
- Have to critically look at skirting vs not skirting. Look at snow modeling

Tues Aug 4 (4.2)

4.2.1 9:00-10:15 (Merrick) Waste Operations, Haz. Waste, Fuels

Waste handling and recycling building shown on master plan centrally; could be associated with a waste energy plant. Up the hill is a haz mat storage building. Question on where the scale is. Rick—where does it need to be—should be on the way to the pier. Discussion of handling haz waste in a big yard. Drums and storage waste bins; fenced in. Ben: what is the process—where is receiving, where it's coming from, etc? Collect waste at satellite haz waste stations in work centers, take to the haz waste yard, and process in a building and place in bins, drums or other containers in the yard. What happens when waste is taken into the facility? Take items, place in processing area, collected over a certain amount of time; determine what drum or tote it belongs in. When it's full, it's labeled and taken outside to be loaded into sea containers.

VMF (greatest source of waste oil)– if have micro-turbines – will not burn as much, goal is to minimize burning in VMF. Collect lots of waste oil, glycol and fuels from VMF and other work centers with vehicles. Taken from work center, but simplified because it's pre-packaged. VMF, fuels, power plant are producers of these wastes. Ben: science cargo—when it comes out of the airplane, and the crate or drum is placed at doorstep of building. Human waste is solid waste and goes to a different processing center—the solid waste center. S. Pole station just drops their waste at their door step—don't know when it will arrive—and it comes via science cargo. For processing, it has to go inside the building. Need a yard for 30-50 containers plus 3 tanks of 15,000 gal capacity. Could be iso tanks. Tanks collect waste fuel—collected for "clean burn" waste oil units. (Waste energy is cardboard and wood.) Can clean burn unit go closer to the source—VMF—yes but need to coordinate and know its not cross contaminated. But what about waste fuel generated elsewhere? From field camps, that fuel will be shipped out because there's too many questions about it, and too small a quantity to recycle. Greatest source of oil for reuse is at VMF, and tank should be located there. Tank could be larger than 15,000 gal. Rick: how much indoor space is needed to process materials?

Crary lab smaller items, run the range of products: oxidizers, flammables, or other classes of materials; need segregated storage. Need an area to process drums: need to weigh it, label it, marked and sent out the door to the sea container. Need for lab to test materials. Need a separate radioactive processing area—separated from other processing area—rad room can't contaminate other waste. Not just segregating, needs ventilation, containment, eye wash station, etc. Storage for spill response at the facility and pads—for their own operations, to responding to other activity spill response. 3 containers full of spill absorbent pads, pigs, etc.

Haz Yard—need water—now have a water tank coming in for hand washing. Need a bath, decon—safety shower and eyewash, with drain. Water should be collected, because the contaminant is unknown. An emergency holding tank. Changing room required and lockers—place to keep ECW and put on PPE for spill response—don't want to put it on in the hot zone or in the office. And a place to get out of contaminated clothes and into clean clothes. Spill response pumps cannot freeze. 4 techs and 1 supervisor. Office needs labeling printers, printers, storage for paperwork. 7 year record keeping—but only need files for 1 year storage—2 at least. Tent—Sprung structure—that is where they have consolidation—oil filters, batteries, fluorescent light tubes, etc. A space, not necessarily heated. Clear aisle—wide enough to drive a forklift. They have a response vehicle—can be outside. This function has the biggest liability for the station. Some buildings have sensor systems to detect CO or other contaminants. Some are code driven based on quantity of materials. Anticipates that size would be much larger than currently. This is the most important and dangerous space.

Needs for Fuel Department: building needs to be 100 feet long. Shared space versus segregated. Restrictions on how much they can intermingle with Haz Waste—different training. 100 ft has to do with hoses and need to test them under pressure. Hoses used at airfield are stored there in winter. Needs a lab with a significant hood, storage for sample bottles; counter space, 3 machines for fuel quality surveillance, dishwasher, place to stage samples. Fuel sampling/testing is an Air Force requirement. Fuel transfers have to be tested. 4-5 tests daily. Dormant storage testing—30 gallons stored in the labs in daily containers-gallon containers or liter containers... Outlets are explosion proof; ideally lights would be as well. Fuel barn smells—fuels equipment segregated to fuel barn. Need offices for staff—20 to 24 people—everyone has a locker; leave clothes at fuels barn—no fuel saturated clothing at dorm space. Office—foreman, supervisor, radio person, meeting space for 20 at a given time; 3 offices with closeable doors for private conversations. Lockers space could be shared with staff, as well as office space. Outside storage requirements: for large number of filters; two existing areas are sufficient and could be consolidated. Building big enough to drive a loader in it.

Solid Waste: Needs a cooker for contaminated soil—currently 30'x30' space. Needs a big pad with berm for melting snow. By weight, 20% wood, 20% food, 20% trash; wastewater sludge is 10%. Remainder is small separate items. Urine and gray water comes in drums from the field, frozen. Tires, medical wasted. 6% of waste stream is cardboard. As mixed recyclables come together, combined they come up to 10% of weight. Frozen wastes require energy to heat up and melt to process. They don't have to deal with cardboard at the facility now; too large for bailer they have. Machine was sized wrong when purchased. Need right size bailer. And have it located by a loading dock to load a flat bed and haul away. Long term—need a small bailer or two (100 tons of cardboard annually—4 semi trucks' full) where you generate cardboard waste and sent directly to waste energy burner—needs to be fed and mixed with wood. May need to find a different burner. Question on why even need a bailer—if cardboard needs to be shredded to burn? Maybe put a compactor at field services versus a bailer. One office requirement for supervisor. Wouldn't have equipment operators picking up materials—would be part of duty operations for fleet ops. Solid waste staff is reduced significantly; fleet ops would handle it and deliver it. Mingled recyclables come from lodging; fleet ops picks it up—maybe load an open top from the dorm directly via a chute. An open top is a sea container. Skips the building altogether. You can line the chute, so you don't have a dirty chute. Or multiple chutes for mixed recyclables, trash and food. May be able to be done without chutes in dorms—one container outside dorm area with built in compactors—people go out to one out building in the dorm area with the compactor—one collection point for the dorms. Needs for labor force: wastewater sludge, tires, mattresses, medical waste, urine, feces and gray water need to be separated and treated. All scrap metal needs to be separated. Ferrous and non-ferrous sort is best to occur on ice—a simple magnet and crusher. That is an outdoor activity—not in the facility—goes to Fortress Rock. Does have an office function for administrative paperwork—which could go anywhere. Would have 3 people total.

Traverse Ops: reviews discussions from last week on combining functions for VMF and Traverse Ops. Traverse Ops has:

1. Vehicle maintenance – 2 full bays
2. HMW unroll and prep – 2 bays
3. Bladder Repair – can happen on top of HMW (4)
4. Tool Assembly for triangle – Crell
5. Food Sorting and segregating

Meetings can happen in the vehicle bays as a stand up. But someone says that's not desirable for VMF.

VMF: Talks about new functions in VMF building—MEC, snow machine equipment; heavy floor need goes away; mezzanine storage could work—but not likely. Rick goes thru options A-D. Some discussion on Option D where everything is consolidated on existing VMF. Question on why Rick added blue Traverse function on steepest part of site, why not on other side. Shaggy begins discussion on phasing: FSTP …goes back to Option B to accommodate MEC early. This is Shaggy's favorite plan that he wished had been in the master plan. In this scheme, Traverse Ops doesn't drop in the middle of the fleet ops yard. VMF would have ANG/AGE items to include:

- ANG: Storage for large items – props, skis with adjacent bench
- AGE: Storage for heaters and generators with work stations and office

Ben: are there other functions that could fit onto the VMF building—not necessarily MEC, but related and compatible—that could be swing space. It could be for construction equipment, but afterward? Haz Waste and fuels is the wrong fit. Why couldn't construction equipment go in the VMF? There would be 4 bays for construction in the existing VMF. Ben has difficulty with Option B, because of huge volume in VMF building doing small repairs. Shaggy: thought would be to build a mezzanine in bay area for storage. Downside, you have to duplicate gantry crane. Ben: let's discuss Phase 0 and the move for

MEC. MEC is now in VMF, so what is the first move? Maggie: can't solve the problem in the next 5 minutes—there's an interim and long term solution. It's a crystal ball problem for the science planners.

1:00-5:00 Break Out Sessions

4.2.4 (OZ) Track 2: Field Science Support

Discussion on waste generated—amounts of cardboard. Covers the processing of those cargo items. Ben says diagram does not show one point of responsibility for movement of goods via aisleways—if there's an interruption, problem of communicating between warehouse spaces. Question on needing 2 doors—or maybe one larger door. Needs to be investigated to minimize the conflict. Rick: back to cardboard—conversation evolves to show that boxes get reused for shipping. Boxes returned with gear inside. Boxes are organized. But Ben says we're looking at a new model—to put equipment in the rack, and the box can be given to the grantee; but when it comes back, equipment won't go back into racks. Ben: getting back to cardboard—heard a tremendous amount of volume but haven't heard how it gets to compacter. VMF is a huge producer of cardboard—and should be located there as well. Is there a way there could be at the end of the concourse—that could be on wheels or onto the forklift and move the trash to compacter? Suggestion for 2nd compactor for redundancy.

Inbound cargo flow and outbound waste? Thinks questions were answered. On any day, 2 to 3 truckloads to helo pad. Ben questions need to store SAR vehicles indoors—accelerates response time w/o having to deal with cold star. SAR enough room for gear and vehicle. Currently located w/FSTP, could it work at fire house? Ben: doesn't want to work to jump thru hoops to modify central services. The gear needs to be collocated with vehicles—but it's not dedicated to that mission—could be available to Helo. Separation creates inefficiency. Ben—is there a way to have SAR have its own equipment? It's been problematic. Dedicated resources: C-130 crash, helo crash—tailored to incidence—Ben: states it's just equipment. There is specialized gear that does not get issued to scientists. Could have a warehouse for the "medium case" contingency. At one point had a huge storage area—not practical. Ben: still sees SAR space as enormous. Why is this building getting loaded with a garage function. Maybe it goes in a concourse. People in the offices: 5 camp managers—horizontal space to put laptops. 1 closed office for HR or discussions with grantees. It would not be ideal to have a work station and do counseling at an office on a space available basis. Not so much with regards to conference calls, but does end up closing the door a lot. Office for McMurdo Implementation Manager required. Bija has 13 people and starts day with daily brief—has a sofa. Could use a training room; don't have to have a space. Ben: should there be conference capability for morning meetings? She has meetings once a day plus a meeting with the science group. May be a group of 10 to 12. For Field Support and Training (FST)—needs 12/13; ATO needs 25. Does not need dedicated classroom. A mezzanine level with conferencing might help: Rick says let OZ solve that problem—may not need a mezzanine level. Supply has a weekly meeting, plus training requirement. Bill: some kind of common space in this area is important. Break room for people to warm up and have a cup of coffee.

Makeshift emergency helipad for SAR—reserve some space in front of medical. Now lots of transfers happen. If space available, have an H painted on the ground so that it could be used a couple times a year.

Wed Aug 5 (4.3)

4.3.0 8:30-9:00 (OZ) Review previous day's work

Shaggy introduces who's in the room—NSF, ASC, RMI. RMI is a think and do tank and make sure they had industry expert eyes on the program and avoid tunnel vision. But sometimes at the beginning of a project, it's good to look outside the box, and get a broader view from a different set of eyes. RMI will have thoughts and will be listening.

Robert Hutchison—coordinating the RMI folks get up to speed. Origins as a systems design house, creating policy and doing projects. RMI is engaged on climate change and working at levels where there's levers to pull, changing the American electricity grid. Excited to be part of the project in a small way—they bring in curiosity along with thinking tools for design and re-design—have worked with RSA, Merrick and OZ. Amory Lovins here, John Rosenblum quasi RMI person, and one other.

Rick Peterson gives a summary of yesterday's conversation of understanding operational requirements. Reviews field science support adjacency diagram. Highlights the concourse and its multifunction character.

Ben—surprised at amount of office space—may need to investigate more shared spaces.

Emergency Airdrop bundles need a home and could be anywhere. Could be in VMF with MEC. These have fuel barrels as part of the bundle.

SAR gear is shown at back end of garage for control. Ben concerned about personnel access to gear. SAR personnel is the Field Safety Training group.

Concerned about a home for 50 barrels at a time—drying barrels before they refill them. Storage from off ice needs to be re-validated. Not doing washing. ASC is still doing something with barrels.

4.3.1 9:00-10:00 (Merrick) Utilities

Aaron Seals provides overview of external items, and others to speak on specific systems. Assumptions: wastewater, power generation and water treatment to remain; facilities in good shape. Utility heart of the station remains in place. Utilities are now a hub and spoke layout with many dead ends. Intent is to eliminate dead ends, make system more robust. End state is looped system with inter-connection in order to facilitate back-feeding utilities and maintain station capability.

Aaron provides overview of dumb utilities: water, fuel, power, heat recovery. Biggest addition to combined domestic and fire water is two water storage tanks of 1,000,000 at top of hill to take advantage of gravity head to provide pressure in to the system and meet worst case fire requirements. Provides a domestic water buffer.

Fuel lines are existing to remain. Runs from tank farm up the hill and down to the ice pier to distribute fuel. Existing fuel line is not part of current scope. There may be some modification depending on helipad location. A second fuel line come in to the IT Ops building and from there to the FSS, CS and Contain Ops complex. A loop if the facilities remain on fuel oil back up with day tanks. Mark: definition of day tank is 500,000 gallon building supply tanks outside buildings—not the 2,500 gal day tanks typically thought of.

Ben: concerned about providing additional pump, redundancy, cost and maintenance. Surprised because he believed gravity would do the job. Surprised about pumping up and pumping down. Fire pumps. Aaron told to look for reduce the need for pumps.

Ben: how is temperature of water is being maintained to avoid freezing? Aaron: currently lots of exterior infrastructure using lots of heat tape—big energy consumer. In new strategy, utilities run through building. Once water is in tanks up at top of hill, there is latent heat of input water flowing into tank, circulation at a fairly constant rate. Dick Armstrong suggested is to have a little hot box outhouse providing some heat to the tanks. Tanks are also heavily insulated to avoid heat loss.

Ben: please explain throughput of tanks. One tank is being continuously drained for domestic use, the other for fire. Is there too much holding time causing water quality problems? There are problems with heat and bacteria building up in lower 48. The other wrinkle about consumption—peaks at 850, and rest of year is 150 people—usage rates are variable. There was a challenge with dedicated fire water means duplicating infrastructure and cost.

Plans to keep loop warm. Single pipe up to tank? Yes dedicated fill line. Concern about single point failure and redundancy? Hopefully, with tanks full, you could take system off line—but would need to think about contingency if there's a situation where tank would be drained with line out of service—could be very problematic. But need to contingency risk management. Discussion on fire line sized pipe for the entire loop; second line for supplying tanks. If tanks are elevated enough to provide 40psi to town station, then you have gravity feed to all facilities, and then you need pumps to keep pressure up when there's an event. Pressure tank for domestic water seems unnecessary, and only need jockey pump for fire event. Thought there was enough elevation of tanks to provide the residual pressure for fire event. Diurnal water demand—water treatment plants already accepting spikes in water use, and you have a lowering population.

Can you use modern mist systems? (Avery—RMI) Combine with more non-flammable construction. Able to take some diversity in system—just because you need 2,000 gpm in various facilities, does not mean you need a 12,000 gpm pump. Dave W: let's try to avoid solving the problem today (too far down in the weeds). Chemicals need contact time. Are tanks insulated enough to avoid heat transfer to permafrost? Yes.

Aaron: fuel distribution. The concept is utilidor has multiple utilities. A couple functions want a more robust fuel system. When fuel is moved to tanks, eliminating the need to constantly patrol system for leaks. There may be modern technology to reduce monitoring. Ben asks to trace fuel from cargo ship: main pipeline from ice pier uphill behind storage to fuel tank farm. Tanks are filled and that is the end of the one-way transit up the hill once the year. Presumes the line is empty the rest of the year. Two lines are coming down. One line goes to helo pad and power plant. Ben: why aren't we getting double duty out the one pipeline from pier? Because there's an existing network. Point is a good one—could have a loop or cross connection. There's an opportunity there to examine. Some fuel lines are charged all the time—all facilities will be valve open all the time. Believes there's enough isolation valves to avoid spills. Question of what purpose is served by a "day tank." Pipe is subject to lots of expansion and contraction—lots of SPCC requirements. Secondary containment required. Double containment piping is a paradigm shift. If complete the town loop system, that could be secondarily contained within the utility tunnel.

Sanitary Sewer: all flows downhill; don't pump it. Once building elevations are set, can design the system. May need some lift station capabilities.

Sea Water system: challenge is with mechanical room addition to Crary—could affect sea water feed to water treatment plant. Some modification of current system. Intake: 4 pumps that serve town; 2 serve Crary. Now if one pump to Crary goes down, takes down the town system as well. Because there are 4 submersible pumps at the intake, and you have to remove all the pumps to gain access to the one needing maintenance/repair. Crary will remain being individually fed. Ben: there are technologies that allow maintaining sea water temperature—some involve greater volume and throughput. Should be looking at chillers to allow temperature to be maintained. Ben: we should consider the problems and look critically for alternate solutions.

Utilidor strategy: buried or semi-buried self-contained systems used to transmit utilities. Strategy is where vehicle areas utilize underground utilidors. Above ground utilidor—some will remain above ground.

4.3.2 10:00-12:00 (Merrick) Utilities/Facilities/Operations

Presentation of micro-turbine systems. CHP plant and heat recovery. Goes thru scenarios with various valve stings. Stand-alone mode, lop injection mode and loop backup mode, for example. Different building scenarios.

Discussion on temperature—currently out at 180 deg, back at 150; would like to lower the temperature. Would also require extending surface area of heat transfer element—for floor.

Heat recovery prioritization. First priority is space heating. Next priority is freeze protection and tank protection. Third priority is domestic water heating—via electric or domestic—via heat recovery loop. Could be instantaneous heating. Fourth priority is de-salinization pre-heat using treated effluent system. Last priority is thermal storage—which could be a couple million BTUs of storage—could eliminate some or all heat trace?

CHP Plant and Heat Recovery – microturbine units – recover heat from exhaust

- Backup boiler
- More fuel generated heat than fuel generated power
- Boilers can be electric or gas-fired – some other form of heat – cardboard/wood
- If one heating pump fails then a back up one kicks in
- This is stand alone

- Turbines – ability to change recuperation? Modulating them. Speed does change.
- Running micro turbines and boilers? Conceivably.
- Armory – virtual trail shafting – turbines have fairly flat efficiency curve (amount of fuel it takes)
- Distributed plant concept
- Augment or replace what is generated at power plant? Intent is for each plant to ability the size that it is in
- Could lose the power plant and system would continue to run
- Options are not confined to system being described
- Wind and solar could be charging a battery bank
- Island mode - Loop injection valve controls access to site loop
- Stand alone mode
- Loop backup mode – assume plant isn't working – all equipment is off and rely on bldg. heating pumps , valve opens and pumps will bring in fresh water and distribute – open valve allows it to go back to the loop
- Serves building and loop at same time (controlled by valve)
- Maintain and trouble shoot?
- Temperatures – want to cool things down a bit – optimize heat efficiencies. Right size based on lower temperature.
- Increase radiant surface areas
- Mark – glycol is whole system. Understand that heat recovery loop and every building is connected to glycol loop.
- Neil – prep for this included looking at Pole power production.
- Heat demand will drop in new facility
- Electrical lode might not drop as much
- Use excess heat where you need it
- Excess heat should be stored (so it's not an excess)
- Still need to bring outside air into buildings
- Optimization of loop

Going Forward:

- Prioritization
- Will have to figure out what to do with excess heat
- Will have forced air, outside air, coils
- De-coupled loop has controlled heat

Dave: would like to see energy from wind handled through storage. Concept of cheaper easier controls—grid controlled domestic water; inverted energy demand.

Need to cool any discharge—heat exchanger on effluent. Heat has to be recovered.

Level of automated control—planned for robust loop. Does injection valve need to be automated?

Lessons learned from other Microturbine projects? Need to find pitfalls.

Optimizing the loop:

- Coil selection:

Electric Utility Distribution Goals:

- Improved system reliability
- System flexibility
- Maintainability
- Renewable energy
- Optimized ruel reduction
- Improved aesthetics

58% energy reductions, 30% by building efficiencies/envelop, plus heat recovery. Need new technology. Proposing alternative loops to tap into various tech to augment powerplant. Site is dark 8 month of the year. Also noted a big reduction in square footage—dropping 1/3 of square footage. Shooting for 500,000 gal fuel usage reduction.

Proposing a permanently Islanded Micro-Grid
Distributed energy/loads

- Local loads
- Generators
- Photo-voltaic
- Wind turbines
- Other technologies

Micro-Grid controller

- Enables integration of renewable energy resources
- Optimizes micro-grid operations
- Maintain system stabilization
- Enables interaction with volt/VAR controls
- Manage renewable assets for fuel reduction.

Electrical utility distribution – overview
Utilidor goals:

- Routing to support loops
    - Collocate with sky bridges
    - Ground based stations

Local Generation:

- Combined heat/power

Typical loop distribution hierarchy (for each building)

- 5kV primary loop system
- Loop isolation capabilities: maintenance & back up capabilities
- Distribution configuration: radial from switch; sub-loop from switch; dual ended switch gear.

Site Info Tech and Comm
IT&C Outside Plant System – goals:

- Support mission
- Communications pathways
- Communications physical transmission
- What IT&C standards and codes to follow? TIA/EIA, BICSI, NSF, NASA, JPSS, SPAWAR—client needs
- Termination into interior communications systems (Baker design guide coordinated effort)

- Transitional cable plant for phased implementation

OSP Comm Pathways (outside plant)

- Pathways will follow utilidor system—grouped services
- Primary notes include IT Ops and CS building (backup data center)
- Secondary nodes located within facilities
- Outside plant fiber

OSP Com level of redundancy and reliability

- OSP cabling to support mission
- OSP cabling to support VOIP
- Minimum of 96 strand SM fiber optic OSP
- Reliability – OSP cabling will be a physical ring architecture segmented into redundant sections
- Reliability – loss of any ring section does not impair IT&C, self-healing
- Buildings are dual-homed

Transitional Cable Plant for phased implementation:

- We can define the end-state of the project OSP system, but how do we handle the interim IT&C needs
- Use new utilidor system for OSP routing, adjust the OSP system segments/nodes with phased development as needed
- ASC to implement IT&C microwave links as needed for phased/planned outages
- Ensure that the main data center and backup data center remain active at all times

Ensure that the mission IT&C needs are met during all phases. Joe says: IT&C O&M effort well in advance of 2020 when buildings disappear. Ben: work-arounds need to be coordinated.

4.3.3 1:00-2:00 (ASC) Environmental/Demolition—Shaggy

Demo opens up space for construction. Need to include demo in environmental impact of the project—has to be assessed in one piece—for timing of EIS process. Poly from NSF explains: Antarctic Treaty needs to be worked, along with EIS, or supplemental EIS. Ideally EIS begins with scoping of the project. Marine Mammal Protection Act managed by NOAA, requires Endangered Species Act reviewed by NOAA—4-8 month review process. Timing is critical. Incidental taking is 4-8 months, purposeful taking is an 18 month review. Building assessment of demo is not as in depth as needed. Takes 24 months for EIS CEE to get a Record of Decision (ROD). Aaron: what other agencies are involved? EPA? Application of NEPA requires EIS CEE (comprehensive environmental evaluation)—requires public comment period. Timeline runs simultaneously with Antarctic Treaty

4.3.4 1:45-3:00 (RMI) RMI Presentation by Amory Lovins (Rocky Mountain Institute)

Radical energy efficiency by integrative design.
Mis-framing the problem of the 9 dot connection solution by the tyranny of "the" – one and only one solution.
The value of saving electricity on a cruise ship…must look at whole system cost end to end.
Total cost of fuel and electricity is a fraction of the cost to taxpayer—fully burdened costs. How to get to full value of fuel: DoD adopted fully burdened cost (Apr 2010 article) of fuel and electricity. Fuel used for logistics. Troops lost in convoy, but fuel is lost—DoD valued fuel at wholesale, but not counting all assets and activities at their end to end, lifecycle, fully burdened total cost of ownership—get really big

numbers. Costs very high to deliver in mid-air (refueling)--$140/gal. Saving fuel is worth 1-2 orders of magnitude more than we thought when we design the systems that use it. Radical efficiency, therefore worth buying, adds a precious strategic vector-Endurance-and can ultimately save 10 to the 10^{th} power in dollars per year.

Lovins Foreign Affairs Fall 1976 article. What if buildings could be heated solely by people and electric loads? What if electric efficiency could be state of the art? Cuts fuel requirements. Can it work and what would it take?

End use structure—what is energy used for? Primary versus delivered (which accounts for energy losses). Still, efficiency of end use device and behavior impacts energy use. What can you do with where the energy is going? There are savings from efficient technologies, smart controls, integrative design which could provide 54-69% energy savings form a 2010 baseline, versus projected 2050 demand.

How to save more at lower cost than thought possible through integrative design. Usually by themselves, improvements are too expensive and payback period. But fails to consider to have fewer E/W windows and a smaller and different HVAC system, which could have lower overall costs.

Is there a sensible way to design a building without the mechanical? Tunneling thru costs toward savings.

Grand Forks facility: incremental costs for energy savings item combined with HVAC savings for a cheaper building and lower energy expenditures.

Residential house in Davis CA was 82% more efficient, than 1993 Title 24 for CA, plus other costs savings. Cut site energy and facility construction costs.

Presents his own home in Old Snowmass, Colorado. Has no heating or cooling system. Lowest temp recorded is -44 degrees C. 99% passive solar heating. He's grown 58 banana crops. Lights using less power than monitoring systems.

Used in European designs—costs added for energy saving elements more than offset by removal of heating system.

Empire State Building saving 40% energy costs. Replaced all windows, let in light but no heat. Cut cooling load by 1/3, and then saved on amount of chiller plant retrofit—smaller plant.

Can achieve savings for old retrofits on curtain wall facilities—needed to be re-glazed—used super windows allowing 6x more light, reduced unwanted heat, reduced heat loss, and more efficient daylighting, saving light fixtures; replaced big cooling system with a new one 4x smaller and more efficient. Capital savings—75% energy savings, cheaper than usual renovations with no energy savings. For deep retrofit portfolio tools, see www.retrofitdepot.org. Savings at low and sometimes negative costs.

Dark 5-8 months of the year, having to maintain buildings at dark and light. Amory: how much do you have to heat the building to be optimal? How much infra could you displace if you have an integrative design approach.

Summer only building.

Efficiency Technology are extremely dynamic. LEDs are moving so fast, that new equipment is coming out weekly.

Windows that automatically let in more heat in winter than in summer. Spray on replacement for Tyvek—30% less leaks. Miniature high speed heat pumps from Switzerland.

LED and PV—electrical efficiency. White LED has asymptotic growth in efficiency. LEDs are durable, rugged, mercury-free, cold tolerant.

What else changes this fast? Photovoltaics.

How fast is design state of the art moving regarding energy efficiency? Using 50kw per square meter in 2015 versus 173 kw/sm in typical 2010 retrofits.

Switching from buildings to cars. .3% of energy spent moves the driver—energy lost from engine, idling, aerodynamic drag, rolling resistance, etc. First make the car very lightweight. Aerospace—95% carbon composite—1/3 lighter and 2/3 cheaper. Toyota demonstration vehicles carbon fiber electrical cars weighing 420 kg total. Also downsize power tain. Avoid costs of upstream logistics and downstream expenses. Make vehicle as light and slippery as possible, less power needed, less drivetrain needed, smaller lighter chassis, better packaging. As components go away, lightening cycle can restart and attain more savings.

Organizing designers: the design process can achieve savings—must design in the future. Can't get there thru incrementalism.

3/5 of the world's electricity runs motors. Savings by fat short pipes, versus long skinny crooked pipe. Requires 2 changes in design mentality: 1. Big pipes, small pumps—not the opposite. 2. Layout pipes first, then the equipment, not the opposite—eliminates 3 to 6 times the friction. These 2 changes equate to 7 to 12 X less pumping and 70kW lower heat loss from pipes, plus added benefits of less space, weight, loss. Lay out supply pipes as if they were drains.

Big data centers: of 100W of power from a power plant, only 9W of energy goes into the chip, .3W into application, .12W energy into business process, and less in to customer value—losses from cooling, lighting, UPS, fans, power supply, and other inefficiencies. Reverse process by first de-bloating software and ensure that every computation cycle is needed, then cut IT equipment's internal losses by 75%, then cut support by 50% etc.

Ultramodern aeronautical technology embodied in gliding bird—imitate nature. If you want to pump water will get 30% more flow.

Some missing opportunities: end-use structure for electricity; air-to-air heat exchangers and exhaust air heat pumps; heat delivery—radiant heat—heating volume vs. personal comfort. Helps w/controlling disease as compared to usual HVAC systems; low-friction pipe and duct systems; small, superefficient pump and fan system. Lab equipment; data center and IT equipment. Passive refrigeration. Lighting design.

Packard foundation HQ, Los Altos, by Peter Rumsey achieved a 58% improvement over Energy Star.

Daylighting—and how to light surfaces versus volume. Morale and health are important factors. Can have gorgeous lighting through good design.

Discusses cooling/heating people not spaces—shows example of adding fans to seats. Minimize unwanted heat gains, Passive cooling, active nonrefrigerative cooling, and finally superefficient refrigerative cooling, cool the storage, controls monitoring, metrics, and displays; Should only need to do the first 4 steps.

Non-violent overthrow of bad design. Transform how design is performed.

Designing for efficiency
- Task elimination—why do it
- Eliminate any thing unwanted by the customer—unnecessary steps, lost time
- Demand before supply
- Downstream before upstream
- Application before the equipment
- Passive before active
- People before hardware
- Quality before quantity
- The right steps in the right order at the right time

Practical design keys to a broad and profitable efficiency revolution
- Radical efficiency = no muda, no rules of thumb, no copying last set of drawings and no incrementalism

The secret of great design integration: no compromise—it's optimization.

Design hints:
- You can only get to simplicity through complexity
- Everything should be made as simple as possible, but not simpler
- Simplicity is not when there's nothing left to add, but when there's nothing left to take away.
- Avoiding problems is even better than solving them
- All the really important design errors are made on the first day

Thurs Aug 6 (4.4)

4.4.0   8:30-9:00   (OZ)   Review previous day's work

Shaggy introduces the opportunity to have cutting edge talk to us; ASC shies away from the cutting edge, they want proven technology that can be repaired locally. We're simply doing a vector check—asking RMI what do you guys think?

Recap of yesterday then building performance goals. Aaron Seal presents utilities recap. Looped utility system replacing hub and spoke system. Talked about utilidor system to de-conflict w/pedestrian and vehicular traffic. Combined heat and power strategy was also presented. Feeds building or overall heat recovery loop. Covered IT&C goals.

Nancy RMI—is power all AC or DC—AC—is there a reason for that. There would be savings for DC—could avoid converting and save a lot. Inside building—could go with a DC BUS in IT OPS; Nancy is looking at the entire campus. Yes, it's possible. Are the CHPs going to be diesel? Yes. RMI: Energy use Intensity goals? Rick: where do we need to be to define success for energy savings? Will give NSF options for goals might be. They won't be set by lunch, but will need to happen soon.

Rick: goal for today is goals. Rick—are there also certification goals? Neil presenting is power summary. Presents power and fuel summary—clarifies—that heat and electricity correlates back to fuel. How much energy produced (electricity): 10 gigawatt hr per year by generators plus 2.3 gigawatt hr by wind. For heat, 18.4 gigawatt hr per year provided by fuel, and 5 gigawatt hr per year thru recovery. Total energy is 36.4 gigawatt hr per year for 625,225 SF of building. By area ist' 58.3 kWhr/sf or 2.8 gal/sf.—when wind is included, drops to 2.3gal/sf. RMI: 2/3 of energy for heating. What goes into that number—Neil: it's fuel into boiler or furnace. For fuel consumption—using 967kGal for electricity production, and 629kGal for heating. Remember—these numbers for the entire station, not by building—so be careful on how the number is used.

RMI: for an individual building, EUI is useful, but for a city, there are a lot more modes—no single technical metric. RMI says there will be a need for a metric set. EUI for buildings, but with exceptions. Threshold. Equipment load is 221kGal for moving stock. 4160 Distribution is 8 miles. Dan from Merrick wants to get an idea of heat trace length, length of fuel pipe, utilidor length. Utilidors will not be heated—any exterior utilidor will have heat trace. Can heat trace be a flexibly controlled—or is it on/off. Majority of current heat trace is on/off. Modulation on demand side is desirable. New heat trace is connected to DDC system. Comment that there are times of year where water is overheated and you'll scald yourself. RMI: build in as much flexibility as early and often as possible to facilitate expansion. Flexibility is a goal? Costs more? RMI: not necessarily. RMI: do you differentiate between mission-related load and operational load? Neil—can only do it by building to differentiate the mission: "Science." RMI: prioritization of load criticality? Yes. Nancy RMI—understand they do not have building loads in town—some buildings do have power monitors.

Neil: slide compares current versus future state. What is operational goal—in terms of fuel, maintenance, ops and costs? Size of O&M crews should go down considerably. Vision form Maggie: 500,000 gallons per year = 3 year resupply vessel. 300,000 gallons per year? Think bigger—may need much, much less. Rick: not committed to 400,000SF—can be less with more robust use of spaces. RMI: an 82% reduction from where we are now. Could be pushed further by looking at add'l resources—ex: coat all building surfaces with PV.

Shaggy: still need to be able to afford the campus and buildings. How much do we need to pay to optimize and select various options/trade offs. Ben: our baseline is so terrible and a sad situation. Could use a baseline of another activity or location—with this baseline, you can't help but improve. Reduction of fuel shipments is reasonable. We're looking at vintage 1965 facilities that are so poorly insulated. How much do we go beyond and how much to pay and where savings can be found. RMI: setting targets with a bad baseline—there is an issue with knowing what is feasible.

RMI presents a facility design. Captures winter solar gain, aggressive insulation (SIPS construction to avoid bridging), create air tight weather barrier (liquid applied air barrier over taping) engage thermal mass. Results of passive strategies is a 75% reduction on energy use intensity from a normal commercial building. Cooling eliminated from facility. Windows: Schuco FW50+ SI series—system fixed windows AWS 75 for casement mounted operable units—more complex than typical Kawneer 1600 frame. Alpen QuadPane C100 -2 HM88 films, 3 air gaps with 90% Krypton—it's 5 times better than code. 2 pieces of glass with two films—R-13 on north side. Code minimum is R 2.6. Superinsulating on north; allow more heat in on south.

RMI: interacting with clients for comfort—airspeed, humidity, air temp, activity level, clothing level, surface temp—comfort people not space. Low infiltration is a requirement.

Dan from Merrick: Electrical efficiency. Missed some slides…Optimize distributing run lengths/paths; upsize conductors for decreased line losses; distributed generation and control. Discussion on LED, dimmable features. Central lighting control—energy savings. Occupancy and vacancy sensors. Key cards for room that controls lights and power. Standardize on fixtures and controls. Considerations for circadian rhythm. Natural lighting: Daylight options; solar angle consideration; static versus dynamic systems; balance of light and heat transfer; light pollution issues; integration with artificial lighting control. Power distribution strategies—transformers, conductors, plug load control (central switchable control, occupancy control, minimize phantom loads), relay control on select distribution panels—includes load shed scenarios. May also get extra power—can use to heat building, heat the loop, charge electric vehicles, storage.

RMI—what do we do to operate without running a diesel generator a lot? Think about battery storage. Batteries are an energy store—regardless if it's from wind or solar. When generator runs, it runs full out. If the project is about efficiencies, then powerplant should is part scope. Buildings are biggest load, but there's also heat trace, water storage, waste water treatment. Could play with 10 degrees of water. RMI—can you speak to what part of town can be serviced by microturbine and what part is served by central plant? Dan: yes and no. More discussion on battery storage. Concern on battery maintenance? Karen RMI: In next 18 to 24 months battery prices are going to plummet and will make more sense compared to diesel costs. Monitoring devices could be installed to gather data to know/improve modeling—RMI—to get pattern of use. Crary should be modeled. Collect data that shows valid statistical trends that show how facilities are using buildings. Nancy RMI—monitoring individuals? There have been studies on Seasonal Affective Disorders? Need data.

Kevin at Merrick: energy modeling: initially focused on building geometry, orientation, then occupancy, movement of occupants, and operations. What stage? Will use REVIT model and be updating the model. To fundamentally drive the model in a smart way through functional balancing. RMI—need data to look for.

4.4.1 12:00-1:00 (RMI) Latest in Lighting

Lighting lunch and learn: Use of daylighting to cut energy reduction in half. Get rid of ambient and surface lighting. Go for personalized lighting. Eliminate overhead lighting. Use LED in a new format, not for area lighting on a ceiling. How important is ambient light if you have personal lights for self and surfaces? Much more appreciated. Gets rid of glare sources. Put light where it's needed and you won't need much at all. Get rid of troffers everywhere—worst possible light. Bring things down from ceiling to surfaces. Studies by Dr. Georg Brainard http://www.jefferson.edu/university/news/2015/01/14/NASA-innovation-award.html. Increased astronauts sleep from 6 to 8 hours. Transportable technology for Antarctica—spectral tuning. Use any possible daylight you can use. Use floor as a light shelf to get deeper penetration of light. Use film technology to bounce light further into room. Use of Solatube is for low angle light, and can be optimized for Antarctica—100% daylight without glare. They also have daylight dimming built in. Sleeping quarters need to be optimized to ensure sleep. Could also be in walls as well as or instead of roof. Films can reflect longer wavelength light on redirecting film. Ambient light—re-do the metrics—foot-candles are the wrong metric. Look to balance-#1 is surface brightness. Ambient lighting is way too high. Only code requirement is 10 Lux for emergency egress—1 ft candle. We see by contrast not by lighting level. More controls for lighting—digital, IP addressable everywhere. Solid state lighting—no need for fluorescents, mercury. Working with organic LEDs. OLEDs. OLEDs are not affected by heat—degradation by red—surface difuse source and blend with LEDs. OLEDs are next explosion. Laser explosion for exterior. Lighting embedded into materials. Can reduce equipment—there's new form factors—a single lamp could be programmed to illuminate multiple individuals/items separately. Get rid of exterior lights; LED lights not warranted for 50 below. Just in time lighting for highways.

4.4.2 1:00 – 2:00 (Merrick/ASC) Energy: Production / Efficiency / Performance

4.4.3 2:00-2:30 (Merrick) Waste-to-Power/Heat Generation
Kevin from Merrick—coil selection. Heat plant savings.

4.4.4 2:30-3:15 (Baker) Smart City

What do you want the system control. RMI—add water and water temperature to Smart City: including flow rates/consumption. Usage, creation, heating, non-heating—it may be the primary buffer for managing McMurdo. Communications consists of SCADA, remote terminal units, programmable logic controllers. Microgrid is customized to meet your needs. All manufacturers are customized to meet client needs. Ray says it's a perfect set up for use at McMurdo's use. Ray needs to know what needs to monitor and what needs to be controlled. Control from a big community level, or down to the component level. Where does it reside, and where will operator be, and what training will be needed. Can be monitored offsite and even controlled. What do you want the dashboard to look like?

Wind—integrated grid between NZ site and McMurdo—demarked by meter. What you get is what you get. Power from wind is fed into McMurdo and distributed from the site. 20 or so electric vehicles; control when they're being charged.

Wind is monitored and is managed by NZ. There is relay logic going back and forth between McMurdo and NZ. NZ will be an input feed for loop for McMurdo. If wind goes down, McMurdo powers Scott Base (NZ). NZ two gen sets of 240kW are part of the overall system—can be controlled by us. Ben Roth: not starting from scratch. L-M rep talks about overarching controls. Remote monitoring and controlling from Denver—VPN in. It's a remote manual system, versus a remote automated system, where a server would make command decisions.

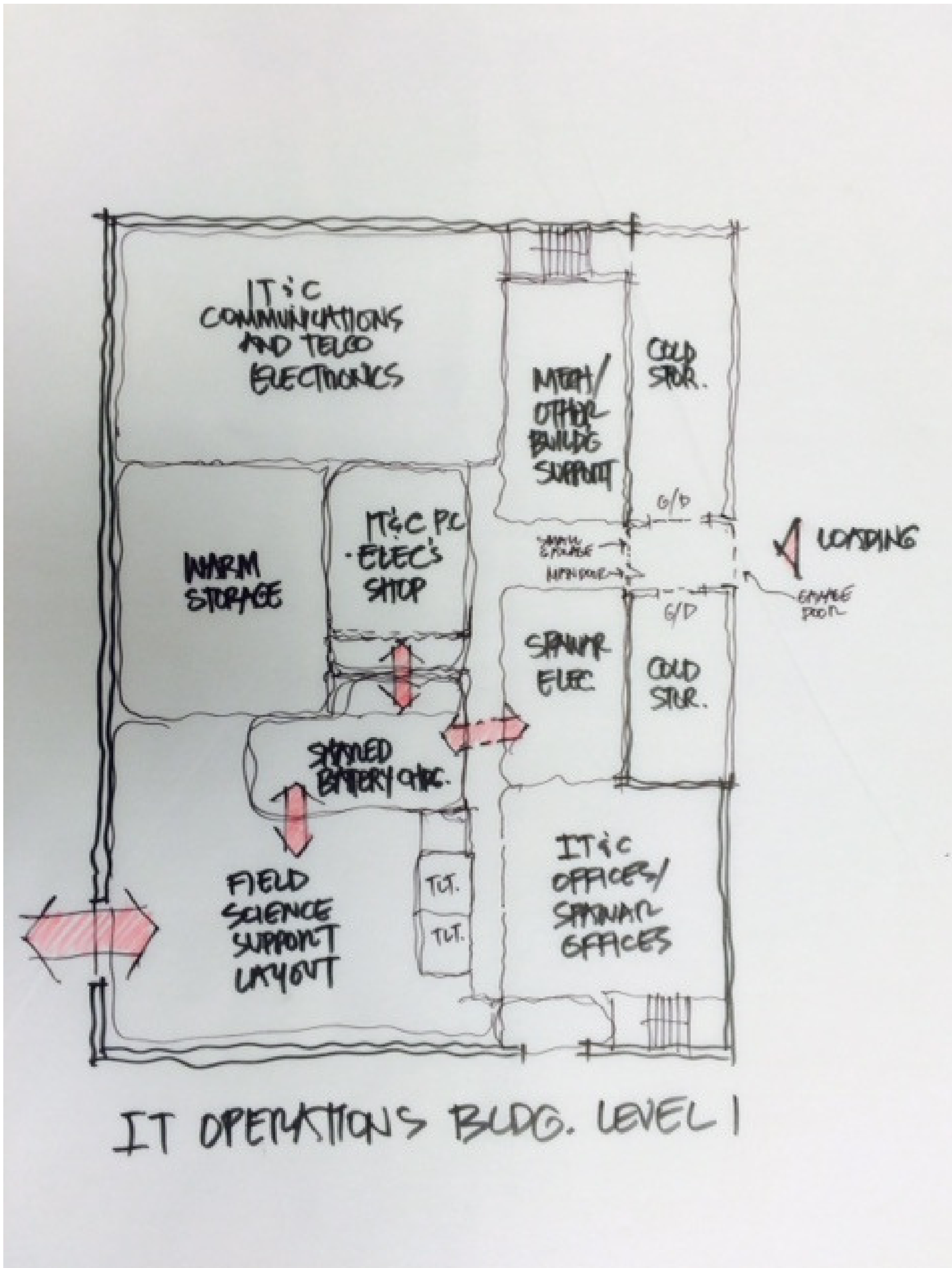
Need to know management plan for monitoring distributed co-generation. Control has to remain on site. Central Services will have a command and control room. Ben: could be anywhere, or collocated. Command and control is where CPU should be located? Yes. Need someone there to address priority 1 issues. Remote monitoring in generator house—a dashboard? Would it be of value? Yes—do that now for DDC systems – it's a controlling device, not just a monitor in every building. Ray—an overall dashboard—Wx, etc? Yes. You want someone in command and control who can take charge and shut things down as needed. Must look at all heat resources, water resources, etc. One system to do it, and how extensive it needs to be. Concern about vulnerabilities with levels of control—people given different user levels. Ray: any other systems that need to be on the system? RMI: how about forecasting for weather, wind, power—needs data so you know how much power will be needed or generated. RMI—a couple of thoughts: first, can foresee how does more wind get on system—need wind forecasting technology—element of seeing ahead for renewables to dispatch. Suggests looking at Belgian camp—have a structured demand management loop for energy spill management. Have all sorts of flipping loads around. Lockheed: somebody has to decide the priority of what to shed. If I start losing generating assets, what shall we begin to drop? There's been advancing on how to structure demands. RMI: before turning anyone off, think fuzzy logic, allow temp to go up 1 degree, look at trend and evaluate. Logic decisions don't have to result in drastic decisions. Leah RMI—part of what you want to do when you build the plan is to know how much can you turn down lights, heat trace, etc—load flexing before load shedding—still needs to be cleared with customers. Almost no change to client. Ben: L-M/ASC would make recommendation to NSF and NSF would opine. Leah—important to think about your load schematic—you see this with utilities—have thousands of dynamic water heaters—it's all on or all off, versus this 10% on.

Kim in Hawaii—designing energy dashboard for clients—tied to building managers or smart grid? Ray should be part of central microgrid.

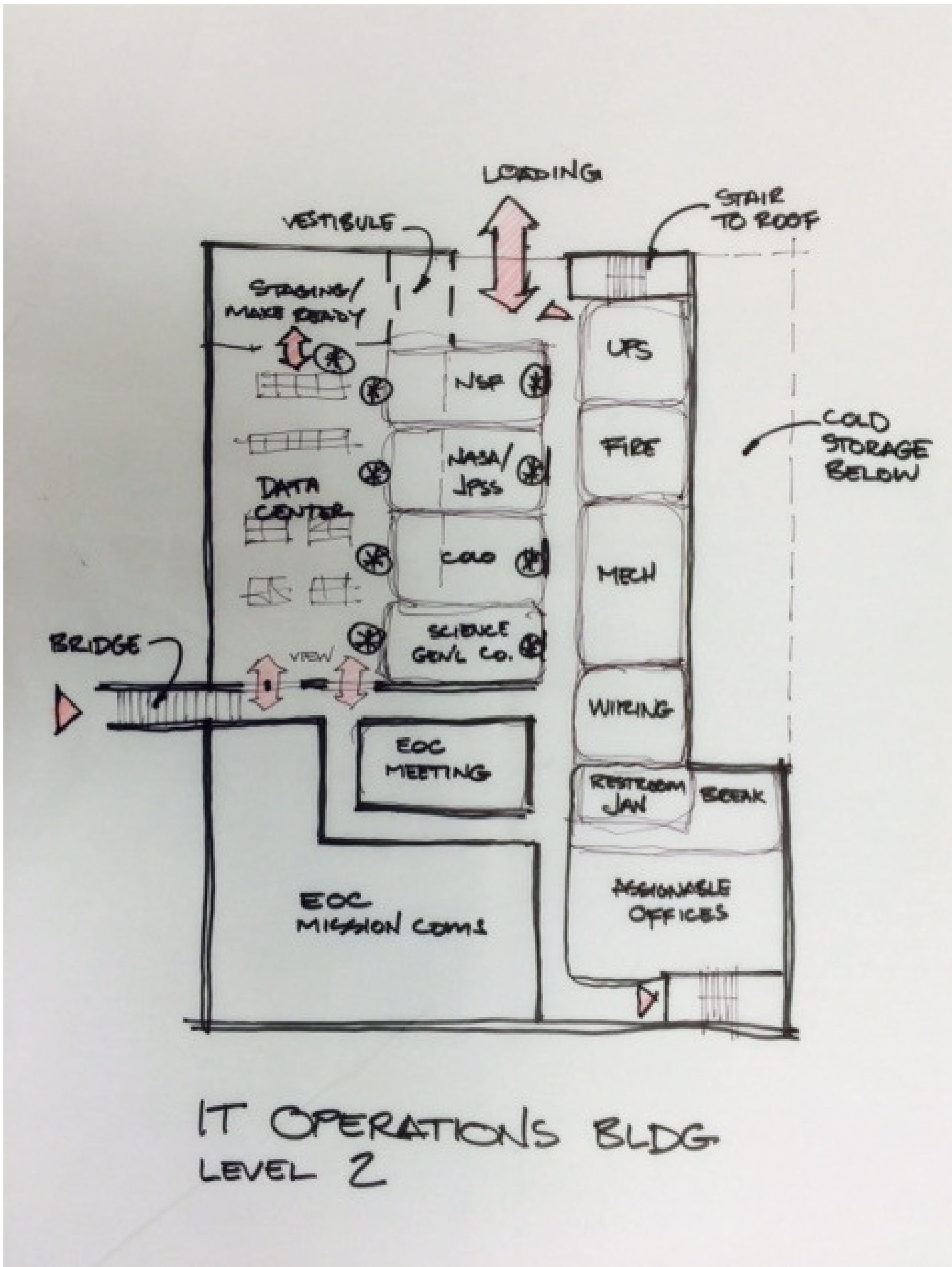
RMI—you must get clear data—amazing results at Dartmouth from occupants getting feedback. Occupant engagement.

End of discussion.

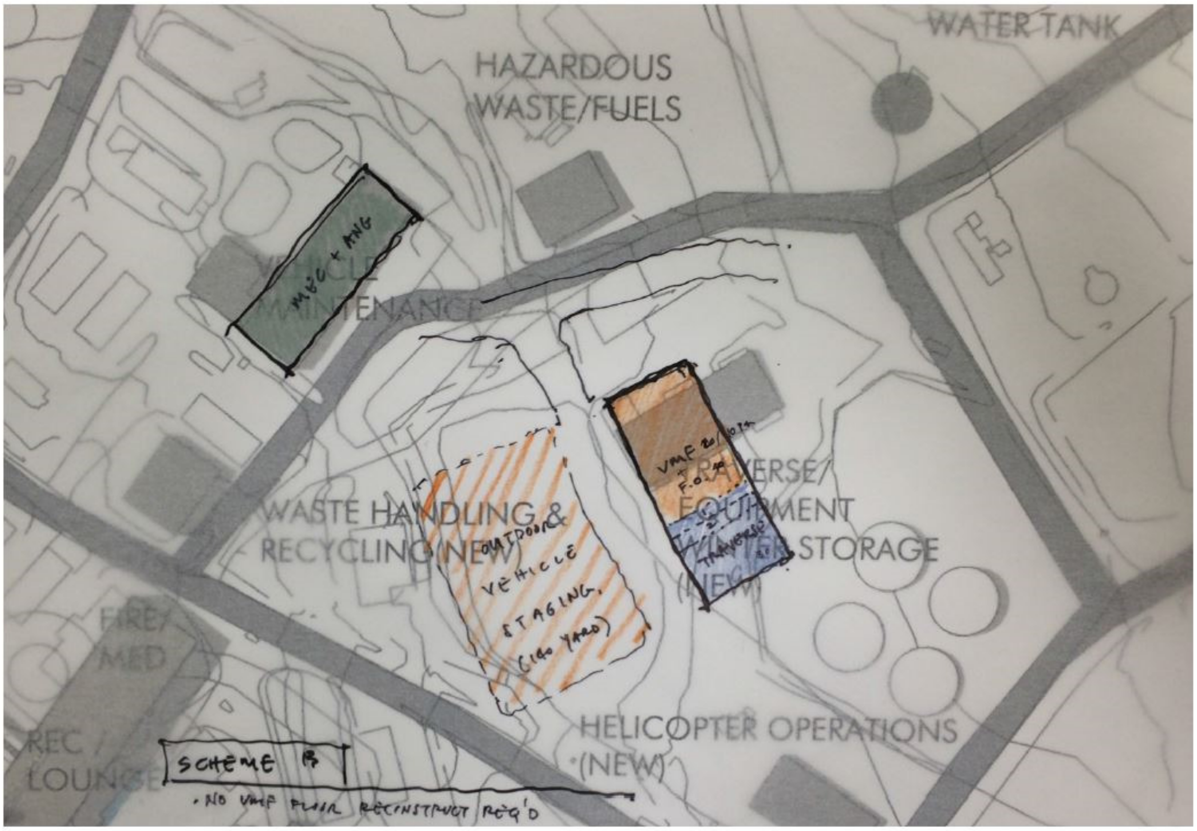
Appendix 1 – IT Ops Facility



Michael Baker INTERNATIONAL


LOADING
VESTIBULE
STAIR TO ROOF
STAGING/ MAKE READY
UPS
NSF
FIRE
NASA/ JPSS
COLD STORAGE BELOW
DATA CENTER
MECH
COLO
SCIENCE GEN'L CO.
BRIDGE
VIEW
WIRING
EOC MEETING
RESTROOM JAN
BREAK
ASSIGNABLE OFFICES
EOC MISSION COMS
IT OPERATIONS BLDG
LEVEL 2

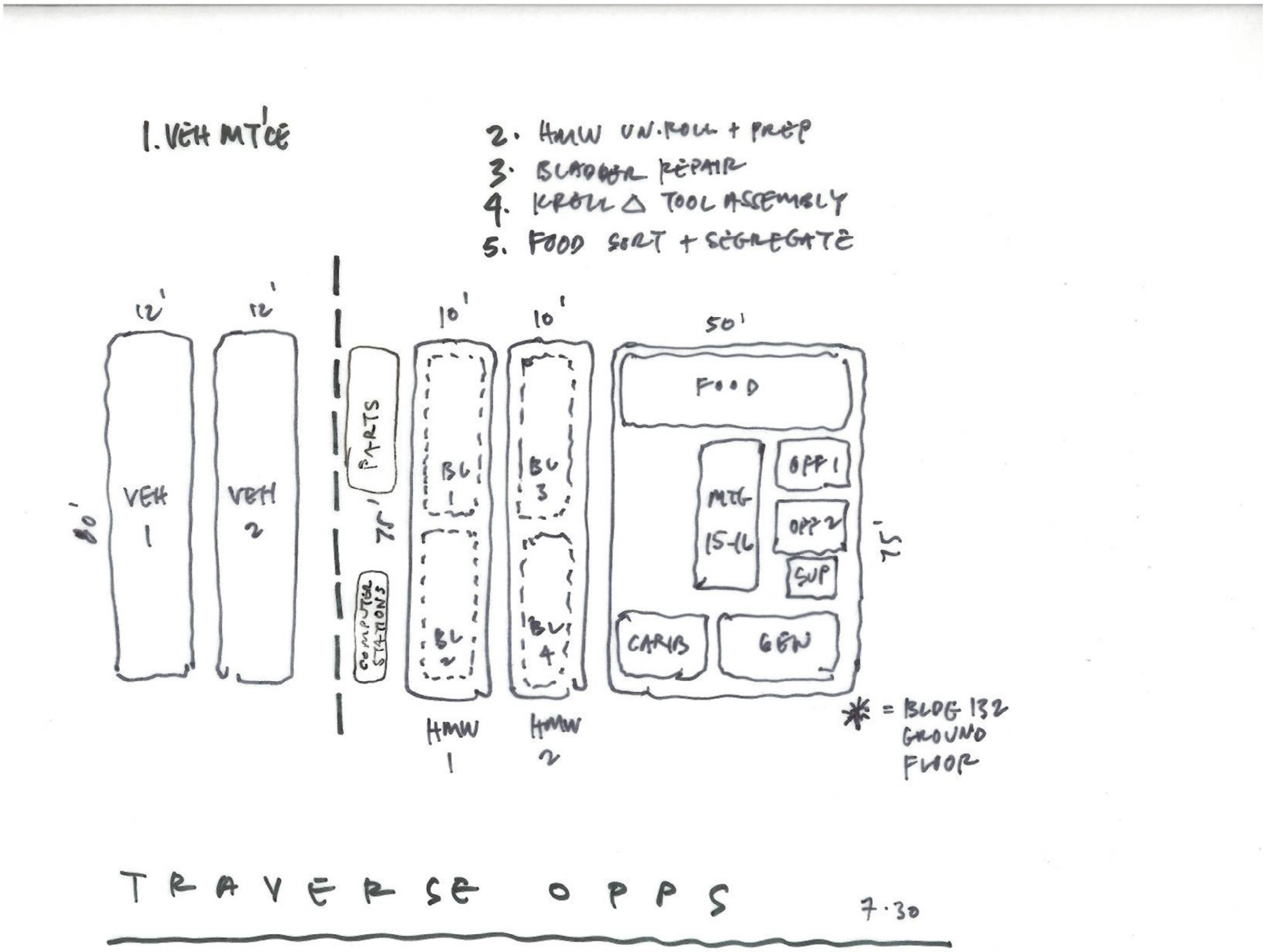
Appendix 2 - VMF



VMF / TRAVERSE OPERATIONS PREFERRED SITE DIAGRAM

MCMURDO STATION CHARRETTE WEEK 4 AUGUST 3 - AUGUST 6, 2015

Revised Traverse Ops with VMF heavy vehicle repair bays integrated:



Appendix 3 – Lodging Siting and Configuration

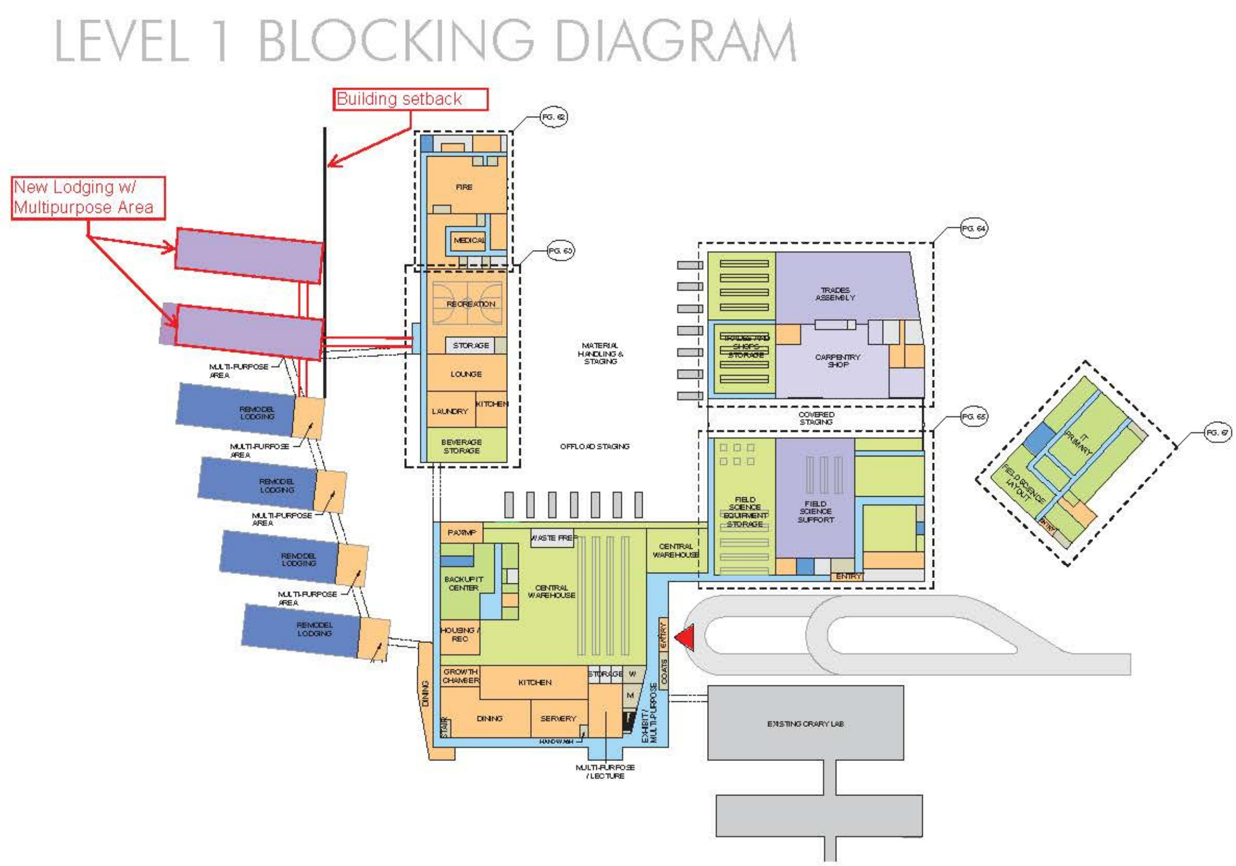
Email to Don Schieferecke and Rick Peterson, 7/27/15, 10:02 am

Don & Rick,

Just playing with the site plan and it seems to me you could locate the 2 new dorms north of the 4 existing dorms, keep the same orientation, but perhaps maintain a constant setback line from the northern most dorm from emergency ops. That way distances stay constant, the connecting bridge distance is reasonable, and you can maintain snow removal and access for deliveries. Also, it may be less fussy to engineer and build two dorms of the same layout out than having to engineer 4 unique solution sets for the reallocation of rooms discussed last week. Thoughts?

Bill

Attachment:



Michael Baker INTERNATIONAL

Email to Don Schieferecke 7/28/15, 9:42 am

Don, just fiddling around with a 4 bedroom suite concept. Rooms are windowless, 8x10, room for bed and small desk. The bedrooms on the outside wall are oriented 90 degrees from the inner bedrooms to create a small living area with windows for daylight and potential view.

I think in the existing dorms, allowing for the lounge, bathrooms, etc., you could maybe get 10 suites per deck, so each renovated dorm would maybe house 120 people. If the two new dorms were 50 feet longer, so you get 14 suites per deck, then those dorms would house 168 people. The four renovated dorms house 480, and the two new dorms house 336, for a total capacity of 816.

Email to Don Schieferecke 7/28/15, 2:39 pm

Don,
I cleaned it up a bit so it flows better and gives better living space. It's based on an 8'x10' clear space and I tacked on a little bit of storage/closet--which allowed the living space to grow and better accommodate 4 folks. The suite consume 580 SF and is 20'X29'. The bedroom module could shrink to 7'X10' as well and save more space. Is there an opportunity to broach a suite concept with Ben and Shaggy?

Bill

Email from Don Schieferecke 7/28/15, 8:00 pm

Bill,

I spoke with Ben after the charette regarding the "suite" concept. He does not want it discussed tomorrow. He wants the conversation to be about the single room with the multi-purpose space on the circulation end. His main reason is that he doesn't want "private" gathering spaces or issues about compatibility between suite mates to arise.

Thanks,

DONALD SCHIEFERECKE, AIA LEED AP
PRINCIPAL
OZ Architecture

Email to Brandon Neahusan 8/3/15, 3:48pm

Brandon,

I didn't get a chance to finish relaying a quick thought on lodging with you last week. There was a question on phasing the dorms, but I'm wondering about that. I understand that there are currently 1250 bed spaces, well above the desired end state of 850. It seems that a management decision to begin to draw down to the desired number of bed spaces ahead of anticipated construction could free up enough bed space to eliminate the need for 203, and have that demolished to allow for construction of the new dorm—one or two. That location at the north end of the site provides a good lay down area, where the grade seems moderate, and might be well out of the way of other construction activities. In other words, through management, the phasing problem could be resolved and you could place a dorm in a more constructible space without the engineering and construction complexity of the other option discussed. The first PDF shows how you could site the two new dorms, maintain a good setback from Central Services and the Emergency Ops building.

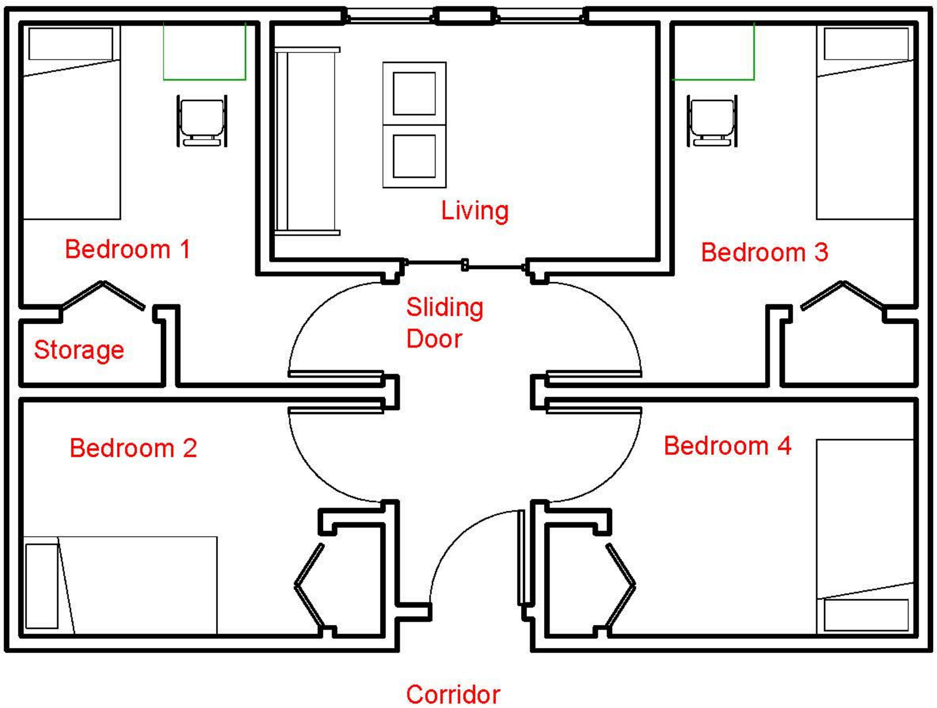
On the lodging layout, there were concerns raised about the length of hallways, and the desirability to see the weather. The second attachment I drew up is a four room suite, consisting of 4 windowless rooms each having clear space of 8'x10'. By rotating two of the units, it makes room for a modest living room space, so that everyone would have a short distance to look out a window any time of day, in any state of dress. The rooms are all equal in size, meeting that requirement, they are windowless, so they are dark, and I think the sound isolation would be improved, because it is a single loaded corridor. The corridor would be widened at each entry of the suite, so there's less of a tunnel effect. Since everyone still has their own room, it still meets the wellness factor. Bathrooms and the dayroom would be at one end of the building as desired, but occupants would also have a smaller space in their suite where they could also read quietly or maybe watch TV, or share some quiet activity with their suite mates. The living room is on the outside wall of the building, with a door and sound attenuation so that the sleeping quarter aspect isn't violated. Suitemates also provide some additional socialization opportunities, and for the military, it's desirable for mental health reasons. This layout would also work with the structural layout that the other dorms have, with columns on either side of the hallway, so there's potential efficiency of design and re-use. Hallways wouldn't have to be extraordinarily long if the buildings remain with the same footprint they now have.

I realize there is sensitivity about noise and sleeping and with having an internal living room. But I think the wall assemblies can achieve the level of quiet desired; but as I've seen everywhere else—mining dorms, oilfield mancamps, and military dorms, silence is also maintained as a matter of policy, peer pressure, formal counseling, and the threat of dismissal if someone doesn't get the message. It's a shame to lose a six figure salaried job from Conoco Phillips on the North Slope.

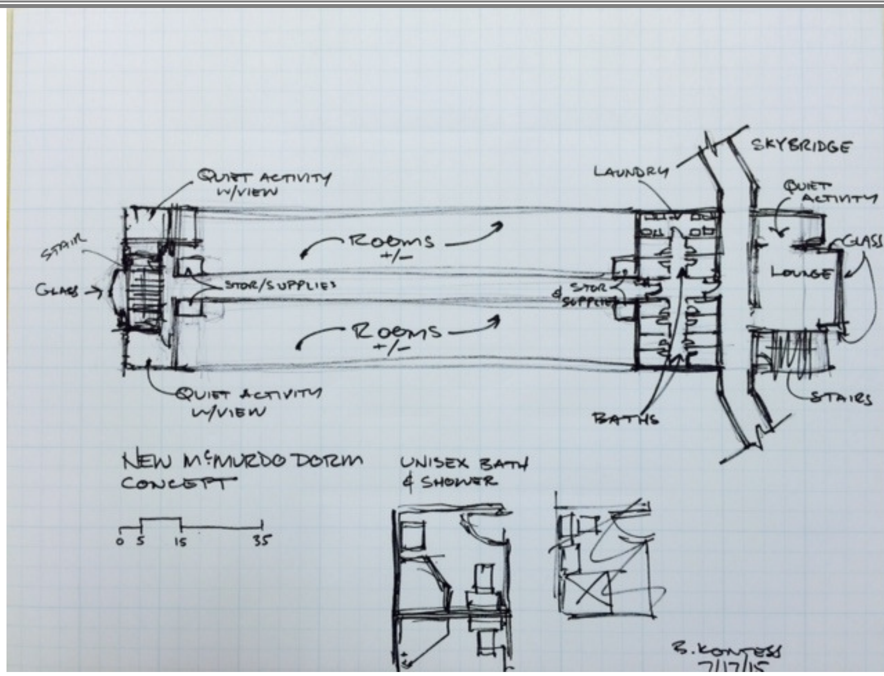
No design is perfect; every owner seeks some optimization of a variety of factors. The suite concept may provide some opportunities to give McMurdo residents and transient people some value added in their quality of life.

Thanks for a chance to share.

Bill



McMurdo 4 Bedroom Suite
8'x10' bedroom module
(20' x 29' overall)



Appendix 4 – Warehouse STAK System

Email to Rick Peterson, Brandon Neahusan, David Winkler, and Ben Roth, 8/3/15, 3:48 pm

Here's the website for the Stanley-Vidmar STAK system, which I specified for the Chugach Electric Association's warehouse. They've used this for their inventory with great success: http://www.stanleyvidmar.com/products/adjustable-racking/stak-system .

I've attached a picture, too.

You can see the built in overhead guides and the "fork lift" is the vertical yellow element that's run by one operator in a standing position.

Bill

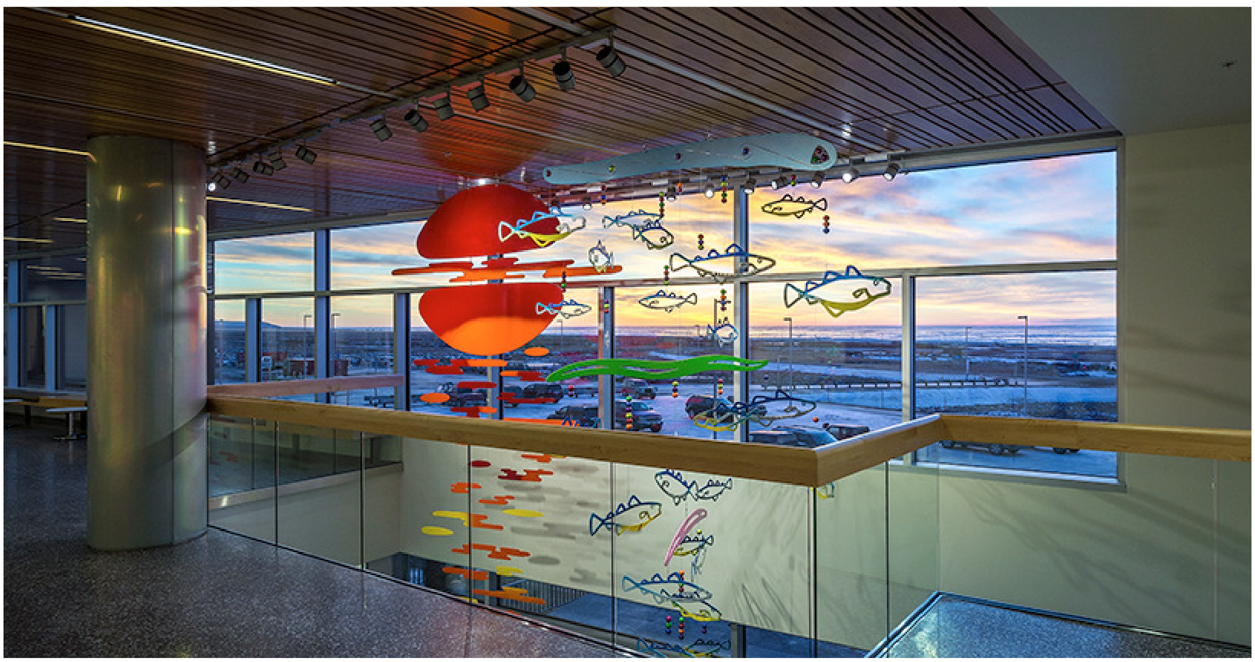
Appendix 5 – Architectural Imagery and Vocabulary from Alaska

Email to Don Schieferecke, Rick Petersen and Dan Miller, 8/3/15, 8:48 am

Subj: Images of Norton Sound Hospital, Nome; and Samuel Simmonds Hospital, Barrow

Recently completed hospitals—large masses that are looking for ways to articulate the mass, use form, color, and light to create good environments for the long winter, and sense of pride within their communities.

Bill




Emergency Triage
Fast Track Clinic
NWCI & Infant
Camp
EMS

Email to Don Schieferecke, Rick Petersen and Dan Miller, 8/3/15, 10:31 am

Subj: Bassett Army Medical Hospital—Fairbanks

The Bassett Army Medical Hospital in Fairbanks presents a Richard Meier-ish vocabulary, and since it's in Alaska's interior, is designed for some real extremes, from over 60 below zero in the winter to 95 above in the summer. So it has wings radiating around a round core.

Bill


KEEP
RIGHT

Ferraro Choi and Associates Charrette Notes

Project Meetings – 07/13/15 – 07/16/15

Monday 07/13/15

1.1.1 10:30 am to Noon - ASC Science Support:

ASC Science Support Staff:

> Bija Sass – (Supervisor Training) Interested in the logistics and field work in general. Teaching component of program brings breath of how they support science.
>
> Liz Kauffman – (S&T Manager/Lab Manager – SNTPS) 15 years there. Likes when grantees are successful in their programs. In charge of logistics of implementing the programs for the different users.
>
> Michael Davis – (Science Cargo Officer) In charge of getting materials there for lab users.
>
> Mark Neely – (Construction Mupervisor at McMurdo) In charge of deep field execution as well as construction projects at McMurdo – materials and project managers.
>
> Cara Sucher – (Manager Planning) Long Range logistical assessments of users who want to work on ice. Looks at all programs and vessels. Reviews new proposals and priorities of proposals for needs. Figures out if projects can be done as proposed and facilitates alternate approaches. 3 to 5 year outlook.
>
> Beverly Walker – (Crary Lab Manager) Logistical manager side. In-house planning for lab users.
>
> Matthew Ericson – (ACS Program Planner) For Palmer Station and Vessels. Helps lab users in their programs.
>
> Samina Ouda – (Science Planner) All platforms – focuses mainly on South Pole and and Palmer Station.
>
> Sune Tamm – (Science Planner) All platforms – focuses mainly on Mt. Erebus/Deep Traverse (field snow mobile) and Near Field.
>
> Judy Shiple – (Science Planner?) McMurdo and South Pole deep field camps (air ops) and their operations.
>
> Steve Dunbar – (McMurdo Area Manager – senior deployed ASC person) Formerly, Field Operations and Director of Field Science Support. Allocates resources for McMurdo and resolves resource conflicts. Answers needs of customers. Be safe, communicate well, be as efficient as they can.
>
> Tony Buchannon – (Supervisor of Mechanical Equipment Center).

Curt LaBombard – (Science Construction Field Foreman/Manager) Previously Science Construction Coordinator. All deep field and local field infrastructure. Now is Science Implementation Manager.

Bill Turnbull – (Manager of ATO, Antarctic Terminal Operations). Coordinates air transport.

Jessie Crane – (Antarctic Research Manager for NSF) Oversees support, planning, and implementation for the science programs at McMurdo Station, Palmer Station and deep field.

Standard field projects are defined by 3 – 5 years of funding and 1 – 3 years of field work. Long term projects are longer observation projects and might not involve larger equipment. Initially, funding might not be long term, but assumption is that additional funding will be obtained to lengthen the funding available. Likelihood of funding being renewed may be good. Generally, the process is:

1. NSF gives funding approval.
2. Information & Logistics – Start with the planning team who talks to the PI. Look at limits, including timeframe. (2 – 4 year projects)
3. Operational Notice is developed and approved by all.
4. Support Info Plan (SIP) - Developed during April for October deployment. Staging space not always available but needed.
5. Research Support Plan (Very detailed) – Issued right before the grantee goes to the ice. Explains exact support to be rendered. Includes:
    1. Logistical support
    2. Materials support
    3. Etc.

Resources can be earmarked if there is a high potential for future funding approval (i.e. helicopter requirements will be earmarked).

Need to consider requirement for some space for operational staging while waiting to deploy to the field. Also, there may be a need for testing and training of equipment/process/people, etc.

It may be a long time (perhaps never) until the facilities have a pool of technicians that can provide onsite service for research PI's who won't need to go to Antarctica.

<u>1.1.2 1:00 pm to 1:30 pm – Introductions and Objectives</u>:

Scott Borg (NSF): Opening Remarks

- MRESC (Major Research for Engineering, Science, and Construction) funding account used by NSF. The project went on 6/16/15 to the MREFC panel. Currently waiting to hear from NSF director.
- Reinventing the program to make it more efficient, not to grow it.

- Soliciting ideas for the future for infrastructure that will be flexible for the future. Want Grantee views/ideas on the facility.

Brian Stone (NSF):

- The project is being billed as an efficiency program.
- Preliminary design phase will lock in the scope and the funding.
- Building a system for the next 35 to 50 years
- How we are going to use the facilities along with what we use them for
- How can the process be better designed and managed
- Continuity of workforce rather than seasonal workforce?
- $258 million/year currently for NSF costs in Antarctica
- $600M funding ask (including $113M contingency) ECC in FY2019 budget?
- An opportunity to reset the costs to run the program
- Need to lock in the costs by Sept 2016
- Blue Ribbon Panel Report called for reduced number of "touches" in the program
- Economic case – A business case that makes the program sustainable in the future

Grantee Introductions:

1. Christy Hansen - NASA Ice Bridge
2. Andrew Kline - Texas A&M
3. Thomas _ - GPS and LIDAR
4. Jason Diebert - Seismic instrumentation
5. Chris Chang DeVries – University of Illinois, Fish Biologist - Antarctic fish adaptation
6. Sean Place - Fish Biologist
7. Anne – UC Davis, Fish Biologist
8. Amy L - Dry Valley Tech
9. Maryann Okall - UNESCO
10. Joe Levy - Permafrost Geologist in Dry Valleys
11. Hal Comelan - Geologist
12. John Stone – University of Washington - reconstruction of ice sheet
13. John Goost – Field Geologist
14. Deneb - University of San Francisco – Marine Biologist - Crill Study
15. --- McMurdo TDR
16. Enell Troop - Arrival Heights
17. Cole Kelliger – Mapping support
18. Abbey Vieregg – University of Chicago – LDB project Telescope at SP
19. Brenda Hall – Glaciologist
20. Chris Ecol – Salt water convenience
21. __?_ IDBO – U of Wisconsin
22. Peter Gorham – University of Hawaii – LDB, looking for neutrinos
23. Kurt - Geologist
24. Ted Anderson - Seismology

1.1.3 1:30 pm to 2:00 pm – Review and Confirmation of MP 2.0 Goals, Assumptions, Parameters, Building Siting:

Dave Winkler:

- Discussion of the project and the process
- 8 years of construction, 1st funding FY2019
- Design-Build and Design-Bid-Build process and the schedule to June 2016
- 6 mo. of design with 2 reviews and then stop for funding at PDR
- Construction complete 2027

Brandon Neuhausen:

- Described the Charrette process
- Master plan background and its phasing to keep station operational

Goals:

1. Logistical Efficiency (product flow): Currently 22 warehouses. Reduce down to a handful of warehouses.
2. Resource Efficiency (energy use)
3. Improved Quality of Life

Grantees:

Master Plan appears well established. What do you want from us? Why are we here?

To understand your current and future needs for long-term use of the station to support science. Idea is to increase efficiency, consolidate facilities, resource efficiency, energy efficiencies, and improve quality of life (happy, healthy people). An overall framework has been developed but we need the details of how each individual piece works.

Defining Parameters, Top 7:

1. Support a population of up to 850 maximum
2. Uninterrupted service to Pole and baseline science
3. Scalability

4./5. Power/WW infrastructure to remain basically as is

6. Crary remains
7. Survivability – back-up support provided in project

NSF Objectives:

1. Whatever we create will reflect the science
2. Promote environmental stewardship
3. Reduced footprint & Skin to volume ratio

4. Promote wellness
5. Promote impromptu gatherings for discussion
6. Promote and represent the US
7. Design should be “of its place”

Progression of the Master Plan:

1. Reviewed and refresh of the previous MP (1.0). Needed to make it more efficient by consolidation.
2. Requirements and phasing changed. Keep Crary viable by moving science staging and cargo to another Science Support Building.

Tuesday 07/14/15

- Background of yesterday and agenda for today. General overview of the science community’s requirements for McMurdo. Detail of needs will be addressed tomorrow.
- Joe Ferraro presented Crary Lab background
- Where is McMurdo science headed?
  - Being addressed by the National Science Board
  - Biology: everything is going genomics and molecular. Taking samples in the Antarctic and studying them back at the university
  - 4 differing science wings and one central services wing currently in Crary. Now cooperating/collaborating as one center:
    - Sharing labs – flexible systems (adaptability)
    - Sharing circulation
    - Sharing offices
    - Cannot accomplish all the work needed down at McMurdo so do the field work and continue/complete the work at home. McMurdo is a good field reserve station.
    - Need efficient storage and staging and movement of materials (efficiency)
    - Need efficient movement of people – dorm/galley/lab (quality of life)
    - Energy – new MEP and heating (reliability)
    - Operation in shoulder seasons (adaptability)
    - IT services w/ backbone (reliability)
  - Deep field science growth has skyrocketed with remote sensing capabilities.
  - Airborne science is expanding with instrumentation on LC 130s
  - AWARE atmospheric weather __ remote _____. Winter flights are happening which is very important for meteorology. More stations can be set up but funding is needed. Spaces have to be designed to meet the specific needs of the user. Example is the benches in the Atmospheric sciences lab to hold heavy batteries.
  - There was an NSF report on potential winter science 10 yrs ago & a 1999 from Deneb on winter science
  - Winter use of space for not only science but for operations to allow more science support in the summer.
  - Due to the cost and time to go to the ice, more need for reconnaissance (collection) science in initial review of samples before sending them back to the University. The real analysis science is happening at home.

- This depends on what science you are doing. There are time sensitive samples that can't make it back to the university. You need the facility and the time to do it.
- Increased thruput of samples at Crary & some processing in field @ Crary vs. just collecting and sending home. Equipment size may reduce but more systems may be desired.
- GPS equipment is very expensive and scientists want more. Batteries are needed which are heavy. New battery systems will be lighter and easier to deploy but then more will be desired.

1.2.1 9:30 am to 12:00 pm – Breakout Sessions - Science:

1.2.1.2 Track 2: Local Science: Sea Ice

Research/Teaching group types:

- Seals
- Fish
- Invertebrates
- Penguins
- Teaching Course
- Sediments
- Algae
- Plankton
- Ice
- Atmospheric Science

1 – What is the specific nature of your scientific research?

- Jennifer - Marine Biology (seals) - Daily trip to the sea ice in summer season. As long as the sea ice is stable and they can drive the snow machines. Find sea ice cracks where seals are and collect samples from seals. Does have sample processing that needs to take place in Crary. Some sample work needs to be done in Crary due to time issues. Normally there are about 3 seal research groups always there. 50/50 access time by snow machine and Helo. For Helo, significant traffic for equipment to Helo pad.
- Deneb – Collections from sea ice in holes drilled – water samples. Collecting plankton and invertebrates samples. Take samples back to Crary to do a lot of lab work. Teaching Course – 30 - 40 students. One month long (typically in January).
- Lars – Physical scientist. Interaction between sea ice and atmosphere. Fun instrument out to ice and take measurements out on ice. Set up instruments in Crary. Doesn't need to be out on ice – can do measurements via data link.
- Anne – Env. Physiologist – interested in young fish and how they react to the environment. Collect dive samples of eggs and juvenile as well as water samples. Hold samples for a month or more and study reactions. Also needs environmental room use in Crary and aquarium space. Some sample prep and analysis before going home. Need separate room for analysis of gasses

away from aquarium spaces. Heavy users of both phase 1 and aquarium space in Crary. 50/50 time in lab/ice.

- Sean – similar to Anne. Fishing various places in sound and transport adult fish back to aquarium space. Heavy users of Biology lab. Heavy use in DNA analysis. Processes study live specimens, take specimens and ship back home.
- Chris Chang – Fish Biologist – same – catch fish through holes in ice. Look for ice crystals in fish physiology. Heavy dive use. Heavy Biochemical use – environmental room. Water temps close to actual conditions is critical.
- Andrew Kline – Monitor conditions around – collect sediment cores around site and ship frozen back home. Doesn't use lab a lot but does process some.
- Trying to do minimal work to process to get samples back home. Will future of grantees work go in the direction of more or less actual on site lab work?

2 – What is the size of your team at McMurdo Station?

- Jen – 4 – 8 people on team. 1 – 2 in camp and 4 – 6 in field.
- Deneb – 35 – 40. Teaching course
- Lars – 2 – 6 people on team – long trip to sites. Takes 4 – 5 people to launch balloons, but really only a couple of scientists. Sometimes gets volunteers to help launch balloons. Hoping to do winter scientists so may need more dedicated staff (less volunteers). Sea ice - 4 – 6 people – half in lab and half in field.
- Anne – 4 – 6 people – October – late December. Sometimes split to different sites and sometimes ½ in field and ½ in lab. Long term – if season goes longer – longer presence at McMurdo.
- Sean – 3 – 6 people. Same season – start smaller as season starts, build up and then taper off towards end of season. Heavy use as specimens accumulated and drops off to 2 people mid/late December.
- Chris – 4 – 8 people. Field and lab work happens at same time. Split time in both locations. A lot of day trips to catch fish. Has her own divers.
- Andrew – 4 plus teacher. Whole group in the field during the day. If ASC doesn't provide dive support, then his team would need it.
- ACS Dive support team is available for any Grantee if they need.

3 - What is the Frequency of your research McMurdo. Annual? Describe the frequency in terms of years.

- Jen – Seal team projects every year until from October to end of Feb.
- Deneb – Biology course intermittent years. Not consistent. Next course 2018. Advanced team goes down in December and course goes month of January. Few people there first of February to break things down. January is the normal off time for Crary and most open.
- Lars – Typically 2 years on one year off – two months in the field but days not critical. Time rotates different times each year based on type of experiment and research.

- Anne – Funding based – 2 years on and 1 -2 years off. There is always about 2 fish groups there every year.
- Sean – 2 years on and 2 off – *3 fish/invertebrate groups every year.*
- Chris – Same
- Andrew – His focus has been annual but slowing down. Occasional looking forward but may be a group there every year.

4 – Describe how your team currently works at or interacts with McMurdo Station.

- Jen – Prep in Crary in the am. Move to sea ice. On ice most of the day. Gear and samples come back at night. In lab prepping and such with samples thru evening.
- Deneb – Try to minimize impact in Crary due to size of group. However, sometimes everyone needs to be in Crary. Coordinate Training (safety, waste management, lab safety, snow mobile training). Has had walls removed between 3 labs for full group. Divided up in 3 – 4 modules of people so varies in how many people in lab and/or in field each day.
- Lars – Prep in lab in am. Gear up and head out into the field during the day. Return with samples end of day. Obtains huge amount of digital data for processing in Crary. Doesn't need wet lab space, needs mechanical type of space.
- Jen – Crary doesn't have large enough shop type space to fix things that need fixing. A good shop type of space would be really good. Currently done in Staging area and doesn't work all that well.
- Anne – One day type is similar to others (more frequent early in season 80/20). Slow process to get animals to aquaria. Time is critical for getting animals back to aquaria needs efficient space. Second day (more frequent end of season 20/80 – run experiments either in Bio Labs or in Aquarium room all day in Crary.
- Sean – Similar to Anne. Some groups bring samples and gear in/out up to 3 time per day.
- Chris – Similar to others – staging and off-loading critical at Crary. Uses many support rooms in Crary.
- Andrew – Similar – 2 – 3 times per day. High traffic at lunch time. Try to go from collecting samples into shipping containers same day. Messy work that impacts others.

5 – How does McMurdo currently assist you to do good science?

- Seasonal flow (field camps) and daily flow
- Positive things about Crary -
- Being able to drive up to level 3 works well for getting to building.
- Stockroom Supply works well being in the building.
- Open stock room good that has all non-inventory stuff. Works well for users but not for administration.
- McMurdo has access to non-programmed supplies/goods and people to build/assist works well.
- Phase 1 biology labs work well.
- Core labs work well.
- Access to support staff is good.

- NSF science officers are in Crary.
- Library is good/important

6 – What is impeding your good science at McMurdo?

- Anne – Cargo arrivals to McMurdo, nowhere to store gear or for students to sit in labs.
- Jenn – Bandwidth is sketchy for Grantee teaching programs with home locations –would allow more flexibility. Access to see ice outside normal open sea ice season (unusual climate conditions).
- Sean – Vibration problems in Phase 1
- Chris – need more storage space for over winter storage.
- Andrew – Impedance – move a lot of heavy stuff from many places – raised loading dock improvement. Lack of staging space.
- Deneb – Storage cage space not sufficient. Office doors not allowed to be open due to mechanical pressurization.
- Lars – Static electricity issues due to low humidity. Condensation issues when conditions are wrong

7 – Where do you see your science going in the future?

- Capabilities of smaller boats in the future – open water science at McMurdo.
- Holding animals in the future will need to be sustained. Maintain the Aquarium moving forward for longer periods of time.
- Future - field schedules better reflecting your program schedules rather than climate schedules.

8 – How will it alter your process at McMurdo?

- Increase season length – might affect how Crary is staffed and when. Could affect number of different groups through McMurdo/Crary. Could affect the length/duration of individual group times.
- Add staging/storage/cleanup/zodiac area for water access – will change options for research location access and open up new location possibilities. Needs some sort of motorized transport from new dock area to Crary.
- Cross seeding of different disciplines may occur in future changing group sizes.

9 – Describe your utility/infrastructure needs (power/lighting).

- Anne – electrical problems blowing circuits (heaters and generators)
- Lars – Access to antenna/satellite not sufficient
- Jen – Glasswash/sterilization concerns with existing
- Common meteorological and marine cable array to provide common info to all users would be great.
- Power issues inside environmental rooms

1.2.2 1:00 – 5:00 pm Debrief of Break-out Sessions and Confirmation of Requirements

- Question 5. **How does McMurdo currently assist you to do good science?** “Antarctica Happens”
  - NSF & ASC provide all of the basic necessities.
  - Crary Lab allows for a central location to staging, analysis, office work, meetings, informal interaction space on upper level and in other odd locations of McMurdo. The flow works well. As a bio-research lab it works very well. The Aquarium is a bottleneck. Having a variety of scientists at Crary working together and sharing a close community. 24-hour access to labs and nourishment is excellent.
  - McMurdo provides great support for science. The SIP process is excellent. The downhill location to the helicopter pad assists to bringing gear to the aircraft. Additional parts for equipment.
  - Good mix of office and lab space based on need and where space is available has provided good cross-pollination with other sciences and shared training and safety. Especially for students. Good mix of utilities for water, gasses, etc.
- Question 6. **What is impeding your good science at McMurdo?**
  - The aquarium is a bottleneck ability to move samples, staging space especially up the spine. A locker room at Crary for personal material. Easy movement in the building when it is full.
  - Storage space for samples. Limited data band width. Humidity controls in the building to allow for high res imaging.
  - More pagers or ability to use a smart phone to coordinate team members.
  - Lack of enough collaboration space. Better ability for tracking cargo and too many touch points at McMurdo. Training and orientation is tedious for those who have been there several times. Could it be done virtually off station instead of a week at McMurdo. Breaking down equipment and room set up at season end when the same space will be used the following season.
  - Housing being scattered is a challenge for team get-togethers.
  - Building vibration
- Question 7 & 8 **Where do you see the future of your work? What changes to McMurdo systems required?**
  - Sea Ice:
    - Longer season and access to the sea ice with Zodiacs from the station. Might be larger teams for shorter times or more smaller teams.
    - Longer term experiments in the aquarium with seawater system available longer.
    - Need to send samples out more frequently with longer seasons utilizing both ship and air freight. Storage in environmental rooms might be a bad use of those rooms.
  - Remote Sites:
    - Larger and fewer groups
    - Use of Traverse equipment for science with ability for communication between PIs at base and students on the traverse or at remote sites.
    - More sophisticated instrumentation
    - More autonomous vehicles
    - Reuse of boreholes from drilling sites
  - Helo supported sites:
    - More science coming with the same time and number of people with better equipment. Remotely operated vehicles = more antennas and places to launch and retrieve them.
    - More work in the shoulder seasons

        - Sensing on aircraft
    - Local McMurdo Science:
        - Longer balloon flights
        - A LIDAR network with other countries
        - Expansion of research with drones and specialized equipment for RNA and DNA molecular sciences.
        - More stringent management of Electro Magnetic transmission around McMurdo. The rest of the continent is the quietness place in the world.

Wednesday 07/15/15

1.3.2 10:15 am to 12:00 pm – Track 1: Crary Lab Programming, Part I:

- Need 2 physics labs – Chinese woman & Lars
- Need wet (includes fume hoods) lab space in Crary because dry lab users can use space outside of Crary.

Scribe: More notes by Kiley Baham?

1.3.3 1:00 pm to 4:00 pm – Track 1: Crary Lab Programming, Part 2

- Glass wash- No central one used. It was removed. Each lab washes their own glassware.
- Matthew, although Crary may be a principally wet lab, some dry labs are needed.
- Physics lab needed
- White boards are important
- Current labs serve as PI homeroom and storage area. More areas needed for storage so labs an be shared.
- Current lab layouts can be tweeked.
- Larger autoclaves needed in common areas. 2 exist.
- Furnace should be in common area
- Radioisotopes used in a common lab. Should have an RI hood
- Stock room staging of return items are done in hallway. Stock room is too small.
- Aquarium users need wet labs closer either in Phase 2 or 3.
- Offices should have windows especially for year round users.
- Environmental Rooms:
    - Temp. controlled unit -1C at phase 3 would be good
    - Others OK
    - -80C freezers should be thought of
- Phase 1 workshop at FPS is too small and inadequate
- Shared microscope room
- DI Water: Type 1 needed for mixing solutions. DI in all of the labs
- Vacuum would be good.
- No gas currently
- A clean environment lab for certain work
- An open student space with open tables would be good for student use.
- Power outages in the lab are frequent.
- Wire for roof top antenna and have ports
- Level 2 Use: Current layout incorrect. All open with coffee adjacent to the stair.

- Coffee Space: Heavily used but not useable when the lecture is on.
- Wednesday night lectures - Larger space than library. Maybe include some lounge space?
- Library area is used for desktop computer MOCA use. Will be assigned to new building.
- Remove the cubicles in the conference room.
- Computers currently in lounge area.
- Grad area away from labs – Maybe for 20 students? (Crary graduate students)
- Conference room is so heavily booked that it is not feasible to think of using it. In the future it will be assigned only to Crary.
- Conference Rooms – Large & small needed.
- Mapping folks to left of stairs – relocate?
- Large space is used for training and science lectures. Training will go to another space. Sunday lectures are held in the galley.
- A similar meet space would be good at each building phase

- Earth Science people are not in country now.

Thursday 07/16/15

1.4.2.2 10:15 am to 12:00 pm – Break out session: Sea Ice

Aquarium Pod User Attendees: Anne Todgham, Chris Chang, Sean Place, Jennifer Burns, Deneb Karentz

- There are several existing large specimen tanks as well as double level tank racks for smaller tanks in the current aquarium room. The largest tank is a 6700 liter tank that is really only used by the ROV people and is not required for the aquatic specimen work. It could be removed (would need to be located elsewhere for the ROV research work) and replaced with smaller tanks that would better serve the aquarium user group.
- The current water tables for the tank racks are not really deep enough (about 6" deep) and replacement with deeper tanks would work much better for the users.
- The users requested more flexibility for more/different size tanks in the future.
- The 3 existing support labs in the Aquarium Pod work fine and don't require significant changes
- There are lab users who require close access to environmental rooms for continued growth of specimens. Currently, the only environmental rooms are up in Phase I of the project which is the farthest away from the Aquarium area. The users requested another environmental room or two in the Aquarium Pod area that will better serve this need. It was suggested that the either the existing storage room or the larger of the three support labs (the dive locker area on the original plans) could be converted to two small environmental rooms and a small entry/prep area.
- The environmental rooms need with seawater, freshwater and power. Same size environmental rooms as in phase 1. This would accommodate several team's use. Ambient air Temp -2C to +4 with matching water temp. Bench space in front of environmental rooms is needed.
- The users requested Fresh Water also be provided to the Aquarium Pod.
- The existing Storage Room and Mechanical Fan Room will not be required once the first phase of construction is completed and can be converted to more tank room space, lab space, or Environmental Room space.

- Storage room is a shop not available to grantees. It is used by deep field electronics folks – should they move to FSSC? Need for sensitive electronics out of the Aquarium.
- The users would like to improve the flexibility of the tank layouts with a more flexible piping and valve configuration to more easily adapt to changes in user needs for the tanks throughout the season. The drain system currently is located at the tops of the tanks and the users requested an analysis of how it could be improved to come from the bottoms of the tanks.
- The users requested a vestibule at the garage door to provide some separation/protection from the weather when bringing samples in from the field. Currently, there is a single garage type of door that when opened, exposed the tank room to the outside environment.
- No need for mud room if it can be provided in the new dive locker building. Need to coordinate with design of dive locker.
- Water taken directly from the ocean without any treatment
  - ~160-200 gal/m flow
  - 3 directions of flow
    - overhead
    - around the perimeter & center
    - labs
  - Manifolds need adjustment
  - Four pumps. Two for the aquarium and two for station power plant. Sequenced one pump running at a time. Additional in line pump for Phase one.
  - Drain system goes back to the bay.
  - May need filtration for some experiments. Algae blooms are a problem for invertebrates.
  - Remote monitoring of the sea water line temperatures and a mooring in the sea for monitoring sea temps.
  - May need saltwater in the labs?
- There is an insufficient amount of electrical circuits to the tank room (only about 3 circuits) to serve the tanks. Additional electrical is required. Chillers at the tanks were popping breakers.
- Add storage to lab area. Labs can be narrower if storage is elsewhere.
- The existing compressed air system is inadequate and needs to be replaced.
- Possible need for exterior ambient daylight tanks. Could be at former aquarium location.
- Temperature monitoring for each tank would be advisable. Loggers are used currently.
- The existing epoxy floor system is showing signs of age and should be replaced. When that is done, the walls should also be provided with a similar water proof system to comply with national aquarium space accreditation requirements.
- User asked the question of whether a filtered water system should be considered. There was a study proposal done previously and that study should be referred to for this question. Water visibility drops from ~500' to 5' in the winter so filtration may be more of an issue.
- Bumpy floor is a detriment to movement of sensitive instruments. Finer grate – Is this possible? Need carts with bigger wheels.
- Accreditation Standards. The program study team needs to pursue with NSF further on what if any aquarium facility accreditation standards should be met with the work proposed for this project.
- Access to MEP separate from grantee building access?
- Regarding chalet side – river/drainage issues?

- Catwalk on Phase II is riddled with antennas – may need to be bigger.
    - Line of sight to sea ice
    - A lot of instruments in Crary tied to the antennas
- Wireless connections for the future for data collection? Internet WIFI at this location is lower priority at this time. 24/7 monitoring. Palmer station “water wall” is a good example.
- Stairway at bottom of spine is hazardous early in season due to snow/ice.

<u>Project Meetings – 07/20/15 – 07/22/15</u>

Monday 07/20/15

<u>1.2.1 9:30 am to Noon Crary Lab Meeting w/ Bev Walker and Cara Sucher</u>:

Winfly – mid August

Current Core Crary Lab staffing:

- 7 staff (core)
  - 1 supervisor
  - 2 lab assistants
  - 1 instrument tech
  - 1 hazmat specialist
  - 1 admin
  - 1 research associate - (does not have to be in Crary) (long term projects) (over winter position) (work directly with grantees) about 6 projects now.
- +2-3 supply personnel
- 3 IT (assignable office in IT Ops?) – Kara says would be nice to stay in Crary but Joe H. is really dialed in.
- +1 facilities person sometimes with helper
- +1 refer tech who spends a lot of time at Crary

Open stock – non-inventoried supplies

Room 174 – currently shared instrumentation

Copy/print in library copy room

N2 – liquid – where is this to be located?

Ice core storage and sometimes meteorites and Cape Bob (refrigerated space).

Haz waste staging at current field party staging and packing samples at end of season.

Field party staging – only held for 48 hours. Cages in here used by 1-2 groups.

Receiving and storage – longer term staging

Sea ice staging will alleviate same field party staging pressure for daily in/out.

Loading bays on Phase II are longer term staging.

Sensitive equipment typically will want to be staged at Crary where dust is less.

Phase II:

1. UNAVCO – technical event, not science event, LIDAR services

2. Iris Pascal – technical event, seismic equipment, not science

Currently these two groups use 100% of Phase II receiving /staging and 25% of assembly and test plus a separate milvan.

<u>1.2.1 1:00 pm to 4:00pm Crary Lab Meeting w/ Bev Walker and Cara Sucher</u>:

Aquarium Needs:

- Site map of seawater system
- Distance from pump to aquarium. Elevation difference = ~60'

Same pump is used continuously for specific experiments.

BL179 on jetty is Seawater (SW) intake pumphouse.

SW intake pumphouse – submersible pump pumps into suction of booster pump.

Crary Lab pump (SW booster pump) to Phase III.

Specs for pumps?

Water plant provides warmed water for de-icing.

No redundancy in SW piping to lab.

Water circulates around Phase III and back to outtake and out to sound. *Sometimes the line back to sound freezes up (has heat trace or flush with warm water).

CRREL may be able to help with ice studies/questions.

Sound temp = -1.9 degrees Celsius.

-1.5 degrees Celsius coming into room at Phase III.

Change of 0.4 degrees Celsius is not acceptable for some researchers.

Pipes and tanks in aquarium are not insulated currently. Tanks may or may not sweat.

Seawater intake pumps will pump either 160 gpm or closer to 200 gpm.

Pumps at SW intake has high pressure switch so if flow around aquarium is not high enough, it will shut down.

Consider a bypass to maintain minimum flow?

Bev will provide photos of various experiment set-ups.

Kim will set up share file site for Crary: Aquarium Photos.

Limit 2nd floor mezzanine access for only Crary folks?

Bev ok'd 1 freeze drier instead of 3 in lab support

Centrifuges – all are a little different, so may need all or several.

Sample packing was near field party staging so still need this area?

Aaron Seal – Can he provide a SW line system map?

Phase II support is more specialized for grantee issues. Should/can this be relocated to IT? Joe Harrigan (ASC) says will be provided in IT assignable offices.

Extend roof catwalk along entire length of Phase II

Network servers still needed?

Phase II storage is now dark room (next to Faraday Cage), mostly used by Phase I.

Faraday Cage is currently IT storage.

More and more going to scientists bringing all their needs and storing crate/boxes temporarily.

Phase III no need for many windows due to animals who are from below the ice.

Light blue tanks may be hard on animals so a different color would be best.

Double SW header to feed tanks to maintain stability when adjustments are made to one tank.

Water wall – measures PH, salinity, florameter. Can add different sensors as science changes.

*Specs for water wall by USAP?

Add bathroom in Phase III

Facilities folks in Phase III MEP wing – office space (2 people now and refer tech)

Marine Ops – should this be Phase IV of Crary?

Talk to Aaron Seal regarding flat pads adjacent loading docks.

July 21, 2015 AM

2.2.0:

Common Themes (from yesterday):

1. Budget cycle is important
2. Skyway connect to FSS from IT Ops building
3. Extend Crary spine to connect to Sea Ice support
4. Expansion of IT and to what level IT Ops needs

IT OPS Breakout Session (morning):

Grantee systems now in Crary Lab would be relocated to science co-lo in BL004 (1st floor) (822 sq ft). Room for ~20 racks according to Joe Harrigan (ASC-LM). Cara says this consolidates from numerous locations on station and some now in Crary. Need to confirm this suffices for Crary.

Help desk (will support Crary also with desktop support in IT Ops) in central services but not necessarily for Crary?

Crary back-up data requirements/number of racks? – Confirm if needed and if so, how much? Need to advise Nick at Baker if needed. **Nick will send out questionnaire to solicit input.**

Grantee communications (radios, etc.) are issued by IT Ops – They combine into a bin → Goes to FSS to be issued. Training may occur at IT Ops or at FSS once per season, but may be multiple groups kind of layered over each other.

2016 (Scott Base?) Horizon study for IT Ops is needed since it sits in a pocket. Crary Lab and CS will have better line of site.

To implement transition to IT Ops of Crary Lab IT support (co-lo science support? And racks (up to 20)) what needs to happen in advance? Equipment ordering, etc.? (Servers in Crary to be replicated to support data collection on servers in IT Ops co-lo?)

- Assume 2020 (September) move in to IT Ops
- 2020 – 2 years for server acquisition? (operational function, not design)

July 21, 2015 PM

Physical Security (Afternoon):

Current electronic key card access at Crary Lab

Current integrated islands of imagery – No longer desired – Brian Stone wants to have imagery up north for mission monitoring.

- South Pole monitoring in tunnels/runway/PP for situational awareness but not necessarily for security.

Access Control:

- Locations – Main IT building: certain areas
- Utilities – Power and water
- Antennas – Not for 10m satellite dish/telescope?

Was Crary key card access part of original design?

Crary needs to have locked safe for controlled substances (used on animals).

Hazardous cargo staging building needs security also (traverse?).

July 22, 2015 AM

No notes

July 22, 2015 PM

Helo Ops:

This morning:

- Situated awareness
- Communications
- Remote diagnostics

July 27, 2015

3.1

Overview

- Crary waste (haz waste) needs to come out and not go to another building. What minimum quantities will have to be staged at Crary for this to be the process?
- Traverse Ops – Will this be kept completely separate from VMF? MEC (Mechanical Equipment Center) needs to be located somewhere – perhaps VMF or Traverse Ops? (2 stories of equipment storage will be demolished in Phase II (Bldg 168). Should it instead be demolished in Phase IV?
- Phasing of Crary – Needs to stay as is or can later phases precede other phases?
- Central services (Phase IV) will impact Crary Lab field party staging (due to skybridge addition?). Perhaps skybridge between Central Services and Crary should be installed during Ph 7 renovation of Crary Phase I west after field party staging is relocated to Crary Ph I east during Ph 6.
- Hazmat (asbestos, etc.) assessment will be completed in November 2015 to inform construction estimate.

July 28, 2015

3.2

Central Services

- Large number of passengers on C-17 coming in October/early November; after that, C-17 is not necessarily full.
- Spiked shoes used during winter but not later in summer. Need to provide bench space at central services in the vestibule for donning/doffing spiked shoes.
- Central Services - Goals – Right stuff/Right place/Size

July 29, 2015 AM

3.3.2 9:00 – noon: Track 2: Crary Session

Crary Phase I:

- Major feedback from the grantees the first week:
  - Need more space…
  - No central glass washing
  - Labs need more flexibility/scalability
- Kimmy Bowyer (KB): Daily grantee requests for items, space for materials/in coming cargo.
- Tim Briggs (TB): Can be general warehousing or some Crary items.

- KB: Maybe some in trade shop. Where will the hazardous materials bulk storage for the Crary Lab be? Need more chemical storage.
- Keith Johnson (KJ): Power outages may have been alleviated recently with Power Plant/wind power/JSOC
- KJ: Phase I boiler replaced with smaller boiler that is not operational. Fire riser in that area now (boiler room) up to valving upstairs. Will need to be relocated to the new MEP addition.
- The original boilers were steam and have since been replaced with a hydronic boiler which interfaces with the site heat recovery loop.
- Above water tank is main electrical panel. Relocate to new utilidor entry.
- Materials coming from/going to Field Science Support daily/whenever C-17 arrives/leaves at end of season.
- Proposed Phase I dock location may collect a lot of snow. May need to be covered or with a vestibule.
- Locate switchgear at storage (left) on mezzanine or maybe fire equipment.
- Outside deck and/or flags from Chalet (use open grating?), limit operable doors on that side.
- The freezer rooms/environmental chambers will remain in the middle of the phase 1 area outside the biology labs.
  - Condensers will need to be located on the floor above and the heat recovered off them.
  - How critical is temp control of the chambers? When the evaporators go into defrost cycle, the space temp can sometimes climb 1-2F. May need duplex evaporators.

Crary Phase II

- Proposed deck on coffee bar may be impacted by drifting similar to space between Phase I and Phase II.

Crary Phase III

- Supplies for mechanical room at new MEP wing.
- 75-85% of mechanical spaces may be consolidated but some will remain in the different phases of Crary – Danny Rauchenstein (DR – PDC). CHP would save a lot of space. Floor space is at a premium for science.
- Joe Ferraro discussed adding a new Sea Ice and Marine Ops Wing down the hill from Ph III (would be Ph IV?). General consensus that Phase IV (connection to Sea Ice Support/Marine Operations with utilities fed from Crary) is a good idea.
- Robert Posma – Power outages – localized or base problem? Both – in Aquarium and on Station. Station power outages may have been resolved.
- Bev Walker – Seawater line – One jetty for science and station pumps.
  - One waterline into sound for 4 pumps
  - Now the only back-up pump system is one deployable thru ice. When there is no ice it is not deployable. What are contingency plans in open water situation if pump(s) go down? Potential single point of failure for seawater, consider adding redundancy.

  - Storm two seasons ago there was significant erosion. Was pipe with pumps damaged at that time? Was dog leg more pronounced after this storm?
  - Science requirements for seawater – need to mimic sound conditions closer.
  - Different seawater system in Aquarium to mitigate issues with water?
  - Similar to Palmer? Two water lines: one filtered and one not filtered. Is filtered seawater needed in the future?
  - Also at Palmer: Two salt water lines so can back flush one while other is running.
- Insufficient Seawater Pressure due to usage.
- Need to monitor seawater temp.
- The Overhead Door is an issue when open during windy days. Add a vestibule or air curtain?
- Facilities Engineer (for Crary) – Typically specialized service techs.
  - Assist the Grantees
  - Handle general maintenance
  - Maintain Barber Coleman controls
  - Their office would include a maintenance area
  - ASC envisions less time needed by these techs to provide maintenance support after the renovation is complete
- There was an issue with the seawater heating up too much when pumped up from the sound. Needed to be chilled back down? Potential for heat recovery off of chilling process? Will increasing flow/pressure address this?
- The seawater intake/distribution system is considered a weak point.
  - Looking for more reliability
  - Currently only have unfiltered seawater at McMurdo.
  - NSF is reviewing the need for filtered seawater infrastructure (filtration would be a major add)

Crary General

- Will there be any modeling of the airflow on the site (RWDI)? Need to ensure Fume hood exhaust and turbine exhaust don't get re-entrained.
- The existing lab has many roof penetrations which haven't been too much of an issue, but we should try and limit them based on North Slope Experience. Also, there is some roof mounted user equipment for experiments.
- Matt Emerson (ME - PDC) – Regarding vibrations: From walking around or when?
  - Pick-up trucks and large equipment, when freezer doors slam, heavy carts in hallway, wind buffeting, environmental chamber doors shutting, helicopter takes off – biggest concern is in Phase I.
  - Phase I was reinforced in original design. If equipment is relocated to Phase II, may be an issue.
  - Carts/dollies/pallet jacks cause vibration. Can do vibration mitigation on small scale with anti-vibration tables (microscopes). Balances can't be used on a windy day. Will sometimes go outside building where there are no trucks/vehicles to do calibrations/measurements.

    - New road on the right of Crary may increase traffic – less traffic on left side? Relocation of helipad? May have to look into stiffening the building.
- KJ: Freezing in crawlspaces with specific wind direction.
- Grounding of the building is a potential concern due to dry soils. Most buildings are tied back to the transformer and ultimately back to the power plant.
- DR: If we were able to rewrap buildings – would be huge gains in efficiency. Vapor barrier is key.
- Joe: Designed to be R40.
- Loading docks get a lot of wind infiltration when open, resulting in rapid temp drop. Need to add a vestibule or an air curtain (more economical).
- There are some requests for decks on the 2nd story plan south of the phase 1 area, and off the coffee room in the phase 2 area. Could be tricky structurally.
- There are some exterior stairs that could benefit from a canopy (snow shedding, drifting, etc).
- There is a desire to add a road down the plan right side of the lab. This could prove trick considering the steep grade and the flat areas required for the loading dock at the plan east side of phase 1 and the plan east side of phase 3 Aquarium.
- There is a desire to have a pad outside of the aquarium for experiments that need daylight (diurnal?). Not sure if this would be like an outdoor wetlab or just a concrete pad.
- What are the humidity requirements for the labs? Typically they are 30%-60% which will be an issue with the envelope at sub-zero temps. Would they be willing to employ a humidity setback based on outdoor temp? UAF has successfully employed this with no issues, dropping as low as 10% RH when it's -50F outside. Reduces potential for envelope damage/failure due to frost.
- FCA is showing fume hoods and storage on the exterior wall of the labs. This will make keeping condensate off the window difficult (radiant ceiling panels?). It may also bring the freeze point inside the vapor barrier if not careful. Also makes heating difficult.

Nathanhoople.contractor@usap.gov (send seawater report by grantees) – KSC sent on 7/30.

Breakout Session Participants:

Kim Bowyer	Kimberly.bowyer.contractor@usap.gov
Nathan Hoople	Nathan.hoople.contractor@usap.gov
Danny Rauchenstein	dannyrauchenstein@pdceng.com
Aaron Seal	aaron.seal@merrick.com
Keith Johnson	keith.johnson.contractor@usap.gov

July 29, 2015 PM

3.3.5 3:00 – 4:00 pm: IT&C Morale Session

- Considering using RFID cards for Crary Lab access.
- RFID or Mag Cards could save money if tied into dorm room lights, power and ventilation (turn off when out of room).

- Key card access terminals on the exterior would need a vestibule as they cannot hold up to the weather at McMurdo.
- Crary will need CCTV Security. Comm Racks will need video monitoring.

July 29, 2015 PM

3.3.6 4:00 – 5:00 pm: Traverse Ops/VMF Discussion – Precursor for Tomorrow's Charrette

- Air National Guard (ANG) has inadvertently been left out of Master Plan programming
- VMF and Traverse ops could potentially get combined into a new facility or into the existing VMF (143).
- VMF thermal siphons have failed due to snow drifting and the floor has seen some shifting. Merrick structural engineer reviewed and issued a report recommending derating the allowable loading. This would mean that existing VMF could only be used for light equipment maintenance unless the floor is replaced (no larger than a truck).
- The above Traverse Ops/VMF items do not match the Master Plan and need to be addressed.
- Potential options will need to be vetted quickly to move forward and stay on schedule.
- The Traverse Ops group operates completely separate from the rest of McMurdo including food.
- There is discussion on whether or not the mechanics in the Traverse Ops can be integrated with the VMF mechanics.

July 30, 2015 AM

Informal Sidebar During 3.4.1. Re: Crary Lab - Kimmy Bowyer, Joe Ferraro, Kim Claucherty

Kimberly Bowyer: Over winter storage for grantees? (forklift, pallet jack) Where? And how much? Maybe could be an level 2 but would need a hoist.

Supplies Include – (Nalgene bottles, etc.) What is storage volume needed? And ideal configuration based on case sizes?

- They inventoried all this at end of the season this past April so should be available.
- Currently have storage in about 10 milvans elsewhere.

July 30, 2015 PM

3.4.2 1:00 – 3:15 pm: VMF/Traverse Ops

- The Traverse Team travels at 6 mph and tracks a 50' swath
- 16 tractors hauling other vehicles (with blades, knuckle boom cranes, winches (MD865 Cat))
- 2 Radar Tractors Prenock (like at ski resort) with 15 ft. boom with gpr
- Traverse modules: 1 genset
1 tool shed
1 bunkhouse
- 2 Traverse Platforms: #1 will go 2x during the season
#2 will go 1x during the season

- The Traverse goes from McMurdo → South Pole
- 144,000 gal fuel is the target per traverse but delivery has been 100,000 gals of fuel per traverse (8 bladders X 6)(2015 may pull 10 X 6)
- 300,000 gallons per season to get to Pole is conservative
- About 60 days roundtrip:
  - 25 days → SP (3 mechanics/1 Field Supervisor/4 drivers/1 mountaineer for each team)
  - 2 week stay (will help SP with fuel off load and other tasks at the Pole during the two weeks such as science platform, Marble Point, etc…)
  - Mechanical repairs at SP. Most done outside but engine work inside
  - 15-20 days to return to McMurdo
  - Two tractors pull the living modules
  - First spot traverse on Halloween, Oct 31 return to McM– Arrive at McM on Nov (thanks-giving – 19 Dec at McM
  - 10 days at McM
  - Third traverse leaves at New Years with return early Feb.
  - 700 feet on ice, 20 mile climb, 300 mile on the plateau
- Wait 2-3 weeks before #2 leaves. Pass each other on top of Polar plateau.
- Back at McMurdo: Pull into bay 1 or bay 2.
- Bldg 183 is another facility they use: (old incinerator bldg) get food for traverse (refer container at ball park). ANG uses Bldg 183 also.
- Bldg 175 2nd floor: How is it used here?
- Preparation at McM August 20 winfly
- When arrive at McMurdo, here is the sequence:
  - Head to Bldg 183 after training. Use ARC (sled on big air cushion) platform for toolsheds (have to build wooden pads for this, also will build HMW (polyethylene sheet).
  - Install wood deck platforms on sleds 8 X 64
  - Prepare sleds
  - Do inventory & DNF
  - Receive food from storage in 2-3 mil vans of frozen food
  - DNF dry food goes from 173 storage to 183 to be divided into packages for the 3 spots. Traverse staff meet delivery from plane and product is not handled by McM cargo staff.
  - Prepare and repair leaking bladders
  - Fuel the bladders
  - Bldg 192 Safety – Keep tractors plugged in as they are prepped for traverse. First spot stages in town for start of traverse, 2 35K generators run to power the traverse.
  - Tractors from #2 go out to shear zone on ice shelf at 32 miles and locate crevasses and dynamites and fills them Oct 10 – 20 with ½ crew.
- SPTSA – SP Traverse Staging Area
  - 6 tractors:
    - 8 bladders each
    - 3,000 gallon each bladder
    - 30’ long x 8’ wide (more specifically 7’4”) per bladder
    - 64’x8’ HMW (rolled up together)
- Build up at fuel pits – Rig the traverse sleds. Staging area at airfield.
- Maintenance on modules at SP staging area.

- Tractor is not limited to 8 bladders – in process of trying up to 12.
- Now done outside but would like to do inside:
  - HMW rollout inside so can pin it down and flatten it
  - Layout two HMW sheets at a time
  - Each HMW weighs about 2,500 pounds – a double roll comes as 5,000 pounds
    - Stacked in sets of 8 – stored this way for last 3 years
    - 3 new rolls of HMW each season
    - Could schedule roll-out of HMW and bladders in alley?
- BL175 – Rent conference room upstairs and office with 4 desks. Cory & Rick operate out of here and 2 supervisors.
- 30-45 minute morning meeting to delegate tasks:
  - For 2 months until they leave (20 Aug to mid Nov)
  - 15-16 people to meet each day in upstairs conf room
  - Personal gear is basically cold weather gear – leave stuff in milvan at incinerator building.
- Food at BL183:
  - 2-3 people to go thru it
  - Frozen and dry goods and DNF
  - Divvy up into 3 traverses.
  - Take it from BL183 to modules at staging area
- Food to BL183:
  - Town & supply store it and deliver to refer at pad (greenhouse)
  - 2 refers used to segregate (spot 1 & spot 2)
  - Dry goods (mixes, crackers, etc.)→ BL174 → haul to 183 and segregate to milvans at 183
  - Food is moved from BL183 milvan to Traverse modules
  - Food ordered from 5 suppliers.
- What is ideal space and configuration for operation?
  - Right now bays 1 & 2 at VMF (24 hours maint., 2 person each bay/tractor)
  - Repairs and maintenance in summer for the season
  - Finishing up spot 2 (8 tractors + 5 tractors for science traverse = 13 tractors)
  - If had 4 bays – would not need night shift
  - May be better to use bays 24 hours
  - Why are VMF mech and SP Traverse mech separate?
  - Other town duties – runway/shear zone/etc.
- Do various projects at McM.
- Operators log and store rolled up bladders
- Winter staff goes through and repairs gear for reuse in Bldg. 183
- Prior to Winfly? 2 mech all winter does help. Now have April operation so have a big crew for longer.
- No mech this winter
- Have separate tractor tools
- Vehicle repair and prep
- Set-up requirement

- Unfolding of HMW
- Loading fuel bladders
- Instead of adding bays – maybe add time and do maintenance thru winter, but may not have parts. Winter flights every 6 weeks.
- Spare parts at these locations: 143, 132, 168. Entire first floor of 132 – CAT spares, genset spares, caribiners/nets/straps. 100'x41' = 4,100 sq ft (4900 sf? warehousing only)
- Could use a space 2 x HMW = 64'x8'(x2)
- Need smooth floor to roll out
- 2 to 3 weeks needed to unroll and attach to toe plates.
- Space for bladder repair maybe two at a time or 4 and use HMW space with overhead crane or loader
- Over 2,500# each = 5,000#/pallet.
- Life cycle = 3 years for HMW
- Install valves in top of new bladders
- Hose storage and rebuild in a clean room
- Fuel tank 344 – houses some equipment (rollers/idlers/tracks)
- Pad 9 is current storage location for all equipment
- BL183 is close to pier and ice so it is good

<u>Outside Storage, Etc.:</u>

- Storing HMW on berms
- Some vehicle maintenance
- Vehicle parking above pier

VMF: Services 250 pieces of rolling stock including heavy equip such as Cats and busses

- 24 passenger vans
- 52 pick-ups
- Bulldozers up to D9 (90,000 lbs)
- Terrabus – Ivan (40 passengers up to D9 weight) takes 2 bays
- Cress has to be pulled thru the bays 3 & 8 due to turning radius (3 trailers and 2 tractors for Cress. A trailer takes 2 bays)
- What will vehicle level change to with newer buildings to support?
- 25 pick-ups work in town or go to airfield (8 to trades + 17 to servicing science) will be replaced with electric side by side ATV type vehicles or hybrids. Supply only has 1 pick-up and uses aging forklifts for delivery.
- Bulldozers fleet to be streamlined moving out old equipment with smaller equipment. D9 to D8 with more power.
- Shuttle vans may decrease with 1,200 populations going to 850.
- Staff 15 day shifts (30) and 10 at night (3 females) total of 40
- Where to change in future? Maybe at trade shops? Do they need to be housed inside in the future due to susceptibility to snow drifting?
- How would fleet change with new station design?

- Current challenges:
  - 6 bays available with Traverse taking bays 1 & 2
  - Limited space is inhibiting throughput of work at about 90% utilization
  - The large equipment drives the size of the facility.
  - More science traverses which could add another 5 tractors (Maggie Kunuth says there is clamoring for another traverse platform for science.)
  - Ross island earth station
  - Only portable exhaust apparatus. Funding pending for system
  - All bays are standard and not specialized
  - Washing done in bays with an oil separator outside. Freezing occurs. Floor is no longer sloped to the drains.
  - Only two drive through bays; 3-8 and 4-9
  - Programmed maintenance is 40% w/60% ad hoc or emergency depending on season. Winter sees programmed large re-builds. Summer is more ad hoc with tire changes and battery charging.
  - Mobile generator buildings and Cress vehicles with trailers don't fit into bays. Crane has to caddycorner into adjacent bays.
- VMF: parts storage is chock full (2-3 people at all times)
- Mezzanine storage would be great
- Engine and transmission rebuild shop used for light vehicles, now – engine rebuilds done CONUS or in NZ. Lockers now in this space and still needed.
- Machine shop still running a lathe – 70% vehicles, 30% science – still making a good chunk of parts that are not available
- Need a clean room for hose-building in engine and transmission rebuild shop.
- Break room – used for safety meetings. Maybe 15 or 20+ folks in there.
- Fleet ops drive the vehicles, 25-30 people meeting every morning. 40 people total.
- Tool room 114 – House all tools here. Also, all field tools here. Highly pilferable, so secure area. Tool attendant also builds and tests hoses and works on light vehicles. Could have hose build and test in adjacent area.
- FLAMMABLES 124 – used for books and 2 computers for look-up for mechanics
- Oil/lube room – flammables stored here (Flammable storage lockers in Bay 5 and 6 and near transmission rebuild
- Oil dispensary
- 2 welders on station (bay 10) – 1 at VMF, 1 at facilities (Metal Fab. – Welding of equipment especially light vehicles and blades and buckets of dozers.)
- Battery charging area – for all batteries on station. Special explosion proof construction.
- Stairs up to mezzanine. Difficult access and very dirty.
- Tire bay. Air supply for drive up would be good.
- Bays are used for all types of maintenance
- 2 portable exhaust systems to use in bays
- Oil drained but only have bay 6 with a drain system
- Floor has settled so wash water is squeegied to drains – sometimes freezes
- Oil put in 250 gal totes at Bay 5
- Oil spill containment area is only in the bays, not outside so limits to where certain maintenance can be done.

- Are showers in here? No, but they are needed.
- Parts storage is too small. Manned by up to 3 in day and 2 at night. Serve by delivering to several facilities such as Fire House, Water, Traverse
- Parts storage also handles parts for:
    - SP Traverse/wastewater plants
    - P16
    - BYRD
    - Etc.
- Mechanical space will lose water tanks but small gain in space after micro turbine installed. Includes compressor.
- Engine and transmission shop used for light vehicles & hose repair in the
- Machine Shop used for science support and work for S. Pole however a modern C&C machine would decrease space taken up by old lathes. Less parts needed with modernized fleet.
- Break room: fits 15 or 20 +, current staff total staff of 40
- No showers and industrial laundry in current facility
- Admin staff area includes VMF & Traverse staff. Need is for open office space with one private area. Current layout includes private offices:
    - Kiosk with three computer stations (Office 5 – now used by all mech (3 computers))
    - VMF Supervisor
    - VMF Foreman
    - 2 Traverse mechanics
    - Service writer (work order admin)
- 15 employees on days/10 employees at night
- Use bridge cranes all the time. 2 currently are adequate.
- Waste oil evacuation system is needed
- Trench drains are needed to avoid working in the "lake"
- Lighting needs to be improved in shop
- Forced air heat is used now
- Radiant heat may be a good alternative (overhead?)
- Have each tech at each bay able to do their work without the center of the bay blocked (bays 2/7)
- Higher and wider doors are needed to service genset modules and blades on tractors. Largest need is 18' wide.
- Vehicle staging for and after repair. Currently on Scott Base side of the building and way of operations.
- A centralized Station car washing facility with specialized system

July 31, 2015 AM

- IT needs to be out of BL189 and moved into building 004 for the phasing plan to work.
- MEC is in 2nd floor 004 – Needs to be relocated for phasing to make room for ITC at 004
- Side-by-side and snow mobile mechanics are the same
- VMF – Pick ups will be reduced. All-terrain vehicles will be reduced also?
- Traverse – Do they stock bladders to store? If so, how many? With or without vents?

- Traverse – 5 new platforms added. (Read the national science recommendations in September)
- VMF & Traverse shared needs: Meeting space , repair bays
- Phase 0 of master plan to relocate Field Safety Training (Fstop, mountaineers), will eventually go to SSC:
    - FStop – 5-6 people
    - One of the mountaineers is dedicated to the Traverse and calibrates and reads the Ground Impulse Radar.
    - Other 4-5 mountaineers instruct the outbound science community (2 day survival course for any person going out of town)
    - There are inside and outside classes of approximately 30 people, 7 AM to 5 PM class and overnight camping (5 pm – 10 am overnight on ice shelf. Happy camper.)
    - Winfly to Halloween for new folks
    - Refresh class, 4 hours. Continuous classes for returning people.
    - High bay space to teach belaying
- Sea ice training course for anyone driving a pistenbully
- Mountaineers also may retrieve equipment for grantees
- ANG – AGE ground equipment, gensets ("ground power unit" genset) and big heaters cannot be outside over winter, at airfield during season. Both small footprints. Aircraft ground equipment.
- AGE – Will prep ANG engines but not touch the engine. 5000 sq ft (staff of 3-4), small shop function for repair during season. 1st floor of BL157 or BL153? VMF repairs their stuff now but would be better if AGE had own repair space.
    - Storage and minor workspace.
    - Separation and security required.
- ANG (Air National Guard) – Propeller storage, skis for aircraft. BL156 ground floor for ANG right now. Some "bench" space rather than "shop" space. Repairs occur at the airfield
- LC-130s only fly all over continent. C-17s in and out do not fly to other parts of continent.
- "White elephant" provides power for runway lights which is SPAWAR equipment
- Scheme "B" 1 – VMF and Fleet Ops in orange, blue is traverse.
    - One building with all Fleet Ops /VMF/Traverse
    - MEC/part-time FSTop?/AGE/ANG in current VMF and construction equipment during phasing (in 2 bays)

8/4/15 10:45 AM

4.2.2 Sea Ice Support Breakout Session

- Sea Ice – LDB may end up somewhere else
- Old helipad may work for LDB – Steve Dunbar
- Pistenbully parking – elevated platform (3') between stalls to facilitate loading
- May also need laundry function
- Need to estimate program requirements for dive services
- Shower and Rinsing – in a dry suit
- Full shower stall with trash can (can dunk fins and rinse suit in it) with hose to rinse gear, use running water for dive gear, regulator, masks, etc. and rinse yourself while in suit.
    - 3'x3' size is adequate
    - If coming from far away, may already be out of suit
- Current area is 10'x10', including shower stall which includes wet storage (suits after taken off)
- Standard season – 18 divers on station. Have has as many as 32 divers.
- It is trending less - fewer divers
- on contract side – For 2015/2016, 17 divers total for entire season (5 ASC divers, never more than 3 at a time, 12 grantees).
    - A lot of grantees bring their own divers
    - Dive season starts early October until 12/15 when sea ice goes away
    - After that time, ASC divers assist w/ facility
    - ASC divers (2 thru out season)
    - Closes down in winter
    - All gear is ASC
- Have a little storage at Crary for regulators, etc.?
- Have any salt water requirements?
- Right now this is done at Crary – no need for salt water requirement
- Have a locker area for divers now – currently have cubbies and not locked lockers
- Separation of wet and dry function:
    - Lockers in dry area
    - Change into dry suit at locker area
    - Then get into pistenbully – diver is part of grantee team
    - Most of PIs are divers
    - ASC divers support some grantee groups
    - Before any diver goes out – will check out (dive) to assess their skill level and orient them
    - Storage requirements -
        - Wet gear hanging
        - Wet gear
        - Dry underwear hanging space
        - Space to fill tanks
        - Breathing air compressor with storage tank

- Also have bank of storage bottles they can cascade
- Limit compressor run time – less noise, less start/stops – try to fill tanks all at once
- Equipment and regulator repair (work room needed/work bench)
- More and more O2 associated so a clean area is needed

- Gas with greater than 40% O2 - the area has to be clean area? Dirt in valves is bad.
- Flammability of O2 is a concern
- Don't want to put regulators together in a "dirty" area
- Co-joined work space is acceptable
- Training requirement – so need a space for this. Videos in dive training space.
- Frequency of use: Every time a grantee group comes in – at early season this is about 2x a day. About 8 people in the training session with a demonstration element so not in Crary but in the dive services area (locker area?)
- Laundry – Needed residential or commercial? Don may know.
- Medical facility will have hyperbaric chamber and be able to monitor diver
  - Standard treatment is 4 hours – Rick
- Right now decompression is between fire and medical
  - They use chamber every week for testing depth gauges, etc.
- Can test entire equipment at once
- Tabletop decompression chamber to test equipment would be helpful
- Dive services is responsible for chamber
- Have to maintain training for chamber throughout season
- The doctor prescribes treatment but dive services implements
- In 30 years, the chamber has been used 13x for treatment
- What is best location for chamber?
  - Maintenance/training component
  - Frequency of chamber treatment
  - Was at fish hut when chamber first came to McMurdo – OSHA prefers it to be closer to dive operations
- Every treatment done so far has been the day after
- If retrieved by helicopter after an accident – how to get them to chamber?
- Follow up: Can an emergency landing spot be close to medical? Don says will be investigated.
- The doctor can get to anywhere – but dive ops needs to get to chamber right away and get it operating and get patient into chamber
- Chamber supervisor can run chamber by himself, but likes to have 5 people qualified to operate the chamber
- Seems best to locate at medical as long as everyone understands why, etc.
- Door to chamber NOT right through medical department – separate entrance
- Also can get equipment in there easily for testing
- Need a couple of chairs/desk right outside? To track/monitor while test is going on (4 hours)
- Not a separate office needed
- Freezing gases: In air storage space?

- Gas type 1?
- Gas type 2?
- Freezing gas – mix of N2 and O2

- Space dive chamber currently inhabits is OK
- Need ability to install portable (like Coast Guard) (hyperlite chamber) Hyperlite can pressurize to 60' of sea water, patient is in there by themselves, not used for seriously ill people, chamber is 7' long for a stretcher, need a clear space of 7' in front of chamber
- Current chamber is basically a Cadillac – Rick
- Summary of needs:
  - Shower rinsing – a closet rod to hang suits while rinsing
  - Dry underwear hanging
  - Dry regulator storage
  - Tank filling
  - Equipment repair area
  - Training area with video capability
- Current facility works
- Current cold storage
- 12x12x16 fish hut is used for storage of coring tables, sample bottles, ASC divers
- +20' container used for storage of dive gear, hose and communications cable hung on outside
- Grantee sampling equipment? Could be used more efficiently.
- Some consumables, makes sense (pull as needed) to store here for efficiency – close to divers
- Dive Umbilicals:
  - 300' long/4'-5' in diameter
  - Have racks on outside of milvan and hang all winter long
  - Have 7 dive umbilicals now
  - Have a couple things on top of milvan? Power cable for underwater welding and cutting
- Inside milvan:
  - lead weights
  - Dry suits – science divers bring their own for ASC
  - Have extra dry suits for all divers
  - Have shelving unit entire length – 3' wide
  - Other side: Tanks inside in addition to those in the dive services area (in racking system)
  - Aisle down center with storage along both sides
  - 40' total of 2-3' deep shelving
  - Current square feet is a reasonable space
  - Before we had milvan, everything was stored on Crary dock
  - If possible, install a fueling station down here for pistenbullys
    - We dive every day (3 divers)
    - Will fuel at beginning of day
    - Gear up next
    - Head out

- Pistenbully tracks not designed for gravel roads so corollary maintenance benefits if can be fueled at dive services
- Need high pressure air to top of pistenbullys (tanks?) need to be able to access from adjacent platform
- Redundancy on station for air compression so no need for N+1 at dive services
- Deep field people hang out at at BFC before they go out (~2 weeks)
- Divers hang out at dive locker now:
  - 1 side of dive locker is locked for shop function
  - 1 side of dive locker is locked but key is available to users of the facility after hours
  - drunks can't get into personal stuff which is locked up so lobby is unlocked but separate locked area is needed (vestibule which can be accessed in a storm for safety)
- Over last 10 years, fewer grantee divers since ASC is helping with their divers. Every diver takes 2 regulators.
- Will ROVs supplant need for divers? No, just allow more support to grantees?
- Do see more and more diving – contractor may provide more of the diving but grantees will still want to be in the water themselves.

8/5/15 2 PM – 4 PM

4.3.4 Amory Lovins Presentation

- Rumsey: expert on lab equipment and fume hood. Energy saving opportunities.
- Exhaust air heat pumps – on fume hoods?
- www.rmi.org/rmi/
- Windows in Lovins' house:
  - R-20 windows K.26
  - 6 selective surfaces plus xenon
- 9/? Charrette report comments back and published
- ASC is hiring a BIM consultant

8/6/15 9 AM – 5 PM

4.4.1 – 4.4.2 Building Performance/Energy Efficiency/Energy Production

- Watts/square foot: kwh – 58.3 kWh/sf = 2.8 gal/sf fuel consumption equivalent (2.3 gal/sf includes renewables)(58.3 kWh/sf includes heat trace, utilidoor losses, etc.)
- Industry standard: EUI – for a building we have numbers, for a city we have alot of nodes
- Need a metric set – for the design team. May be value in using buildings to modulate the power available
- Mark Bartram – 350 KBTU/sf is ballpark average
  - Crary is tight, others not even really insulated
  - What can we generate onsite due to resource opportunities?
  - Then work back to find target energy consumption
  - What is the fuel tanker frequency desired? One every 2 years? One every 5 years?
- Neil Miller - McMurdo Fuel Facts:
  - Fuel equipment -221,454 gal/yr
  - Does not include SP, deep field camps, etc.
  - 8 miles of 4160 volt line
  - Need ? miles of heat traced line and waste heat
  - Heat trace – now some is on/off and some modulates
- Leah? (RMI) – Flexibility is key. Need to design in as much as possible.
- What is science load vs. operational load? Metering for buildings: not much is available – can break out some use
- Energy model – will start at building level
  - What is our goal first?
  - $26 MM cost for new PP year 0 (about 2009)
  - $117,880,548 year 1 (operating cost?)
  - $79,460,734 year 2 (operating cost?)
  - $74,639,196 year 3 (operating cost?)
  - $50,527,102 year 4 (operating cost?)
- Neil – Renewables and 80% efficient MicroTurbines can quickly lower operating cost by $2MM/yr
- What is our operating goal in $?
- Fuel, maintenance & operation?
  - Keith has 90 on staff
  - Anthony has 12 on staff
- NSF – Maggie – wants 3 year resupply. About 500,000 gal/yr consumed – Or shoot for 300,000 gal/yr?
- Or start at root of what facilities need to operate?
- About 82% reduction from where we are now seems realistic
- Leah (RMI) – Seems realistic. Maybe start with resources that are available now to inform our goal

- With a bad baseline, 99% may even be feasible
- May want to allocate heat trace for water and other utilities to start
- 1 engine at 40% and MicroTurbines in town and boilers for heat and vehicles in town, cannot meet the 500,000 gal/yr with this scenario. We use 442,000 gal/yr for only the single generator.
- With 1 system to provide heat and power and 4MW wind or other renewables – if wind is available, this would see better reduction than now
- Neil Miller:
    - 36% of fuel energy at Power Plant is converted into electric
    - 35% power and 45% waste – Microturbine or ? recip generator
    - With more renewable – we are shifting to all electricity, less (waste) heat
    - If we are heavy in electricity and wind goes away, we have to pull from Power Plant
- Shaggy:
    - Building envelope – glazing
- Cara (RMI):
    - Under 25-30 KBTU/sf all net zero buildings are in this range
    - RMI Innovation Center
    - Capture solar heat gain – thermal mass in floors, etc. passive heat gain
        - Biomass phase change in walls
        - SIPS construction R-40 walls, R-60 roof, no thermal bridging
        - Super tight air infiltration: 10% of normal
        - Liquid applied air barrier on top of SIPs over taping (Cured within a day. Mark Bartram – enclose in summer and do inside in winter)
        - Stay on top of all subs and make sure quality is there
        - Glulams in core and SIPs on outside
        - Floor is structurally cross laminated timbers
        - Temperature limits of air barrier – Cara will confirm
- Results in 75% reduction energy use intensity.
    - No cooling system for this building
    - Super small electric radiant mass
- Schuco FW50 + -SI series instead of typical - Kawneer 1600 series
    - Minimized thermal bridging – they measure infiltration thru windows
    - These are operable with actuators and locking mechanism
- R2.6 code – 5x better than code:
    - Alpen Quad Pane C100 – 2HM88 films, 3 air gaps with 90% krypton
    - Alliance windows (trade partner who pulled order together)
    - Alpen windows (gas fill)
    - S16 (glass & film)
    - Schuco (aluminum frames)
    - Super insulation on north. Less insulating and pull more passive solar on south.
- 6 Factors:
    - Also using heated/cooled chairs (Hyperchair), surface temps

- Air speed
- Humidity
- Clothing level
- Air temp
- Activity level

- Looking at exterior wall with phase change to hold heat or cool from night before
- Different between body parts, hands and butt most important for heating. Face is more important for cooling.
- Radiant doors and walls
- Thermal mass
- Windows
- Bio PCM (phase change material) in walls and lighting shelves
- 64 – 80 degrees Fahrenheit is band for temperature
- 90% heat recovery
- At least make this a requirement - .6 ACH (air changes per hr) at 50 Pascal is passive house requirement for air infiltration
- Army new construction requirement – 0.25 cfm/sf at 75 Pa
- RMI preliminary test – 0.174 ACH at 50 Pa, 0.176 cfm/sf at 75 Pa
- Would focus on net zero and passive house and not LEED (which may become just a point game)
- Smoke testing: done
- Construction consultants used to make sure quality is maintained – sealing it up guru says this is tightest building he has seen
- Separate ventilation system and temp control: decouple ventilation and conditioning system
- Battery storage including bi-directional vehicle changing stations
- ? Use plants to give off humidity?
- CBE has a chart that plots hours(?) in each room on a psychometric chart – RMI designed to this band – modeling looked at all inputs to thermal comfort
- Costs to achieve 40% energy svgs via envelope drop off as more savings is achieved
- Annual EUI in KBTU/sf (RMI):
  - 42 with traditional system – envelope
  - 36 high performance envelope
  - 32 daylighting and light
  - 29 Thermafuser and efficient HVAC
  - 0 roof top PV array
- Merrick – Dan Harrington, Elec. Energy: Prod/Efficiency/Performance
- Merrick - Kevin Breslin – Energy model
  - Inputs:
  - Initially high level - focused on building geometry and their materials
  - Then fine tune how it is used
    - Occupancy
    - How occupants move around
  - Will include Wastewater treatment & water

4.4.3 Nancy Clanton – RMI, Lighting and Daylighting

- Fractal patterns – (nature Design & Controls = Net Zero is the ultimate)
  - Judith Heerwagen – University of Washington, has done research on daylight view
  - What about nighttime view? Or the winter in Antarctica? May be an important view to have.
  - Live webcam – can't tell the time of day it is
  - A lot of junk out there now – people that are in total total darkness – what is the need?
- During our first 6 months, melatonin needs are imprinted on us.
- "Melanopic lumen" – Whole building design guide is incorrectly using this term
- Need blue light during day to produce serotonin
- When we sleep we need absence of blue light
  - LED produces a lot of blue light
  - To go from blue to red you go from high energy to low energy – phosphor changes
  - Melatonin – critical for healthy sleep
  - Screens turn to amber in evening. "Influx" program.
  - Cannot produce melatonin without production of serotonin
  - Melatonin works in darkness only
- Red is long frequency light and does not affect melatonin. Should address with electric lighting system
- Cone and color vision are associated with X chromosome
  - Some women are tetrachroma
  - Women have enhanced color vision
  - Women prefer warmer light at night
    - 10 deg sun in south in December at its highest point
    - In April thru Aug. - No sun at all.
    - LEED Version 4 daylight and views does not work outside 48 states
- Redirect glare to useful light
- Reduce or eliminate ambient light and consider surface brightness
- Parabolic troffers – get rid of them
- Solatube has a model for low angle light (have daylight dimming louvers)
- Sleeping medication issued from medical – Need to look at us
- Can consider installing solatube in wall instead of roof but will only work 50% of the time. *Can use to go around corners and bring in horizontally
- Foot candle is the wrong metric – surface brightness is #1 for the ambient. Ben says certain tasks need this.
- IES also has luminance recommendations and formulas to translate illuminance (fc) to luminance. (IES is going in this direction from fc)
- Emergency egress lighting is 1 fc
- Hallway lighting can vary. If you lit the walls, may be able to get by with 2-3 fc
- Contrast is important for vision. Use this as metric for visibility.
  - Increasing/decreasing light level does not change contrast

- Digital controls for lighting are important and can integrate with smart grid. IP addressable and mesh network
- FHWA – Next generation controls will be on your phone and use to control
- Solid state lighting is the future
  - Fluorescent will not have parts in 2-3 years
- OLEDs – not affected by heat. Surpass efficacy of LEDs in 2 years (primary red)
- LEDS affected by heat (primary blue)
  - Primary red and primary blue blend together to integrate
- Next: Future of exterior may be laser
- OSRAM was light that can be controlled via phone – 4 different lights in 1
- If can see the light source (exterior of McMurdo) that is wasted energy
- LEDs fall apart at -50 degrees F (boards separate)

4.4.4 Kevin Breslin – Merrick – McMurdo optimization strategy – Operational efficiency

- How to instill water consumption ethic? 30 gpd/person at Pole, 110 gpd/person at McM
- Water usage per dorm varies –
  - Long time users in upper case dorms much less water used
  - Other short timers use 2-3x more water
- Coin operated showers?
- 55-60 deg F in bathroom so longer shower is a natural behavior
- Use greywater for vehicle washing
- Use waste-water heat and grey water reclamation?
  - What is actual potable requirement?
  - Commercial laundry uses an ozonator and potable water today
  - Potable percentage may be higher since no irrigation and other uses such as what you would see at a normal city
  - Can we recover water used wash that is evaporated in driers (in Europe condensers are already in driers)
- Glycol heating (40% propylene) – use single heat loop
- Currently not humidifying at Crary – only at JSOC and a handful of buildings
- A vapor barrier on absolute interior of wall
- IPOD does not last long due to static electricity:
  - Need static controlled flooring
  - Grounding of control covers
  - Touch screens on gensets – operators discharge before they touch

4.4.5 Smart City Presentation:

  - What will be monitored vs. what will be controlled?
  - Main controller in command and control?
  - *Tie the smart grid into OUI for energy consumption per building

8/6/15 Recap:

- Will use wind process to evaluate configuration of Phase IV Crary and Traverse Orientation
- #6 Dive facility – Clarify numbers to accommodate
- #7 Resolution on strategy to combine VMF & Traverse. FCA will start working with Merrick on best way to organize buildings on the site.
- #8 FSS cartoon bubbles were further developed
- #9 Utilities – Reviewed strategies and material flows
- #10 RMI Presentation – We were inspired to establish stretch goals and work as an integrated team
- This is an efficiency project – think beyond what we normally do. Get added benefits like well-being, etc.
- Touched on opportunities at PP, WWTP, etc. What about those that are out of scope?
- Ben – Scope is an issue – Those elements are off the table. As professionals we should be looking at things critically. If there are compelling arguments we may reconsider.
- Ben – This is a long term project. We will have to live with the results. Keep your eye on the prize/tow the line on scope/convey to ASC/NSF any "dumb" things. Can consider outside of scope if it makes sense.
- Rick – Good ideas that are coming in: We are poised to provide a range of goals to NSF for building performance, etc.
- Rick – Session on energy production:
  - Lighting session: focused on well-being and lighting energy svgs
  - Energy optimization
  - Smart grid

Merrick and Company Charrette Notes

Charrette Week 1
Denver/ASC, July 13-17

Monday July 13 (1.1)

0900 – Welcome and Introductions

Refer to sign-in sheet – ASC, NSF, A/E Teams

1.1.1 1000 Internal Team Meeting (ASC / Oz / Merrick / FC / Baker)

Dave Winkler provides a presentation to the A/E teams

All 8 D-B projects are aiming for 35% by June 2016 (Merrick/OZ)

D-B-B projects to 60% (with potential for 90%?) by June 2016 as well

Clarification on why D-B and D-B-B mix was provided
- D-B is generally faster and promotes better collaboration
- ASC feels they could get best industry talent utilizing D-B
- But has to do with the color of money and the things they are able to do now versus later

For the charrette, documentation is going to be very important
- OZ will be leading the effort on the creation of the charrette reports
- After the charrette reports are produced, will generally utilize September 2015 to get the basis of design (BOD) going
- ASC has a template to help with the production of BOD
- Likely will start design in earnest in October 2015 and will have until June 2016
- Between July of 2016 and February of 2017 will be when everything is going "final" based on the actual design and cost estimates

Ben Roth – this will be a recommendation to the NSF director and they have up to 60 days to make a final decision
- That presentation was a while back so should be hearing on this in the next few weeks

Dave Winkler – the external panelists are not associated with the NSF
- Put through the wringer with risks, contingencies, etc.
- It's a very formalized process

Rick Petersen presentation on schedule for charrette
- The first two weeks are really primarily focused on listening to grantees, users and key stakeholders
- Need to listen carefully to a cross-section of the scientists
- Hear the grantees, users, scientists, etc.
- Should be able to represent each of the facilities that we will be designing
- This week about the grantees, next week engaging allied agencies (aircraft, helo, tenants like NASA, etc.
- Listen to how best support the activities currently happening as well as what they will be doing (adaptability/flexibility)
- Listen how activities are changing
- In Denver, the design team will then integrate with ASC support

Design should be adaptable / flexible

Ben Roth
- Wants grantees to let us know what they are thinking
- It is difficult, if not impossible, to predict where science will be heading in the future.
- Provide a platform that is flexible for future grantees. This is the vision.
- Nature – elaborated on NSF's stance on the Science Vision
  - Need to understand that NSF operates from the large scale to small scale
  - NSF doesn't dictate what should be supported, the community lets them know what they will be doing
  - National academies have a current study indicating what's coming up for science
    - Follow-on study from them on what kind of science will be performed in the next 10-20 years, similar to the Blue Ribbon Panel report
    - Have done workshops and outreach throughout the country
    - Dates haven't been set, but anticipate report(s) due ~Aug this year
- Shaggy continued to provide direction
  - Working on scalability
    - That will get us 30-50 years of useful life

Conducting User Interviews
- Rick

- Pull as much info as we can from users
- Will create a charrette report
  - Note making new information
  - Compiling what we've learned /created
  - Understand not just needs but priorities
  - Learn projects goals and importance
  - Articulate this back to users, strive for buy in from grantees, users and key stakeholders
    - Make decisions
- Ben Roth
  - Document what's beneficial
  - No second guessing
  - Document what's been said / dialogue had with a goal of identifying mission needs
  - Provides a solid step to move forward
  - Really, really need to know requirements
    - Find the bare minimum
- Don (Oz)
  - Intent of the Friday session is to set path forward based on what we hear from groups
  - Will be a clearing house of information with NSF and ASC
- Rick – Wants context
  - For instance, some "wellness" things may be in conflict with logistics/efficiency
  - Requirements will be prioritized
- Joe Levi
  - Listen to scientists and they'll listen to each other
  - Encourage them to talk together
- Shaggy – in reference to the SAC personnel in attendance
  - ASC folks have deep understanding of how the station runs
  - Not always looking for input on how it should run
  - Users will know methods, daily life, etc.
  - They're there to vet what's going on behind the scenes
  - Operational SME's will be quite useful
- Nature
  - Broad spectrum of the grantee community that will be attending this week
    - 6 disciplinary program areas which are issued money
    - Biology
    - Geology
    - Etc.
    - Some of these folks don't regularly interact, so the team may get some information from this collaboration during the charrette

Shaggy reminded the team that ASC and the A-E team need to set the pace / voice of interviews

Nature – it could be detrimental if the grantee community is working/interacting directly with "the money"
- Might lead grantees to withhold information

Don S – runs through general agenda for the week

Ben Roth – suggests really emphasizing that the Master Plan 2.0 is generally set
- Would need a very compelling argument to change anything

1.1.2 1030 - Kickoff with ASC Science Support

Introduction of ASC staff and personnel – refer to sign-in sheet

Shaggy downloads the group on the goals of the charrette
- Not looking to recreate the wheel
- Planning horizon is 35-50 years
- Mentions the concept of scalability

Dave W – reiterates that we have the framework/footprint of where things are going to go
- Folks will have another chance to review when we release the charrette reports
- Intent of this is NOT to leave here with drawings and such

Shaggy reiterates to ASC group that we WON'T be bouncing questions off of NSF

Rick encouraged the team to ask the correct questions and listen
- Don't want to frame it like "what do you want?" but more "what's constraining you right now?"
- Manage expectations
- Don't want to overbuild

Dan Dozer – What is the process a researcher goes through to get brought to the Ice (e.g. gets a grant)?

Cara – Describes the process
- Starts with a planning team that works directly with the principal investigator (PI) on the project
  - Determine who, what, when, how, etc.
  - Dependencies for time, location, duration
  - Then they work with the implementation side of the group to come up with a broad plan that will cover the breadth of the project (around 2-4 years)
  - Make sure it covers what is needed
  - This will also unearth what group is lacking
    - For instance, if it is an inexperienced group they would add a mountaineer guide
- Operational Notice
  - Shows how things will happen logistically
  - NSF / ASC / Scientists must all agree and vet it out
  - This is a driving doc to ensure grantee receives what is needed for grant
- Then goes to the Support Information Plan (SIP)
  - Detailed plan for getting their work done on Ice
  - Implementation folks are then directly working with the scientists
  - Fill out in April
    - Gives a good buffer to get it right
- Then goes to Research Support Plan (RSP)
  - Right before the scientist goes to the Ice
  - Summary of all discussions for summer season
  - Works out exactly what they'll get for support when on Ice
  - This is "actually what they need"
  - Can vary between years and is a constantly morphing plan
  - The RSP is the document followed by staff / grantees while on the ice
- Includes detailed items
  - Logistics (to, from, around)
  - Equipment
  - Support for equipment, research
  - Helicopter hours / snow machines / etc.
  - Food, chemicals, toilet paper
  - What needs to be procured and moved

Ben Roth – How are the facilities adapted for research? What happens if a particular space isn't available?

Beverly Walker describes the process
- Start with the SIP
- The SIP has dropdown lists with existing areas to be used/requested
- If something doesn't exist, it's not on the dropdown list
- They can handle special requests by input in the comments section and there are alternatives
- In these cases, they will work with the scientists on how to possibly update a space, push the project out a year, etc.

Dan Dozer – What happens when experiments are completed?

Bev
- Select items will stay and they'll incorporate into inventory if applicable
- Sometimes they make it go home or retrograde as trash
- Multiple groups may collaborate, so it's hard to split up any stuff that's left behind

Jesse Crain
- People leave behind LOTS of drilling equipment since they "might" use it again
  - Lots of stuff lingers, especially if it's large

Matthew Ericson
- In the SIP, trash and retrograde hasn't been captured well prior to now
  - But they are now starting to capture this aspect

Jesse Crain
- There is sometimes a mentality that a grantee's pending proposal will come in
- This can delay retrograde operations since they think they'll need it next year
- Need to decide when things just go

Shaggy – briefly touches on the concept of "Phase 0" – namely the effort to retrograde MCM prior to the Master Plan activities

Ben Roth – How does the process change between long term vs short term experiments?

Jesse Crain
- Short term
  - Usually 3-5 years of funding
  - And 1-3 years of field work
  - PI – Might have several projects but they are the Principal Investigator
- Long Term
  - Funding for maybe 5 years
  - But the groups continue to re-propose for their work
    - They expect it to be continued
  - They usually have a probe or something being monitored
- Other long term
  - Items like drills (always need ice coring)
    - They hold on to some items if a reasonable expectation exists
    - They can earmark resources
  - Items like Helicopter camp
    - Sometimes needs to have critical mass / many users

Ben Roth – What is the storage scenario with expired equipment

Jesse Crain
- They can move items that aren't applicable any more
  - May take up to 2 years to move
  - Need space for the relocation though
  - Very rarely is it instantaneous
  - Also need some amount of space for items in limbo
    - Think about how / where to store
- Sometimes it's stored in McMurdo but needed elsewhere

- One season may be needed to analyze for reuse
- Once something has sat in MCM it takes a lot of time to evaluate it

Michael Davis – One of the big spaces they use is the Snow Dump
- Being overrun with science "stuff"

Joe Ferraro – What is the method for inventory control?
- Mark Neely – They are starting to move a lot of items which are lingering
  - Right now, it's the smaller equipment but need to move bigger items
  - This would help set up the ground work for getting stuff out of there
- Steve Dunbar – They have gotten rid of lots of stuff but they do like to keep some items for potential future use
  - They have a poor system for inventory monitoring and they're currently "not there" on inventory control
    - Need more barcoding, want more barcoding
- Jesse Crain – The grantee inventory system is not integrated with the MCM system but this is being cleaned up
  - The problem is it's not part of station system and it "doesn't belong to them"
  - More internal to grantee's items
  - Policy is to remove all items from Ice when funding ceases
  - Hard part is that some items are needed for future proposals
- Kara – With regard to "non-standard" SIP requests
  - Staging space comes up a lot with the folks that are doing deep field science (testing, etc.)
- Bev – Working with grantees on what's to be removed
  - It's not necessarily just the deep field people, even folks staying in MCM and the do-not-freeze (DNF) requirements would warrant discussion
  - Some items fall into no man's land
- Shaggy – Looking to standardize all of this
  - On parts, processes, etc.
- Larry Male – We have the perfect storm right now with everything coming together
  - But it's a good starting point to do this

Joe Ferraro – What's the process for items that are stored at MCM from Pole support
- Storage for Pole at MCM is recognized since MCM is support to Pole
- Need to ensure space is allocated for this

Kim Claucherty – With regard to Crary, what about info that is not available in the SIP? What's not currently on a SIP that you see requests for?
- Kara – Staging space comes up regularly as well as testing locations for exterior equipment
  - They want a conditioned / sheltered space to work on equipment
- Bija – There's only one classroom at present which doesn't always accommodate every group correctly
  - It's a pinch point and scientists are asked to arrive early to accommodate this constraint

Dave Winkler – How would the station change if WinFly became institutionalized – need to tease this out in the charrette
- Jesse Crain – If WinFly becomes routine, they will have a demand
  - Especially folks who have Sea Ice work, Arrival Heights, seal research, etc.
  - If the capability is there, the interest would be there
- Don S – How does this affect facilities?
  - Bill Turnbull – Suggests using Pole as a model
  - Jesse Crain – If they could operate longer in the winter, what other items could arise?
    - People haven't really looked at processes for working in the dark yet
    - Don't know, but they might add night flight
    - Science could be in Dry Valleys in the "shoulder seasons" (e.g. the austral spring and fall)
    - Haven't had the chance to explore but probably would
    - Need to see decisions on how people would push the "winter model"
    - Doesn't think they would ever level the load (e.g. reduce summer population with corresponding increase in winter population)
    - So summer would generally stay the same but winter could increase
- Brian Stone – Reiterates that this is an opportunity to improve the science and support currently taking place

in Antarctica

    - Reduce or contain operating costs
    - How this is done is important
    - Be open to things like dropping from 850 to 600 on population, etc.
    - Reinvention of how they’re running the Antarctic program
    - Need to show efficiency, it's how this project was sold
        - Can’t go in with an attitude of “we’ll do what we’ve been doing”
        - Otherwise, eventually, O&M costs will overtake the science funding opportunities
    - Flexibility and configurability is key
    - Think marketing!
- Jesse Crain – There is a size and tempo that should be noted when talking about MCM operations
    - Need 80% of MCM operational to keep Pole open, due to fuel
    - MCM size is directly affected by Pole operations

Richard B – Does the scientific community think science will be conducted the same way?

- Jesse Crain – Autonomous systems and remote monitoring are likely going to become more prevalent
- Likewise, the community may be open to some sort of flexibility

Scott Borg – Don’t eliminate the opportunity to train researchers

- They do have discussions about if a grantee has to go
- It is very unlikely that they will have “generic” techs to help researchers on ice

Dave Winkler – At the end of the project, will have better tech, better connectivity, etc.

1.1.3 1300 - Intro and Objectives, Rules of Engagement – Kickoff for Grantee Session

Refer to sign-in sheet

Scott Borg briefs the group on why we're here

- We are at the very beginning of the process but can talk about MREFC (Major Research Equipment and Facilities Construction) funding now
- We have the opportunity to re-invent the program but NOT to grow the program
- Not all ideas will come to fruition
- Want to enable efficiencies and flexibility in science

Brian Stone – provides background on Master Plan and NSF process

- Conceptual Design Phase (from July 2014)
    - MREFC panel approved on 16 Jun 14
- Preliminary Design Report (PDR) Phase
    - Made the pitch to the NSF director
    - Currently awaiting approval
- Goals coming out of the PDR
    - Locked into scope and funding
    - Meet the requirements and needs of the users
    - Some things that have been set, but there are still things that can be changed
- Set standards for 35-50 years for this "system"
    - Need to think about how we'll use the facilities instead of what they'll "do" there
    - Seasonal workforce changes?
    - Better continuity of workforce?
    - Offload non-location dependent research operations like training, shakedowns, etc.
    - "Throughput and velocity of the system" - Blue Ribbon Panel
    -
- How to sell it
    - Efficiency program
    - Spending too much money on facilities, no cash left over for research
- Make it economically worthy in addition to scientifically worthy
- Request into FY19 budget, target getting it finished by FY17
    - 8 year buildout
- Economics
        - Reduce number of 'touches' in current system (per Blue Ribbon Panel)
        - One of the things they'll need to do this year is to benchmark the current operation

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Scott Borg – Congress gets that MCM is not a "profit center" but need a good argument that it will be a sustainable system

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1.1.4 1330 - Review and Confirmation of MP 2.0: Goals, Assumptions, Parameters, Building Siting

Dave Winkler – provides a briefing to the group with the scope slides

- Ran through expectations / timelines
- Palmer is "catching up" right now and there will be a separate session for that
- 8 year build out
- Plan to shortlist about 3 firms for each D-B package
- Construction expected to be complete in 2027

Shaggy – briefs group on the rules of engagement and the charrette process

- Trying to figure out all adjacencies and work flows

Rick P – presents the goals for MP 2.0

- Main tenant is efficiency
- Three canons
  - Logistical efficiencies
  - Resource efficiencies
  - Quality of life
- Trying to consolidate warehouses

Shaggy – provides a brief history on evolution of Master Plan from version 1.0 to 2.0

- Existing SSC (B004) is the L-shaped building
- Intent is to square off the back side and it becomes primary IT
- Field Science Support becomes area for cables/wires and such, co-located with electronics shop
- Existing SSC becomes more IT-centric

1.1.4 1530 - Phasing Discussion

Shaggy presents the phasing plans as they were indicated in Master Plan 2.

- In relation to new lodging requirements, there will be the need for 100 to 150 beds for construction personnel while this is going on
- Don't want to dictate that spaces are one thing and one thing only
- Want scalability and flexibility
- Comment on location of helo ops – suggestion to move it to Phase 8
- Concerns on daily access to Arrival Heights
- Concerns on office space
- Concerns on network speeds and capabilities
- Scott Borg – there is no plan to change the access to Arrival Heights
- Concern about pedestrian/foot traffic during the construction phase of the project
- If demo areas are not built over, fill in pits / excavations for ease in surface transportation

Helo ops

- No MPC (max performance climb) when moving from the newer helo ops pad
    - Current helos aren't float capable with payload, can't fly over open water without floats
- Hydrocarbons (surface) at helo is much higher at current location
    - Might need to review the location

More improvement on IT / Comm connectivity

- New Ross Island satellite connectivity (earth station)
- Arrival heights has bad IT connectivity
- Small investments in small upgrades to network hardware
    - NSF
    - Guest network
    - Might need to consider what functions can move off, yet take up bandwidth
    - Want any upgrades to take into account these items
    - New Zealand telecom network (working on using some of theirs)
        - Would complete a fully redundant comms link
        - If that happens, can move certain items off continent

No plan to change access to Arrival Heights

- Antarctica New Zealand is in talks for collaboration for a new, modern facility

Footprints are 'locked', internals are not

1.1.4 1700 - Designers and ASC review day's input and develop notes and graphics for next day's session

Dave Winkler – summarized tomorrow’s expectations

- Suggestions for directing users inputs
- What are you currently not getting
- Where is your science going
- What are your needs
- How can we make life / science / support better for you
- Tell me how you can be more efficient

Airfield has spurred some interest

- Some want to join for next week

Dunbar's Goal

- Publish a paper
- Keep a presence

Tuesday July 14 (1.2)

2.1.1

Rick Petersen – starts out with summary and overview of agenda and ground rules
- Outlines breakout sessions for the morning

Joe Ferraro provides an overview of Crary Lab history
- 1983 NAVFAC awards program to study what's need on Ice
- 1987 design completed

Rick Petersen does a "warm up" session in advance of the morning breakout sessions (following are notes from several people – names not provided as it was just an informal Q&A session amongst the overall group)
- Where is the science world heading?
    - Users indicated that there is a report in progress from the National Academy of Sciences which will outline the direction of research as it applies to Antarctica
    - This will provide the big picture and will ultimately influence the types of science the grantees will pursue
    - The report has not been released yet
    - What are the big things that will happen with Antarctic science?
    - There are always challenges in balancing
    - Science analysis flow
        - Sample analysis could change
        - Samples may be shipped home or more efficient could be on-site
        - Depending on how/where the analysis is happening it will affect the equipment being brought down
    - Crary is an opportunity but it doesn't necessarily have everything
    - Working in the Dry Valleys
        - Science will never really go around the continent
        - Their focus will remain local
        - A focus on the ecosystems and habitats around MCM
    - More push for sky horizon scan
    - There was also an extensive survey of groups of scientists for a project that wrapped up last year
        - In biology, everything is tending to go genomics and molecular
        - Collecting samples in Antarctica and taking them home for analysis
        - Don't foresee this analysis happening on the ice
    - Deep Field Science
        - Will continue to grow
        - Battery technology has allowed for acquisition of more data and longer device life
    - Think about how the facility is going to enable people to do field work – scalability
    - There is a theme of "more and better" science
        - Growth and technology have skyrocketed
        - Seeing a trend in funded sciences going on a growth curve
        - Think we need to consider what today will look like and what we'll be seeing in the 12 years of construction
        - Are there other phases?
        - Would field support double?
        - How do we grow the amount of science within the existing footprint?
    - Another growing area of science is airborne
        - Putting instruments on C-130s and such
        - Also discussions about unmanned aerial vehicles (UAVs)
        - Could have an impact on airfield similar to LDB
- They are getting to the point where the future is getting more sophisticated
    - It might now grow, but it's getting more complex
    - Think about extreme weather items

    - They are still going to be going to MCM to acquire information
    - Beware of too much customization but beware of having too light of a common denominator for lab requirements
    - They also may be facing expanded season lengths with winter flights (WinFly) increasing in frequency and such
    - They may face budget restrictions that limit the amount of people going
    - There are areas of Crary that were never used for their intended purpose (e.g. Faraday Cage)
    - An electronics area was never assigned, which resulted in benches having to be retrofitted to hold the weight of the batteries
    - Intent is to make sure they get what they want
    - Flexibility is key!
  - Impact of WinFly could be huge, especially for meteorology
    - Is ideal scenario in winter due to the very stable, favorable conditions for observing
    - Grantees see where the UAV use would be expanded and effective here
    - Wouldn't necessarily reduce the summer work or population, but would add to the winter research population
  - They are going to see tension between more science "at home" versus science at MCM
    - There will be a greater need for reconnaissance if their seasons are limited
    - They will also need to "do" some of the science to make sure they got what they went there for (e.g. limited field tests to make sure their sampling methods are correct)
    - Need sufficient (not cutting edge) technology to verify samples are adequate
    - If items are time-sensitive (e.g. water, nematodes), they will have to remain on the ice
    - Deeper science or longer-duration research which requires more cutting edge technology is typically done "at home"
    - Not sure what new advances will allow for the deeper science to be moved to the ice or moved from the ice
    - There's a difference between making field collections and then doing chemical analyses or microbiology at Crary
    - They want to do at least some work there so they confirm they have what they need
    - This is generally at odds with the concept of using MCM as a waypoint for science
  - As tech advances (e.g. GPS) think smaller, cheaper and that more teams will use it
    - Number of scientific devices for one grantee's study grew from 2 to 20 since they're more efficient

BREAKOUT SESSIONS

Aaron Seal attends Session 4 – Local/LDB Town Science

Don S/Joe F provide introductions

Don S – wants to understand the "business model" and function of the grantees/user groups in MCM

A question from the users on planning horizon

Don – set at 35-50 years

Run-through of the pre-selected questions (e.g. standard questions that were asked of all the breakout sessions)

Joe F – requests what types of group/science are present as a part of introductions

Ms. Chu – LiDAR research for atmosphere and space interaction (SAIR) – science at Arrival Heights

Byron Adam – MCM LTER group – long term ecological research – 11 principal investigators – most work in Dry Valleys but use Crary to process samples

Mark Neeley – construction manager for MCM

Esther Hill – science manager for ASC

Jeff Warbach – associated with MCM station health – an observer for this session

Ben Roth – NSF project manager

Abby Vieregg – works at LDB – looking for neutrinos and atmospheric science

Dave Winkler – ASC

Christie Hansen – NASA Ice Bridge – NASA airplane at runway

- Needs flexibility in transportation options to get from airfield to MCM
- They have a large team, communication is extremely important
- There are gravity stations where they need access for GPS ground stations
- They fly every day

Discussion continues on constraints currently limiting science

Christie

- Would like better overall internet
- It's inefficient for data processing

Byron

- They are reliant upon MCM for the lab
- Prioritizing field time vs. lab time
- Some samples they do have to run and analyze at Crary
- They are intensive users of Crary lab
- Do research on water samples
- They can't just freeze things and ship them to CONUS
- A lot of it does get shipped back but they do use Crary intensively

Ms. Chu

- Needs access to Arrival Heights
- Winter is more important to them due to the favorable weather/clarity conditions
- Summer is more challenging but they're bringing in new equipment to help

- They use laser beams in research and they're concerned about interference with aircraft and LDB (long duration balloon)
- She needs office space for her people to be there
- Also wants better internet and has had varying issues with the speed of the network systems
- Further on Arrival Heights, other users doing ELF and VLF (extremely low frequency and very low frequency) can impact magnetic field changes
- Her science is generally something that needs to stay out of town
- They need power and internet and food and water
- 4-5 people in summer and one winter-over

Joe F – Asks if Arrival Heights is similar to the "quiet sector" at the Pole and the answer is yes

Discussion moves on to personnel and teams

Byron

- Has 27 slots each year for his team but it's dependent on time of season
- At any one time, 15 deployed (amongst MCM and Crary in general)

Christie

- 25-30 in MCM at any time
- They were in Crary but it was not big enough, so they moved to the Crary library
- They're not there every year
- The team is spread out but there for a short window
- Normal deployment would be about a month

Abbey

- LDB up to 35 peaking just before Christmas
- Another 10 or 12 people for support
- Could be potential for 50 people when they're preparing for launch

Mark – they're seeing between 60-91 people for LDB, but dependent on payloads and amount of payloads

Discussion moves on to frequency of science

LTER is annually

- Deploy October and stay until camps shut down in February

LDB is annually

- Ramps up late October and they're there until January
- If everything was set up right, they could stay later

Ice Bridge

- Typically every other year but got messed up with government shutdown, going to be back in 2017 and then 2019
- Normally down there about a month

LiDAR is year-round

Discussion moves to where they think science is heading (in relation to impacts of more frequent WinFly)

Abbey

- LDB can't fly in winter since they need the right weather conditions
- But staying through February would be on the wish list

Byron

- LTER has gone into April with helicopter-supported research in Dry Valleys
- Would love to come in earlier and stay later
- WinFly would be good start and then April/May end

Discussion moves on to how these groups interact with MCM

Ms. Chu

- Her group has an office in Crary
- They do use de-ionized water
- They need a vehicle, the last 2 or 3 years they just got a pickup that they could use on their own (as opposed to being shuttled by ASC support staff)
- They are "almost" self-sustained
- Would like office space for 4-5 people and they prefer Crary
- Sometimes they do need a fume hood for chemicals
- Typically ship their cargo in by box
- They do have consumable parts that they need to cycle through
- If they bring in new systems, it would equal extra cargo (impact to ASC)
- They typically ship via the cargo process
- Their equipment has been damaged by sea water before when they shipped so they prefer to fly everything

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Ben Roth – explain to us what happens when team first arrives at MCM – walk us through

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Ms. Chu

- They need to clean optics from time to time at their equipment (on Arrival Heights)
- But they need fume hoods to split chems from big bottles to small bottles for transport to Arrival Heights
- Their experiment is a permanent installation so no need to set up or break down
- Her group is "standard" deployment in that it's primarily just the people with sporadic cargo

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Abbey

- Their days consist of very regimented schedule
- There is one shuttle out to LDB/airfield in the morning and one back in the afternoon
- Sometimes team members will stay in town for training and such
- A suggestion for Crary is to de-couple the kitchen/break room from work areas, there's too many people and not enough space
- They monitor the data from Crary after the balloons are launched and they're talking online to Texas once the balloons are launched
- Most people stay for launch and then leave (around Christmas), each group will then keep 3-4 around to monitor the data
- A lot of times they go out to LDB anyway since they don't have a space in MCM that's conducive to their work
- 24 hours a day staffing on computers
- Some people are working from their dorm rooms (not preferable)
- They don't necessarily need lab space, just good office space
- The lion's share of the work is done at LDB/airfield
- They have two huge hangars, shops, kitchen
- She doesn't think there's really anything they could separate/de-couple from the LDB facility (in relation to "moving" work to town)
- About the only thing they would prefer is post-launch office space
- She thinks that their cargo goes immediately to LDB and Mark Neeley confirm (e.g. they don't haul stuff into MCM and then bring it back out – it's just dropped there directly from the flight line)
- in relation to maximizing the launch window, it boils down to weather times wind
- This plus the requirement to get out of MCM at end of season limits the number of launches they can do
- They could maybe launch one more a year, but not necessarily 5 more a year
- One of their big constraints is transportation as they are beholden to the transport schedule
- In a perfect world, they'd be able to stay an hour for training in MCM or late on a Sunday or something

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Christie

- For Ice Bridge they take everything in and bring it out so it's not really an impact to MCM operations
- Most stuff/cargo shipped to NZ via sea container and then flown down from CHC
- They need materials very early in the season
- They do have a large cargo footprint
- They have a significant amount of training requirements

- Their cargo is stored either at airfield or Crary (with limited cases of storage in people's dorm rooms (not preferable))
- They had their own dedicated van for transport but did use the shuttles as well
- Of their team, some people are flying, some people working at air field
- Even with the one van it was cumbersome
- In total, they have about 25-30 people living in MCM with 15-20 people going to airfield on a daily basis
- They spend about one month in MCM but the timing during the season can vary
- They were given dates by NSF for the last deployment (late November/December)
- They prefer mid-October
- They do have needs that are supported by MCM
- Some people doing data processing/checks in town
- If they're not flying, space for everyone is a huge challenge
- They only do full team meetings on fly days around 6 or 7 at night
- There are dedicated servers for Ice Bridge in Crary
- They are fine with going into a cage in a co-located server/data center
- They had rack tents at the airfield where they can do data processing and pre-flight planning (weather, etc.)
- They would like GPS ground station antennae, need to find a place in town where there's a heated room and a spot with a clear view of the sky
- They prefer 2 GPS ground stations: one at rack tent at airfield and one in town somewhere
- They use radios and pagers for the communication
- They use snowmobiles and sleds at airfield to transport parts and such
- Cargo staging has space in Crary (for like 3 days)
- It was a challenge because people were unpacking and taking their time while the space was needed for other teams
- There is nothing driving them to have offices in Crary itself but it would be preferable to be close to their cargo

Byron

- There are 5 different teams with potential for 6 depending on events
- They ship stuff through Hueneme and then flight from CHC to MCM
- They deploy some in October, some in December and some at the end of December so it is staggered
- There are some teams that do need to work together
- There needs to be a PI there for the entire season on the ice (but this could be handed off from PI to PI as teams and deployment warrant)
- The first thing they do is training and such
- Then taking equipment from storage in Crary and configuring their rooms/spaces
- They go to science cargo to retrieve their stuff or go dig out stuff that stays down there on the cargo line
- They have to ask Crary staff to forklift stuff to the field party staging area
- They either assemble and set up in lab or stage it for transport to Dry Valleys
- All items are generally table-top size with some consumables, some equipment
- They keep some of their stuff on "the line" in over-winter storage
- Some stays in Crary, some deploys to field camps which stays in field camps all summer
- At the end of season they pack everything up and it goes to the line for over-winter
- They need BFC and MEC and fuels
- They go up to science construction to get their stuff
- They're constantly using pickups to go around MCM and it's very complicated to get their current resources
- There is almost always a week on the back end of Dry Valley deployment
- The teams come back on an intermittent basis during the season
- Some stay the whole time, some come back periodically and some do "day trips" from MCM out to DV
- It is rare that one person would stay from October-February in the Dry Valleys
- They wheel/cart samples from helo up to Crary
- Comes in on a dolly usually (normally heavy) with 1-3 trips to get everything to the labs
- They have issues with temperature-sensitive samples
- Part of the samples are processed and stay in MCM but the vast majority of samples collected end up in

CONUS

- A lot of the analysis is done in Crary
- The temperature-sensitive samples are "stepped down" to lower temps iteratively and need to be maintained prior to shipping
- Some people are in Crary full-time from October-February with work in offices and in labs intensively
- Long-term storage is a formalized process
- They do intentionally leave some samples over-winter with Crary staff checking in on it over the winter
- They are intensive users of water at Crary and they don't have the water necessary in the Dry Valleys to process, which leads them to come back to MCM
- Most of the time the person that collects the samples accompanies those back to Crary but sometimes they'll pack it up and send it by helo for someone to accept at Crary

Ms. Chu – needs a flammable cabinet for chem storage

Christie – nothing special they need in town other than food, board, "normal" support

Next question #5: how does MCM assist you to do good science

Byron

- Thinks that Crary is a real gem to enable their science immensely

Christie

- The SIP process went well and their complex requirements were captured
- Everything they requested was there
- Collecting their requirements, working with planner and then on-ice implementation went well

Abby

- Love the "simplicity of life"
- Someone cooks breakfast and dinner, they don't have to pay bills, etc.
- Basic needs are provided

Christie – wants more ports for internet

Byron – likes that helo pad is just downhill from Crary as it helps when they're wearing ECW and have to trudge down

Next question #6: what's impeding science?

Ms. Chu

- Internet is too slow

Abby

- Internet is a blessing and curse at the same time
- It could be managed in a way that is a lot more efficient with the current infrastructure

Abby

- Transportation: spends 2 hours a day on the bus every day she's at MCM
- Vans are faster and flexibility in schedule is good
- They could potentially have 3 or 4 more hours a day they could be working

Christie

- If transport time becomes longer, it shortens their science flights and is a direct impact to their science

Byron

- Field party staging area is too small
- There are time restrictions on storage
- Sometimes they need a bigger area to assemble stuff
- They do it outside which is fine on nice days but crummy on bad weather days
- They would be fine with a shared space with other groups

Ms. Chu

- In summer their offices get crowded
- There is ambiguity in whether Arrival Heights is a "field site" or MCM

- They can't get field food for when they're up there for a day or two

Byron
- Wants a biological safety cabinet
- They have issues with vibration in building, the HVAC and helos exacerbate this as well as heavy lab doors opening and shutting

Ms. Chu
- Can hear through walls and would like noise isolation

Next question #7: where do you see your science going in the future?

Abby
- Pushing toward ULDB (ultra-long duration balloons)
- LDB will continue for the foreseeable future

Ms. Chu
- Intention to push for Arrival Heights geobase observatory

Jesse Crain
- Regardless of what happens at Arrival Heights, they need to figure out how to support the work that happens just outside MCM versus discrete science that happens out in the field

Ms. Chu
- Their main impact on MCM is the power requirement
- They need/want more LiDAR stations
- Collaboration with China, Japan, Australia to install a potential ring of LiDAR stations

Byron
- Anticipates increased need for virtual meetings and outreach
- They need something for meeting space that's really not met right now
- He thinks there will be an element of expansion of the science
- At some point, they will have larger collaborative groups to support
- Anticipate a big increase in the use of drones and if they could launch from somewhere near the station, it would be awesome
- They can launch some of the drones right out of the back of a pickup truck on the sea ice but if there was something on Ross Island, it would be nice (but he understands potential impact on helo ops)
- Also foresee molecular-level research which all needs to be done at home institutions
- They do have suites of experiments they would love to do on the ice
- Experiments will become more and more extensive
- They would like cleaner facilities as well
- Doesn't think there would be a need for sequencers down there (for molecular/genomic research) as it's not a good use of time/funding
- Would like more sensitive environmental chambers
- Wants to fluctuate temps and light on diurnal cycles
- Telemetry is a big deal as well, want to be able to monitor instruments from MCM or even CONUS, they are using iridium phone right now and is not optimal

Mark Neely – is there a need in Crary for humidification?

Byron – thinks this would be solved with the new environmental chambers

Dan Harrington attends Dry Valley and Helicopter Support Science

0930 - 1200 - Track 3: Local Science - Dry Valleys and Helicopter Support Science

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Refer to sign in sheet

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1. What do your groups do?
    - Comprised of several teams so wide array of functions / timetables
    - Lots of field time.
        - Sometimes gone for weeks on end
        - Sometimes gone for a few hours
        - Always use helicopter to get where going
    - Prep for field visits

    - Bring back samples
        - Ground water
        - Earth samples
    - Send back data from sensors
    - Analyze samples in lab spaces
    - Analyze data in offices
    - Provide support to drilling projects
    - All projects require

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2. What are the size of your teams?

   Total team size is approximately the same but teams grow and shrink pending science needs
    - Teams range from 4-5 up to 45
        - LTER itself is 31
        - Smaller projects fluctuate down to 4-5 and up to 10-12
    - Teams operate all season

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3. Frequency of research?
    - Teams will be in the field during anytime you can fly the helos
    - There are two basic types of team schedules
        - Short term teams will go out daily to a week
        - Long term teams will go out for multiple weeks to months at a time
    - Due to varying team schedules, always motion moving back and forth to Crary/helo
    - Teams will then use the lab in spurts
        - Short term in there much more than long term teams
    - There's a noticeable spike at the beginning and end of season, when all teams are around

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4. How teams currently work at / interact with McMurdo?
    - At the beginning and end of season, gathering / returning materials from multiple points around base: comm, food, equipment, etc.
        - Described as a 'star' pattern
    - Beginning of season also has approximately a week of spin up with required training at main building
    - During the middle of the season, typically pull back interaction to only three facilities: warehouse, helo, crary. Described more as a triangle.
    - Overwinter storage
        - At the end of the season, work to put equipment in overwinter storage
        - When retrieving the equipment, have to make a call. This can take hours to days to have the box show up at the lab.
        - Selectively, the grantees have had to shovel out own outside container
    - Staging to go into the field
        - When getting ready to utilize a helo, pulling items from several locations
        - Bring all the helo building to be weighed
        - Often need to borrow a truck for short spurts at a time

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- Returning from the field
  - Helo ops will truck grantee / equipment back to needed areas
- Dorms
  - Usually check in and check out so dragging personal gear around every time
  - Sometimes arrive late to where the dorm office is closed i.e. no place to sleep
- 'Princess list'
  - Occasionally have to send a single person to retrieve personal items to bring back to the field. This person needs to have access to both science equipment items and personal items which could be located in several spaces. Could take more coordination amongst the gatekeepers.

5. How does McM currently assist you to do good science?
   - Cages
     - Good size.
   - Helo pad is downslope
     - Much easier to carry gear down than up
   - Having office space in Crary allows for ease in monitoring labs. Allows the grad students to see the science.
   - Good at creating 'organic interaction'
   - Local walk in freezers allow for grantees to drop off samples when returning and then process them when rested

6. What's impeding good science?
   - McM is good but doesn't flow well
   - Need more storage. Right now, have lots of outdoor but it takes a long time to get to it when an order is placed to retrieve it.
   - Would like to track storage.
     - Missing an integrated method for tracking and retrieving storage.
     - Millvan Alley seems to take a long time to get items from.
   - Crary itself lack storage. Some items stashed in the hallways.
   - End of season equipment return is quite lengthy. Is there some way to expedite it?
     - Filling out paperwork
     - Calling Mike Davis for Crary pick up
     - Winter storage
     - Cleaning of dorm rooms
   - Between field outings
     - If there was a way to expedite retrieval of goods, would reduce time at Town
   - Ensure to provide a good living space. It'll come back 10 fold.
   - Need to look at HVAC system in various spaces. Some of too hot or too cold.
   - Would like to have more storage at helo building. That way have time to move items up there, get them weighed and have it all ready for a trip. Sometimes get called and told to be at the helo in 30 min and end up hand carrying heavy equipment.
   - Have to wait too long for a forklift / truck to move gear up to helo or down to Crary.

7. ??

8. What is future process might occur at McM?

- UAV / drone
  - Space to work on, store, and test.
  - Possibly at Crary or at helo hanger
  - Telemetry isn't really liked to be on NSF internet so need to ensure network is there
- Be great to telemeter directly to McM
- More exterior antennas at Crary.
  - Could be on roof, exterior walkways, or on adjacent structure (length pending)
- Possibly need lab for instrumentation at Helo Terminal
  - For future LiDAR type equipment

Kevin Breslin attends Sea Ice session

9:30-12:00 Break-out Sessions - Science

(FC/OZ) Track 2: Sea Ice

Focus on how McM works

Introductions

General
- Would benefit from year-round access
- Sample transport (clearing customs) is sometimes an issue

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1. What is the specific nature of Sea Ice research?
    a. Seal Biology
        i. Daily trips to sea ice
        ii. Go out to cracks, handle seals, track seals, collect data
        iii. Samples are tissue
        iv. No vet work
    b. Sea Biology
        i. Snowmobile
        ii. Drill holes in ice and collect samples
        iii. Small animal research
        iv. Teaching function, also orientation for research grant writing
        v. 50/50 US/international instruction - 30 day duration
    c. Sea Ice - Snowpack research
        i. Snowmobile
        ii. Measure ice and snow
        iii. Measure atmospheric data
        iv. Would really benefit from remote data link to provide daily monitoring of data
    d. Environmental Physiology for Fish
        i. Salinity, pH, temperature, etc
        ii. Work in aquarium and monitor changes in fish based on changing environments
        iii. Sample prep and analysis
        iv. Collect fish - live sample
            1. Collect sample, freeze and transport
        v. Lab prep includes gas mixtures (dry area)
        vi. Sea ice work is mostly water collection
    e. Environmental monitoring
    f. Monitor environmental impact of science research
        i. Collect sea and soil samples
        ii. Minimal use of lab for sample prep
        iii. Samples are typically frozen before shipping

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2. What is the size of your team? (need to see population matrix)
    a. Seals
        i. 4 to 6, but sometimes 8
        ii. Lab may vary from 2 to 4
        iii. Field vary from 4 to 6
        iv. Some work has to happen locally - can't be analyzed in US
        v. Typically three teams operating
    b. Sea biology
        i. 35 to 40
    c. Sea Ice / Snowpack

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   i. 4 to 6
   ii. Only need 2 scientist, but need additional staff to launch balloon
      1. Assistants don't have to be dedicated to program
   iii. Variable staff and working hours
d. Fish Biology
   i. 4 to 6
   ii. Can be split between two sites or field / lab work
   iii. If winter operations are possible, then annual staff could be reduced to 2 to 4
   iv. In the lab every night
   v. Need 2 ASC divers
e. Environmental
   i. 6 to 8
   ii. Split between field / lab work
f. Environmental Impact
   i. Need ASC support for diving operations (2)
   ii. 4 staff

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3. What is the frequency of your research at McM?
   a. Seals
      i. Every year, long term research
   b. Sea biology
      i. Intermittent - sometimes every year, sometimes every other year. Next year will be 2018
      ii. Typically only there in January, a few stay over into February to break down
      iii. Try to coordinate with low staff at Crary (holidays)
   c. Sea Ice / Snowpack
      i. Typically one year on, two years off
      ii. Usually stay one to two months in field
   d. Fish Biology
      i. Funding-based
      ii. Typically two years on, one year off
      iii. However, other fish groups are there and overlap
      iv. Typically, two to three fish groups in attendance every year
   e. Environmental Impact
      i. Dropping off - intermittent
      ii. ASC has a group also

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4. How does your group interact at McM?
   a. Seals
      i. In Crary to prep gear
      ii. Move to sea ice during the day
      iii. Come back at night
      iv. In lab through the evening
      v. Gear needs prep every day/night
   b. Sea biology
      i. One person to coordinate with permanent Crary staff
      ii. Coordination is difficult - logistics with almost every group in McM
      iii. Space reconfiguration for teaching (remove walls)
      iv. Increasingly difficult because more programs are taking space
      v. Field operations increasingly difficult due to staging and ECW equipment
   c. Sea Ice / Snowpack
      i. Start in lab, work in field, lab at night
      ii. Collect 100 of GB of data daily
      iii. Upload to lab every night
      iv. Need better lab space (dry lab, high vacuum, etc)
      v. Equipment maintenance, configuration, assembly is ongoing issue

            1. Need dedicated lab equipment shop
        vi. Grantees don't know what equipment is already available on station
            1. Equipment requests are redundant
    d. Fish Biology
        i. It's a slow process to bring animals back
        ii. Need efficiency when bringing animals back and offload at aquarium
        iii. Day 1 - field, Day 2 - Crary
            1. Starts with 80% field and 20% lab
            2. Ends with 20% field and 80% lab

5. ??

6. What is impeding you from doing good science?
    a. General
        i. Leveling the loading docks
        ii. Internal vehicle storage
        iii. Sometimes there is a delay before equipment / samples are delivered for analysis
        iv. Not enough storage space (more cages)
        v. Long term storage for ongoing research
        vi. Excessive vibration hinders microscopy
        vii. Localized humidity control
        viii. More open lab space?

7. Where do you see your science going in the future?
    a. General
        i. With climate change, open water boating operations may open up
        ii. Longer holding times for animals (longer operating hours and/or long term operation of aquarium)

8. How will it alter your process at McM?
    a. General
        i. May allow longer duration of operations
        ii. May see "gold rush" effect of scientists looking at late season biology
        iii. May see logistical issues with resource sharing
        iv. Could allow for more flexible use of space
            1. Some researchers don't have to be on-site as long
            2. Logistical effort for scheduling personnel and resources
    b. To-do: Get report for NSF winter operations

9. Describe your utility / infrastructure needs
    a. General
        i. More power
        ii. Greater bandwidth
        iii. Greater data/power reliability (UPS)

Jon Delay attends the Deep Field Science session

9:30-12:00 Break-out Sessions - Science

(OZ) Track 1: Deep Field Science

Q1: What is the specific nature of your scientific research?
Brenda ○ Glacial geologist who works in the transcontinental mountains; field camps of 4-7 people Fly in via twin otter, or helos, live in tent camps; study how ice has changed over time
John Stone ○ Collects surface rocks 800-1,000 lbs per season; Brenda also collects tiny amounts of fossil algae. ○ Rock samples get transported back to McM throughout the season, packaged up in McMurdo and shipped back to the U.S. relatively quickly via commercial airlines (2-4 weeks).
Howard ○ Collects terabytes of information; seismology science. Hot water drill about 20 meters long. 5-7 people in field camp. Radar about 500 lbs., 600-700 lbs of drills; Pascals, geophones. ○ Typical field camp would have about 6,000 lbs of cargo; use science cargo for equipment staging.
Kent "Iris" ○ University consortium; 10-15 different experiments throughout the continent; focus on seismology, science is moving to smaller equipment, but broader area of science; more channels (locations); iridium telemetry. ○ Need additional staging and cargo storage. ○ 4-5 Pascal employees on the ice at any given time. ○ Mapping support for logistics and science support; bandwidth is the biggest challenge. ○ Mapping used for safety (i.e. looking for crevasses. ○ Multidiscipline drilling project with 40-50 people; biological samples; temperature control back (do not freeze) to Crary is important.
Kelly Brunt – NASA ○ 40-50 people in field camp; have own aircraft; 5-10 instruments per aircraft; ○ Prefer to have a camp out a Pegasus where 40-50 people can meet; Jessie Crane and Steve Dunbar indicated that there are challenges to this model (ex. handling human waste). ○ Huge increase in permanent field camps ○ Terrestrial LiDAR is employed near McMurdo; due to lack of preparation time back in U.S., more preparation is being done in McMurdo in Crary lab. Different shipping configuration requirements to get equipment to McMurdo vs. shipping to a deep field camp. Need roof space for testing and calibrating equipment.
Mathew ○ Automatic weather station (AWS) 4-50 people deployed per year; installation, repair and maintain 60 weather stations across the continent; 6,000 lbs of new equipment per year. Equipment goes from science cargo to Crary for configuration and testing then back to science cargo. Prefer to have helo close to Crary due to short notice flights on helos.
Kirk Pantos ○ Study volcanos; tectonics of volcanos; 4-8 people per camp. Try to get to field as quickly as possible. Collect rock samples. 1,000 lbs of rock samples per year.
John ○ Geologist; small field parties; 3 different field deployment themes; small field camp 4-6 people; snow mobiles out in field; need to pack food to be self-sufficient. Need office space for times when weather doesn't allow deployment to deep field; geophysical remote camp; need bench space in Crary lab to setup and test equipment prior to deploying. theme – traverse ops – rapid ice drill; 15 people with heavy tractors. Science traverse is different than fuel traverse ops for fuel to south pole.
Ice coring program ○ 2-3 km of ice cores; need to remain cold; 50-60 people in multi-year camp; transport via LC-130. ○ Remote field camps made available to all disciplines every 3-4 years. Transantarctic mountain camps (TAM)

camps. 20-40 people. Go through McMurdo for staging.

- Some long-term science programs pack up at the end of each year, then unpack at the beginning of the season; hauling back and forth from science cargo to Crary lab. Seems to be a need for dedicated cargo storage space.

What impedes current science?

- Points of receiving, staging and shipping are not currently an efficient work flow. Lack of ready access to material handling equipment. Science cargo center needs open roof to test equipment. Consolidation could be problematic for staging and laydown areas.
- Collaboration space is desired in field science drawing upon synergies of the various deep field camps.
- Discussion about rigging teams who set up towers around McMurdo.
- Carpentry field foreman is another valuable resource.
- Long term gravity base and magnetic base stations are an ongoing concerns.
- Would like to preserve certain geodetic controls.
- Quality of life and privacy is a concern.
- Short term housing with single rooms may be a concern.
- Almost all training can be down off ice to improve efficiency – could be virtual.
- Concern expressed about how science will be impacted by phased construction.
- Perhaps there needs to be a science phasing plan.
- One stop shopping would be helpful.
- Limited communication (cell phone via wi-fi) would be very helpful

What is working well at McMurdo?

- ASC support staff are much appreciated by the science community.
- One stop shopping would greatly improve efficiency.
- Initial binder could be improved for new station personnel.
- Helo ops close to Crary or science staging is preferred.
- Collaboration is focused in Crary Lab; scientific community prefers more collaboration throughout the station.
- Access to Crary Lab is a current challenge. Would prefer more open access.
- Prefer to have more meeting and workstation spaces in Crary labs.
- Contingency material and equipment supply is appreciated.
- Some science support staff desire more privacy in order to work efficiency with fewer interruptions.
- Orientation should focus more on which resources provide which services and where they are housed.
- More access to food 24 hours a day.

Where do you see your science research program in the future?

- Logistics and science are being funded out of different budgets.
- More drones will likely be used in the future.
- Telemetry will be used more in the future allowing remote scientific operations.
- Fewer small groups, increased number larger groups.
- More traverse ops platforms going forward; traverse ops comms will need to be increased; fewer scientists in the field will require more and better communication.
- Anticipation is that more science will be conducted for a longer duration throughout the year.
- Autonomous underwater vehicles (AUVs)

How does your team interact with McMurdo Station?

- Need cell phone access to wifi in McM
- What type of infrastructure support is required to conduct deep field science?
- Temporary power, communications, ground transportation?

Byron Adams – LTR group

- 6 person team deploys to Shackleton camp on Ross Ice Shelf; samples a biological and temperature sensitive. Helo supported. Science cargo storage of samples. Keep cold (KC).

Ben Roth

- Would like a summary of work flow from IRIS perspective. Jason – complete training, locate equipment, unpack boxes, assemble in science cargo, disassemble equipment; take flight on C-130 or helo; grantees assemble and palletize their own equipment; science cargo staff tracks the equipment; grantees typically do not travel with palletized equipment

- Grantees could diagrammatically indicate their typical sequence for workflow in terms of building a pallet for shipping to the deep field. Suggested to include on the completed questionnaires.
- Big horizontal laydown areas are requested for cargo assembly and testing.

LUNCH BREAK

Some sessions elect to take an additional hour (1:00-2:00 p.m.) to finalize breakout sessions

Main group session resumes around 2:00 p.m.

Start of group discussions and summary of 4 breakout sessions

- Question #1
  - Sea Ice – Jenn
    - General research nature, daily transits, fish, seals, bringing samples back to lab
    - Immediate work and also prep for shipping of samples
    - They use sea ice as a platform to conduct research
  - Deep Field – Matt?
    - Put together instrumentation, cargo flow
    - There is one group that uses MCM to stage once and deploy to field camps
    - Others are on spoke and hub system with other stations
  - Helo Science – Joe
    - About every discipline represented in MCM and they work close to MCM
    - Their science is a mix of short-term sampling and longer-term monitoring
    - They do sampling and measurement at helo-supported sites
  - Town/LDB – Don S
    - LiDAR at Arrival Heights, LDB, Ice Bridge, LTER
- Question #2
  - Sea Ice
    - Field team size in MCM about 4-8 people per PI/project
    - There is a mix of people in field, some people at station or daily transit back and forth
    - There is a question on fewer/bigger groups versus more/smaller groups
  - Deep Field
    - 2 sizes – a lot had 4-5 people – one had 50 people
  - Helo Science
    - 3 sizes – 4-6 people – larger camps for drilling/NASA 10-12 people – up to 30 on others
    - Often see partnerships to create clusters of slightly larger teams
  - Town/LDB
    - LiDAR 3-5 in summer, 1 over-winter
    - LTER 30 people or so
    - Ice Bridge 25-30 all at once
    - LDB roughly 18 people total
    - Comment on phone that it could be close to 100 with other staff
- Question #3
  - Sea Ice
    - Always groups that are using sea ice every year
    - 2-4 field seasons
    - A project will have a given number of years pending funding
    - There is always something going on, some people come in WinFly and leave early, others that are October-Christmas, others in late-season
    - Usually 2 years of project, a year of write up, a year off then do it again
    - There are double deployment opportunities
    - Contingent on window of sea ice

- Deep Field
  - UNAVCO and such could be 5 years and are there all the time
  - Most are 2-3 years
  - Some are in specified windows like the Trans-Antarctic Mountain class once every 4 or 5 years
- Helo Science
  - Typical with some 2-3 year and some with more time (like LTER at 6 years)
  - There is a wide range of time scales
  - Most groups are related to monitoring, so time is actually a good thing
  - Some folks heading out at start of season for 3 months, some are daily commuters and do work in MCM
  - Within helo-supported science, people are going to be out in October and through January if possible
- Town/LDB
  - All are generally annual projects happening every year
  - LiDAR is year-round
  - Ice Bridge one month every other year

- Question #4
  - Sea Ice
    - With regard to interaction with MCM: in general, their groups use space at Crary
    - They are moving to/from field on daily basis
    - Prepping gear, using Pisten Bullys, helos
    - They come back to station with samples/live specimens, do clean/prep, repeat following day
    - There are issues moving gear to/from field and to lab spaces
    - They facilitate transfer of people and stuff
    - Some do things multiple times per day
  - Deep Field
    - Arrival/training once they get their cargo
    - Set up/testing then they re-pack and get back into cargo system
    - Have to wait for good weather to go do work
    - They are either based out of MCM or hub and spoke
    - Some tend to use science cargo as focus area as opposed to Crary
    - They have split up a bit on how they operate with some using Crary and some doing right outside science cargo
    - They use Crary since there's power and tools and there's also too much space taken up in science cargo
    - They have varying degrees of setup time (e.g. how long they'd leave something set up outside Crary to confirm it works) but normally just a day or two
  - Helo Science
    - Mix of deep field and sea ice
    - Gradient of groups dominated by equipment or dominated by lab time
    - They have different sources for consumables and supplies but generally follow the same path
    - Arrival/departure, food, fuel, comms, etc.
    - They use science cargo and BFC and others (or a combination of them all)
    - There is a strong flow between Crary and helo ops and back and forth between Crary and field science support
    - Some of them do need a laboratory environment
    - Their stuff ultimately becomes cargo
    - The bulk of their science operation has much less interaction (e.g. during the season) with potential for small needs on food, mountaineers, etc.
    - They have issues finding places to over-winter items and then cleaning them off next season for deployment

- Town/LDB
  - The group's biggest elements are generally shared
  - Office requirements, transport requirements
  - Heavy use of cargo ops, with stuff coming into town and usually it doesn't leave town
  - There is a reliance upon Crary and personnel/equipment within Crary
  - Also a reliance on airfield and airfield services
  - BFC, MEC, carp shop, etc. to get out to Dry Valleys
  - Need ability to have collaboration space
- There is a side conversation on hub and spoke concept
  - Can you schlep something far enough by hand or do you need a vehicle?
  - This is part of the challenge
  - Most are using Crary as hub then going to BFC, MEC, etc.
  - The more this can be consolidated, the better
  - There was a suggestion in Rick Petersen's group to chart a course using a bubble diagram which will chronicle how the grantees see it (can identify overlaps)
  - There could be unintended consequences in consolidating things like people conflicting/"tripping over each other"
  - The support staff schedules generally act as their structure
  - The average helo team spends about a week in MCM before they start doing science (training, etc.)
  - For things that involve a forklift or digging into milvans, they do depend on station personnel
  - They generally try to be self-sufficient but if they need a forklift (for example) then they are beholden to support staff
  - If there was more open stock, it might be Ok to help eliminate the bottleneck but there are downfalls
  - Anything that's not in a package to open generally needs guidance/support to confirm it works and such
  - General discussion on having vehicle requirements in the SIP

BREAK

Rick Petersen
- General download and guidance to talk about function (as opposed to a "place")
- Wants to hear more about the process and people

Ben Roth
- One of the things that's confusing is when we talk about Crary as a "place"
- Wants to drill down on if it's lab, lab supplies or whether it's just a good "office space" with no lab requirement at all or a lay down space

- Question #5
  - Sea Ice
    - Those who use sea ice as a platform think it's a well-supported system
    - MCM relieves the day-to-day pressures of focusing on science (support, food, dorms, etc.)
    - Crary as a lab space: most of the sea ice group stages gear, runs experiments, brings samples back, hold fish
    - They also really like the informal interaction space like the Phase 2 coffee area
    - There are interaction spaces in the lab and in other odd corners of MCM
    - They don't want to lose those spaces (coffee house, darts, etc.)
    - They can go out and get samples and the flow works
    - Everyone has generally figured out how the current system works
    - From their perspective, the flexibility of support staff is fantastic
    - Crary is actually a very good lab
    - The aquarium is a bottleneck, but otherwise as a research lab it works very well and it's adaptable
    - By and large MCM works well

- Deep Field
  - Consolidation of variety of scientists in Crary
  - There's wonderful co-location (UNAVCO, etc.)
  - There is a balance between SIP and being ready for contingency ("when Antarctica happens")
  - Most times everything is available
  - They are excited about 24 hour access
  - Good air support
  - Rick Petersen points out that if we become more efficient and reduce stocks, it will be a balance between having "extra" stuff
  - 24/7 ability of the galley for hot food is great
- Helo Science
  - MCM has evolved to support science but in a complicated kind of way
  - Need to make sure we are capturing all capabilities and resources that have evolved over the years and to keep the stuff that works
  - It's a tremendously well-supported station
  - Everything is prepared for teams on their arrival (in conjunction with SIP) and it's a notable exception when it is not ready
  - By and large, preparedness and planning is awesome
  - Walking downhill to helo from Crary is a plus
  - The science support is comprehensive and expert
  - They really like mix of office and lab in Crary
  - They like that they're mixed in with atmospheric and other scientists as it's need-based as opposed to discipline-based
  - Informal benefit to students being in the environment that they don't get at the universities
  - Everyone is pretty friendly about sharing resources
- Town/LDB
  - More accolades on Crary and support
  - The "simplicity of life" not paying bills, having food cooked for you allows greater focus on science
  - The proximity of Arrival Heights has allowed for expanded science

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- Question #6
  - Sea Ice
    - They focused on Crary and some on larger things at MCM
    - Within Crary, the obstacles are aquarium space, physical space, ability to move live samples in/out of aquarium
    - They also identified the need for staging space, gear moving in and out
    - They're moving multiple times a day
    - They would like a mud room with lockers for soiled gear, etc.
    - Ease of movement is challenging
    - They talked about making sure cargo is available on time as sometimes this is a bottleneck
    - The environmental rooms become sample storage from time to time
    - They would like to improve access to sea ice in "shoulder seasons" (e.g. austral spring and fall)
    - There is an element of vehicle flow when they move over to the Scott Base side
    - There are bandwidth constraints, both from the field to MCM and from MCM to CONUS, would open up seasons
    - Would like vibration control for equipment and humidity control
  - Deep Field
    - Lack of easy communications is an issue in context of being able to find other members of party
    - They currently have one pager per team, so if the team needs to gather they need to hunt down all members

- Lack of staging space
    - Would like more collaboration spaces
    - Would like tracking of cargo (potentially online)
    - They're trying to have on-ice training time reduced (virtually? Could it happen in CONUS?)
    - They understand that some of the training is still important and necessary
    - They talked about shared housing and having whole groups together
    - They talked about orientation process and streamlining this, the books are nice but still would like some of the station interaction
    - There are lots of touch points for their cargo
    - There is an awful lot of moving stuff around (and support staff helping them move stuff around)
    - They still have to pack all their stuff up even though they know they'll be back next season and that no one will need their space
  - Helo Science
    - MCM is a very interpersonal communication place, things get done by sitting down and talking to people
    - Every mission/support is different
    - There is a need for more collaborative space for the ability to sit and talk in a quiet and focused way
    - They would like to see more flexible meeting space (private space)
    - They are grappling with same storage issues as the other groups, scheduling/coordination of storage
    - It's the impression of many groups that MCM's ability to respond to tense situations has waned (weather impacts, cargo impacts, etc.)
  - Town/LDB
    - Internet bandwidth and management
    - Limited flexibility of transport
    - Lack of staging spaces
    - The aspect of adequate office space
    - Sound and vibration isolation in Crary

- Question #7/#8 (responded to together per request of Rick Petersen)
  - Sea Ice #7
    - Talked about potential for seasons extending and more flights, potential for Zodiac-based sea ice research
    - Would require facilities and logistics that don't exist currently
    - Would help out longer-term experiments, with the aquarium being an example
    - Field schedules right now are not reflective of the science they want to do, but the logistics involved in getting them to/from their work
    - If the season expanded and the logistics are there, it might spread the footprint on-station across the station and the team structure could change
    - Larger teams for less time or smaller teams more frequently
    - They see more and more collaborative efforts
    - Having informal and formal spaces to interact would be nice
  - Sea Ice #8
    - Helping keep the aquarium open year-round would be nice but would impact staffing
    - If they did Zodiacs, have to figure out how to get samples transported
    - They would like to get samples out more frequently (like to CONUS)
    - There are two different things: some send out samples on the vessel or some sending them out air cargo
    - More frequent sample shipping might relieve cargo ship backlog
    - The stuff that goes out on air cargo can't generally wait long enough
    - There was also discussion on whether you could get tissues back to CONUS
    - More frequent flights would decrease the burden on hand-carry of sample

        - They really had no desire to move lab work from CONUS TO Crary, most think it's not a good use of ice time
    - Deep Field #7
        - Smaller with more amounts on the numbers of equipment for observation platforms
        - This takes smaller batteries, weighs less, etc.
        - Talked about telemetry and iridium/satellite
        - Groups might be smaller but there might be larger groups
        - They talked about bandwidth
        - Foresee fewer scientists going with traverse teams, reduction of that personnel but this would lead to need for communications
        - They emphasized more science throughout the year
        - Exploring autonomous vehicles (land, sea, and air)
        - Foresee more ice core drilling
    - Deep Field #8
        - Ship support and traverse support
        - Would be heavily reliant on communications
        - Foresee making things lighter and more agile
        - Vehicular resources and communication resources
        - They could be placing instruments in the bore holes from drilling exercises along the traverse
        - This would lead to increased demand for servicing of equipment
        - Foresee more testing of systems at MCM
    - Helo Science #7
        - More, better, smaller, faster
        - Remotely-operated vehicles
        - More antennae and controlled roof access
        - Space to launch/retrieve/work on autonomous systems
        - Want to do more work in shoulder seasons
        - Also discussed telemetry and remote sensing/aircraft
        - More science from helo-supported platforms
        - Still will need people in the field to make judgement calls
        - They don't see a reduction in scientists but do see more science coming out of those groups while staying the same size
    - Helo Science #8
        - Increased off-season use
        - On-continent bandwidth
        - Roof access
        - More science with improved logistics
        - Less time in MCM and more time in the field
    - Town/LDB #7
        - ULDB – ultra-long duration balloons
        - Increasing geospatial observatory at Arrival Heights
        - Increased LiDAR network
        - Expansion of LTER
        - Aspect of using drones as well as where the next level of analysis is (e.g. molecular)
    - Phone input comment
        - Consider more stringent management of EM (electromagnetic) interference and transmission
        - Antarctica is "radio quietest" place on earth except for at MCM

Rick Petersen downloads group on course of action for Thursday 7/15

Comment/question/side conversation on whether we should be anticipating international collaboration

Scott Borg

- International collaborations are great, but how do you fold that in
- Might want the flexibility to accommodate foreign interaction but he has a hard time imagining the impacts on infrastructure
- Think about the functional needs of the science
- He thinks there may be the case where there are too many projects going on to support, with relation to the comments on flexibility and spare parts
- They need to keep allocated resources stable (including support FTEs)
- One of the issues on Crary has been safety issues
    - Having consumables in the lab spaces, wondering if there was a conundrum there
    - Easy to have coffee next to the bench
    - Should we think about creating some partition that would not make it that easy to have consumables in a lab that's reserved for biological experiments?
- The design of Crary didn't anticipate that so much space (especially phase 2) of Crary would be utilized for staging
- Preparation of equipment is a key thing but need to find appropriate space
- The program, no matter what size, will have a limit of capacity
- The program officers have a tendency to support as many good science projects as they can and there's a lot of pressure to put as many projects in the field as they can
- But this can overstress the capacity and at some point, you begin to lose flexibility
- Should the bar be raised?
- Overstressing the system comes out with comments like bottlenecks or 8 people sharing an office

End of Session

Wednesday July 15 (1.3)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

Merrick team met with ASC IT/Comm (Kevin Gibbons) for pre-planning for IT/Comm strategies going forward

8:30-9:30 (OZ) Review previous day's work – All Attendees

Rick Petersen starts off discussion for the morning

- Reviewed and summarized the previous day's themes from the grantee community
- Common themes:
  - 1. Reduced touch points
  - 2. Reduced time to field
  - 3. Streamline science support staging
    - a. Geographically
    - b. Operationally
  - 4. Understanding movement of people and goods – grantee comment: would like to understand intended movement between buildings and work centers
  - 5. Clear orientation upon arrival
  - 6. Dedicated space for multiyear projects
  - 7. ASC support has been greatly appreciated over the years from the scientific community
- Comment made that the Crary lab assistant's location at front of Crary works well as is
- Comment made about considering preserving some of the historical facilities where practical (ex. Chalet)
  - Consider reusing some of the historical building materials in the new design
- May need to consider tourism and the historical context of the original facility
- Shaggy introduced the McM entry experience (i.e. the station front door)
  - Concern about entry area/dropoff being in the same space as traffic between Crary and Field Science Support/Cargo
  - Concern about moving the equipment calibration operations from Crary lab to Field Science Support/Cargo
- Shaggy reviewed the Field Science Support/Cargo facility blocking diagram
- Shaggy reviewed the blocking diagram for Bldg 004 (IT/Comm/Data Denter)
- Rick Petersen reviewed a process flow diagram that summarizes the current and future process flow for field science support

Jon DeLay attends the new field science support facility programming morning session

- Programming on the discussion agenda
- Deep field grantees commented that the new field science support/cargo facility program will work very well with them
- UNAVCO – seems to be satisfied with new space allocation in new field science support facility
- RFI (ready for issue) means equipment ready to go for grantees, but not ready to ship via aircraft
- Helo cargo could be incorporated into field science support/cargo
- Would like dedicated ventilated space to test stoves and other flammable equipment
- Field party food needs to be given consideration
  - Perhaps a shoppette within field science support/cargo
- Field science support freezers and refrigerators need to remain dedicated to either food or samples
- Consider a mezzanine to north of field science support facility (overhanging south end of "alley" between science support facility and trades)
- May need work station areas in ATO (air transport ops) and within the field science support
- Consider several overhead doors on E/W/N walls of FSS
- Field party staging requirements were discussed
  - Field science support/cargo
    - Tracy discussed several office, workstation and small conference rooms and adjacent layout space needs with grantees

- Small group office needs of 4-6 people within field science support
- Consider moving mandoors on field science support and Crary lab to the east side of each building connected with a sidewalk across new entry area

Aaron Seal attends the dive locker morning breakout session

Anne Todgham

Sean Place
Chris Cheng
Lars Kalnajs
Mark Neeley
Andrew Klein
Jenn Burns
Cara Sucher
Matthew Erickson
Chris Fritzen
Chuck Angler?
Curt LaBombard
Dave Winkler
Deben Karentz
Refer to sign-in sheet

- Don S – starts out with vision from Master Plan for the dive locker/sea ice support facility
  - Would be for the groups that go out on the ice regularly
  - Storage for ECW and other gear
  - Staged adjacent to the Pisten Bullys and snow machines
  - Snow machines would remain down at the sea ice transition
  - Envisioned as a Pisten Bully parking lot
  - Come back in from the ice, access to Crary at C wing
  - Would include the local balloon launch facility
- Lars – There are two different kinds of balloons
  - MacOps launches two balloons a day, every day
  - And then scientists launch maybe 12 during the course of a season
- Mark – Does this include the mobile structures and the means to repair/maintain those?
  - Fish huts used as an example
- Don – Refurbishment of the fish huts would be done at the trades shop
- Mark – Wants to know where that repair/maintenance would reside
- Andrew – Is this a point to have a conversation about a structure on the sea ice as well?
- Mark – Making an argument that would say put the fish huts close to the dive building
  - Have to pull up to carp shop to fix them currently
  - Some of the materials that the grantees need in the fish hut to go to the ice could be adjacent
- Don – Can discuss this
- Question on the fueling of the Pisten Bullys (PBs)
- Don – We do have fuel capability close by
  - Could be located adjacent to dive building
- Anne – Would have to go to the pass to get gas so it would still be wear and tear on the road/equipment
- Andrew – This could take up to 45 minutes a day
- Cara – Is there a potential for Zodiacs (boats)?
  - Could this facility double as a boat house?
- Don – From the aspect of the MP, this was not discussed but can be included in the executive recap
- Cara – If it were a boat house, it might be something worth mentioning in relation to people with Palmer experience

- Don – Table it for now but will include in notes and discussions
- Jenn – Sea ice access is right below Crary, but in the summer access is over by Scott Base
    - This could change connectivity of roads and such
    - Go onto ice shelf and then access sea ice from ice shelf on the Scott side
- Karentz – Snow machines used from the Scott side
    - There is a lot of gear so staging is important
- Jenn – Things/people/equipment are moving differently than maybe we anticipated
- Anne – If there was flex space for PBs early in the season it would be beneficial
    - But then later on when PBs are no longer usable it could be used for boat space?
- Lars – They start out with PBs at WinFly
    - At main body, some switch so it's a mix of snow machines and PBs
    - Late season is pretty much all snow machine
- Karentz – They COULD use PBs in late season, they've just chosen not to use them
- Lars – No one would use them unless they hauled them to Scott
- Andrew – Brings up the point that we shouldn't focus on vehicles for now since this may change in the planning horizon
- Jenn – Flow of material from Crary to the sea ice
    - Daily operations from Crary to sea ice and back
    - Some aspect of storage and work space
    - Hang up, clean up and dry out
- Drop off points at Crary where you can handle small stuff (nets, etc.)
    - currently leaving in field party staging
- Karentz – Need to be able to rinse and dry things
- Jenn – They kind of need a mini-BFC (Byrd Field Center) in some sense, like the cage space
    - Hang things up and stuff them in
    - Traps, nets, generators, light meters
- Lars – The storage does need to be segregated
- Karentz – Current problem is that field science in Crary is crammed full
    - There are a few cages that can be assigned to groups
    - This needs to be replicated in the new sea ice facility
- Question on what's being stored
    - Electronics, tripods (8 foot tall), poles, shovels, ice axes, buckets, jiffy drills, things that use fuel, survival bags
- Question on personnel
    - About 12 groups max that would potentially use this facility
    - Up to 8 groups could be using this at the same time
    - Some may not use it as intensely as others
    - So a requirement for 8-10 lockers
    - Concern isn't necessarily to have lockers but more segregation
    - Deben Karentz wants security (e.g. lockable)
    - General storage space would also be good
- Following is a free flow discussion on requirements, individuals making statements weren't tracked
    - Generally carry or PB down from Crary with their gear/equipment
    - They want some staging and spread out space
    - They dry out stuff first and then put it in the locker
    - There is a mix of stuff that will be dry and wet and they need some sort of dump space
    - They currently use field party staging to do all of their drying
    - Would prefer something about 4 times the size of the current field party staging?
    - It would be helpful to have full-on waste stream disposal capabilities in this facility
    - There IS a haz waste component associated to the work they do
    - Would like a little shared kiosk for laptops/wi-fi so people can check weather or similar and not have to go all the way up to Crary

- They need a rinsing area
- There needs to be a BIG RED LINE between field science and the dive operations
- They don't want to rinse in the same place
- They want a definite decoupling of the dive half and the science half
- Generally need to think of it as two lines coming off the sea ice, one line for science and one for divers
- All the divers share the same space regardless of whether they're ASC-related or scientist divers
- A comment that the penguin researchers are not represented here in this meeting
- There is a desire to have potable water at the dive locker
- Is there a potential to add sea water feed to the dive building? It would be a nice to have
- They would like to provide for a "dunk tank" they could use to calibrate equipment and test breathing tanks, maybe 10' diameter?
- What are we going to name this facility? The Marine Ops Building?
- Balloons
  - Science balloons are launched from the road in front of WWTP currently
  - They just need a flat spot and a dry bench
  - They're only there for about a month a year
  - A dry bench would be nice
  - A garage door would be nice but sounds like it would already be there for the PBs
  - Standard commercial garage door (12 x 12)
  - Having a garage door on leeward side of the building for the balloon function is preferable
- Is there a potential for over-winter storage?
  - Storage lockers would be sufficient for over-winter space
- They would use an element of DNF (do not freeze) if it was offered
- They would like to see a mud room and changing area
- Would definitely like washers/dryers for sure
  - Teams of about 4-6 people and washing once a week approximately
- There is a question on whether there needs to be humidity control inside the building
- There is a potential for pulling in trailers attached to PBs (or other vehicle)
  - Potential pull-through capability?
- Would like a restroom, coffee station and maybe a little kitchenette
  - This can be shared with the dive side
- There is a potential cross-connection with helo ops
- They would like exterior lighting
- There are 8 PBs to accommodate
- There is an element of vehicle traffic between Crary and dive but also need a nice, solid pedestrian connectivity as well
  - Dave suggests golf carts?
- Tony asks if this could be Phase 4 of Crary? Like with a physical connection?
- A reduction in tracking dust on to ice would help them keep the transition open longer (albedo)

Kevin Breslin and Dan Harrington attend the morning Crary session

Dan H's notes

- Joe from Ferraro Choi (FC) provided the history for the design of the Crary lab with individual entrances and future expansion
    - Thirty years later, the function has changed and expansion is happening through other facilities
    - The updated Crary facility will begin to act like one facility
- Joe provided the history of each pod
- Biology Pod
    - Lots of sound issues between labs
    - Mechanical mezzanine lifts the mech systems away from the floor space in the labs
    - The existing field survey has been made obsolete due to expanded field requirements
    - Facility was built on a 20'x20' structural grid for ease in renovations
    - Services under floor, with mech above
- Core Pod
    - Was designed for initial receiving
    - This was where the field boxes came in and were broken down and vice versa when deploying
    - Boiler in Core Pod
    - Had a fully redundant boiler in another pod
    - No longer working so may be able to pick up the mech space here as work space
    - The Lounge on the 2nd floor was intended as a lounge from the get go
    - Some spaces were never fully utilized so there are also potential gains here as well
    - The Library is used for flex space such as make shift desks for "homeless" grantees
- Earth Science Pod
    - Two large mechanical rooms are not as packed as they were during the original inception
    - More potential to move into these spaces.
    - Rock cutting labs are still there and still used
- Meteorology Lab
    - Has instrumentation up on the roofs
    - Faraday cage was intended but never really utilized
    - The Dark Room has been moved to this pod, in the storage room
- Aquarium Pod
    - Mech room here may be able to be moved into
    - The dive locker space was quickly re-allocated as a dive facility was constructed
- The goal is to make this a laboratory building and move non-lab items to a nearby facility
- Dan Dozer – presented what's the current standard for other lab institutions
- Now is the time to focus on making this a great lab for now and for future
- The lab spaces really need to be flexible and reconfigurable quickly as 'hoteling' happens fast in Crary
    - It will be a fine balance between fully flexible and costs
- Discussed the kinds of functions …remember to think future
- Maintain flexibility
- Typical lab configurations shown
- Although they may not be directly applicable, they show how various adjacencies influence design
    - Offices inside labs
    - Central Building Corridor
    - Open Lab Ghost Corridor
    - Office and Labs Separated
        - This is a new direction that is gaining speed
        - Lots of windows, visibility, opportunity to "see the science"
        - This is how universities are doing things
        - Good opportunity (when you have them) to showcase to visitors
- CU Boulder raised the point that the laboratory needs to have been designed for optics, etc.

    - Also need to mind the ash buildup on filters.
- Dan Dozer – discussed trends for lab environments
  - Sharing of instrument and support spaces
    - Cost of equipment and grant money
  - Core lab suites
    - This may not be as applicable (i.e. only good for glass wash as it serves several users)
  - Flexible casework system to adapt to changes in program needs
  - Increase in computational work
  - Student / lab worker write up space outside of labs
    - Keeps enviro and health safety people happy
    - Different level of collaboration
    - A place to eat / sit / relax
- Evolution of laboratory casework
- Evolution of research lab design
- What's being provided at university settings and what's attractive to you / what's not
  - BYU's new lab (designed by Dan)
    - Natural light throughout the facility is nice
    - Large open lab suite with large, contiguous spaces
      - This allowed for less redundancies so resulted in more lab space
  - Univ of Wisconsin
    - One, large square
    - Lacked a ventilation system
    - Interior core is for stairs, bathrooms and ONE common room
      - Very vanilla
  - CU Boulder
    - 4 big rooms, all adjacent
    - One room as a machine shop
    - Lots of reconfiguration to make it work
  - Montana St
    - New lab but no flexible casework
    - Her lab has no natural light
    - Offices were attached to the lab but all internal
    - Torn if windows to the lab makes you feel like a fishbowl or not
      - Dan said people are quickly adapting and love it
- ASC (former biologist) raised the issue regarding light intrusion and how it affects the lab design
  - It's a problem at Palmer presently
  - Some labs use a pull curtain but that influences the lab flow
  - Darkness isn't just for biologists…laser folks want them too
- Building metrics
  - Analyzed existing Crary lab sq ft spaces
- Challenges with existing building
  - Entry / stairways / spine will remain the same
  - Loading docks will likely remain in the same
  - Kelly / Doug would be totally ok with moving to FSC
    - ASC / lab manager might have an issue when science is spread out
  - Reshuffling of the mechanical spaces
- Expansion in phase 1 explained
  - Holds MEP items
  - As wings are renovated, tap into new head end equipment
  - New mechanical capabilities
    - Unknown
    - Users want air separation system
    - Users want better controllability

        - Users want quiet spaces
- Bev discusses how the facility is used
    - When in 'winter mode', drop temp in empty spaces to lower levels but still condition the space
    - Offices stay warmer for continued use
    - HVAC system has been updated to include better technologies
- Dan raised historical issues and challenges and unique issues he sees
    - Staging for Crary is going to be an challenge and need to work on minimizing how much lab space is allocated for this but don't want to cut it too shy
    - Field gear does not have a great home
- Crary IT
    - It's nice to have this proximity but where does it go?
- The office space here isn't really as you see it at the universities

Kevin B's notes

Crary Lab - Part 1

- Want to update lab with modern features
- Office space was designed to be flexible
    - However, there are soundproofing issues
- Mechanical mezzanine is intended to keep mechanical equipment out of occupied area
- Although there is field party staging, it is too small
- Designed as steel structure on a 21' foot grid
    - Can be torn down to grid and reconfigured as needed
- Interstitial space below floor for plumbing
- Mechanical mezzanine for HVAC
- Many researchers prefer to do their work in Crary because it's a better lab than their home lab
- Trends
    - Sharing instrument/support resources
    - Core lab suites
    - Flexibility in casework configurations
    - Increased computational support
    - Office space outside of lab
- Casework systems
- Discussion of alternative lab configurations
- Building Metrics
- Mechanical systems will be completely redone
    - Current plan is to provide a new addition just for mechanical systems
    - Once mechanical is complete, old mechanical can be removed
- Staging

Lunch Break

<u>1300 - Spin Up for Afternoon Session</u>

- Usually grantees get their same lab back for sequential years
- Cara says that even though they get their labs back, maintenance is done on the off season and this may not be obvious to the grantees
- Dan Dozer reviewed the presentation from earlier
- Ben Roth asked how bench systems approach wet labs
    - Dan indicated that sinks are fixed, known areas, where the rest are movable
- Most labs go for Medium Gray…20% go with black
    - Epoxy resin
    - White are not even recommended by the manufacturer as it's too hard to match

- Seeing more projects with shared spaces
    - Better growth and retraction
    - Lots really like the natural lighting
- Ben Roth asked how you handle visiting scientists
  - Dozer - Common to have spaces for visiting scientists
    - The space is more generic but is still flexible enough to most easily adapt to new requirements

Dive Locker/Sea Ice session was morning-only so Aaron Seal attends second half of field science support afternoon session

Kevin Breslin and Dan Harrington attend afternoon session for Crary

Dan's notes

- Univ of SF - One lab built in 1960s
    - Was never renovated
    - Windows were problematic so went back and frosted over the glass
    - People were unhappy with how pinched the labs /spaces were
- How will new science support center and Crary interact? Who's stationed where?
  - Dan
      - There are people in Crary now who may move
      - Would be more field-based users
      - Wet lab users will stay in Crary
  - Don't want to try and relocate wet labs, would be pricey
  - Computation and / or dry space could possibly move
  - Need to review phasing with users to make sure the labs are renovated in the proper order to be maximally efficient
- UNAVCO / Pascal folks are open to moving into downstairs MEC (MEP? Space) so they could come out of Crary
- Doug (?) has an interest to have an electronics dry lab somewhere
    - Not sure how well it'll work for other spaces / users but would be great to have one that they could hop in on from
- Lars does wet lab work but also needs spaces for a physics lab for lasers, sensitive equipment, etc.
- Ben Roth - Need to really lock down cold storage spaces (freezers, fridges, etc)
- Unknown - Grantees like to have their own lab as they can then allocate space to grad students and storage
    - If that functionality can leave the lab (i.e. reserve spots for these functions), more than happy to get larger labs or share more space
  - BYU grantee
      - Little alcoves, adjacent to lab has a white board
      - Whiteboards in hallways don't work as there's too much traffic
      - But somewhere away from traffic would work.
  - At McM, people use and sit in every nook and cranny.
  - Amy - Pending group size, they just meet in the office
      - Calendars are placed on whiteboards.
- Amy - big, open labs can sometimes create odd scenarios like when each group has music on
  - Dan mentioned there are treatments for acoustics but might need labs broken up into smaller space
- Dark work
  - Again, users requested this for smaller periods of time
      - Amy said that they use a small room and run the instruments in it all day
      - But then no need for it for a period of time.
  - When folks do chlorophyll, it's an acetone
      - Need ventilation in these spaces
      - Dave says acetone should be in a fume hood anyway but understand why it happens as is
- Amy
  - Muffle furnace and autoclave should be in their own space

    - Right now, these are in someone's lab
    - People keep hopping in and out of the occupied spaces they're located in
    - Muffle furnace would be great if they have a small and big one due to how much heat it gives off
    - Dan said to look at short and long term autoclaves and what to replace them with for size, quantity, etc.
        - Need to know what users are sterilized?
        - Are there objections for killing samples and then using for sterilization?
- Dan - a number of users are moving to shared radio isotope hoods
- Amy - mind the adjacencies for flow
    - Rad Lab is pretty far from the counting room
    - Nice to have it near
- Rad Lab, despite how big it is, is accurately sized
    - Bev says there are times when each inch of benchspace has been used
- Note that people change in their offices so might not want to have windows in offices
    - Amy said grantees 'live' in the Crary building
- Glass wash
    - Multiple ways to handle this, just need to know what works best
- Dan et al discussed the acid rinsing, where it takes place, frequency, duration of washing
    - Using 1&% HCl
- Doug - would like to have physics lab space because it's hard to stand at a fume hood all day
    - Right now in a wet lab so not really the right function
    - Due to the work with his group, he could move across the street
    - Dan suggests it might be worth keeping one end of the building as a dry lab
    - CU Boulder says sometimes it's preferred to fix and calibrate in Crary
    - Dan said may not need wet lab everywhere
- Doug - thinking about his future folks that will eventually take his spot
- Dan - always do dry work in a wet lab but can't do wet work in a dry lab
    - Might be better to make all wet labs for future.

1500 -

- Jenn – is working in a lab she doesn't like
    - Too large of a lab (any more than 2 PI's) is problematic
    - Offices are nice to have daylight
- Unknown – A lab that allows for users to have 2 or 3 or 4 or 5 'bays'
- Grantees are multitasking at the benches
    - Use one bay for one item, and then slide over and fill the downtime with other, adjacent activity
- Amy
    - Nice to have an office in the lab
    - Dan said could reconfigure the lab bench to act just like an office desk
    - Stock and return room is not big enough
- Kelly
    - Wright to Armstrong = 62 years from first flight to man on the moon
    - i.e .are we thinking of science for a long period of time
- Dan asks the grantees to come up with ___
    - Want more control of temp in rooms
    - Electronics / tinker space (of adequate size) for grad students
    - DIY water is widely used….may want type 1 DIY facility wide
    - Seawater is provided at aquarium and up to top lab (could eliminate if aquarium is sufficient size)
        - Need water conditioning
- Mezzanine level
    - Amy provided update to floor plan
    - Good to get rid of hoteling
        - Always feel bad going up there and people are working

    - Need to think about which networks are required where
- Amy - power outages in the lab
    - Feeder goes down
- Freezers
    - If they have minus 80 freezers, good to place in separate room with cooler ambient to help keep them cooler
- Physics labs like access to outside
    - On roof is best
    - Could have roof ports as well
    - Ports would also support when need outside air
    - Radios to communicate downrange aren't great when inside
        - Need to get close to a window
        - An antenna to connect to on the outside would be great
- Vacuum would be good
- DI water would be good
- Air is good
- Data
- Central autoclave
- Class 10,000 clean room
- Computers
    - Server class computing

Kevin B's notes

Crary Lab - Part 2

- Recap of session #1
- Discussion of circulation efficiency
- Are the number of sink, benches, etc adequate?

4:00-5:00 (FC/OZ) Brief results of break-out sessions – All Attendees

- Rick Petersen facilitated a discussion summarizing the Crary Lab and Field Science Support programming.
- Field Science Support – programming summary
- Crary Lab – programming summary

Thursday July 16 (1.4)

- Rick Petersen kicks off the day with a quick presentation of the dive/sea ice/balloon building sketch
- Deben – reiterates the need for a pickup truck loading area (like a dock)
- General comments on the plan
  - More space for divers, get them separated (like with walls) from all science, including dump tank
  - Comment on breathing tank filling and having quality air intake (e.g. Pisten Bullys parked in the building and warming up may affect air quality)
  - Question on whether this would support "all" balloon science at MCM – something to confirm
  - Need potable water to it as well as fuel for PBs
  - Add helium tank storage to outside of facility for balloons
- Rick Petersen presents the central services model to the group
  - Comment on laundry being in contingency area and whether it could be next to key issue (so they can get bedding too)
  - Suggestion on putting housing/rec next to PAX
  - Questions on size of PAX
    - Rick Petersen responds that we'll be looking at that with ASC in the next couple of weeks
  - Deben – Question on science
    - They usually have excess baggage and how is that figured in?
  - Shaggy
    - Thinks it would be cargo and ATO
    - Was never the intention to bring all science stuff back into the building for PAX
    - A lot more vetting needs to be done
  - Deben
    - There is a lot of traffic between Crary and field science support
    - Potential for a walkway?
  - Jenn
    - Comments on the other 99% of the time they'll be on-station where they have to walk past dining from dorms to drop off ECW and then back to dining
  - Joe Ferraro

- The link between Crary and Central Services needs to be reviewed

- Chris Chen
  - Question on clarifying the exit process a little more
  - Need to review the sequence of bags (both soft and cargo) upon entry
  - Steve Dunbar was not worried about the weighing of things in relation to the split of personal and science gear
- Bill Turnbull
  - There could be two bag drags, one for science and one for personal
  - Unless we can move PAX closer to central warehouse
- Amy
  - Suggestion to put coat room right at hand wash (to alleviate Jenn's concern)
  - If added a coat room at the south end, then don't have to go all the way to front coat room
  - You'd possibly come in from other directions
- Deben
  - Your coat stays with you at the labs
- Ms. Chu
  - The entry is nice but really only used a few times a year
  - The rest doesn't really help the daily flow of use
  - Where can they park trucks?
  - Can't be in the Kress path
- Jason
  - Is it anticipated there will be truck access to baggage?
  - Could tag it to indicate that it doesn't need to go all the way to PAX (like science cargo)
- Shaggy
  - Your bags are different than your excess bags and we need to clarify
- Deben
  - Makes a comment about staying indoors for 12 months
  - People will also like to access the exterior of the dorms as well and will not always travel through the walkway

- Question on structured external walkways
- Rick Petersen
    - Elevated steel boardwalk concepts, some on ground where no buildings are adjacent
    - Need to do a better job of shedding gravel and dirt from boots (like tracking stuff in)
- Shaggy
    - Industrial washers in the work centers so also not tracking in stinky stuff
- Cole
    - Comment on micro-communities in MCM
    - Would be great if we could keep that
- Chris Chen
    - Suggestion on warm room (like Scott Base) to assist in drying things quicker in laundry function
- Jenn
    - Asks about taking 3 bars down to one bar
- Kudo comment on getting dorms away from dozer traffic
- Suggestion to slope the floor of the auditorium/presentation area
- Dan Dozer
    - Would need to factor in that there would be a lot of traffic going by the lab area on the Central Services side of Crary with the sky bridge
- Doug
    - Likes the roof-mounted electrical and telecom items
    - Make sure the satellite dish clears the top of buildings so there's a view of the horizon

Morning break

Aaron Seal attends the Crary aquarium breakout session

- Their largest tank is 67,000 liters
- They're all looking for a little more flexibility
- They have so many tanks currently and it's hard to move around them
- Large tanks get the least amount of use
- Usage changes at different points in time during the season
- Also do plankton collection with nets in the tanks

- Water comes right out of the ocean, no filters on the line
- Two submersible pumps: one for water to overall MCM station and one for water to the tanks
    - 4 pumps total, primary and backup for both MCM and Crary
    - Between 160-200 gpm
- There are Issues with flow, but they think it's a pump problem
- If they change one tank slightly it affects the other tanks
- Tanks at the end of supply are not only warm but they get the least amount of flow
- Tank closest to feed is the coldest
- Group that tends to use small rooms
    - Mix gases and electric/mech work
    - Having space that's dry and out of the way and disconnected from the aquarium would be helpful
- They use the labs down there by the aquarium
- Joe is thinking they could get wet labs up on phase 2
- Labs could be smaller to free up space?
- Deben and Anne use the rooms
    - Everything plumbed into the rooms so there's less chance of losing stuff in transition
    - If the storage can be taken care of elsewhere
- Sensitive electronics that they want to keep away from the tank systems
- Suggestion to plumb in compressed air
- Right now mostly groups that are doing electrical work for deep field are using the storage room
    - There's concern over electronics and the sea water involved
- After pumps have been removed/shut off, they do a freshwater flush on the system
- Don't think there are redundant lines, but the pump system is redundant
- Only ever one pump running to the aquarium at any given time, they do alternate them to exercise the pumps
- There is another small booster pump that gets water up to Phase 1
- Would be amazing to have the 2 environmental rooms in the aquarium instead of Phase 1
- Suggestion that Palmer be used as a guide
- Need to be powered appropriately so they don't need to use extension cords

- Want temps from -2 (Celsius) to about +4
    - Would be nice if they could get colder
- 2 minimum environmental rooms
    - The environment in rooms at ambient temperature
- Bench space would also be a big help
    - Bench along the wall like they have at Palmer (outside of room)
- General discussion from Bev about ROVs (remotely operated vehicles like submersibles) and what they're currently using
    - But this function may be replicated in the new dive/sea ice facility
    - They don't need constant flow of sea water, just a tank to test ROVs
- At the least, if the large tank could be moved out of the middle of the lab, it would definitely help
- Current modularity is restricted
    - Improved modularity would be optimal
- Side draining of the tanks (current situation) is horrible for cleaning
    - Would prefer to have bottom drain (like Palmer)
- If there was a piping system where they could uncouple and switch tanks, it would be awesome
- Also potential that PI's have their own tanks where they'd want to come down with their own and plug-n-play
    - Palmer is like this, but they have a garage door that can accommodate the larger tanks
    - Crary's existing door is currently not big enough for the biggest tanks
- Lot of people using dive locker near the aquarium for prep and are leaving doors open, which messes up their temps
- South end of the Crary "spine" is a heavily used path for sea ice
    - Stairs are narrow and top is usually icy
- Desire to add additional capacity to breakers and electrical systems
- Good air would be great, dedicated compressor unit for the aquarium would be a good thing
- Suggestion that they gear up/document the new stuff for accreditation (like university level lab space) on the aquarium space
    - At least meet the minimum standards
- Drains from aquariums currently just go right back out into the sound, not through the sanitary sewer

- Request to plumb in instruments for remote monitoring
    - Esther mentions “water wall”
    - A mooring out in the sound to collect oceanographic data would be awesome too
- Point is made that longer seasons could lead to aquarium work at times of year when there will be plankton and algae increase in MCM Sound
    - Could gum up the works

Jon DeLay and Dan Harrington attend Central Services recreation and quality of life morning session

- Gym/multi-purpose space brainstorm session
    - Theater/plays
    - Prom party
    - Halloween party
    - Mountaineering/ropes training
    - Climbing wall + bouldering
        - Cove with fall pads
        - Can the multi-purpose be carved our for a bouldering cave?
            - The lounge below the weights might hear the weight room above
    - Very rare equipment (UAV, balloon, quads) testing and calibration may utilize this space
        - But very rarely (3 days per year)
    - Steve Dunbar
        - Consider using the helo hangar for UAV and balloon testing
        - Has tools, crane, etc. but would need to run through with helo building
    - Matt
        - It’s nice to have options
    - Steve Dunbar
        - May need to accommodate the Sunday night science lectures (up to 200 attendees)
        - Currently they are exceeding the space available
        - Prefer semi-casual atmosphere
        - Better A/V and better seating
        - Better acoustics

        - Existing galley has too many windows
    - Current lounges may host up to 200 people total at a given time
    - Band/music concerts
- Discussion on 3rd floor and chapel
    - Preference to maintain a "coffee house" space and a "Gallagher's" space that are separated in order to facilitate spontaneous interaction
    - User suggest not having the coffee house here
    - It's nice to keep as a quiet space, not a coffee house
    - Need to control the space
    - Coffee house has an open mic night, etc.
    - Matt
        - A couple of years ago, there was a rumble with the chapel
        - No yoga in the chapel
        - Need to control the space
        - Needs to be locked down and dedicated
    - Users suggest moving elements of the existing chapel into the new one
- For lounge/alcohol spaces, make it "real"
    - Set up with plumbing, sink, etc.
- Need to identify space and location for new store
    - Possibly collocate with the beverage storage
    - Need to study where store is best located
    - Beverages account for majority of store sales
        - Consider cases of beer and how they're purchased
        - Buy a ticket and then pick up at the warehouse?
- Kitchen exhaust is a concern due to access for maintenance
- Kevin Breslin
    - Should consider moving laundry and kitchen facilities to upper floor to better facilitate exhaust
- General discussion on the need for skills development opportunities supported by adequate and appropriate spaces

- Highway 1
- Gear issue room for rec (wants to be down low)
- Music rooms
- Studio/radio station/etc. (where is it?)

- Tracy (Oz) leads discussion on quality of interior/social spaces
- Steve Dunbar
  - Lounges make sense to keep traffic through the dorms down, but may want to consider locating the dorm lounges on the plan left side with views overlooking the bay and scenery to plan west
- Lounges have TV, pool table, etc.
- Cole
  - Likes the idea of having the lounges on the plan west end
- Rooms will "probably" have TVs in them
- Concrete is too cold
- Would prefer warmth and natural light
- Finishes need to be durable, but inviting
- Make something other than Antarctica within the spaces
  - Art work, pics of landscapes from other countries, etc.
- Try to feel less institutional
- Consider built in room darkening shades in dorm windows
- The feel of the current coffee house is good
  - The color blue is pretty nice
  - Something besides white, brown and blue for internal spaces
- The pictures shown are large
  - If the singles are in one area, versus doubles, do spaces need to be different sizes?
  - Divide up lounges a bit within each door
  - Want comfy couches!
- Know the difference between casual dining and drinking versus true collaboration
- Decals for walls?

    - Provide themes for various dorms, lounges, buildings
- Some field folks would rather give up some space in individual rooms to have more space in the lounges
    - It's only a room to sleep
- Everyone wants a window to the outside
- Need to mind the extroverts versus the introverts
- Lounges are also used when people need to hang out and not wake their roommate(s)
- Door locks/hotel-type swinging doors are actually really noisy at present and wake people up
- Rick continues master plan discussion
    - Saunas are nice
    - Need to remember that Distinguished Visitors (DVs) need to be "wowed"
        - Hut 10 serves this function currently
    - Hut 10 has a huge demand
        - It's a good thing for morale
        - Have a party, be away from the station, be rowdy
        - George Blaisdell states that they have to clean it up/rebuild it all the time as people trash it
            - There's no responsibility/accountability in the current setup
- Lunch break
- Afternoon session is combined – no further discussion on central services and all groups talk Crary
- Joe Ferraro presents the proposed program for the Crary lab
    - Users would like roof access through the roof for various equipment
    - Users suggested Phase 2 be flexible space
    - For the physics guys, wheeling a cart onto a deck (not a loading dock) would be excellent
- Discussion on remote classrooms, video teleconferencing, distance learning
    - Something more than a webcam
    - Live communication, 2 way capability (e.g. for discussions back and forth)
- Balloon activity needs a flat area to launch from

Friday July 17 (1.5)

Executive download session with NSF, ASC and A/E firms

Notes from Jon DeLay

1. Rick Petersen – provided a summary of the week's highlights summarized by seven bullet items (reference Oz notes for the seven bullet items)
2. Rick Petersen – reviewed nine common themes of grantee requirements (reference Oz notes for list)
3. Briefed George Blaisdell (Chief Program Manager - NSF) on the highlights from this week's charrette.
    a. Focused on Crary lab renovation.
    b. Reviewed the program for building 004 (new IT/Comm/Command & Control)
    c. Question brought up regarding potential impacts of future lab certifications (Institutional Animal Care and Use Committee (IACUC) IACUC Laboratory/Study Area Inspection Program)

Notes from Dan Harrington

<u>0830 - Weekly Overview</u>

- Refer to sign in sheet
- Rick presented the process of interviewing the grantees, top takeaways from the discussions, and the charretted floor plans.
- Presented the master plan overview, building adjacencies, etc
- Discussion with Rick and Aaron regarding the master plans and how it's harmonious with the grade
- Shaggy discussed the requirement for reduced site maintenance
    - Snow testing explanation
- Build out will take place as funding allows
- Utilities discussion. No more overhead. Utilize racks and / or buried utilities as well as building interiors.
    - Will provide this direction after bores and ground penetrating radar reports have come back (this season?)
- Request hazard report from Shaggy. Add to D/B RFP.
- Aaron presented any potential civil run ins
    - Need to establish what an acceptable level of grading is
        - i.e. Can some items be placed on grade and then covered?
    - Drainage will be a challenge
    - Precast versus cast in place will change construction approach
- Shaggy indicated our need to understand native soils
- Flashing light goes when filling the main scuba tanks
    - Verify this is in the 35% plan

<u>1100 - Joe Ferraro presents Crary</u>

- Presented the pods
- Ben echoed that flexibility is key. Important to design platforms which can be expanded and contracted as grantee program sizes change.
- Aware of and will design to light sensitive lab operations
- Storage discussion
    - Need to run to ground what exactly are the storage requirements
- Issues with roof mounted antenna
    - Cable routing has been an issue
- Need outdoor deck space adjacent to aquarium. Certain experiments need natural light.

<u>1130 - Shaggy presents the FSC and IT/NOC and general questions</u>

- George stated that this has to be a well-managed space to prevent pileup. Lines on the floor, access control, etc.
    - Great to have natural light into these spaces

        - Ben indicated that the team will look to balance natural light with energy consumption
- User asked about our understanding of future science needs
    - Ben spoke that the team was very sensitive to this requirement. Nature indicated that there was a large group of new and seasoned grantees. One Nat'l Academy of Science panel member was in attendance. The findings should be out in August which will allow the team to identify and verify the concepts are meeting the current and future needs.
- Need to be conscious of social spaces in the dorms. Good to have congregating spaces but provide sound separation between these spaces and the 24/7 quiet dorms.
- Lab accreditation discussion. Some grants cannot be awarded without the IACUC accreditation.

Notes from Kevin Breslin

Review of week / Preview of upcoming activities

- Kevin Gibbons
    - Adjust agenda to accommodate changes in personnel who can attend
    - It looks like attendees can be in attendance most of the week
        - Monday (7/20) mostly unchanged
            - Intro (Start at 7:30 sharp!)
            - Recap
            - Phasing
            - Workflow / adjacencies
            - Lunch
            - Central Services
            - Mid break
            - IT&C Morale discussion
            - Joe Ferraro will have a breakout with Bev regarding Crary Lab management features
        - Tuesday (7/21)
            - Intro
            - Airfield (3 hours)
                - May be some discussion on programming of each structure
                - NASA/NOAA may not want to be here all day/week, but they are local (might do a breakout)
            - Break
            - Airfield
            - Maybe have an IT discussion to infill extra time
        - Wednesday (7/22)
            - Add short recaps after each track
            - Physical security
            - Command/Control
            - Lunch
            - Track 1 - Helo
            - Track 2 - COMM/IT
            - Remote Ops

Mid-morning sidebar discussion with Steve Dunbar regarding the airfield – Jon DeLay, Dan Harrington, Aaron Seal and Don Schiferecke

1. Paul Sheppard is NSF ABM for transportation
2. Flow
    a. Single airfield concept (and master plan) is 4 years old, need to keep in mind
    b. Mentioned that new prop maintenance building blew some welds when they tried to move it this season
        i. Likely caused by the fact that they had just done tack welds to that point, not full welds

   c. The new airfield facilities will also need to be towable
      i. Need to keep transport in mind
      ii. Turning the structures is difficult
3. History
   a. Pegasus site was originally picked due to ample snow available to "pave" the runway and compact to ice/hard snow
   b. Also underlying ice sheet to provide sufficient support for wheeled aircraft and "paving" operations
   c. Williams Field is on a very thick layer of snow which supports the ski-equipped aircraft
   d. In general, the two airfield couldn't be in the same location due to these differences in function/construction
   e. C-130s are generally more "sooty" than the C-17s and they don't want the dark matter on the Pegasus airfield
   f. Both airfields are moving due to the ice sheet advancement over the year
   g. For Pegasus, there have been issues over the past couple of years
      i. Dark volcanic soil blows off of Black Island onto the airfield
      ii. This increases albedo on the ice and leads to enhanced snow/ice melt
      iii. Two years ago, there was over a meter of water on the runway
4. The new airfield "Alpha" will be approximately 11 miles from McM (replaces current Pegasus airfield)
   a. Will be for the wheeled aircraft
   b. They've done snow coring samples there and feel they can still get the "anvil effect" (with regard to "paving" with snow)
   c. Will take a couple of seasons to put lifts of snow on and compact
   d. They are planning on being able to do test runs in the next couple of seasons
5. Williams will continue generally in its current location and configuration
6. Does NSF anticipate ever using the sea ice runway again?
   a. For the foreseeable future, they are NOT planning on using the sea ice runway
   b. But if so, is NSF really committed to taking sea ice off the table?
   c. If the sea ice runway were to ever come back, it would present some issues
      i. The facilities would have to be smaller and towable to/from Williams
      ii. The sea ice transition (from sea ice to permanent ice shelf) can pose problems depending on how "rough" it is
      iii. Sea ice can melt, re-freezes in large chunks and these can be tough to haul the mobile buildings over
      iv. The mobile buildings take a serious beating in the towing process
      v. If there is any possibility of sea ice runway at all, it will drive the size of the buildings (in general, would make them smaller for towing)
      vi. Regardless of whether the sea ice remains, the buildings will still be moved at end of season for "winter berming" (the process of elevating mobile structures onto an elevated pad to make dig out easier the following season)
7. Airfield communications
   a. MACOps – ground transportation
      i. Handles the ground side of operations
      ii. The firehouse gets consolidated into this
   b. MACCenter – air traffic control (ATC)
      i. SPAWAR operates this currently
      ii. Long-range radio control
   c. MACWeather
      i. Another SPAWAR facility
      ii. Collocated with MACCenter
         1. If they could get good enough communications (e.g. redundancy), some of this function could be moved off the ice into CONUS
      iii. Most of weather forecasting is currently not on the ice
   d. Communication with MCM via microwave tower communication

        i. Running the weather ops
        ii. Experimenting with omni-mount/omni-directional and new antennae
        iii. Needs to be re-aimed/re-adjusted after the tower is relocated seasonally
    e. Receiving microwave node is in McM at T-site
        i. Radome above Scott base
        ii. LDB also runs through here

8. Fuel
    a. Generally JP-8
    b. Fuel is pumped from MCM tank farm down to Scott Base via hard, permanent connection
    c. Flexible (temporary, seasonal) hose is then provided from Scott Base sea ice transition to Williams Field
    d. There is some level of refueling C-17s at Pegasus
        i. Typically when they're going on to Pole
        ii. Will take fuel on via fuel truck driven out from MCM
        iii. Usually no full refueling of a C-17 at Pegasus
9. Timeline
    a. Receive approximately 3 flights per week via C-17 when Pegasus is operational
    b. They operate on wheeled aircraft generally the first 3 weeks of October (C-17s at Pegasus) and then at end of season from early February on
    c. Between October and February, Williams Field (ski-equipped airfield) is opened for the Air National Guard (ANG) and utilized by the C-130s and Ken Borek Air (KBA)
        i. ANG comes down on skis and brings in the mechanical staff
        ii. Next the ConEx boxes come in
            1. Lots of spare parts and gear
    d. But there are several instances over the course of the season (e.g. "shoulder seasons") where both airfields are operational at the same time
    e. Pole operations begin around late October
    f. In early December they close Pegasus through mid-Feb due to thawing issues
10. They tried a single field
    a. Had both wheeled and ski runways
    b. They're not going to try and run both functions at the same location
        i. Williams for ski
        ii. Pegasus/Alpha for wheeled
11. Jet-assisted take off rockets (JATO) are being phased out
    a. The new eight-blade propellers are being used to replace the need for JATO
12. New SAC structures will need to be rigid enough to tow and push and push the corners of the structures to turn them
    a. Suggestion for a "bumper-style" attachment to all mobile structures to take the bumps and movement
    b. They need to knock them loose from the ice sometimes
    c. At LDB they tried to heat the skids but it didn't work well
13. The airfields experienced 127+ mph winds prior to wind station being damaged in the most recent storm
14. Utilities
    a. LDB utilizes trusses to distribute utilities between buildings but this leads to the buildings needing to be very exactly placed
    b. For this piece of the project, they need connections to be flexible
    c. They currently use poles set by linemen to distribute power
    d. They don't have the time to set each building in the exact right spot, especially if they're moving from sea ice runway
    e. If they move from sea ice to Williams, they need to do it over the course of a weekend – timing is key
    f. Likely need to heat each structure individually
    g. Look at 3-4 day fuel supply day tanks
    h. Toilet (head) at airfield
        i. Need to address raw sewage disposal
        ii. There is no chance to pipe the waste out

            1. Chemical toilets?
            2. Incinerators?
                a. They've tried incinerators, but they were not functioning adequately and required a lot of management/maintenance
                b. The solids to liquid ratio is not "normal" in that they're only seeing day time activities (e.g. more liquid than solid)
            3. They did use to drill an "ice bulb" and dispose of waste there, but not any more
            4. Use a "honey bucket" truck to drive waste back to MCM
        iii. Discussion on raw chicken products
            1. Gray water was going down into surface
            2. Salmonella is a danger to local bird populations
            3. Have to burn chicken waste at Palmer
    i. Potential for flushing toilets run with snow melt?

4:00-5:00 (FC/OZ) Brief results of break-out sessions – All Attendees

Rick Petersen facilitated a discussion summarizing the Crary Lab and Field Science Support programming.

Field Science Support – programming summary

Crary Lab – programming summary

5:15-7:00 (ASC/A-E Firms) Designers and ASC review day's input and develop notes and graphics for next day's sessions

Charrette Week 2
Denver/ASC, July 20-24

Mon July 20 (2.1)

	7:00-8:00	(ASC /A-E Firms)	Set-up and confirm day's objectives
2.1.1	8:30-9:30	(ASC)	Introductions and Objectives

Introductions (see below and also refer to sign-in sheet)

- Lance Mackey – Michael Baker IT Consultant
- Paul Sheppard – NSF services and logistics
- Mark McQuen - National
- Rick McKuhn – ANG and NSF
- Jack – Bldg 165
- Mike Sherman – NSF staff aviation program manager (maintenance)
- Matt Russian – SPAWAR – ATC/Meterology
    - Brett Thomas
- Frank Thomas
- Russ Barris - Operation
- Mark – SPAWAR meteorology
- Dustin? – SPAWAR
- Jeff Sharp – Lockheed Martin (L-M) IT and comms
- Joe Harrigan – IT ASC
- Christine Aldrish
- Maggie Knuth – NSF operations manager
- Kevin McCarthy – NASA Goddard Space Center
    - Really wants a skybridge from IT to Ops
    - Wants to make sure new facilities are built/commissioned/online before demo of old facility
    - Need facility transition plan
- John Walker – NASA HQ
- Mark Harrison – NASA
- Scott Douglas – NASA JPSS
- Bruce Thoman – NASA Goddard
- Neil Pahl – Fire Chief CFAR
- Jeff Altman - Ops
- Alex Morris – Fuel Supervisor ASC
- Pete Cruzer – ASC Operations Logistics
- Jack – ASC
- Gary Cardullo – ASC Airfield Manager
- Dave Lipman – NOAA JPSS
- Rob Anders – DoE
- Cara Suiture
- Matt Morris – Website Building
- Bill Huntley – NASA JPSS Goddard Command and Control
- Rita Pittman
- Michelle Trembly – LM
- Larry Mail
- Pat Smith
- Tim Howard

- JPSS – Joint Polar Satellite Systems

- Recap - Dave
- Phasing - Dave
- Agenda – Kevin
- Dan - Workflow / adjacencies
- Shaggy - Blocking Diagram

- Dave Winkler
    - Provides a download and logistics on the week
    - Reiterates to this group that this is an “efficiency project”
    - Palmer Station portion is running a little bit behind, will be charrettes on that later
    - This is a complete re-do on MCM
    - They’re not using “single” for airfield anymore
        - Not necessarily starting from scratch but may need to dust off the airfield MP (it was produced 4 years ago)
    - They are going after MREFC funding
        - For “more and better science”
    - Runs through debrief/overview
- Kevin Gibbons
    - Goes through agenda
    - There is a potential for breakout sessions on Tuesday
    - Maybe something on the earth station?
- Shaggy
    - Downloads on rules of engagement with regard to MP 2.0 and 1.0
    - MCM needs to remain operational at all times
    - With regard to help ops, there’s lots that needs to be done
        - They need weather data, FAA regulations, etc.
        - Want to spend time on needs of facilities
    - Need to figure out roads and waste disposal
    - Need to consider shop/ops work area during phases 1-6
    - Need a detailed transition plans for staffing
- Question on a connected walkway for Building 004 as well as the others
- Shaggy
    - Hasn’t been any talk to date of sky bridge to 004
- Kevin McCarthy from NASA
    - It would be in best interest of NSF and NASA to have sky bridge from Field Science to Building 004
    - Kevin McArthur (NASA) expressed the overall IT concern for the transition of B004 prior to dropping B0189.
    - Currently in Condition 1, they have people sleeping in the JSOC building
    - It wouldn’t necessarily be a requirement but definitely beneficial to all agencies
    - Kevin recommends a multi-agency transition plan which may take quite some time. May take a summer season to fully implement.
    - Alex asked about the wellbeing / collaborative space for lounges / bars. Shaggy indicated that there may be a few odd seasons but that lounges are noted as integral to the operational success of the station.
    - Kevin McArthur asked that phase the demo of bars so that one is standing at end of summer season. Likewise, encourage to keep cohabitation, in some extent, during renovation.
    - Pat (IT) indicated that external agency partners (NASA, etc) will need a more solid schedule for transition so as to prepare for the transition. Winkler indicated that they’ve hired a group to help with the phasing plan.
    - Winkler indicated that the Charrette Report will be out in August and can be reviewed by all users.

- Morning break

- Shaggy, Presentation of NSF Master Plan video
- Shaggy walks through phasing
- Kevin McCarthy
    - Concern about transition from Building 189 to their new facility
    - The general philosophy is "make before you break"
    - They would need to bring up the new facility and test it before they can take out the old one
    - They need multi-agency transition plans
    - Transition timing would definitely not be a week but maybe a month? Could be an entire summer season?
- Shaggy
    - This master plan supports that
    - Do have to do homework and have a plan
    - Reiterates that master plan phasing is not based on a year, that's not what the phases were intended to represent
- Alex
    - Questions taking out all of the bars/lounges at once
    - Where will people go?
- Shaggy
    - It will admittedly be awkward for a bit but need to figure it out
    - Intent is to replicate the function elsewhere
- Kevin McCarthy
    - Questions on schedule
    - Suggests phasing demo of bars so at least one is left
    - Assumes coffee house would be easiest to demo
    - On lodging, there are married couples and co-habitants
- Shaggy
    - Want to maintain flexibility and focus on making lodging quiet space but the answer to the question is yes
- Bill Hundley
    - How many seasons will we not have backup to comm/IT infrastructure?
    - How many seasons do they need to plan on a second set of equipment?
- Shaggy
    - Thinks Phase 4 central services function is about an 18 month construction period (in response to question from audience)
- Comment on population
    - Sometimes 1,000 people down there
    - Annual surge in October
    - In relation to 850 personnel
- Shaggy
    - This is related to potential for WinFly
    - Will be spikes in population for construction and such
    - They are looking at baseline science support
- Kevin M
    - Look at 2-3 seasons during stimulus package where MCM was busting at the seams
    - Thought there were like 1,100 people down there
    - 3-4 people in a 2 person dorm room
- Shaggy
    - With the way they schedule it, pretty easy to tie resources to what they're doing
    - Will impact the amount of support staff
- Alex

- How do you get trash to Fortress Rocks if the helo ops building is where it is?
- This needs to be taken into account
- Need storage space for all of the waste

- Shaggy
  - Need to figure out laydown space and roads
  - Touches on the concept of Phase 0
- Shaggy touches on the wind modeling study
- ATO = Antarctic Terminal Operations
- Ben Roth
  - There are some issues associated with cutover and phasing
  - Closing in on physical plant requirements?
  - When will folks be engaged to download on requirements (movement of electrons)?
  - How will duplication be manifested?
- Shaggy
  - Will be ongoing throughout the process until we have it figured out
  - Communication ongoing and often
  - Will be reaching out on a regular basis
- Pat Smith
  - Need to know what kind of sustaining they're going to need (especially personnel)
  - Need some sort of calendar for personnel continuity and assignment
- Kevin Gibbons
  - A transition plan is typical
- Kevin M
  - Will have to go into budgeting
  - Will they have to duplicate the equipment?
  - It is never too soon to start planning for transition
- Shaggy
  - This is how we get their requirements
- Question/comment
  - Also important for life cycle replacements
  - Scheduling is very important
  - What's going to be unified and what's not?
  - Need a few years to get things into resource planning and funding
- Dustin (not sure on name)
  - Funding in 2019?
  - If it's a year of buildout, would be a move in 2020
  - Would have to start in '17 for the refresh cycle
  - What's the expectation of this week and when will we get to the calendar?
- Shaggy
  - The point of what we're doing is to understand that process and how you work in MCM
  - Need to refine the requirements
  - Starting to talk about allocated spots, from there we would touch on schedule and refined timeline with more in-depth schedules
  - Guessing that we're a year out from the specificity they're looking for
- Dustin
  - At the end of August, will we be able to say something like "3rd quarter '16"?
- Shaggy
  - Sounds reasonable
- Dustin
  - A lot of this isn't in people's current budgets
- Dave W
  - Thinking Jan/Feb of '16 for first design milestone

- Kevin G
    - There will be time yet this week to go through this in detail as well
    - By the end of the week, we'll have at least done some backward planning
    - Establish high level milestones
- Ben Roth
    - Would suggest there's a difference between last week and this week
    - We have to engage with these folks
    - Need to develop a recipe for sequence of events
    - A lot more to discuss above other groups
- Brandon Neahusan reviewed McM MP2.0
    - Users indicated a sky bridge between FSC and IT Ops is important
- NASA – prefer a skybridge between field science services building and bldg. 004 (new network operations center)
- NASA representative concerned about transition from current command and control and data center to new location.
- Comment –team needs to review population requirements, particularly the peak population.
- Dan Miller presented an overview of the personnel, material and waste movement
- SPAWAR – 4-6 people; socialize with their own group typically; 24-hour operation
- Need to consider recreation during off hours for multi-shift organizations
- Brian Stone – addressed the group; provided overview of the master plan process; biggest challenge is to validate criterial and assumptions
- Scott Borg – addressed the group on the long range goals of the program
- Michael Baker – morale services discussion; remote teaching – two-way communication
- Pat Smith (NSF) – they have had requests for live tv or radio studio broadcasts; described current video monitor system and information in Bldg 155.
- Need to address whether or not plans to increase bandwidth or not. Pat Smith – plan is to increase bandwidth by replacing the earth station at Black Island and relocate to near McMurdo station.
- If bandwidith was available, VTC would likely be used 50%+ of the time.
- Building 004 – building requirements
- Discussion with Gary Cardullo regarding the airfield
    - Break ground on Alpha Runway next month as a proof of concept – single airfield for C-17 wheeled aircraft
    - Will move to 12 mile mark from McM to replace Pegasus
    - New 10,000 sf runway
    - Williams field serves the ski equipped aircraft
    - Always need to maintain a second runway in case Williams Field is inaccessible

- Break

- Dan presents cargo and personnel flow slides from MP
- Question on truck traffic to 004
    - Not weekly but they periodically get large shipments of racks and such
    - Don states that there will be loading dock capabilities
- Maggie
    - Asks about staging area on waste flow diagram
    - Don responds that it is TBD for now
- Shaggy presents blocking diagrams
- Dan presents 3D model
- Question on where people dump their ECW
- Shaggy presents command and control in SSC
- Pat Smith
    - Is the space physically constrained by the existing perimeter of the building?

- Shaggy
  - There are utilities, grade, etc. around building
  - This is the logical shape as it stands right now
  - There was a master plan for a phase 2 on SSC (may even be a design on it) for the flat pad to east
  - We're not following this with infill on the "L"
- Discussion on transition from 189 to 004
  - Might want backup to NASA/JPSS in the area of central services
  - In order to facilitate the transition, may need to provision an extra string of equipment
  - May be logical once operational in 004 and put that interim equipment as a backup
  - Desirable to have backup for NASA/JPSS near the backup for NSF

Flow Diagrams
- Dan (Oz) presented the McM Flow Diagrams
- Users asked about truck access for IT Ops
- Dan (Oz) presented the SketchUp model walk through
- Shaggy presented the masterplan blocking diagram for each facility

- Lunch break

- Comment from JPSS/NASA
  - Space-wise thinks they have either the JPSS will be covered or NASA will be covered, but not both
- Dan/Don present further on Central Services
- Joe Harrigan
  - Asks if there's a presentation space
- Dan talks about all-hands area
- Kevin M
  - When people are offloading at the "red triangle", is there room enough for people to drop their gear?
  - And is it big enough for a C-17 crew/personnel for 150 people?
- Don
  - When we get into scaling the multi-purpose room, will need to dial in to make sure it's adequate
  - Handle a plane load of people
- Ben Roth
  - Also suggests that the inbrief gets scheduled
  - Like if there are 2 aircraft coming in, schedule one after the other
  - May not be most efficient, but would allow an alternative
- Don
  - What aspect of recreation do they need/use?

- Jack Lawton (? AF ANG) – Will there be a rec space big enough to fit recreation?

- Don – would be looking at something more on the scale of a high school gymnasium

- Don – what would they take advantage of?

- Matt Russian – will things even look the same? Like will there even need to be a debrief when people get off the plane?

- Joe Harrigan – what is skills development?

- Don – pottery wheel, band practice, fly tying, etc.

- Joe H – what's the plan on central computer space? Will it be needed if there's wi-fi at the station?

- Don – talks to nooks and crannys available for social interaction
- Kevin M – asks about flipping the lounge/room concept in the lodging – also about laundry, where would it be?
- Don – will be somewhere in the lodging (personal laundry) – intent to have laundry in the space you live – sky bridge at level 2
- Ben Roth – lounge areas haven't been fully developed yet – multi-purpose space that will evolve as the design develops
- Kevin M – enjoyed the sauna, should consider for some of lodging
- Comment that the coffee house is the one bar they hang out at
- Kevin M – no blaring music, there's places for everything – lose flexibility by losing the 3 bars
- Comment on "engineering" a lounge – will become what the people make of it
- Maggie – does the lounge (in contingency operations) need to be one space?
- Dan – could be divided
- Joe H – within their department they hire folks that have retired from another profession/technical minded – have not come back due to the lack of social spaces – common theme is generally desire for quieter social life – loss to the program
- Matt Russian – Comment on where the "noisy space" will be
- Kevin M – didn't see a small 2 person office near chapel for chaplain to have one-on-one advising space – Chapel of the Snows has existing stained glass that should be re-used – siding in coffee house, pieces of Jamesways, etc.
- Don – didn't get into this type of detail for MP
- Bill Hundley – Is there a place planned for a theater like the coffee house? – would like to keep association with "recreation" (e.g. glass of wine)
- Kevin M – thought about piping in LCD TVs to be used "off-hours" for movies – wire up front
- Ben – how do the folks in the room collaborate with one another?
- Pat Smith – brings up a point about NASA having two winter-overs that aren't a part of the "overall population" – comment on integration of "isolated" people
- Jen Raymond on phone – one of their big collaborations out of office is pilot, grantees and ASC personnel – happens in the coffee house/lounge – discussions about improving logistics – for work center but outside of it
- Kevin M – wonders on where the store will be
- Don – thinks that store would work best on the resident side
- Kevin M – Also suggestion on barber shop

- Dan – asks about NASA's daily process

- Mark Harris – pretty much isolated with what they do – work with IT more than some of the others – work about an 11 hour schedule, partially overlapping – remotely operated – do a lot of stuff with JPSS – is potential that they have to scramble in case of emergency – if it's something they know will happen, they will have people sleep in JSOC – may have to travel up to building 71 in emergencies – bunk areas around the data center would be nice

- Bill Hundley – for JPSS, 5 or 6 people in January for 6 weeks – most work being done in 189 where most of their equipment is – squat in office space in 175 – 3 week deployment, in and out – unless they're doing upgrades or major maintenance on receptors – discussion on warming huts, provided by ASC

- Kevin M – NASA does normally send down a couple of maintenance people

- Bill H – team usually stays pretty much together – socialize with NASA guys – they do get out – as long as they have offices, it will help – would like collaboration space in their office area – daily telecom back to Goddard and Colorado

- Telecomm work flow
  - Comms heads out early (approx. 1 week early) to set up a link to McM
  - Then can set up microwave wireless mesh after the buildings are towed out to final position

- Neil – safety considerations for social spaces – max occupancy?

- Fire heads out to each site prior to each landing and needs a place to plug in trucks
- Need a pax terminal at both runways for emergency / winter flights

- Don – at MP stage, no – in design stage it will be addressed

- Ben – will not compromise on life safety – but there will be a management element

- Jack Lawton – operator side of the house is 24/7 – day sleepers – crew rest times – would like lounge space as shown in the MP – need a conference room for daily meetings – use lounge space currently for weekly meetings/calls/training

- Mark SPAWAR – can unwind "rather loudly" – have some people that never leave the building – some guys spend the day out and away – some concerns – there's a lot of talking in the hall – interact at dinner, etc. – lot of different cultures there, some people are going to migrate to like individuals – not a lot of mixing until it's purposefully done

- Alex – band room associated with skills development?

- Don – may not be shown as "band room" on the plan but within a multi-purpose space

- Alex – gym does aerobics, weights, etc. like a 24 hour fitness?

- Don – not to that level – likely more to be more of a larger space – could provide dividers

- Alex – just wanted to make sure things like yoga is a big space consideration – concern over space "after work" and having it all at the same time – not everyone wants to spend time "on display" in public, what about private spaces? – and where is Icestock?

- Joe H – there is a certain element that combining people/work centers will take care of the collaboration space

- Pete Cruzer – has to be some dedicated rec areas that aren't "morphable" – need to consider the late shift/shift workers

- Suggestion on taking surveys to see what people would do/what they'd be interested in

- Brian Stone – section head for Antarctic infrastructure and logistics – still very much in requirements gathering phase – all stems from the Blue Ribbon Panel Report – have to have a long range plan – biggest challenges right now is validating a set of requirements – have to build broad support across the government – funding is a challenge – under a lot of pressure to justify what they're doing – being viewed as an "efficiency project", need to understand what parts of this will allow for reduction in operations costs – trying to embark on operational cost research as well

Central Services

- Users indicated that the floor plan may not fit both NASA and JPSS. Working through the plans indicated there was adequate space for both.
- Dan (Oz) presented the Central Services internal plan
  - User asked where a large, all hands type meeting would be held. Dan indicated that there was a large lecture room as well as potentially using the gym for an even larger group.
  - Kevin McA questioned whether the lobby was large enough for a C-17 worth of people and gear. Don stated that the lobby would be scaled to handle a plane load of people.
  - Ben Roth suggests that inbriefs might need to be scheduled. This would help with user influx and flow.
  - Joe Harrigan raised the issue of the need (or not a need) for computer labs if everyone has a laptop and we have a wifi?
  - Kevin McA discussed the merits of having a lounge at each end. Additionally, a sauna should be considered (one there currently)
  - Users like the Coffee House bar b/c it wasn't loud (and didn't have country music). There is some flexibility loss when you don't have multiples places. Give others the option to go to many lounges and not force them into 'country music Tuesday'.
  - Crowd insisted you can't engineer a lounge. Consider allocation other lounges open to all users, not just those located at the end of the dorms. Maggie pointed out that the dorm spaces are not necessarily one space, could be subdivided.
  - Joe Harrigan mentioned that there are actually people who didn't come back because there wasn't enough quiet, single space that wasn't a bedroom.
  - Kevin McA didn't see a small two person office adjacent to the chapel which is good for one on one discussions. Preserve the stained glass windows. Don indicated that the MP 2.o doesn't have all individual spaces shown such as a chaplain's office. Dan said we'll preserve some materials due to history. Kevin McA said keeping siding of the coffee house would be excellent.
  - User asked if there was a space for a theater. Don indicated the gym could double as this. User liked that the coffee house had a "flavor" to it, where one could get a glass of wine, relax. Provided a different feel.
  - Kevin McA said to look into large LCD tv's for rooms so you can use movies, films, conferences, wine bar, etc. Have lots of flex in all spaces. Lots of wiring and infrastructure needed for all spaces.
- Ben Roth asked how support agencies collaborate and what work flow is like
  - Pat has wintered over before with smaller groups. Folks get lost in the shuffle. How do you encourage your teams to integrate with the community as a whole.
    - Mark (NASA) said they do better actually in the winter to integrate. Summer has lots of people so easier to get lost in the bustle. Nasa has two contractors that winter over.
  - Jen Raymon (on phone) stated that aviation ops, pilots / grantees / personnel chat about the logistics and efficiencies in places like the coffee house. Having those spaces to allow this interaction is nice.

  - Kevin McA didn’t see the store, barber shop, etc. Understood it's very conceptual but worth showing those spaces so you don't lose it in the mix.
  - NASA folks maintain the JPSS / MG-1. During the day, maintainers are pretty isolated. They work a 10 - 11 hour schedule. Can scramble on short notice if need to run out to fix antenna. Some guys sleep in the facility now if repairs deem it so. Currently don’t have a way to get back during Con-1. A bunk area near the data center would be a requirement. Right now have a cot. If no enclosed walkway, definitely need the bunk area.
  - User (black shirt) usually does maintenance on receptors on T site, exterior sites, etc. Sometimes maintainers are there for extended periods of time. They may be out all night but most work is done in B189 or in office spaces that they borrow in B175. This is typical for JPSS. Every four years, there's a major upgrade. Every 12-15 years, upgrade receptors. No receptor plans until 2022 but will have to do maintenance.
  - Rytheon, Daytron, NASA all work to maintain items. Daily maintenance is by NASA. Radome is coming up this year.
  - Users indicated that collaboration happens in the office spaces. Some collaboration is local but also have daily communications with Goddard and Colorado. Need a spot for this.
  - Fire Dept questioned if the social spaces number of occupants have been addressed. Know that certain spaces draw lots of people such as bars. Don indicated that for individual spaces, this has not been addressed, but at a master plan level, it has. Events like the Halloween Ball needs to be looked at. Ben Roth said frequency of events need to considered. Team indicated to design for current requirements.
  - For flight / ANG. Senior Master Sergeant said maintenance staff have day / night shift. Lounges used after each shift. Operator side is round the clock, anytime day or night. A shared lounge space for the entire community would be tough given the varying schedules. Need a conf room for daily briefings, and currently use lounge for weekly commanders call, etc.
  - SPAWAR group has people who like the laid back coffee house atmosphere (i.e. retired FAA crew for ATC) and people that like the energetic spaces. Collaboration happens in the both of these spaces, as well as hall or in the lounges. Problem might be that different cultures exist and don't always mix. Just don’t see all groups hanging out together.
  - The gym is a great place to collaborate and is a desirable space to be. Users use the gym 24/7 for varying group sizes.
  - Lots of public spaces but not all users want to be in public spaces. Sometimes smaller groups need a spot and dorm rooms were used for this. i.e. don't want to be on display.
  - Users indicated that they still need to make sure have a location for Ice Stock!
  - Joe Harrigan said that pulling spaces together will be great for IT / collaboration spaces.
  - Gary (green shirt) said multifunction space tends to take shift workers. Be nice to be aware that there are shift workers so make sure don’t lock yourself into multifunction spaces and schedules..
- Brian Stone
  - Summed up last week's finding and indicated the team’s biggest challenges.
    - Need to provide a validated set of requirements. This will help us get the money.
    - The team will be under pressure to justify all of our actions since this is viewed as an efficiency project.
- Reduce operating costs.
- Provide a sauna in at least one of the dorms
- Coffee house is a vital facility (quiet place of social interaction)
- Need a private office for Chaplain
- Need to preserve the stained glass windows at existing chapel
- Would like to see a theater function in one of the areas
- Use large LCD TV's in smaller rooms instead of large theater function
- Pilots/Grantees/support personnel frequently need to collaborate
  - Need workspace and informal space
- Need a store
- Need a barbershop
- NASA's daily duties

    - System maintenance
    - IT collaboration
    - 10-11 hour schedule
    - Mainly operated out of Wallace(sp?) Island (24/7)
    - Short notice scramble for antenna repair/relocation
    - Need a bunk area at the data center for emergency lockdown
- JPSS
    - 5-6 people typically in January
    - Maintenance on receptors
    - Most work is outside at antenna
    - Typically use warming huts for field ops
    - Mostly use offices for collaboration
- Neel - Need safe egress for large numbers of people
- Ben - Will not compromise on life safety
- Support forces (ANG)
    - Maintenance - typically day shifts
    - Operations (crew) is 24/7
    - Need soundproof sleeping areas
    - Need conference/training room
- Staywa?
    - Flight crew
    - Radio COMM
- SOPP?
    - Three areas - continuous shifts
- Bandroom - part of skills development?
- Gym - what is it's configuration?
    - How to accommodate different needs (P90X, yoga, spin, etc)
- Is there a good place for small private parties?
- A lot of shiftwork, so the gym needs to be flexible
- Brian Stone
    - Must have a good plan to get funding
    - Must have broad base of support
    - Need to reduce operational costs

IT Moral Services (Baker)

- Baker presented IT Morale
- Trends is that more users are bringing their own devices. Need a system that can accept these.
- Video teleconferencing is "officially prohibited" by day to day users.
    - Joe Harrigan said there are requests for continuing education (SPAWAR, etc) as well as requests for Skype / VTC functions. Both 2 way and 1 way presentations.
- Ben Roth indicated that dedicated spaces such as a studio will be a very hard sell. Try to avoid these types of spaces.
- Users suggest that spaces should be made as flexible as possible. Provide several rooms with larger format displays.
- Kevin McArthur suggested that a webpage or channel that can bring more information regarding weather, flights, etc to the users would be great. Pat said Digital Science Service does this currently but needs to be updated. There might an efficiency if content could be generated off continent and then pushed down to the Ice.
- Mass notification would be great.
- Bandwidth remains an issue. The focus is not on bandwidth off ice. Pat indicated they've looked at various methods such as a FO cable to New Zealand but it's cost prohibited.
- Dorm room discussion. Design for tv and phone in all rooms. Video on demand is very useful. Would be great to have a channel that provides the flight, weather, etc information.

- Internet café discussion. Right now, the current IT lab functions as the café when classes aren't held. Nice to have a legit space for the café. The days of the bank of computers as a café may be outdated but having a location where a few computers are provided along with spaces to sit with your device applicable. Remember that not all people have a device on them so they'll come into the café at lunch and check email.
- Worth investigating cell phone services on Ice. Currently this isn't present but could be achieved with a portable type cell tower.
- Email discussion. Email is used by all on the Ice but is typically used as a central method to move information around (i.e. flight info). Email is not delivered to all terminals though. Pat indicated that the station will eventually have a wireless cloud system. Pat also indicated that information flow needs to reviewed as a push (email type) or pull (users search out).
- Hotel experience discussion. Consider a video management system and video on demand.
- Station radio discussion. McM received radio equipment and 6 stations from the Navy. Currently very low cost. Keep the radio (or a radio of some type)
- Pat indicated that wireless will need be partitioned to morale and mission.
- Kevin McArthur indicated that for the multifunction spaces, some will have non-movable tables. They'll want it this way so that the table can have power / comm / AV. Joe indicated that conference rooms in general are in high demand.
- One item to consider is the type of devices in the field when pushing info. i.e. touch screens / smart phones don't do well in the cold
- Nick @ Baker (Morale services)
    - Is remote teaching and learning needed? Yes. IT currently supports video-conferencing on an as-needed basis. Both one-way and interactive presentations.
    - NASA hosts public affairs style broadcasts that would benefit from a videoconferencing function
    - Include station data on wall displays
    - Tie wall displays into MNS?
    - Need a space for introductory training
    - Off continent bandwidth less than 10% of total volume
- B004 Data Center
    - Want to have technical equipment on ground floor to avoid excessive weight on second floor
    - Need to anticipate future use of rack space for programs
    - Special data center requirements
    - Want a direct skybridge connection to central services (for condition 1)

Breakout Meeting with Gary

- Masterplan is OBE and needs to be updated
- Summer field (Williams) will fly skid planes
- Winter field (Alpha/Pegasus) will use wheeled planes
- Alpha field design is a proof-of-concept
    - 10,000 foot runway on compacted snow
    - Will take 12-14 months to prep
    - Will be at 12 mile mark (14 miles away?)
    - Just for testing
- Will need to maintain both runways
    - Will allow for flight diversion for severe weather
    - Fire dept at both
    - Passenger terminal at both
    - Meet AF regs at both
    - Refuel at both, but trucks will be stationed at Williams
- Most of the buildings are ANG, but some will be ASC
- Operations
    - Usually, planes leave engines running
    - Planes are unloaded/loaded and refueled
- Winter field can support Hercules and 757

- Break

- IT&C discussion – Michael Baker (Nick and Lance)
- Focused on internet cafes, “hotel experience”, station radio, etc. – for down time – suggestion to bring content in (music, movies, etc.) – digital displays, video walls

- Currently prohibited to do things like Skype unless there is permission – no bandwidth

- Ben – wants to point out that two-way remote teaching was the desire of one grantee

- Kevin M – wonders how much full-time people down there would actually use the two-way communication

- Joe H – lots of grantee requests through SIPs – they do Skype down there but they can control it – lots of requests for continuing education needs – they do facilitate those – Joe thinks it’s a need for most – both live and static combo

- Pat Smith – brings up public affairs – they have press come down and want to do live broadcasts – some need for a studio space? – small but it has been consistently requested over the years – there is an old TV studio space but not used for that any more – not a top priority, but depends on which direction the agency wants to go – would be an element of a remote TV crew but would be something inside with an anchor -

- Ben Roth – brings up efficiency again and a studio would be like a dedicated space – would be a challenge to have a dedicated space as a part of the program

- Refer to Harrington notes on overall discussion of IT Morale Services

- Don presents a primer for Building 004

- Question on where the aviation supply shop goes – skis, life support, parachutes, joint inspector office?

Tues July 21 (2.2)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

Pre-meeting strategy discussion

1. Dave Winkler asked about Helo Ops and McM environmental; need direction from NSF
2. Geothermal is off the table; wind and solar is still an option
3. Need to select formal building names and stick with them
4. IT Ops
5. Need to work with the outside agencies on a regular basis to allow for transition plane, especially on the IT side
6. Winker suggested that an informal interim review (prior to 15% design) be considered for the design-bid-build
7. Need to begin thinking about teams
8. Winkler indicated that LM ASC has a BOD template that the teams will need to use as a template, but then customize and elaborate.
9. Charrette questionnaires due two weeks following the last charrette
10. Merrick would design the outer ring of IT/Comm; Baker will guide the overall IT/Comm strategy for each building including the airfield.
11. Need to identify key points throughout the week
    a. Budget cycle is important to the outside agencies
    b. User/IT/Comm transition plan
    c. Skyway from Field Science Support to new IT Ops (Bldg 004)
    d. Sea ice support building is proposed to be a phase 4 to Crary lab

8:30 am – Summary of previous day's takeaways and look ahead to today's agenda

- Refer to sign in sheet for attendees
- General presentation of agenda and takeaways from previous day
- Budget cycle in relation to operations and funding
- Phase 4 of Crary becoming attached and the Sea Ice Support building

9:00 am – Airfield summary

1. Air Force rep described the airfield process
2. Prefer to be able to circle the fuel pits; allows for more fueling locations; allows
3. Life support group at airfield
4. Maintenance function was described
5. Consider bringing airfield warehousing to the flight line to reduce the footprint in McM (Bldg 159)
6. Currently bldg 156 first floor, 157 cold storage, 159
7. Ben Roth – the new VMF and the Traverse Ops buildings may provide storage space for the flight line
8. Currently 3 6x6 storage bins for consumables and air plane parts
9. ANG space requirements; JI function; shop space; limited storage capacity; office space
10. ASC is leaning towards VMF and Traverser Ops to house the ANG space requirements; once boilers are removed from VMF, space would be renovated to house ANG functions including workshop; will require physical separation
11. One goal for airfield would be to minimize the number of trips to town required to maintain or repair certain aircraft parts
12. Aircraft skis are maintained in McM and need to be protected from the elements
13. Need IT/Comm space (i.e. closet)
14. Need separation between head and galley bulidings
15. Typically all buildings are wired for power in series; believe there is a better energy strategy going forward
16. Power reliability is an issue at the airfield currently
17. Power quality and power surges are issues currently

18. Current airfield lacks power redundancy
19. First power protection should be clean power from town
20. Comm – all comm should be wireless at the airfield
21. Gary C. – need to keep ease of airfield facility configuration in mind.
22. Need to consider the weight and size of
23. There is a redundant comm requirement for the air traffic control tower
24. There are no plans to maintain a sea ice runway
25. There is not an air traffic control tower planned for Alpha runway (new Pegasus); uncontrolled airfield
26. Pegasus will be the win fly airfield
27. Discussion shifted to the wheeled runway requirements
28. Head module, PAX terminal/emergency refuge, fleet ops with office space, fire department – need a warm space to store breathing equipment, but fire fighters do not overnight at Pegasus
29. Main body – 3 or more flights per week
30. Also serves as a backup runway
31. Need a multipurpose building with a shop vs a dedicated fleet ops building
32. Limited fuel requirement; once or twice a season 15,000 – 25,000 gallons of fuel required for c-17 flight to South Pole; fuel truck is only about 2,000 gallons; can move 35,000 gallons per day
33. Fueling process – need to plan for how vehicles are refueled.
34. ANG programming:
35. Typical flight crew is 6
36. Airfield master plan appears to meet the programming needs of the ANG facilities; may need a small conference room as part of the space
37. ANG life support/shops area would need to be secured storage within the facilities
38. No AV requirements for projection
39. Second floor storage may need overhead door for fork lift access; intent for second floor storage to be removed before moving building at the end of the season.
40. Large storage items (i.e. skis) for ANG would be stored in McM
41. AGE/Cargo/KBA airfield programming
42. Do not thaw (DNT) is a welcome addition
43. Do not freeze (DNF) space as shown in the airfield master plan is adequate
44. Plan for 3 airdrops per year
45. Fuel is pre-filled in fuel storage barrels; need to know quantities for building code compliance
46. KBA storage of 1,200 sf is adequate; pull through with overhead doors on each end of building would be ideal; aircraft heaters and generators are stored in this facility; equipment is moved around with a pickup truck; critical building for medical airlifts
47. Fleet ops: 800 sf vehicle maintenance and tool facility appears adequate
48. Fleet ops: 600 sf office space is adequate; additional shop space in this facility may not be required since shop space available in vehicle maintenance facility.
49. SPAWAR programming: spaces as shown are adequate
50. Fire department: prefer offices on second floor and meeting/working spaces on first floor.
51. PAX terminal: full second floor for fitness area may not be required; consider separate KBA PAX area on second floor of PAX facility
52. Emergency shower and eyewash seem to be a good idea (portable)
53. Consider adding a shower for firefighters and others who might be stranded at the airfield for days at a time.
54. Head module: 50/50 split male/female; would allow 4 fixtures per gender
55. Galley: design for airfield workstaff; food was preped at airfield last season; need to consider waste collection and transport; consider a two-story facility for the galley to
56. Passenger loads are 40 or less from Williams Field (ski runway)
57. General workforce at ski runway – approximately 80 staff

- Airfield discussion

- Don leads discussion
    - Don presented the SAC with the understanding it an outdated document
- Will be looking at two runways – ski at Williams, wheeled at "Alpha" site
    - Moved to two runway locations (Willy and Alpha). Alpha is old Pegasus.
- Looking at what's applicable for each location

- Airfield
    - Gary - need science support buildings
    - Need Fleet Ops building (not currently shown except on rendering)
    - Gary
        - It takes a lot of time to wire the buildings up
        - Very labor intensive
        - More efficient (newer) technology should be used
        - Power (generator) reliability is a problem
        - Need better quick connection scheme that doesn't need an electrician (same system as microwave station?)
        - Be careful of time it takes to setup waste heat
        - If it takes more time to setup power, then the planes have to wait
        - ASC has redesigned bldgs for consolidated operations - height (2-3 stories) is fine
        - Tower has direct link to town
        - Tower has priority for data over most other town operations
        - ATC is not needed at Pegasus
        - Fleet ops needs to be multi-purpose/multi-agency
    - Peach shirt
        - Able to cut power usage in half
        - First priority is clean power
        - UPS is only a backup
        - COMM - everything should be wireless
    - Maggie
        - Would like to use waste heat
        - Keep bldgs small to keep ground pressure down
        - Fleet ops needs to be multi-purpose/multi-agency
    - Larry
        - Since some bldgs are tall (2-3 stories), are they more difficult to move?
    - Don - do bldgs have to be tall?
    - Neel
        - Pegasus
            - Need infrastructure and SCBA storage
            - On-site for 5-hour shift during flight ops
    - Fleet ops is a hub during flights
    - Fuels guy
        - Pump sleds would be nice
        - No special bldg requirements
        - Fuel truck is ~2,000 gal
        - Tanker sleds up to about 25,000 gal
        - All told, can have up to 60,000 stored at Pegasus
    - Fueling
        - Don't know how much fuel is being used
        - Need to meter usage
    - Building size
        - Passenger Terminal
            - 126 people would use during "rush"

        - 60-70 people typical use
        - 3 hours maximum
    - Food Service Module
        - Typically get breakfast in town
            - But occasionally need to get out early
        - Microwave
    - Fleet Operations / Multipurpose
        - 24-30 people
            - Weather observer
            - ATO
            - Fleet Ops
            - Fuel
            - Other
        - Small tool storage
        - Restroom with interior and exterior door
            - Good idea to allow all personnel to use
        - Easier to provide COMM
    - Vehicle storage?
        - None needed
    - Need a DNF module
        - 2-3 pallets (10'x30')
        - Reliability?
- Utilities
    - Water
        - Melted Ice
            - For non-potable water
        - Potable Storage
            - Potable water brought by truck every other day
            - Only in Galey
    - Sewer
        - Need in Head and Galley
        - Storage
    - Fire
        - Capacity
        - VHF radios are not working well
            - Add repeaters?
            - Want hardwired handsets
        - Fire command center should be located near Fire Station
        - MNS is needed
    - Heating
    - Power
        - No special power needs
        - Must be clean
        - Remote monitoring (status and usage)
        - Must be stable and clean
            - NAV has voltage range requirements
        - Current
            - Three generators in three locations
            - Winter flights use battery powered approach lights
        - Starting this year
            - All sites will tie back into town power system via underground cable
            - All lights converted to LED
        - Future

            - Want to convert to LED approach lights once AF approves
        - COMM
            - One building or room (12'x12')
            - Racks plus UPS
            - Wireless umbrella, will extend to full site
            - Can be co-located but needs physical security
            - Need line-of-sight to McMurdo
            - Phones will be IP
            - Will still need radio
        - Other?
            - 200 gal LOX
            - Air
                - Filtered (life support)
                - Unfiltered (shop)
    - Cargo / Transport

- ANG – were involved in the process as it was going on – have seen the report but haven't reviewed since it was put out
- ANG needs shop space
    - What amenities are needed?
- Daily work flow for ANG
    - Pegasus / Alpha
        - For wheel aircraft (C-5)
        - Land at Alpha only
        - No ATC present
        - Pick up some fuel, drop of / pick up users at pax terminal
        - Typically land and take off quickly
    - Willy
        - For ski aircraft (C-130)
        - Primarily land at Willy but can divert to Pegasus
        -
        - Allowed to park for extended periods of time
        - Move from parking spot, to fuel, to parking for loading, back to fuel for inspection, then take off
        - Sometimes fly multiple flights per day, with or without the same crew
    - For crew
        - Prior to flight, crew goes to B165 (currently) for mission plan, weather, etc.
        - Then transport out to field for flight.
        - Move planes for fuel, inspection, loading.
        - Head to Bang Facility for last minute update
        - Back to aircraft for flight
    - Fueling
        - Circular fuel pit is ideal as it allows for fuel spaces to 'rest' between refueling
    - Fuels operations
        - Move fuels back at the end of season
        - Tanker sleds hold 35,000
        - Trucks can hold 2,000
- Daily work flow for KBA
    - For crew, follow same pattern as ANG.
    - Aircraft follow C-130 pattern (park overnight, daily missions, two flights a day, fueling pattern, etc
    - One pinch point is that KBA has to wait for ANG to move for fueling
        - KBA refuels themselves and could possibly use a fuel truck (1000 gallons) but that adds another 'touch'
- Facility discussion

    - In general, debrief space is a challenge at both locations
    - Some items are stored in McM proper (supply / life support / cold storage)
        - Be better to have these items at the flight line
        - Need cold storage and conditioned storage
    - Maintenance and Storage
        - The plan is missing airfield storage. Needed for three distinct groups (JI, shop space, storage)
        - If move storage to airfield, would cut down on transit times / trips.
        - Overwinter storage for heated items would be brought back to town
- Facility considerations
    - Need to verify that the 2.5 story buildings are practical. Sail area and transportation may be harder with these.
    - Higher is better for ATC reasons and a consolidated of building allows for ease in heating and power
    - Maggie would hate for a decision to be made which would not allow for Sea Ice ever becoming an option due to facility size.
- Air field functions as plan is shown
    - Missing IT functions / facility. Need to add.
    - Consider grantee function space. Right now it's tents and that's not ideal.
- Icepod / Crash Detector Radar (CDR) is currently stored in town. If could store at airfield, it'd prevent a trip to town
- KBA has not seen the report

- What is needed if it is wheeled aircraft only
- ANG – don't stay on-continent – need fuel, parking, PAX terminal – Pegasus layout last year was very bare bones – not familiar with the C-17's, but support seemed to work well

- Fire personnel requirement at both runways?

- Ben Roth – asks what typical process is on a routine basis to discover requirements

- Move on to LC runway

- Best document to start from with regard to requirements

- Aircraft generation – get tail numbers for that day – they're normally parked on the apron – go through pre-flight and cargo – sometimes cargo loaded on the spot – crews would show up, would head to fuel pits, fuel up, go to navigation area and then come back to the fuel pits – inspections – individual planes fly multiple times a day – like to keep using the same tail – flight crews swap out after some flights – sometime there are "double shuttles" where they can use the same crew for two flights, but relatively rare – go to Building 165 now for weather briefing, planning, etc. – if plane needs to be moved to fuel pits first – enlisted first, pre-flight checks then officers come in – try to not load cargo in fuel pits – like the circular fuel pit concept – prefer to have the aircraft in the fuel pits – decreases the amount of time – try to minimize engine starts and stops – go to airfield dining facility currently – looking for an area to do that – current plan is to use cold bag storage area for these meetings – in a typical operation, fuel would come to the aircraft and there'd only be one engine start a day

- Ability to circle fuel pits is a positive of the design – added the option for more fuel pits – there are spots that get damaged and they want those to heal

- KBA typical day – start in 165 for briefing, then transport – aircraft parking in overnight parking – potential conflicts with the LC-130 – they stay with airplanes as they fuel – on return, if it's end of work day it will return to overnight parking – quite often that KBA is waiting on LC's to fuel – eats into crew duty day, affects science support – would be good to not share pits – one of the "healing" pits can be used for the smaller aircraft – but there is an operations component – KBA fuels their own planes

- Would a fuel truck work for KBA? – tank and a pump house would be more cost-effective than fuel truck but then manning it becomes the issue

- Typical LC maintenance would be structured around a hangar – all work would be done at the hangar or on the ramp – electricians/hydraulics, all work done on ramp – would like separate work space from office space so they don't overlap

- Don runs through buildings
- ANG Building 1 maintenance ops center with offices and shops – believes it's all the office spaces they wanted – debrief space is a challenge currently
- ANG Building 2 – ties into central building in MCM – supply and cold storage in MCM – life support in MCM – operationally they would like to bring all of this to the flight line – ski storage would need to stay in MCM but everything else could be brought to the line – looking for s.f. on current warehouse – 159 stays warm all year round- currently 156 is supply area (1st floor) stays heated all year round – 159 shared with ANG – Shaggy suggested this would be replicated in Central Services – also a JI function
- Maintenance shop and storage – keep consumables at airfield – 3 6x6 bins where they store consumable aircraft parts – storage above shop space is where they'd put as much warehouse function as they could – question at the time was how they would get to 2nd floor

- Shaggy – kind of blew it in the MP and missed a few things for ANG – 3 distinct requirements – the JI function – limited shop space – limited storage capacity in town – had looked for a couple of spots in the MP, VMF/Traverse Ops – thinks there's synergy with JI function – field sciences building next to ATO? – could pack chutes and such – for storage/workshop function, good chunk of existing VMF where once they pull boilers out, could be renovated with physical security – AGE could be in there too – building could be rated light mechanical

- Storage at airfield would help them to not bring stuff in, take to town and then bring back from town

- Everything that needs to be kept warm is brought back to CHC at end of season – there are times they'll lose days since a part is town and they have to wait for it

- All storage for flight season would be at airfield minus skis (need to be kept out of the weather) – need climate-controlled environment – skis are kept at MCM year-round and are rotated out every few years

- Wants to review again and check with people "back home"

- Gary – anything that they're doing at airfield that could move back to town?

- Larry – how much goes into town and then back out to airfield?

- Once bins are maxed out it goes back to town

- AGE/Cargo/KBA – Gary refers to Pete Cruzer and that Pete wants to take a second look at it – early discussion about splitting up that space

- KBA – always been an issue on storage – needs to take a look at this

- DNF storage is cargo, will confirm with Pete

- ARFF is fire fighting

- Maggie – thinks we're missing an IT space

- Cara – might make sense to put some space for grantee cargo – setting up rack tents every season to support themselves – Gary seconds the notion of a science support building for the airfield – all-purpose building for science support – every year – Gary will work with Curt to come up with a s.f.

- Ice Pod hangs off C-130 and collects science date – some landing site reconnaissance – ice pod has 3 weeks of missions and they try to do it with their reconnaissance – crevasse detection radar

- Maggie – how often are they used? Could they be stored in town?

- Don presents town layout in MP

- One thing they've learned is to separate head and galley

- Fleet ops and SPAWAR is not shown on the map

- Question on funding – current head won't make it to 2020

- Maggie – NSF will be doing ongoing maintenance and will include things like this as they go along – will check with MP progress at that point

- Where's the power generation?

- Discussion on utilities – what's hindering activities?

- Gary – time-consuming way they go about utiltiies – everything is wired in series by a couple of lineman – 3-5 days to get everything wired – electrical and comm – big thing is getting town power from the central generation facilities – several power outages last season – affects NAVAIDS – working on a plan to replace generators right now – reliable power to airfield is desired

- Last few years they invested heavily in staying away from town power – just have had bad power over the years – invested in UPS systems and cut parts usage almost in half – no redundancy – they need stable and clean power – first protection should be clean power from town, not the UPS – don't see a need to pull comms out to airfield, just power

- Maggie – makes a suggestion to use waste heat out here

- Dave – could use wind and solar out there to charge batteries out there

- Gary – want to be careful about the time frames needed to put these things together – his concern is that someone could confirm it doesn't take too long – if they're moving back and forth between the fields, would be a lot of down time – stanchions between buildings would limit equipment movement – stanchions require exact placement of buildings

- Larry – is a 2/3 story building practical?

- The higher the better for ATCT – top is just the cab – they do have redundant comm requirements for ATCT – have a direct link to town – they have to have redundancy on almost everything – have to have connectivety in town before a majority of their operations begin -

- Maggie – don't plan on having sea ice runway in the future – regardless of whether the airfield moves, the buildings will be stored on berms for winter

- Gary – no ATCT at Pegasus, uncontrolled – no plan to have ATCT at Pegasus

- Don – asks about the wheeled airfield requirements

- Maggie – need fleet ops and fire out at Pegasus

- Could be more than 3 wheeled flights a week – also is backup runway for Williams

- Neil – need plugs to plug their stuff in and a warm space to do breathing air and such – don't stay at Pegasus, about a 5 hour evolution (e.g. they'll do it when flights come in)

- Same philosophy for observations – they're generally out there 6 hours before flight

- Maggie – PAX terminal still at Pegasus – more for emergencies and WinFly – could also have groups waiting for transport to town – need to think of multi-purpose space at Pegasus

- Gary – for safety reasons, weather-observer can't be off in their own hut – seconds the thought on multi-purpose space

- Alex – once or twice a season, the C-17s will take on up to 25,000 gallons of fuel for training to Pole – Ok with multi-function building – work with fleet ops – they can move 35,000 gallons in a day if they need to – at the end of the season there is residual fuel – have done WinFly airdrops at Pole – on average they have 40-60k gallons out at Pegasus

- Discussion about some sort of storage space at Pegasus

- Another mention of multi-purpose space – wish for some type of "retail type" shelving or something for storage – potential vehicle maintenance at Pegasus?

- Discussion on fuel for vehicles at Pegasus

- Break

<u>1100 – Building by Building Function</u>

- Concern over the AGE building

- ANG Building 2
  - No AV requirements for conf rooms
- ANG Heavy Maint
  - Storage on 2nd floor could be hard
  - Might just add a second garage door so that a palette could be lifted up directly to 2nd floor at beginning and end of season
  - Not all items make their way home so need to then put back in?
  - Skis are not stored here. These will go back to McM.
- AGE/Cargo/KBA
  - Want direct access to exterior for items like engine maintenance. Large item maintenance.
- DNF/DNT (Pete)
  - DNT is a great improvement since don't have now
  - DNF is a good size.
    - 14 air drop bundles for contingency
      - Right now kept at McM. Much better if can keep DNF at airfield.
      - Can be rigged and ready to roll at new DNF storage

                - Not needed to be secured
                - JI would rather then not transported to the field and built out there. So storage at airfield DNF is preferred.
                - Airdrops happen every year but rarely have to use contingency drop bundles
            - Pete thinks would be able to keep regular season bundles in the DNF as well
                - These have barrels with fuel in them already
- AGE Maintenance Shop and Storage
    - Existing is a little small
        - Nice to move items stored outside to inside. Otherwise, get buried in storms / winds.
    - Pull through would be optimal
        - Injuries happen pushing / pulling through. Pull through is best.
    - Aircraft generators, heaters, servicing equip. All on wheels (single or dual axle)
    - This is a critical building. When storms come through, and a medical flight comes through, their gear is stored here.
- Fleet Operations
    - Structure 1 (offices / shop)
        - Could cut out shop space on here.
    - Structure 2 (vehicle maintenance)
        - Good to do work on site for vehicles
            - Used to do this years ago, good to get back to this plan
        - Passenger van would be great to get into here
            - This is proper scale
            - No bulldozers
        - Good for light work. Real / heavy work goes back into town.
- SPAWAR (Greg)
    - All good!
- ARFF (Neil)
    - All micro singles for all personnel upstairs
        - If adequate, all microsingles upstairs and all office downstairs
        - Some living spaces
    - Usually 24 hour on but few times longer
    - Go to galley for food
        - Eat common meals. Need a small break station for other meals (coffee, fridge, micro)
- Pax Terminal
    - Maggie says fitness is not a requirement but not seeing equipment up there. Good to program it though.
    - Maybe bikes and treadmills.
    - No shower…Maggie says too much scope creep.
        - Sort of requested but might be cut from program.
    - There's an emergency shower in galley currently. Need to add this and eye wash bottles.
        - Will need in maintenance shop (as OSHA dictates)
        - Consider if buildings go cold, have them be portable
- Water logistics
    - Gary said had to haul water to Pegasus
        - Williams, generate own water from snow
- Head
    - If 50/50 M/F split, gives about 4 fixtures per side.
    - At Pegasus, 130 folks
    - At willy, 40 or less
    - Out to field camp, 15-30 max
- 30 staff, multiple flight crews, 3-5 fire fighters, 3-7 for fuels, 7-10 for ops.
- Galley
    - Don't feed passengers out there.

    - Will feed if super long delay.
    - Design for surge capacity
    - Changes from prep to service and back
    - Maggie needs to review if really need 'full kitchen' is needed.
    - Gary said primary function is to feed workers out there or when have an aborted flight and need to feed passengers.
    - Food waste / water waste
    - Ben said looks like exactly same size as have
        - Maggie asked if worth looking at a second story
    - On phone - if went up on galley, would give chance for added visibility

- Thinks it's capturing requirements except for the debrief – need good sightlines to airfield for the MOC itself – have debrief area in the same building – typical flight crew is 6 – would just be office spaces – life support shop and storage area needs to be sealed off due to nature of equipment – don't want this accessible to just anyone – closed off meeting space? – comm area/break area with a table so they can have crew meetings – just a round table with no projector is fine

- Alex – wonders about materials in buildings when they get moved – also about hauling heavy stuff to 2nd floor

- Intent would be to remove everything when they shut down Williams – stuff would still have to be put somewhere warm – not over-winter storage so they'd need a place to put it – warehouse 156 stays throughout the winter

- Pete Cruzer – very large items like skis that wouldn't go on 2nd floor

- Don – clarifies that skis would stay in town

- Thinks prop building would fulfill heavy maintenance function minus the storage element – storage has to be secured – will look into physical security requirements

- KBA doesn't need any shop space, just a place to store things

- Current AGE storage shed is a little small – vital to be able to store more equipment out there – challenge to get everything in there for storms – potential to make AGE maintenance bigger – 1200 s.f. for both functions (shop and storage) seems appropriate – drive-through capability would be preferable – any kind of servicing equipment – pulling with pickups currently – critical in storms – they store critical equipment there (stuff for Medivac)

- Would like to get back to being able to do some maintenance at Williams – fleet ops vehicle maintenance from a passenger van standpoint and pickup trucks – nothing bigger than passenger vehicles – troubleshooting and very light maintenance – major problems would still go into town

- Fleet ops office does currently exist but cobbled together – would like it streamlined – doesn't think the shop portion of the airfield manager building is necessary, they could use the vehicle maintenance shop area for that

- SPAWAR – everything looks good on their space

- Fire (Neil) – 8 microsingles on 2nd floor, all office on 1st floor – 24 on, 24 off in general – sometimes 2 days, but exception rather than the rule – they rely on the galley like everyone else – they need microwave/coffee pot/refrigerator – don't need a full kitchen

- With regards to fitness space: it's not a requirement but it's something they've talked about for a while – there are a lot of people that are out there – grounded flights, fire personnel, etc. – not sure a whole 2nd floor is appropriate for this – potential for shower? – need emergency shower – currently have eyewash bottles – any of the maintenance shops would need eye wash/emergency shower – would be a portable unit – potential for "normal" shower in the head module?

- Gary – at Williams, raw sewage is put in a bulb in the ground and water comes from snow melter – new snow melter? – touch on with utilities
- Pete – need appropriate sized stairs for people going up/down in ECW – two facilities single story would be fine
- KBA – would like to see KBA secure storage
- From aviation ops side, having a separate KBA PAX side would be beneficial
- 40 or less on PAX count for Williams going back to CHC
- In the 80-100 range for people work force at Williams
- No general PAX feeding at Williams – but there are times (like delays) where they do feed people out there
- Current galley size is not adequate – they're eating in shifts
- Changes from year to year but they've done both food prep and food service
- Gary – caveat to people that eat out there – primary function is to feed the workers – have the off situations where PAX need to eat – puts a strain on supplies
- Maggie – current galley is 3 separate buildings so there are walls and such that make it inefficient – new galley could be smaller so long as the flow is better – potential for putting seating on 2nd floor?
- Potential for a flexible bridge between the 3 modules? To prevent the need for mating and tolerances
- 2nd level would provide extra visibility to the airfield
- Refer to Dan H notes
- Break

1:00 pm session – Continuation of airfields discussion

1. Wheeled airfield programming (Alpha Runway)
2. PAX
3. Common facility (fleet ops [colocated but separate for microwave, freezer, , SPAWAR observer, tool storage, weather observer, ATO and shops, fire storage) including head facility with interior and exterior door access; up to 24 staff. All staff are at runway only during flight, but fleet ops and weather observer; facility would have to
4. C-17 capacity is up to 120 passengers
5. Maximum duration at Alpha airfield for PAX is 2-3 hours.
6. Kress vehicle can house 65 people; but should not be relied upon as staging
7. Would like to add a DNF at the wheeled runway

- Fire is ok to be located in the pax terminal
    - Neil just needs a small work space, but a small separate would be best.

- Keep Fleet Ops somewhat separate.
    - Need their own space. Eat all meals out there. Have a microwave, fridge, freezer, etc while out there.
- Alpha / Pegasus Runway
    - Fleet ops is out early, running two shifts to get the runway set up. Day shift and night shift.
    - Weather observer arrives at runway 6 hours prior to flight
    - Gary said if folks get stuck out there, good to keep all collocated b/c of weather.
- Pax terminal
    - Pete says big flights, 120 pax per shot for first / last couple of weeks
        - Then tapers down to 50-70.
        - A 50-70 would be more appropriate anyway. 9 out of 10 times, people hang out outside while waiting for a flight.
        - Only on extreme storm days, do they pile in.
    - Pete says people usually are only there for 3 hours before being brought back to McM. People typically move out and back all at once.
        - 65 pax can hang out in Ivan. Could use as a portable staging area but don't bank on this.
- Schedule during flight days
    - Workers grab breakfast in town and then head out. Very few times, head out before breakfast is served. Provide microwavable food at flight line just in case.
- Gary asked if AGE shed (existing) could shift from Willy to Pegasus
    - Keeps equipment out of weather.
- DNF / AGE Shed / Pax terminal
    - Would like a DNF at Pegasus (enough to hold a few pallets...15'x30' would be adequate size)
        - Grantee group was using DNF as a hanger for their UAVs. Having a facility would allow for them to launch.
- Staffing between two locations
    - Might pull one person from Willy to Pegasus for a wheeled plane but usually associated with each runway.
    - Pete might pull equipment from Willy pending what comes in at Willy
- Utilities
    - Shop will need compressed air but not water
    - Power filters
    - Power monitoring
    - Gary has current loads on what facilities pretty much take (Anthony will have existing current loads on airfield items)
    - Have several 50 gallon liquid O2 carts brought down from Christchurch.
- IT&C (Jeff)
    - Willy
        - One sled mounted building (12'x12' in size)
        - Rack, UPS. Run off of standard power.
        - No blocking line of sight to t-site.
        - Could be in another bldg but need physical security.
    - Alpha
        - Need same as Willy
    - Weather services needs a redundant link back
    - Wireless connectivity could be extended to the cargo areas
    - NAVAIDS will eventually change
        - TACAN go away eventually if aircraft update their hardware / software
- Bandwidth
    - If moving functions off of continent, need more bandwidth but have no idea that need to know how much.
    - Jeff says no challenge to bandwidth from airfields to McM
    - Off continent is the pinch point
    - Pilots would possibly use to update ePubs on computer

- VOIP replacement is in progress at McM. Will eventually extend to airfields.
    - Phase 1 - Replace the PBX (update 10 phone lines)
    - Phase 2 - replace more (up to 600)

- Cargo flow
    - Cargo items in from McM need to get shaken down, repackaged, then shipped out to pole.
    - Ben asked if cargo from Christchruch can be packed and loaded more efficiently so that not having to repack on the ice. Pete says they're already doing it to some degree.
- General cargo breakdown
    - Palettes are stacked by inventory. Pete then will move to DNF / DNT / ship to town.
    - Equipment operators will direct where inventory goes.
    - Operators load trucks so that most efficient order / lbs loading / capacity prior to shipping back to McM
    - Breaking down on ground (outside) is the preferred way, otherwise need a very big building to do it inside.
    - DCN or shipping number is assigned (PHI or KBA has input here?)
        - Christchurch carrier notification email links FedEx to local coding
- Ground transportation
    - Some needs to equipment plug in lines for keeping engines warm
        - Plug in lines on DNF, Pax,
        - Pegasus has Fleet ops plugs
        - Outfit about half the buildings for exterior plug in lines
- Ben to Pete
    - Does anything pete does impact allied agency group (NOAA, etc)
    - Pete - if those agencies are awaiting a specific shipment in (parts, etc), identify early, snag part off of palette, and assign priority.
- Water
    - Maggie - Snow melter from for non-potable. Truck bring out potable
    - Water is delivered every other day
    - Storage
        - Galley is only place with potable water, has a storage tank
    - Don - Melt on site? Maggie, depends on snow accumulation season.
    - Pegasus - no water delivery. No potable water access. It's BYOWater
        - Bathroom is a non-flushable.
        - Kbres - want it to stay that way? Gary - it's simple. Gets shipped out, not to waste treatment plant.
    - Gary - Willy will continue to use the bowl (bulb?). If had to haul, requires more people to staff.

- Power
    - Williams Field
        - Had 3 generators
            - One main for town TACAN
            - MLA
            - KBA facility
        - Wire is cheap, all items will run off main generator in town including runway based lighting
            - PAPI
            - REILS (already LED)
            - Battery operated runway edge lighting
                - Keep in charge at airfield or charge in airfield
        - SSALR
            - Threshold and strobes
            - AF has not approved LED approach lighting yet
            - 100 kW to operate at present
                - 15 kW ish when eventually move to LED
        - Wire for main generator (for Willy)

- Underground to approach lighting from main generator
- Tie MLS into this run
- SSALR are buried cables
- Weather group is out there early and help setup:
  - Tower
  - Map aids
  - Take observations earlier
  - Even before 130s are in place
- All on white elephant generator
  - Had a fault in switchgear last year. Down to one generator in unit.
- For SPAWAR
  - About 05 Oct, put a small standalone generator out there for two weeks (but hates doing this)
- For science
  - Have a science group out there almost every year
  - Had a rac tent but would prefer something more permanent
  - Dedicated skid mounted facility for science support
- If look at waste heat
  - Duke Armstrong (consultant) advocates waste heat but users have mixed emtions
  - At LDB, need to have buildings be located spot on so that overhead utility can be properly connected. No play in connection.
- Pax and ARF (?) tried to move last year, but didn't happen
  - 4 plugs for Ford F-450's
- Matt discussed timing for runway certification
  - Need lights and NAVS for all airfields running so that FAA can visit and certify
  - For all three runways: Willy, Pegasus, and Sea Ice (if used that year)
  - Approx 19th October, FAA land the "challenger" bird
    - Lands in Pegasus, does flight certification for Pegasus
      - Certify TACLAN, PAPI, REILS, SSALR….do them all at once.
        - Takes about 4 hours to certify MLS and another 4 for TACLAN
    - Then move to other sights and verify. Takes too long to move generator from each site.
    - Matt says the real big deal is the 24-48 hours to spin up prior to flight check. So want to have a generator connected and not-disconnected. Takes about 5 days as is.
    - From on phone, better to have the options to move FAA around quickly.
  - Gary says they have 4 generators for the MLS as of now.

- Don to individual plans
  - ANG 1 building
    - CTK (Consolidated Tool Kit) AF guide says have to store tools in a specific manner.
      - Every 12 hours account for all tools
    - Have a deficiency and have to work on a makeshift bench or work in rear of aircraft.
    - A lot of spaces currently used as office / shelter space.
    - Users would like a table downstairs for weather / flight ops meetings and a room for desk, a few computers for office space.
    - Flight line will have to house 11 people per shift
      - This is the biggest shift. Some may be smaller.
    - Aircrew flight equipment (life support)
  - ANG Heavy Maint
  - AGE / CARGO / KBA
    - Minimal shop space needs
    - No fancy power req's, (120V is good)
    - Work bench on shop side
    - Wall shelves on storage side
    - Like to pull an engine in to work inside

        - Shop end would like more width, 12’-14' is desired
    - AGE Maintenance
        - No one here to represent
    - FLEET OPS
        - Change tires, brake lines, etc
    - SPAWAR
        - Electronics / ATC gear
            - First floor, concerned with size of door. Needs to be wide enough for a server rack
        - Within the tower / cab
            - Console, radio equipment, computers, monitors
            - Common area (on second floor)
                - Lots of time on watch
                    - Controllers get 10 hours limit
                    - Others do more
                - Need micro, fridge in facility on second floor
            - Want heavy equipment on lower floor
        - ATC items gets moved…used to move items into / out of rack every year
        - AFLCS
            - Not hard wired

- Afternoon power conversations

Utilities:

1. There is a need for a 200 pound liquid oxygen tank at the airfield
2. New ski runway and wheeled runway will be setup for wireless communication (wi-fi); will extend to the cargo ops areas as well
3. New ski runway and wheeled runway will need to a communication tower
4. Need to keep radio communication in addition to new wireless phone communication
5. More wireless devices envisioned to track cargo, but will likely happen back in McMurdo
6. In general, future power requirements are anticipated to reduce in the future
7. In general, future comm requirement are anticipated to increase in the future
8. Data over wi-fi is desired; unclear if phone over wi-fi is desired; cell phone/lithium ion batteries do not perform well in cold environments.
9. Gary C: team needs to give careful consideration to keeping the Alpha airfield utilities simple so that they can be dissasembled and reasembled over a weekend, rather than weeks or a month that it currently takes long duration balloon facility to be reconfigured

- Dan H leads the discussion
- Utility
    - Gary indicated that utility setup takes 3-5 days to wire up. This is too long when need to shift site over a weekend.
    - Power outages / lack of power are problematic. It has cost the program money as it may cause a flight to delay.
    - Need stable and clean power. Keep voltage and frequency at a usable level.
    - Like to move, and sounds like we will, to wireless connectivity between the facilities.
    - Maggie indicated that waste heat system at LDB was a good idea but Gary indicated that it takes too much effort to set up.
    - Consider the use of wind or solar.
    - Power needs to stay off of the grade so that trucks could get around

- Gary – lays it out – as the operator of the airfield, the requirement is to have stable, clean power – Anthony (their power guy)is in Denver and not available right now – clean = no spikes in power – affects NAVAIDS when the power drops and spikes – can decertify NAVAIDS

- Gary's download on the power system now and what it will look like on 10/1
- At Williams, 3 generators – 1 providing power to "town", 1 running microwave landing system, 1 running KBA – they are going to run everything off the main generator in town as of 10/1 – less fuel, easier to maintain – includes runway end lights – PAPI lights – SPAWAR bringing in LED PAPI – some battery-operated runway lights – some LED – simplified short approach light system – 500W incandescent – AF has not approved the use of LED for approach lights – probably 100kW to operate approach lights – LED 15kW or less – holding them up from coming forward with project to replace incandescent – will stay that way until they install LED – battery only for winter flights – they burn a long time

- Dan – with more WinFly, any advantage to burying?

- Gary – wire for main generator right now is underground out to the approach lights – going to install another wire to microwave site as well – same at Pegasus – planning on re-installing this year

- Generally out there early so they can set up tower and NAVAIDS – doing even before the 130's get into place and before the utilities are in place

- Gary – example of what they did last year – did operate a separate generator for SSAR lights – everything at Williams will be on white elephant generator this year – Williams is very similar to Pegasus layout (didn't have Williams layout in the MP) – everything will be on white elephant this year – white elephant has two generators: primary and backup – has ATS in case primary goes down – believes they got the power surges worked out – tentatively 5 October for setup – hates doing it, but my put up a standalone temp generator to get started up – provisions for the smaller, temp generator

- Dan – how would science would work into this?

- Gary – typically always have grantees out at Williams – have dedicated ski science support buildings – rack tents take a lot of labor, reasoning for suggestions on a separate science support building

- Will discuss power generation further in Denver

- Gary – additional input on power generation: if we do look at waste heat – Dick Armstrong has advocated waste heat – if he ever goes back to the ice runway, can't stay out all season – has to move in early December to Williams field – can typically do this over a weekend – anything similar to LDB would be onerous for timing – issues on LDB: waste heat goes overhead – buildings have to be spot on – wants to maintain flexibility to do a sea ice runway in the future – need to move quick

- Ben – can be handled with quick disconnects instead of rigid connections

- Gary – currently all power feeds are done by linemen – still can improve though

- Dan – what's moving and when?

- Gary – last year, PAX was at Pegasus for most of the season – was moved to Williams then back to Pegasus – in the new concept, nothing will be going between Pegasus and Williams

- At the times there is an ice runway, they have to power 3 airfields at once – have to have lights and NAVAIDS at all 3 and have them checked off by FAA – once FAA buys off, they can shut them down – set up Williams for NAVAIDS but don't fly into there – all 3 checked in the same week

- Gary – three years ago on ice runway, had all 3 going – microwave landing systems and lights at all 3 fields – no plans right now to construct ice runway – but if someone later on wants it to come back, will need to support the 3 – Challenger does flight cert for NAVAIDS at Pegasus – will then do the same at Williams – historically, used to do two FAA flight checks but got away from that – flight hours on Challenger (FAA cert plane) are very expensive

- Greg – there's no set time limit on how long it takes to certify the approaches – when the Challenger is there, they may not fly Williams but could do Pegasus – too labor-intensive to unhook things and flip around for the flight checks

- Gary – scenario: Challenger checks weather and Willie's is bad – wants to check MLS at Pegasus – if they have to take a generator out to Pegasus, it's too time-consuming

- 24-72 hours to get systems up and running

- Ben – conceivably, could "borrow" a generator from town?

- On phone – the more options we've got for single day of flying, the quicker the Challenger gets out of Antarctica – the more flexibility to multiple locations, the better

- Gary – 4 generators dedicated to the MLS right now – 3 plus a spare

- Other considerations on ice runway than just the buildings and transporting those

- Don – wants to talk programming a little more – more interested right now in the shop space – what is CTK?

- Consolidated Tool Kit – AF guidance on storing tools in a very specific manner – every 12 hours (for them) they have to be accounted for – currently one building is half CTK and half sheet metal – currently only shop space they have – only other space is the engine "boathouse" as a shop-type space – currently working "off-equipment" on benches or heating aircraft and working in the aircraft

- Don – refers to questionnaire – shop-wise is it work bench with volt meters and such?

- Looking for a bench and 110 power – prop building would be the most specialized space – basically electronic avionics needs to build wiring harnesses and comm cords – currently do over their desks and chairs – a lot doubles as office/shelter space – need a place for everyone due to weather considerations

- Don – need a conference table?

- Would work since they're holding all their meetings in the galley right now- as for CTK, as long as there's shelf and cabinet space it should be good – will shadowboard and identify where the piece/tool goes – with regard to office space, need a desk and a couple of computers – building 2 will need to house 11 people on a shift

Airfield ANG Shop:

1. CTK – consolidated tool kit
2. Ken Borek Air – storage 10 x 20 OK; shop should be more like 14 x 20 ; common/PAX area should accommodate waiting area for 16 passengers.

3. SPAWAR shops – sever racks should be on first floor; shops space – small to medium electronics repair areas with benches; ATCT cab is most important space.

- Air crew flight equipment – usually 1 or 2 people – desk and a computer, maybe 2 desks and computers – believes they have bins and racks for exactly what they need

- Propeller building will serve the shop function – need to accommodate the storage function

- KBA shop space – very minimal – standard 110/120 power – work bench setup on shop side – storage area wants wall shelving – currently pull and work on engines outside, weather-dependent – in the new facility, wants access from at least one end for a large door – 4x4 door at least?

- Tires, jump starts, brake lines – kind of stuff they'd be doing at the airfield on the vans and such

- Main concern on SPAWAR is size of door on 1st floor – have bottom floor as equipment racks for ATC

- Airfield lighting control system from Navy – not hardwired – what they would use to control runway lights from ATCT

- Break

- Don downloads on airfield discussions

- Bill K (M-B) – provides overview on IT Operations Building

- Industrial spaces moved to bottom floors – data centers are on upper floors – can reach reception via bridge/stairs or from outside – 2nd floor various agencies operate their data centers – common collocated data centers – self-contained cages with restricted access – supporting offices adjacent to their servers – EOC (emergency operations center) functions and EOC meeting area – stair to the roof to access roof equipment

- Kevin G – two rooms in area dedicated to EOC functions – two rooms are flex rooms – replacement spaces for rooms in 175 and 165

- Assignable office space is a big problem right now – space in 175 is too remote – important to JPSS and potentially NSF IT group

- Kevin G – talks about scheduling – did some backward planning – September 2020 that building (IT Ops) would be ready for occupancy – 189 would shut down in mid-2021 so people would have about 9 months for the cutover – interagency transition plan to be worked on – focused primarily on relationship of this new building and the occupants of Building 189

5:00 pm Session Summary

1. Discussion regarding moving dive operations into the Crary lab phase 4. General consensus is that this is a good idea. Still need to run the concept to ground and to determine which firm will take on the design scope for this space.
2. Need to determine scope split on dorm connectors.
3. Need to talk about Dan Pickett about airfield galley size, etc.
4. May want to provide a summary of changes from the master plan to the current charrette scope.
5. NSF and users requested timing of what phase the McM airfield will be constructed.
6. Airfield – do we need to retain the sea ice airfield for future? Need input from NSF.
7. Is there a need for a science support space at the airfield.

8. Plan is to stay with the C-17 and LC-130 platforms for the near and mid-term future.
9. Continuing collaboration with the outside agencies as well as the entire team in general will be critical going forward.
10. Confirmation of collocated data center in the IT ops facility.
11. Keep the goal of identifying mission needs during the charrette rather than shifting into a design mode.
12. FAA will evaluate Helo Ops location, size and requirements during this upcoming austrual summer season. Need to press the helo ops people on their requirements.

Wed July 22 (2.3)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

<u>0800 - IT Discussion</u>

- Airfield
  - IT will provide requirements for 12'x12' sled
    - Rack
    - UPS for 3-4 hours
    - Possibly a separate genset
  - Merrick/Oz design sled
  - LDB is not part of our SOW
  - Microwave connectivity between sites and then site to local bldgs
  - MNS and other functions can go over wireless
- McM
  - ASC design temp ring based on microwave
  - Baker / Merrick work together to establish node locations.
  - Nodes start on exterior and then possibly move to interior of facilities
  - Baker will establish overarching guidelines for IT and will push it down to design teams

8:30 am – Reviewed salient points from yesterday's discussions

Key takeaways included:

1. Planning for two separate airfields
   a. Wheeled
   b. Ski
2. Program from 2013 report is good for town layout
3. New prop building replaces the ANG shop function
4. Need to understand the airfield construction schedule
5. Does Sea Ice Airfield capability need to be retained
6. Is a building to be provided for Runway Science/Storage.

- Airfield
  - Refer to sign in sheet for attendees
  - Dan led daily recap
  - Airfield
    - Planning for two airfields
  - Program from 2013 is still good for town layout
  - New prop bldg replaces ANG shop function
  - Need to understand airfied constrution schedule
  - Retain sea ice?
  - Provide runway science building?

IT&C

1. Transitional planning and continuing collaboration is critical
2. Co-located data center facility was confirmed by group
3. Group consensus of revised blocking diagram
4. Confirmation of Backup Data Center Requirements

   - Transition plan and continuing collaboration
   - Co-located data center was confirmed
   - Group consensus of revised blocking diagrams

- Confirmation of back up data center reqs

9:00 am – Physical Security

1. Currently, Cary lab has card key access
2. Pat Smith – informed the group that NSF envisions and command and control center in CONUS which operates 24/7.
3. South Pole – has monitoring and recording cctv security capabilities
4. Card key access for various facilities was discussed (data center)
5. Crary & medical would require physical security for controlled substances
6. Fuels, waste, VMF staff would leave soiled work clothes in work centers
7. Radomes physical security and video monitoring was discussed
8. Airfield life support facility requires physical security
9. Post office and points of sale facilities require physical security
10. Radomes: need access control for safety; will likely go to card access and remote monitoring
11. Small out buildings/shelters only need key locks for physical security
12. Cameras locations (CCTV)
13. Alcohol warehouse, bars, ATMs, antennas, interior of remote facilities/equipment enclosures, helo pad areas, two airfield runways, possibly monitor key utility
14. Consider locating remote cameras at various sites for weather/environmental monitoring

    - Physical locks
    - Key cards at Crary lab
    - Cameras
        - SPAWAR has cams on hills for weather
        - IT uses cams at remote looking at racks
        - At black island
        - Emergency / MAC ops has cams to monitor station
        - ATM camera
        - Booze camera
        - Arrival heights
    - None of these are central systems. All islanded systems. Managed by user groups.
    - Pat said to eliminate fragmented design
    - Get away from "stovepipe" of imagery
        - Wants to have imagery available for people off Ice
        - Would help for 24/7 monitoring on state side
        - Situational awareness (like at pole)
        - Keep high density video local and then possibly pipe stills / throttled up north
        - Pole is both monitored and recorded
            - Think like security booth
    - Medical and pharmacy is required
    - Video at radome entrances
        - On 10m, kill switch integrated with door
        - On 4m, kill switch is in vestibule
- Access control / video
    - Need to discuss where, what kind, to whom, etc
    - Most buildings have just standard locks now (with brass keys)
    - B004 wants security inside bldg, not necessarily external
        - Desire to have access log to see who's entered
    - IT looking for controlled access to wiring closets
    - Not needed at radomes. Just a kill switch and a camera.
    - Want at power generation bldg, water building
    - Dispatch, mac ops, required to have access control

- Might be worth it for dorms to have card keys
- FD still can get in via knox box
- Joe Harrigan discusses the system upkeep and what it may take to migrate to a key system
- Kara said key card in Caray is great
  - Role based
  - Hard keys take up much more time
  - Be nice to have a campus wide system
  - Crary had it b/c allows grantees to know no one has been in their room
- Gibbons said in future, might be able to use card for more than access. i.e. store, equipment rental, etc
- SFA/ANG has a requirement to lock but not necessarily key card
  - No SCIF / open storage requirements for the single office where have a safe with classified paperwork
- Key cards are great logging items
- Safes / long term storage lockers
  - Data center has a req for fire safes for backup tapes
  - Gibbons reminded team that storage for long term items were brought up last week
- Storage / lockers discussion for extra gear
  - Pat - back in the day 155 hallways was lined with lockers. Went away during when the navy rotated out and populated with civilians
  - Maggie has a fire safety issue with the lockers. Just something to be aware of.
- Peter - T&L (trans and logistics) group indicates that there are some high value items
  - Hazardous cargo prep should be a secured area
- Neil indicated that the current system (hard key) has too many master keys to carry around. Likes the idea that one key card could be carried around for access.
- Medical and pharmacy would like ACS
- Crary locks for controlled chemicals
- Airfield is a key lock (life support building)
- Neil raised the concern for point of sale locations such as post office, store, etc
- Joe sees people wandering / poking inside T-site.
- Pat - B221 was open from the outside incase folks needed a place to be in weather. There was an internal refuge area
  - For remote shelters, key is much more simple. IDS would be beneficial
- Navaids at airfield needs to have doors locked
- Roof access
  - Monitor roof access and two catwalks (Joe mentioned yesterday in other meeting)
- Joe uses cams in remote facilities (like T-site) where you can't go due to a Cat-1 condition. Use PTZ to look at equipment and doors.
  - Prevents IT from having to go outside in bad conditions / saves time to troubleshoot
- Extra cams would provide situational awareness - remote sites black island, t-site, etc
- Cams on helipads would allow grantees to be able to tune in and know when a helo is ready for flight.
- Joe said cameras were set up to allow for limited access, i.e. only certain individuals could see the images from certain cameras. Need to review how access would be allowed.
- Could use PTZ cameras to do monitoring for solar panels, do inspections, etc.
- Existing cameras access would be beneficial for Helo Ops to see if helos could fly. Might prevent launching weather equipment in bad weather.
- Cameras could be used as safety in wintering i.e. linemen responding in a Con-1
  - Ben said if this is a problem, interested. Otherwise, might not need.
- General cams to cover whole station.
  - Ben, which areas need recording capability
    - ATM, pharm, select storage, point of sales
- Bandwidth with Joe
  - Pat don’t worry at the local level due to robust backbone
- Pat raised fuels operations

        - Art says not an issue in the past. Not "don't care" but keep track of folks via radio. Always in contact with them. No understood benefit to video.
- Recap
    - Key card
        - Data center
        - Power / water
        - Dispatch / eoc
        - Select groups with safes
    - Video
        - Atm
        - Pharm
        - Antennas
        - Alcohol / point of sale
        - Overall situational monitoring
        - Sensitive storage

10:15 am – Command and Control

1. Fire department requirements - McM
    a. Currently staffed during the day with 7 fire fighters, but that number could potentially be reduced going forward
    b. Helo ops and Flight Radio Operators (FROs)
    c. Helo ops and fixed wing aircraft dispatch requests to be located in helo hangar
    d. Fixed wing ops use iridium radios to communicate with pilots on the ice

- Nick (Baker) presents command and control functions
- Fire (Neil)
    - Fire and ops can possibly combined
        - Believe this would be staffed 24/7 year round
        - Helo / fixed might be seasonal
    - Fire has 5 people and mac ops has 7 people dedicated to dispatch. Neil sees the ability to combine.
        - Request to have helo ops stay in hanger and not move into command and control.
    - Neil unaware of any groups in industry doing any remote ops / dispatch.
    - Condition 2 and 1, all drivers need to check in with fire when driving
    - Dispatch will place RF antennas in ideal location and then have a remote setup
- EOC
    - Console would handle just emergency conditions
    - When gets 'hot and heavy' the separate EOC would be acoustically separate
    - Nice to pull up individuals channels in the EOC. Helps get the full picture.
- Acoustics / dark finishes
    - "quiet the space down"
    - Needs to have maps on wall
- Pat visited a FAA en route flight following facility
    - Individual acoustically sound stations. Can quiet the room and quiet the individual location.
- Fire communications
    - Wants to be collocated with MacOps
    - Fire wants all MacOps and all MacCenter on their consoles
- MacCenter
    - Data messaging
    - Automated display

11:00 am – Command and Control – Facility and Infrastructure Needs

Don discusses facility reqs

- Similar current arrangement would be fine for facility standpoint.
    - Single workstation at McM, rest are at airfield
- Raven Ops staff
    - Radio communication needed
    - Can't see number of people reducing
        - 3 offices

11:30 am – Communications

1. Mass notification – currently lacking on the Ice; significant life safety issue
2. Needs and requirements going forward – more efficient mass notification system; major muster are a current challenge
3. Pat Smith – current communication platforms are stove piped and very inefficient and ineffective
4. Need to address aircraft movement reporting going forward; currently very cumbersome
5. Any site connected via a road to McMurdo, there is a need to be connected to the McM mass notification system; comment made that Scott Base (NZ) needs to be tied into the McM mass notification.
6. McM supplements emergency operations, including fire protection, at Scott Base
7. Kevin Gibbons – summarized the morning; reminded the group that there was an extensive McM Ops Center study and resulting report from 2010; that report will be share with the design team.

Nick presented the comm system presentation

- MNS
    - None exists now
    - IT has no need to mass notify anyone. Just fire.
    - Joe has the as is
        - Pieces
            - Personal interface
            - Email
            - Pager
            - VHF
            - HF
            - TV display
            - None is unified
        - Seen in the past that visual messages don't really work.
        - Usually used for muster and trying to do a head count
            - Very manual process (can take a day!)
        - Flight notification reports goes to certain subsets
    - Pat
        - Too much hodgepodge. Wipe clean and redo. Capitalize on this opportunity to do it right.
    - Flights
        - Flight guys initiate takeoff, but pass to MacCenter after cleared
        - Different aircraft require different alerts
        - Info is cumbersome
    - Pat
        - Lots of background work to get correct mass note signals / alerts to work
        - If all inputs can be put into an authoritative source
            - Then it goes through automation placing highest ranked alerts first
    - At present, flight info is manually entered .
        - Flight would really like and welcome new tech.
    - Neil says that volunteer muster falls apart. Hard to activate teams.   Overhead speakers are great.
        - Want interior and exterior speakers. Similar to Pole and Scott.
        - This would cut down on muster role call times and increase safety.

- Pat
  - Need to have it zoned properly so that don't it's effective to those that need to hear the signal
- Does airfield need to be integrated?
  - Airfield, LDB, major site connected by a road, T-Site, Arrival heights
  - Add Sea Ice to this as well

1:00 PM – Helo Ops

1. Mike - FAA is scheduled to visit McM this austrual summer (Oct-Nov 2015) to investigate the Helo Ops.
2. Same person at FAA will be the individual to certify the site for Helo Ops
3. FAA has no jurisdiction in Antarctica
4. Current thinking is that there are two options for siting the new helo ops
   a. Current helo ops location
   b. Existing ballpark
5. Unclear as to expected timing of resulting helo ops siting recommendation
6. Helo ops will be included in a design-build RFP package, so the design could be more performance based with the D-B contractor responsible for site adapting to FAA recommended site
7. Number one concern is safety: flight and operations
8. Anticipated helo is Sikorsky S-92
9. PHI has developed a conceptual site plan and hangar/office floor plan which were summarized and discussed; design team should attempt to obtain the proposed conceptual helo ops floor plan and site plan for inclusion in charrette report.
10. Current proposed helo hanger footprint is appoximately 200 x 300 ft.
11. If the new helo ops hangar is located in the current helo ops location, there would be a need to for temporary/staging areas would need to be provided
12. Helo ops arrives in McM Oct 1; flights starts 10 days later; 3 mechanics arrive in winfly to de-winterize the helos that remain on station
13. Temp operation range is -54 c for one helo and -40 C for another helo
14. Reviewed helo ops business operations
   a. Hangar arranged for 6 helos
   b. Hangar would need to be heated for summer ops; would not need to be heated in winter
   c. Consider radiant heating to make the heating operation more efficient
   d. Regular maintenance occurs every night (1 mechanic during the day; 4 mechanics during the evening)
   e. Restroom facilities required
   f. Officing on 2nd floor with PAX and cargo ops on 1st floor would be acceptable.
   g. 20 people work in hangar but only 16-18 during the day; only 13 required for helo ops (balance are pilots); 12-14 meet in the morning to plan the day's operations and to get their assignments.
   h. Sling loads built by night shift night before the airlift
   i. Helo ops retrieves part of the helo cargo and some is delivered to the hangar
   j. Ideally, PAX and cargo would have separate flow patterns.
   k. Typical PAX ops would be 12, but 24 PAX seating is envisioned for the future. Need to further evaluate PAX capacity requirements.
   l. 25% of helo flights are cargo only (estimated)
   m. Need to consider the transportation of gear and instrumentation from field science support and Crary lab to/from helo ops needs to be considered. May fall into a McM ops function.
   n. Consider cargo sorting space within the helo hangar
   o. Single conference room, briefing room, meeting room would likey be acceptable
   p. Locker room for 18 personnel with 18 lockers would be highly desireable.
   q. Light maintenance (ex. PAX helmets, mics, speakers) occurs in helo hangar
   r. Flight communication with PAX (ex. grantees) could be improved for flight notification to improve flight schedule efficiency

s. Every science group (either PI or whole team) typically needs to meet with the helo ops manager to plan helo logistics for science deployment.
t. Cargo weights and balances operatoins were discussed; all cargo is weighed and tagged with appriate weights; sling loads are pre-weighed and tagged prior to arriving at helo ops.
u. Internal cargo returning to helo ops gets delivered in some form or fashion to other facilities at the station; equipment or material does not typically go back into helo ops.
v. Waste fuels and oils are collected into barrels stored outside.
w. Utilities currently used: oxygen tanks, compressed air hard piped along exterior walls with hose drops; new facility should have a compressor room; specialized power requirements – 220v in garage/hangar; lubricant volumes are low enough that portable distribution (by bottles) are adequate
x. Hangar comms – currently has own iridium radio system and radio system to communicate with helo pilots
y. Helo fueling ops – refueling station would be below grade where possible to avoid hazards; currently gravity fed fuel storage tanks and then piped to refueling pad; fuel is currently metered to the helo ops; redundant fuel pumping would be required.
z. Currently there are 5 fueling stations at helo area.
aa. Helo pads require tie downs, power and grounding capabilities; need sufficient power to for helo pads
bb. Backup power required for certain critical helo ops functions (i.e. communication)
cc. One overhead bridge crane is required (5 ton).
dd. Multiple wind indicators are highly preferred
ee. Aircraft entrance to hangar to should be directly adjacent to helo pads

Lance Presented Remote Operations

- Remote ops started by doing weather from someone's house in South Carolina
  - Progressed with removing certain capabilities from the ice
    - Most of weather forecasting is done in Charleston, SC, however some tasks still being done on Ice.
    - Will have 3 on Ice, 5 in SC next season
  - ATC on ice. Only 2 in towers themselves. They provide weather ops.
    - Two radio circuits go to SC. HF and air to ground UHF line. SATCOM comes in from Christchurch. Can do ATC from Charleston. Caveat is that need redundancy. Need flight radio operator or ATC until can get the redundancy.
  - To push work off Ice, started with lowest level of administrative work. Did lots of cross training. Since 2003, 40-50% less bodies on the Ice.
    - Not as restrained in SC for bandwidth. Push out 15 forecasts a day (more than previously done). For comparison sake, National Weather Service might do 5-8 / day. Keep people longer b/c not burning out.
    - Staff is rotated down to the Ice once every three years. Only having ever worked in Charleston is not a good idea. Need to have lived it locally. This setup also provides the flexibility to not have to fire someone if they don't get PQ'd.
    - Goal is 1 forecaster on Ice and 3 in SC. Reduction from 10 in history's past.
- Pat asked about communication flow
  - Started with AOL IM
    - All comm is now real time.
    - All guys have spent time on Ice so understand the "Ice tempo".
  - Weather and ATC in SC (the ROTH office) are in real time to McM airfields.
- Joe asked if had any issues operationally
  - Communication flow being split with have some minor drawbacks. If they had to rank location scenarios, the best thing is to have them all together on Ice. Second best is all located in SC. Split is third.
  - Prevent failures and expedite training by teaming up a seasoned employee with a green guy.
- Still have a weather observers stay at the field.

- Air crew is used to getting remote weather briefings. Was nice to have someone local on the Ice but understand remote operations.
- When went down to 2 forecasters, pilots didn't have the biggest problem, it was a NSF reps. Culturally, people are less comfortable with remote ops. Want someone there to help them through.
- Joe mentioned the help desk.
  - Have one person at help desk. Used to have 3. People were mad that they got a message machine. So would snag techs as they were en route to somewhere else. Breaks continuity.
- Maggie asks why Joe kept a person there.
  - Helps to have someone with the local experience. Helps smooth over the changes to more remote ops.
- Redundancy and uptime for remote ops
  - FAA has a required number of 9's (number unknown)
  - Remote ops is not cheaper to do in the states. Labor rates are different (especially for contractors). 54 hour standard work week. Labor laws in states charge overtime for 40+ hours. There are also weekend / night uptick charges. Probably a wash if you include travel for labor rates. Cheaper labor rates.
- Joe mentioned that one of the ultimate drivers was to be efficient
  - More bodies on ice means more infrastructure.
- Utilize Iridium system. Charleston, Denver, McM for housing data / sharing data. Have a good back up, redundancy for state side. Efficiency here as compared to Ice.
- Gary indicated if there's not a forecaster on duty, can call or email for a weather report.
  - Previous contractor went through this same exercise. Challenge is not just the culture, it's a paradigm shift. It costs money to send someone to the Ice. Remove them if possible. Free up a bed. Free up infrastructure.
- NASA and JPSS are doing remote ops to the greatest extent possible
  - Both monitor remotely. Still need local support in case something breaks.
  - Technicians will always be on the ice.
  - Somebody has to be there for customer interactions. Somethings are better person to person.
  - Gone slow and steady to removing support from the Ice.
- Joe
  - Big area of concern is customer interaction. Started with 3 summer staff, 1 winter staff and have slimmed down to 1 summer staff only.
- Pat
  - Customer interface. We're in the opportunity to re-engineer services. Rethink. Reinvent.
- How handle sense of abandonment?
  - Can get jealous of person helping you in a warm office elsewhere can be rough.
  - SPAWAR indicated this goes away after a few years but there are growing pains.
- Fire
  - Dispatch might be able to be moved.
  - Not personally familiar with anyone doing this that remote. Even FOB in Afghanistan use a local dispatch. Need to review military and industry to see if remote has been done successfully.
- Larry
  - Lots of schedulers on ice. Talk of moving them. Specifically work order scheduler types.
  - Right now doing control manager is done remotely. The DDC system for HVAC. This would likely move back to Denver with Smart City.
- Joe
  - What kind of robustness is required for remote connections? How long can it be down for? What's critical? Watch for how many 9's are requested vs required as this can add costs.
  - SPAWAR uses multiple methods with less 9's.
- Off ice communication
  - Prioritize IP traffic and can commandeer bandwidth if needed for critical signals.
  - Group into very active versus passive types of communication.
  - Users need to categorize communication types by priority. That way IT can manage bandwidth.

- Aaron Seal attends the afternoon helo ops session with PHI

- Mike Scheurmann – FAA will be coming down this year – they have no jurisdiction in Antarctica, so sometimes a challenge to get them down there – by the time they got a "semi-yes" it was too late in the season last year – has to go back to them for next season to get a person down – but all he needs to do is ask – October/November for the inspector to be on ice – the person that goes down will also be the person that approves the site for helo ops – going to do everything the FAA would normally do to certify a site – won't have one person doing survey and then another approving the site – wants FAA to take a look at entire MCM station – one of the big things is prevailing winds – could be potential for other sites – they may need to gather wind data for other spots on site

- Ben – so we're using the FAA as a consultant? – Mike confirms

- Mike – don't have to do it, but they're a recognized authority – self-imposed – will be a different person than the one responsible for the airfields – could be up to a year to get the FAA report

- Don – decision was to indicate in the ballpark for MP 2.0 – try to create something that could go about anywhere but will have an impact on the site – is a D-B project so we have some flexibility

- Ben – could be a performance-based specification – could develop generic design and then D-B needs to meet those requirements, with the additional input from FAA

- Mike – never heard the FAA come in and state building requirements – generally the siting of the helos themselves – all related to geography and topography

- Ben – allows us a great deal of flexibility

- Mike – yes, but he's never started from a blank slate before – driven purely by requirements – orientation could come into play as well like prevailing winds hitting the wrong side of the building

- Ben – have a pretty good idea on the starting requirements for now – may be less than stellar but will need to review the compromises faced in operations

- Don – wanted to start from overall level – distributes PHI exhibits – cargo transport and people transport – piped system for fuel delivery – from a site standpoint, cargo and people on one side and helo ops on the other

- Keith Cox - #1 priority is safety of flight – design is based on their largest helo

- Alex – their fly way is shown on the main road?

- Keith – thinks it would be parallel to the road going through the gap

- Alex – talks about dump space (T-1 fuel) for sling drops

- Keith – when they take off now, they have to weave through fuel tanks

- Mike – is absolutely the stuff the FAA will take a look at

- Keith – about 70% of the time from their current location is favorable – once they're over the cliff there's suitable areas on the sea ice – last month/two weeks of the season they have to go through the gap – other 10% the winds are screaming and they have to take off through the gap

- Ben – back to Alex's question: if you were to fly through the gap and there are vehicles, does that hinder them?
- Keith – would take off toward the gap on the left side of the road – with sling load they're not allowed to fly over people, vehicles, etc.
- Alex – so by the time they hit D-15, they need to have enough elevation
- Keith – would have enough altitude to go into their flight plan – prior to this, they just need flat surface to abort – part of the problem is terrain in current area, but also more than 50% of time they have winds coming down Ob Hill onto the heliport – have to overcome to fly out of there – limits their loading capabilities
- Ben – worsened by location currently?
- Keith – yes – kind of splits around Ob Hill – favorably take off into the wind
- Alex – would always shoot to come through the pass and not need to do a 180 like currently
- Keith – correct – would come into and out of the gap – would be at level of Ob Hill around the fuel tanks – approach through gap ideally, but could go over current heliport and over the smaller tanks – also could come up the main road from ice pier area
- Ben – questions on layout – helo parking perpendicular to road – curious if there was consideration given to rotate into real estate
- Keith – rotate it 90 degrees for cargo loading – wheeled out to parking area and then they'll hover to flight line
- Nick – talks about how they shift over to a sling load area so they're not hooking loads next to "parked" helos
- General discussion over the location, orientation of the proposed PHI facility – Ben, Mike and Keith point at 11x17 exhibit and discuss
- Ben – facility has to be operational during construction – need workarounds – maybe other shell space or facilities – can't just close down helo ops
- Shaggy – if it did end up that current location is correct, there's a lot of demo and sitework in the current helo ops area – to prevent shutting them down, demo and site work in area to move them to
- Ben – discusses fuel lines – they're currently flying over fuel lines? – confirmed
- Keith – problem is that they're barely over the terrain while they're climbing in there
- More general discussion on small aerial exhibit
- Discussion on PHI's daily operations
- This is Phase 7 (strategically) since they need all of the area up there

- Keith – come to town October 1 – 10 days from there they start flying – February 15th is about when they leave the ice – 3 mechanics come at WinFly (helos over-winter at station) – currently 5 helos for the USAP mission – they have flown once in April and it was marginally successful – probably couldn't do helo full winter due to temp constraints

- Longer operations will be desired if they're doing more shoulder season work

- Keith – test flight is where they make sure there's no leaks – they drain all oils and fluids to winterize – 10 day window to start flying missions – come in first flight of main body – had talked about bringing one pilot down prior to main body (like 2 weeks?) but can't do it logistically – all pilots are now dual qualified for both aircraft

- Keith walks through hangar design (S-92) – what it's set for is 6 helos – would want every helo in with very bad weather – also need to consider accommodating the Kiwis – double door system is a mod to the design (in comparison to their "Gulf design") – would be an air lock type area for them to stage and get up to speed – A-stars – this layout they wouldn't need to take the blades off

- Ben – makes comments that, with blades on, it would take up a lot of real estate – could you look at some with blades off, but not all?

- Keith – needs to be heated, but not during the winter – could definitely scrunch down space – very regularly they have 2 birds in hangar for maintenance – if they go 3 (currently) it's a challenge – could take blades off 1 or 2 in event of a storm

- Cara – makes point that some grantees wanted space near/adjacent to helos to store some stuff

- Keith – with regard to heating, the double door would extremely impact temp in hangar – helos stay on the line overnight except for maintenance – one mechanic on during the days and the rest are on nights to do all the maintenance – move them with an antiquated tug with a wheel system on the skids – 4 helos would be out on line every day to fly – 15 minute intervals from 8-8:45 – 5th helo is a spare – 2 normally come in at night for maintenance – Kiwis had two helos a lot last year, plus 2 from Italians – all US and Kiwi helos at lower level (plus fuel) – upper pad rarely used – Kiwis sometimes just fill up and go park at Scott – would like to have a bathroom in their hangar – would like the dispatcher up in a cab-style elevated environment

- Ben – is it possible to have a two story facility? Advisable? Less than desirable?

- Keith – two levels would be fine – officing over top of PAX would be fine – parts currently stored outside or into hangar when they can find space

- Nick – one cage in science cargo for storage over-winter – couple of milvans outside current facility – spare blades are in boxes by the milvans – can use forks lifts to move the blades

- Keith – takes about 4 helo techs to get the blades off – they take them completely off – wants door big enough to bring an a-star in

- Keith – on personnel – there's 20 of them but not all there at one time (16 in morning?) – 5 pilots and 5 helo techs every day plus a mechanic and a couple of others – so revise earlier number to 13 – would like a room big enough for them to sit – they need to meet, definitely in this facility – most sling loads are built by the night shift – typically the pilots aren't even in the meeting – chief pilot is there

- Nick – they normally pick up cargo from multiple places around town – stage it appropriately and after morning meeting they load it into helos – DNF is in their PAX area (not good) – stuff that can get cold goes out to the line

– sling loads are typically built the night before – all cargo and PAX currently coming through the same small door – 24 seats for PAX is a little heavy – it's not unusual to have 12 passengers in there – want people there 45 minutes prior to their flight

- Cara – grantees discussed the possibility to stay in helo PAX in case they're delayed for an hour or something – would be nice to have wi-fi and waiting area – so maybe the 24 person model would be beneficial
- Nick – want to get cargo, DNF, etc. between 24-48 hours prior to flight
- Ben – would someone be able to deliver their stuff a week before hand?
- Cara – if there was a place at helo to store it would definitely help
- Keith – for helo ops supervisor, scheduling based on weights is typical – for people showing up the day-of with their stuff, it's somewhat of a surprise to predict weights and flight plans
- Cara – some of this will always happen – but if they had certain parameters it would help – would help though more than what they're doing currently
- Jenn – another benefit on early cargo is the ability to fly stuff out earlier/ahead of time if there's a "flight of opportunity"
- Ben – questions whether there would be people there to receive stuff sent out early – in general, there would be but they wouldn't "leave stuff in the wild"
- Nick – sling loads are cargo only
- Keith – maybe 25% cargo only?
- Keith – could be 5-10 times a day that the pilots are flying – helo schedule comes out previous night with potential backup missions
- Jenn – someone is in dispatch role from 7 a.m. to midnight, sometimes later
- Nick – hopefully most of your stuff is at the hangar day prior – they're weighed the morning of and have to do that (e.g. couldn't do it night before at Central Services or anything) – would prefer to see everyone weighed as they're getting ready to go
- Shaggy – talks about grantee cargo aspect with going back and forth with tools, gear, etc. – good going downhill, but not great going uphill after return
- Cara – concern related to not having cargo space in hangar – but if there was, would help people to get stuff early and only have to get themselves to hangar in morning
- Mike – from a contract point of view, the helitechs shouldn't be driving people around – stretching bounds of what is reasonable for their duty – there is an operations component to figure out
- Nick – thinks additional space would solve a ton of this

- Cara – further, space at hangar would work for people coming BACK to town too – generally give everyone enough time to schedule appropriate transport
- Nick – from cargo handling standpoint, their current tracking system is Ok
- Pete Cruser – can't really do it the same way they do airfield – labor-intensive – assigning shipping codes and such would be extra work – they typically stick with fixed-wing – it could be done, but would need additional hands, labor and time
- Keith – if science cargo was next to helo ops, would that help?
- Shaggy – couldn't really do that
- Nick – typically don't encourage passengers to go to their snack/coffee area – they're not providing food or anything
- Keith – thinking that two locker rooms could be combined into one space
- Shaggy – shower for mechanics?
- Keith – would like hot water (currently don't have)
- Break
- Discussion on washing of floors/aircraft – has soap in it
- Nick – 4 different waste barrels right now – potential for fuels, oils, etc.
- Don – requests corporate standards from PHI – could put in questionnaire
- Question on lighting levels as well – not quite sure what the standard would be
- Don – anything in the future/on the horizon?
- Nick – talked about trying to make their own cargo system wirelessly integrated with flight system
- Keith – iPad type technologies emerging – could be done independently in their group or could be tied to MCM – they download databases at night, would be nice to have a cohesive system
- General discussion on sling loads and weights to and from the field and what happens afterward when they get back to town
- Nick – mechanics will fill out a haz waste form for used oil/transmission fluid
- Is some 220 needed (labeled on plan)
- Hangar has whole radio setup as well as iridium setup – antenna as well

- Keith – current fueling system is adequate – but if you were building a new facility, ground-mounted fueling would be helpful

- Alex – 2 15,000 gallon bulk tanks that are gravity fed by fuel farm – from there, pumped to the individual fueling stations – is potential to gravity feed but there are filters involved (e.g. need a certain head across the filters) – maintenance hasn't been a huge issue – huge issue at start up with water hammer and learning curve – demand for pump really based on customer demand for time – there is a meter component to the fuel distribution system – there are two pumps for redundancy – currently 5 filling points

- Need tie-downs, grounding and 110 at helipads

- Keith – 5 ton OH cranes – probably could get away with one crane even if there were two rows of helo parking – multiple wind indicators would be nice – generally want aircraft entrance direct to the heliport – nothing else really driving orientation – if they stay in current location, the further they can get away from Ob Hill, the better – like if it would move into the gym area

5:15 pm – Executive summary session

1. Helo ops siting and ops study is scheduled to be conducted in Oct-Nov 2015

Thurs July 23 (2.4)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives (Preparatin for NSF Executive Debrief)

1. Team developed summary bullet items of salient discussions and requirements identified throughout the week

8:30 am – Debrief with NSF

1. Don S facilitated the week 2 charrette summary as follows:
    a. Broad and consistent understanding, review and comment from Agencies
    b. Confirmation of master plan 2.0 guiding principles and facilities configuration
    c. Understanding of Agency interim process flow and ideal adjacencies of sub-functions.
    d. True appreciation from Agencies that they:
        i. Were given opportunity of participate
        ii. Saw real evidence how their input may be considered
    e. Airfield planning will be for two separate fields, wheeled and ski equipped
        i. Buildings need to be designed to be moved quickly
        ii. Need to retain capability of a Sea Ice Runway
    f. Agencies need an understanding of construction schedule to allow for budget process and transition planning
    g. Expanded bandwidth off continent was discussed frequently
        i. Reduced staffing, increased reach back
        ii. Expanded situational awareness in CONUS
2. Brian Stone – asked if the design team can identify areas where functions can be performed off continent if it proves to be more efficient (i.e. saves operational budget)
3. Don S and design team indicated that the design team can identify certain operational efficiencies that can translate into facility efficiencies and operational efficiencies
4. Items not included in McM MP 2.0
    a. Enclosed connection between Cary and Sea Ice Support building
    b. Enclosed connection between IT Ops building and Field Science Support
    c. Airfield IT Ops building; follow on discussion within NSF – decision made to include this facility in the program
    d. Additional facilities and infrastructure for wheeled runway
5. Decisions needed
    a. Site location for Helo Ops; Brian Stone asked if there was discussion or consideration given for co-locating a helo pad adjacent or on top of a related work center (ex. roof of field science services building or ground based pad adjacent to field science services)
    b. Building for Runway Science facility or space at airfield; currently two rack tents are set up each season to support this function
    c. Does Sea Ice Airfield capability need to be retained? Asked and answer was yes. Could impact the design of the airfield structures in terms of size and configuration to allow the facilities to be relocated quickly and easily. Brian Stone confirmed that smaller, more towable facilities would be beneficial.
    d. Replacement of sea water intake? Ben Roth: don't let seawater temperature criteria drive a new sea water intake. The current sea water pumping configuration is less than ideal and could be considered a potential single point failure.
    e. IT Ops Building
        i. New facility blocking diagram was reviewed
        ii. First floor is instrument layout and configuration space, field science support layout space. Brian Stone reminded the group that if this is a critical facility, there should not be hazardous ops or storage within the building. Building access should be controlled.
        iii. Second floor is more the technical space (backup EOC, data center)

iv. Brian Stone asked if the facility is planned to be large enough to house future data center expansion
v. This facility will house the backup emergency operations center (EOC); primary EOC will be housed within the Central Services Facility

f. Helo Ops
    i. Concept floor plan received from PHI will require right-sizing once minimum requirements are identified.
    ii. Brian Stone – reminded the group to consider the fire protection requirements for a hangar (i.e. how to handle a hangar full of foam)

g. Brian Stone – asked if the team received feedback about other aspects of the new station design. Consensus was that the outside agencies more mostly focused on their particular work centers, not so much on quality of life facilities.

h. Physical security summary
    i. Card access was discussed. Mixed reaction from outside agencies.

i. Personal storage areas discussion; storage from one season to the next.

6. Dive/Sea Ice Support facility – idea was revisited; idea to incorporate into the Crary lab facility was well received.
7. Ben Roth – revisited the helo ops strategy; should consideration be given to co-locating helo ops with a work center (i.e. roof of field science support facility); helo ops representative (Mike Scheuermann) opposed this strategy; it is industry standard to have the helo techs build and certify the helo cargo packages.
8. Scott Arnold (NSF – budgeting?)

<u>0830 - Dave and Don present the out brief</u>

- Bandwidth discussion
    - Might be more of an operational expenditure (OpEx) issue. Not part of scope.
    - Pat sensed struggling in room from remote ops folks
- There's a cultural shift that needs to be altered
    - Pat thinks users are not relinquishing old ways but may need to
- Dave indicates remote sensing can save labor / bodies
- Pat reminded design team not to leave out IT facility at airfield
- Sea Ice requirements
- Ben indicated that sea water intake is not part of scope
    - Brian said still capture it so that it can be shown as vetted
    - Show that we're cognizant of needs
- Discussion surrounding the sky bridge
- Brian asked that we really look at the code requirements (i.e. foam in hangers)

10:40 am – Review charrette agenda for weeks 3 & 4

1. NSF attendees: Ben Roth and possibly Scott Arnold
2. Reviewed and adjusted agenda for next two weeks
3. Ben Roth – geothermal energy would be acceptable to meet the Antarctic Treaty, but feels it is impractical to implement at McMurdo.
4. Consider energy production from sources with delta T opportunities.
5. Discussion on editing the master charrette meeting minutes. OZ proposed to send out a master document and have the consultants use track changes to capture changes.

Fri July 24 (2.5)

Overflow and Internal Management Meetings

Charrette Week 3

Denver/ASC, August 3 - 7

Mon August 3 (3.1)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

- Meeting kickoff, Dave Winkler
- Alma Huber – Safety Moment
- Dave Huelskamp presents a brief welcoming message
- Shaggy presents opening message
  Shaggy
  Robert (PDC, working with FC on Crary)
  Karen (PDC, civil eng)
  Dave W
  Don S
  Joseph Orton
  Nathan Hoople (Palmer PM)
  Rick P
  Kevin B
  Christine L
  Dan H
  Keith Johnson – Utility mech / facility maintenance supervisor McM
  Dave Sherman – (Facility Engineer for McM)
  Bill Kontiss
  Kim C – FCA
  Joe Harrigan
  Rob Robbins – dive services supervisor
  Tim Briggs (ASC PM)
  Bill Turnbull – Antarctic Terminal Operations (ATO) - (manager or airlift terminal ops (ATO) / air lift, cargo processing)
  Kim Boyer – supply supervisor
  Keith B
  Pat F
  Joe Levi
  Mike Day – station services
  Erin Lancaster – housing/lodging oversight
  Dan Picket – program manager for station services
  Todd Eines – overall food management (former culinary manager on ice)
  Michelle Tombre – program planner
  Frank Marcwilliams (?) (quality manager)
  Kevin Gibbons
  Larry Male
  Jon DeLay
  Curt Labombard (science implementation manager)
  Richard B
  James Hilden (lead engineer / architect for ASC)
  Kyle Hoppe – ASC electric/energy engineer, utilities mechanic in 09
  Ben Roth
  Neil Miller – polar systems engineer, power system engineer, DDC controls

Kiley Baham
Christine Eldridge
Steve Dunbar – MCM area manager
Liz Coffman (logistics manager for science)
Danielle (OZ interior designer)

- Dave Winkler
    - Reiterates that Palmer is tracking behind MCM
    - Goes through the NSF process walk-through presentation
    - Discusses what's in and what's not and funding, etc.
    - The current cost estimates are parametric and based on square footage
    - By September of 2016 will be looking for bottoms up cost estimates
    - Goes through D-B packages (Merrick/OZ) and then D-B-B
    - Reiterates "make before you break" concept with relation to keeping things functional
    - This is an efficiency project.
- Rick P
    - Presents overview of DC meetings and MP 2.0
    - First week with the grantees was to understand their world and their lives
    - Week 2 same thing with tenants and allied agencies
    - Now we meet with ASC to get the foundation of our design for the next two weeks
    - Presents overview takeaways from Week 1 with grantees (slide)
- Shaggy
    - Presents Week 2 overview slide
    - Seeing more remote sensing with a reduction in size of field camps?
    - MCM wasn't made with IT&C in mind, has changed everything about how business is done there
    - Makes the point that they will be sticking with 2 airfields and "possibility" for sea ice runway (in contrast to the recommendation of single airfield complex (SAC) from airfield MP)
    - Discusses transition plan and cutover plan for people moving from old facilities to new facilities
    - With regard to bandwidth, this will help with the infrastructure to handle more bandwidth, but it's generally an operational issue
    - They can buy as much bandwidth as they want, but to what end?
    - Will need to factor this in with relation to NSF and spending
- Dave Winkler
    - Reiterates that this is an efficiency project
    - At the end of the day, need to make a business case and show that we've reduced costs
- Rick P
    - Drills down into Week 1, presents slide
    - Asks for comments from audience
    - Rick presents the MP 2.0 site plan, adjacencies, etc.
- Dan Picket
    - The orientation piece was a bit surprising – with regard to grantees saying orientation/wayfinding was something to improve
- Rick P
    - Runs through MP 2.0
    - Three main things on why things look the way they do
    - This is an efficiency project
    - Concept of "make before you break" (e.g. new space needs to be done before old space is demo'd)
    - Reiterates that each phase needs to be self-sustaining AND efficient
    - Overall strategy of working around 155
    - Goal of re-using the things that are working well like lodging and Crary
    - From a logistical standpoint, want to take the 20 existing warehouses and put them directly adjacent to where the goods will be used
    - Brings up the concept of stacking 2nd floor functions underneath Central Services

- Dave W
  - Brings up and discusses the snow modeling exercise
- Neil
  - Asks question about pedestrian traffic between Crary and field science support
- Steve Dunbar
  - Asks about the grading aspect of Central Services
  - Will ramps be installed?
  - Rick confirms that we'll incorporate ramps and should be able to get them between lodging
  - Probably won't be as severe of a slope as the existing Crary ramps
  - Suggested we consider number of available beds during the peak of construction to ensure there is sufficient housing for residents and construction workers.
- Comment made to centralize industrial laundry, but de-couple the residential laundry in the dorms.
- Consider laundry shoots in dorms
- MEC = mechanical equipment center; snow mobiles, piston bulleys, small generators

Morning Break

- Rick P
  - Presents flow diagrams from Master Plan starting with personnel
- Bill Turnbull
  - Is there an exit out to the open "yard" area from PAX?
- Rick
  - Yes, every corner of every building is going to have an exit
  - Will have to do this for life safety purposes anyway
- Bill T
  - Is this main Kress dropoff area going to be the main pickup for all ops people (airfield, shuttles, etc.)?
- Rick
  - That's the idea
- Steve D
  - The day-to-day shuttle stops could be over by the dorm (like current Derelict Junction (DJ))
  - Carrying stuff all the way through building (from dorms to main entrance) may be onerous
  - Point was that formal entrance should not be a replicated DJ function
- Bill
  - Want to limit traffic in drop off zone (between Crary and Field Science Support)
- Larry
  - Question on whether science cargo and personal gear can be marked?
- Bill
  - If they have hand carry, it comes as personal gear
  - They're trying to change the mindset on this being "cargo"
- Tim
  - Making an assumption that the "fleet" will look the same it is today?
- Shaggy
  - Yes, assuming it sticks pretty much close to what they're using now
  - Dozers, Deltas, etc. sticking with the same idea
- Rick P
  - Moves into material flow
  - Mentions turning radii and number of milvans in the yard
- Kim
  - Cautions that if you're moving all trucks in same location (the yard), there could be more than 2 trucks at a time and need to plan for that
- Bill
  - What about vehicles that get used all the time? Is there room in the central area (in relation to plug ins)?

- Shaggy
    - This would be up in the Building 140 area
- Rick P
    - Moves on to waste flow
- Dan Picket
    - Can we explore dewatering on waste?
- Shaggy
    - That's all absolutely a part of this
    - Like wood chip boiler and dewatering
- Dan P
    - This will determine how much space they will need
- Shaggy
    - Knows that central laundry and janitorial is huge, need to work with Erin on this
- Erin
    - Thinks we keep washer/dryers in dorms and then do central laundry

- Steve D – what percentage of laundry is generated by galley?

- Dan P – they're doing their own for most part

- Erin – they're doing aprons and oil-saturated stuff – also getting oil/fuel-saturated stuff from Fuels

- Shaggy – talking about getting those work centers their own industrial laundry (fuel, field science support)

- Rick P – this is one function we're actually looking at de-coupling

- Ben – will the volume be there to make this efficient?

- Steve D – bulk of workload is when station is emptying out – sleeping bags is an example of something that could be worked on over the winter

- Shaggy – for tents, being able to be sprayed down and floor drain

- James – want different washers and dryers for fuels, greases, oils

- Erin – ever been talk about a laundry chute in dorms? – fire code violation when blue bags are put in the hallways – would cut down on their staff for linen runs

- James – if they go single stream on waste side, they would only need half the current waste stream space dedicated in the dorms

- Erin – the reason they do things right now is if in case there's a boomerangs – tags with names on it? – would have to get quickly and re-distribute for another night

- Ben Roth – what's frequency of boomerang?

- Erin – they see it more on field camps, higher rate

- Bill – maybe a couple a year on C-17's?

- Shaggy presents phasing concept from MP 2.0 – does reiterate the concept of 150 construction workers

- Discussion on what happens to the SSC function with relation to the IT data center

- Shaggy – MEC is one of the hardest ones to come up with ideas – probably going in VMF or new Traverse Ops – (Mechanical Equipment Center) – sleds, Pisten Bullys, generators, etc.

- Ben – at conclusion of each phase station is completely usable? – Shaggy confirms yes

- Shaggy – plan does not rule out winter construction – shell and core in the summer, interiors in winter? – this is the way it's scheduled right now – goes back to baseline level of science support – once they figure this out can figure out support staff (plus construction population)

- Curt – other function of MEC (mountaineers, etc.) will need a temp home

- Kim – have 168 coming down – two floors of VMF material that would have to find a home – traverse could have their own supply if necessary, why tear down 168 prior? – there's no need for the footprint in future phases

- Shaggy – refers to the "Phase 0" concept – need to consolidate what they have there currently

- Kim – if 168 is taken out in Phase 4, it would reduce touch points

- Steve – asks if number of beds in lodging remains relatively static over the course

- Shaggy – the new footprint will allow some more consolidation

- Steve – should map out personnel versus beds in every phase

- Dan P – external coolers and such take up most of their footprint right now – a staging space between cargo and warehouse would be helpful

- Erin – they struggle with rec storage currently – TVs are an example – no room in the housing office – anything they check out is piling up right now

- Joseph – brings up the staging aspect and how to build and keep things functional during construction

- Shaggy – is definitely a challenge but will rely on big D-B teams that do this all the time

- Shaggy – want to get environmental folks down this season to start testing ACM and LBP so they can get an idea on $$$ estimate – same thing with geotech personnel as well with regard to petrochemicals and such

- Frank – asking about NSF setting the baseline of science – D-B contractors are likely to come back with 150 bed request (for instance) – balance the work that needs to be done whether science, science support and laundry and such – will impact the amount of time for construction if they need, say, 200 beds and there's only 100 – who's giving up beds, science or construction?

- Larry – makes point about market research currently done and what they'll be planning on doing – to reduce risk factors – going to be a scheduling thing

Lunch Break

- Joe Levi / Rick provided the overview of the user groups
  - Future science, users asked if 'boating' should be added
- Kim presented Crary overview
- Joe Levi presents Sea Ice
  - Rob Robins asked about fuel down at the Sea Ice site
  - Logistical concerns with filling air tanks and combustion engines
- Rick presents Field Science Support

- Don't combine FSC offices with Jen's offices in Central Service
- Liz Kaufman asked if keep South Pole food wants to stay at airfield
  - Dan Picket(?) said moving toward one order for McM/SP and then separate it out on Ice
  - Ordering SP food two years in advance. Between order and send out, changes occur (ketchup bottle example) so reassembling may happen anyway.
  - Bill said good to have up to 5 pallets for short term staging to SP and could come from central services
  - CO2 from dry ice would ruin samples. Need to coordinate storage so CO2 isn't where it's not allowed.
  - Pole is only delivered via vessel
    - 10 to 12, 20' containers (milvans)
    - Sometimes hold on site, sometimes send frozen food directly to pole
    - 10 to 12 frozen pallets, 6-8 dry food pallets to Pole / year
  - Maximum frozen food = 10 milvans = 100 food crates
    - 40x40x40 inches = each food crate
      - Avg order is about 30,000 cubic feet, knowing each cube is about 50 cubic feet.
    - Has dipped down as low as 5 milvans
- Food
  - Dan to find out the four food delivery requirements by Thursday (see next day's notes)
- ATO area only being inside may present a problem
  - Stuff just shows up and grows around Oct.
  - Shaggy - this isn't the intention. There's outside staging areas just for this purpose.
  - Lesson learned from pole, had no idea that it was going to grow as did (from 100 to 250). Make sure don't scale too small that we hurt ourselves in future.
- Designing for 850. Could surge to an unknown value
- Doors at Field Science Support are open most of the day

- On phone
  - Robert (FCA sub)
  - Karen (FCA sub)
  - Steve Rupp – ASC dive services
  - Bev Walker – ASC Crary Manager

- Shaggy/Joe Levi/Rick P – present the results of the "7 questions" posed to the grantee groups in week 1 (e.g. dry valleys, sea ice, deep field science, local science) – what do you do? Where do you see your science going? What keeps you from doing good work at MCM

- Steve Dunbar – wonders if boating should be up on list?

- Rick P – it's in there a couple of times – should at least allocate space for boat services in the master plan

- Ben Roth – asks about vibration in Crary lab

- Kim – talks about equipment driving by and such – captured on their list

- Bev – reinforces the notion that calibration issues come up frequently – there is a workaround using the gravity building

- Kim C walks through Crary bubble diagrams

- Ben Roth – on Phase 2, field party staging at both ends of building – thought function going to be reconsidered?

- Kim – this is an early bubble diagram – thinks this morphed to layout space over the course of the last two weeks

- Rob – questions the location of the UV experiment area, there's an existing road here

- Kim – this is just notional at this point, can land it somewhere appropriate
- Joe Levi presents sea ice facility bubble diagram
- Ben Roth – floor plan changed since last time we saw it – what was rationale for evolution?
- Shaggy – whole point of this was the interaction between dive services and grantees – know that there's a concern on filling breathing tanks by vehicles – is an intention to have a fuel line coming down here
- Steve Rupp (on phone) – reiterates concern on idling vehicles around tank filling
- Rick presents the blocking diagram for field science support building
- Bill Turnbull – fuel packs can't be stored outdoors
- Bill T – asks about the office spaces – is Ok with office not necessarily being in the ATO area – touches on mezzanine
- Rick – trying to get everything on the ground floor if possible – would be a work station next to ATO and science cargo, but for on the fly work and not "office work"
- Ben – asks rationale behind the freezers accessing the alley
- Bill – since they wanted it a dual feed/door system – thinks that some of the freezers could be reduced in size – want to be able to put AF palletes into the "keep frozen" and "keep chilled" freezers
- Liz – asks question on freezer at airfield? In relation to bringing stuff into town and then back out
- Dan P – been moving toward one food order for SP and MCM – currently ordering SP food two years in advance – goes into storage – all packaged in one lot, regardless of too much or too little
- Ben – ran into a problem recently with product at SP and one at MCM
- Dan P – crux of it is that they're ordering 2 years in advance and personnel counts change – are getting down to where they could package by week or month – integrating SP stock with MCM is going to be beneficial
- Bill – currently SP comes to MCM on the vessel – if it doesn't come at right time, it can go cold over winter – if they're going to keep food over-winter for SP, will determine the size of the spaces we're talking about – worst case is about 5 20' containers of frozen food for Pole every year – thinks freezer at airfield would help
- Keith – need to make sure that we're placing all freezer infrastructure (compressors, etc.) right at the location
- Plan for 10 milvans worth of frozen food transiting through MCM to Pole (last year they had 5, year before it was 6)
- Bill – don't want to be digging through MCM food to get to Pole food
- Bill – field camp food is a whole different story
- There is MCM food, Pole food, traverse food and field camp food
- Dan P – takes action item to figure out how much food storage to plan for
- Steve – trying to move stuff inside – work centers are replenishing stock with outside storage areas

- Bill – concern with ATO is size of their cargo yard – stuff keeps coming every day – they fill the yard up with cargo before they even fly to camps – early season (Oct/Nov)

- Shaggy – no intention of bringing everything in – will be other staging areas

- Steve – need to figure out where the OSAs will be and how big they will be

- Bill – lesson learned from Pole – grew in science capacity – designed for 150, but have 250 now

- Shaggy – touches on the increased Winfly and shoulder season discussion

- Shaggy – planning 850 as the high water mark for personnel with surge capacity

- Ben – surge is more for contingency like if Scott went down and they needed to come over – need to re-think and get away from current model – once re-build, will have brand new facilities – will have a requirement for fewer repairs and associated personnel – if they're hard-piping fuel, this will eliminate some folks too.

Science Operations Overview

1. Deep field science overview
2. Sea ice research overview
3. Dry Valleys overview
4. LDB/Town Science
5. Need to allocate future space to dock boats
6. Vibration tends to be a problem within Crary. Calibration often cannot be done inside of Crary.
7. Crary lab programming summary
8. Piston Bulley dive services facility programming summary
9. Discussion o nSP food logistics
   a. 10-12 Air Force pallets of frozen food and 6-8 dry food gets delivered to Pole each year.
   b. Food ordered for SP 2 years in advance.
10. ATO indicated that they'll need internal and external staging areas.

Afternoon break

- Don presents download session on airfield master planning and what was learned in DC

- Steve – did anyone talk UAVs?

- Don – yes, and this could be part of the "runway science" space

- Liz – brings up KBA storage and whether the DNF and DNT includes KBA – there have been times people go to field camps and don't have their personal bags – should consider support for KBA

- Shaggy – not a palette, just stuff

- Larry – would this be above and beyond the airfield science building?

- Kim – just something that needs to be considered

- Steve – comment/concern about keeping sea ice – not just the transition but eruption of ice chunks as sea ice freezes and thaws – needs to be factored into the ski design

- Don moves on to helo ops download with PHI

- Kim – talks about potential for NZ copters as well as Coast Guard, Italians, etc.

- Steve – wind regime in ball park is different for storms – just make sure to accommodate when thinking of outdoor storage

- Shaggy – 3 salient points on helo support: getting cargo from field science support to helo, also storage space at helo, people on flight delays – combo of briefing room, conference room, etc.

- Liz – some talk about Italians keeping helicopters at MCM

- Ben – intent is to meet our requirements and we'll plan for that

- Kevin G walks through IT Operations

    - Reiterates that bandwidth is an operational cost – working on automating bandwidth and the management of it – no ideas on what bandwidth will look like in 2027 – bandwidth is not a part of scope – Ross Island Earth Station IS a part of scope

    - Runs through IT Ops floor plan/bubble diagrams

    - Dunbar – room for balloon ops in here?

    - Kevin – could be part of the assignable office spaces

- Dunbar – curious on backup power scheme

- Kevin – typically you'd have standalone emergency generators

- Rick P wraps up the day's session

- Question on where the retail store will go

Airfield

- Don presents the airfield report
- Liz asked if KBA has a separate DNF/DNT setup
    - Users have left items behind due to messy storage options
- Dunbar states that when tracking skis over the hard conditions, rocky conditions may require higher point loads for the skids
- Dunbar said that the users may be less excited about the upper helo ops site
    - Shaggy said weather station and FAA are investigating now

IT Ops Facility

- Kevin G presented the IT&C design
- Bandwidth is not part of scope
- Wireless cloud over network
    - Attendee asked about hardwire to DDC items. Kevin said it'll be a design issue which we'll work out.
- Discussed IT Ops plan, space allocations, etc.
- Discussed video monitoring and access control
- Discussed morale services
- Kevin Gibbons asked about backup emergency power for the IT Ops Facility; Kevin indicated that those details will be worked out during design, but typically redundant power will be required.

Session Summary and Plan Forward

- VMF and Traverse Ops is scheduled for this Thursday afternoon
- Fire and Medical will be this Thursday morning
- Afternoon download with A/Es

Tues August 4 (3.2)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

- 8:30 am – Summarized previous day's discussions
- Shaggy opens up – reiterates efficiency
- Tom Sente (sen-tee) – restaurant industry (culinary arts)
- Tracy Tafoya (OZ)
- Sydney Brown (OZ)
- Joe Ferraro (FC)
- Rick P provides a recap of Week 3, Day 1
- Touches on food storage discussion from prior day – Dan Picket looked into space and size
- Kim – 40x41x40 is typical size of food crate
- Dan – average order is about 30,000 c.f. for freezer
- Lance Mackey (Baker IT&C)

Review

- Rick provided review of yesterday's work
- Dan (ASC) provided input to the SP food order

9:30 am – Summarized the Central Services Facility Functions

1. Discussion regarding pedestrian circulation in kitchen, dining and servery areas.

- Rick goes into Central Services
- Ben – confirms maximum space to support the mission – remember this is the Master Plan, blocking diagrams – it's roughly the layout and we're validating that all of the things that need to be included are included – we're looking at block diagrams right now to confirm s.f. and such
- Bill – will post office be in Central Services as well?
- Rick – that was the intent – need to figure out how they'd interact with cargo stream
- Erin – housing and rec we're showing, is that office?
- Rick – for those who need to have access to the population – if they need to be in separate areas, they could have a wall between housing and rec
- Erin – with amount of luggage and having "big red" on, may have some flow issues with regard to laundry
- Bill T – by the time you get your key, your luggage may not be there yet – usually about an hour after the plane lands

- Erin – just sees lots of struggle (especially if new) with people coming into the station – typically try to make it in one big loop – people struggle with bags and laundry

- General agreement that having POC/PI there to welcome the "newbies" is a great thing

- Shaggy – they "trust us" that they're a part of the program now – won't ever change that the POC is there to meet folks the first day

- Joe – some of these people haven't even met yet

- Dan P – looking at footprint of servery and growth chamber, would it make sense to flip the multi-purpose/lecture room to the dorm side?

- Rick – can consider this

- Erin – there's no real reason to move housing – keys are handed out at orientation, only go to office if there's a problem

- Bill T – large population numbers are in October and November – from there it's lower numbers based on need – couldn't the multi-purpose room be used as the chapel?

- Rick – some places by necessity will not have a 24-hour program – separate schedule from everything else and chapel is one that needs to have its own space

- Keith – for all hands meetings, what would you do? – swap servery and dining with a movable wall on the multi-purpose room

- Rick – gym could be used for this

- Keith – wouldn't backup IT be better in contingency building?

- Joe – intent is to take over the SSC, which would be their primary location if Central Services failed – this is the separation from the main facility that provides a safety net – another reason is that command and control are all located either upstairs or downstairs from the backup – just a way to consolidate into central spaces instead of doing several data centers and such

- Joseph Orton – wonders about vehicles coming in for lunch

- Rick – since station is currently spread out, there are lots of vehicles – in the new configuration, would hope to have people walking to lunch

- Joseph – have dozers and heavy equipment coming in

- Bill – currently park at Derelict Junction

- Don – use chalet pad for parking?

- Joe – brings up the point that parking near Crary would add vibration and diesel exhaust

- James – could make it a policy that people need to park somewhere else and could be shuttled to lunch – has been more of this in the last few years (people parking right next to the buildings)

- Keith – if they're parking up by heavy shop, shortest route would be cutting through contingency building – no hand wash, coat room, etc.

- Dan P – wants a hand wash at every entrance

- James – going through a lot of effort to get dining with a great view – not very congruent with circulation on the wall side

- Rick – would help but would then have a conflict with people crossing food

- General discussion on re-configuring the whole kitchen/dining/servery area

- Rich B – asks when food service pulls their food for the next day

- Erin – thinks there needs to be a hallway for kitchen personnel to get to waste prep – want to keep warehouse secured

- Steve – will this accommodate the Terra Bus?

- Rick – based on Kress, not sure on Terra Bus – will need to check

- Bill – thinks there should be controlled entry into the dining area

- Joseph – brings up the "grab and go" function currently served

- General discussion on sizing of the dining area – since hours are extended now, does this reduce the crunch on peak personnel in dining

- Steve – thinks that multi-purpose space shouldn't be theater style seating – this would allow it to be overflow for special meals and such

- Dan P – likes rectangle tables with function to go round – thinks this offers flexibility with no leaf necessary

- Rick presented Central Services

- Shaggy indicated always wanting to meet folks at the lobby the first day
  - Managers (20-25 total) will hold up signs as groups find them
- Lecture space will hold 125-150 (126 is max on flight). Will be used for in brief from flights
- Consider flipping lecture and growth / dining.
- Why not use the lecture as chapel?
  - Chapel is a space which needs to be accessed 24/7
- Why is back up IT not in contingency ?
  - Joe says backup IT is the SSC. Otherwise, a lot of infrastructure is required if in CS. Backup IT is located near MACOPS so can build on that infrastructure.
- Discussed how the lunch flow with people and trucks will work
  - Truck parking could be an issue
- Health inspector will look for a hand wash at each entrance
- Rick presents the walk through model of Central Services
  - Rick discussed the sky bridge between Crary and CS
  - Turning radius is setup for Cress vehicle so will fit Ivan
- Dining
  - Carpet is a bad idea
  - Need a walk off area
  - There are spiked (matt tracks) shoes that need to be taken off and stored in a cubby. 5-10 people would do this
  - Mind the flow for dining
    - Like how pole has it.

    - Two points of entry for handwashing
    - Consider grab and go food locations
    - When put Wifi in those areas, people turn those spaces into wifi lounge so when meal starts but not be a big deal since station will be wifi
    - Rick - can downsize dining since it's 24/7 eating? How would holiday affect this? One user said 230 seats.
    - Consider (even if anomalies) when Aussie / Italians get stuck there.
    - Lunch hour is lunch hour. Everyone trying to eat at once so there will be a surge.
    - Do not go Officer / Enlisted type dining. No privileged dining.
    - Tables
        - Like how some square tables can be flipped out to be round
            - Can be flexible to make a long table or small table
        - Still want the "suicide tables"
        - Bar type seating at the end? Seating by yourself
    - Discussion on making this a bar afterhours
        - Have a hot beverage area (coffee) and then that could change to a beer station later
- Multi-purpose lecture
    - Dunbar suggests not having it stadium
    - Uses it for Distinguished Visitor functions as well

- Morning Break

- Discussion resumes on personnel count versus seating in dining

- Ben – thinking of a concourse-type feel – potential to eliminate conflicts by adding width alone

- Rick – think of an airport – grabbing food at a spot and then crossing concourse to find a seat

- Discussion on layout of dining area and re-doing the circulation

- Ben – the goal is to have single dorm rooms, inherently smaller – people may want the opportunity to come to an open space like the dining area – collaboration and social space

- Ben – goes back to the concept of layout versus management – put up signs about not wearing coats and such

- Discussion on the growth chamber function

- Ben – this was a placeholder space – also a maintenance tale to this kind of activity

- Dan P – brings up self-contained units

- Joe H – thinks there's a big morale component to the growth chamber as well

- There was a dedicated person that ran the growth chamber before

- Kim – Pole growth chamber is all volunteer

- Keith – reinforces morale issue with light, humidity and greens – thinks it was priceless

- Joe H – people will latch on to this

- Dan P – decentralize these areas so there are several around the station?

- Food service discussion. Not a good idea to allow trays / silverware to walk away from the serving area. Inventory is lost.

    - If person is ill, they want you to eat in your room.
    - Customer service seems to eat in rooms b/c otherwise gets bombarded.

- Updated plan (new hallway which splits the dining / servery) was shot down due to lots of traffic.

- When tear down a facility, consider how to reuse the materials on both interior and exterior (lots of oak)
- Growth chamber is a great moral booster (used to have hammocks in there)

- People volunteer to take care of select portions of growth chamber

- Lunch Break

1:00 pm – Kitchen, dining, storage

- Maximo is utilized to control inventory, including stored foods.

- Currently 30 crates of frozen food are moved each week from the warehouse to the galley.

- Components: Freezers, refrigerators, thaw box (chilled) and do not freeze (DNF).

- Air Force pallet is 88 x 108 inches.

- Need to consider waste stream and waste removal from central warehouse, kitchen and dining.

- Aaron Seal joins afternoon session of kitchen/warehouse function of Central Services

- Kim – Around 40 shipping containers frozen only – can't really unload them as fast as they're coming off the boat

- Bill – yes, they're processed but they're backfilled with food waste

- Kim – will need laydown area for those that they can't unload just off the truck

- 24/7 offload operation

- Kim – most of the freezer is buried during the winter – picking stuff out a crate at a time – crates are generally 40x40x40 (plan for 42x42x42) – everything would be much easier if they had a slot for everything – they currently don't spaces for everything and need to pre-plan – talking about 1200 or so slots for frozen (includes South Pole food)

- Air Force palettes are 108x88

- Kim – dry goods separated amongst various floors of a few different buildings – some are half palettes like flour and rice – canned goods may be a full palette but depends on weight – comes different every year

- Goes back to waste prep discussion

- Kim – reiterates a need for a hallway between the kitchen and the waste prep – says that waste prep doesn't necessarily need to be indoors

- Don – responds that NSF vision was to reduce visual clutter

- Todd – talks dewatering food waste first, then tagged and moved – could fill a tri-wall a day with just #10 cans (uncrushed)

- Kim – will be concerned about smell in waste prep
- Don – this will be a refrigerated space to help control odor and spoilage
- General discussion on PAX conflicting with waste prep
- Bill – is PAX area big enough to hold 126 people for the outbound flights?
- Don – hadn't gotten to this yet
- Bill – would all outbound be picked up from the PAX area in the yard?
- Kim – switch PAX with central warehousing?
- Don – intent is to be loading outbound through the main entrance as well
- Don – indicates that waste prep in central warehouse is for all "core" MCM facilities (lodging, food, kitchen, etc.)
- Bill – in his mind, waste prep is outside with potential for chutes coming in – needs to be easily accessible for waste handlers
- Afternoon break
- Discussion on officing for warehouse/kitchen/waste prep
- Don – intent in MP was to have centralized administration for "higher level" folks in second level of Central Services, not doing the day-to-day operations
- Kim – need an office space for 2-3 (maybe an extra at offload) within the warehouse location
- Mike Day – need something for inspection
- Kim – having office on dock side (instead of kitchen side) would help this – they're dealing with cargo all the time, not just at offload
- Todd – if something coming in during dinner time – takes 8-12 people to hump stuff into the kitchen – can't do dinner and processing at same time due to staffing issues
- Kim – curious on what size we're thinking – excess medical supplies, pens, paper, gloves, large outdoor things (compressed gases, empty 55 gal drums)
- Don – will have distinct storage requirements for gases – would like to store in proximity to where the product is being used
- Kim – they go through a lot – propane is pumped in the pass, a long way away from personnel – only transport to cargo at an outdoor location
- Bill – against regulation to put propane and acetylene indoors
- Kim – control all inventory for station services
- Don – concept for Central Warehouse was for food and station supplies – brooms, toilet paper, etc.

- Kim – significant amount of DNF and she doesn't think it's represented in the MP – anything with an SDS shouldn't be stored with food – centralized haz material storage? – they do have flams cabinets but not enough space currently – on a housing run (once a week) they could fill up a full truck with stuff

- Don – as represented on the MP, central warehouse is 30,000 s.f.

- Kim – also thinking a customer receiving area at central supply/warehouse is necessary – counter and work station – both onesie/twosie requests day-to-day as well as a work center manager coming in for a bundle of goods (example is gloves once a month) – would suggest keeping a connection between warehouse and retail store (when retail store is shown) – beverage is already in another location – clothes and chips take up space

- Dan P – wouldn't necessarily split – take beverages out of retail and sell beer/wine out of the lounge area – could picture store being a lot smaller if this is the case – could also scale down food product in there since there's grab and go function to galley – revenue from food in retail store is not monumental

- Discussion on the backup IT center being way too large in comparison to central warehouse – Don responds that these will all be right-sized

- Bill – in relation to post office, letter-sized normal envelopes are the least of what they see – lots of oversize packages – doing a bank of PO boxes would likely be a waste of space – they do go by USPS regulations – one of the problems is that mail is the lowest priority – stacks up in Christchurch – will get hammered with one, maybe two air force palettes of mail when it finally comes through

- Don asks where they see their operations going

- Kim – getting stuff up to speed in Maximo – having palette racking will definitely help – can now have most of everything in one location

- Dan P – pretty significant bakery footprint – if warehouse is increased to accommodate frozen bread, they eliminate those positions and that footprint in the kitchen – currently making baked goods from scratch – much more efficient kitchen equipment they can program and is self-cleaning – pot washers, etc. – retail store has opportunity for online component – put on intranet, check it out, see if it fits, etc. but then order on intranet – would reduce store footprint

- Mike Day – selling beverages out of the beverage warehouse?

- Dan P – going cashless would be a labor reducer – could be using iPads everywhere and not even have a POS

- Todd – being able to forecast in the kitchen what you need to produce – maybe a survey for people coming onto the ice – will help them make better at food and reducing waste

- Mike Santos (ASC)
  - Responsible for beverage, rec, gym
- Rick presented the recreation design
- Shaggy emphasized mental / physical wellbeing
- Mike Santos - Rec spaces aren't just huge social spaces. Station is lacking quiet areas (reading, puzzles, etc is still rec). Like a living room type space.
- Joe - Work happens over the social times as well. Budget cuts has reduced it from staff of 6 to 1. Lots of items are volunteer based. i.e. one year gets a dance class. Based on what skills sets come to the ice. Need to keep it fluid.
  - Needs to flex from one type to another within 5 minutes.
  - There have been space constraints. People use lounges, work centers, etc and used for big parties. Live music, bands, etc for up to 500 pax sometimes . Takes many, many man hours to set up / tear down.
- B/c have to flex, need lots of storage.
- Mike indicated yoga is the biggest rec items.

    - Shaggy said that had a lot of carpenters injured one year. Now, 20 minutes before work, go to yoga and stretch.
    - Lots of pinch for the 30 minutes prior to the work starting up (after breakfast).
- PAE (employer for trades people) require stretching each day
- Pole does all stretching together and then have a daily brief
- Gym, at present, is a sterile space. Too hard to hear each other.
- Erin - Each work center has general and specific stretches. Could be centrally led but then have to break off and do specific stretching.
- Mike stated that each work group has an individual message for their group so a 'one meeting fits all .
- Mike - lots of spaces going unused (i.e. bars) during the day. Mind the tables on wheels, need to reconfigure, etc.
- Erin - effective initiatives. (House Mouse) Certain things work for long term duration groups. Others swing by for a few days that don't have time / desire to participate in such activities.
- Social events seems to be a well-defined separation between grantees / contractor. Everyone invited to contractor. Not all to grantee. It'd be neat if the byproduct ends with mixing groups but don't build it with just that in mind
- How space are currently scheduled
    - One rec person in the summer season only occupies an office. Person acts as a 'volunteer coordinator'. Does leg work and scheduling and supplies for the volunteers.
    - Schedule has an online form but it's very manual though. Sometimes have a hand written board. Powerpoint slide on a thumb drive. Computer not hooked to network.
    - Goal is computer monitor by doors / common areas to show activities. Needs to be pretty easy to change this.
    - Pending the event, need to fill out forms (if alcohol is served), and get it approved by station manager.
- Gym
    - Like to have retractable bleachers and curtains that go between the two halves so multiple events can happen simultaneously.
- Mike
    - Yoga = 50-60 people. Rec stores matts, blocks, straps but some folks bring their own as well.
    - Another big pinch happens from 1730-1830 after work as everyone is trying to get a workout in before dinner
    - Need to be aware of room sizes. Too big is not always the best answer as it makes hearing the instructor hard and can make it less personal.
    - Weights and cardio should go near each other
        - Have good weights / cardio but way too crammed in
        - Peak times is tough. Right after work.
        - Mind that hear weights drop when next to yoga, P90X, etc. Think separation of spaces acoustically.
    - Timing
        - Think about which swing spaces could become rec areas right after work. Absorbs that peak.
        - If work center has a projector and moveable desks, you'll get the request.
        - Having swing spaces, takes pressure off of other times
    - Current spaces and their uses
        - Big gym
            - Halloween party (everyone on station attends)
            - Dodge ball
            - Basket ball
            - Volley ball
            - Climbing wall
                - Like to add bouldering
            - Organized fitness classes (but only b/c can't schedule inside fitness)
            - Bathroom (no shower, consider adding)
            - Contingency needs showers
                - Would also help with those surges from other bases
                - Surges have happened 2 of the last 3 years (25-60 pax)

- Yoga / fitness room (most popular and most flexible space..the "workhorse")
    - Yoga
    - Dance
    - Cross fit
        - More body weight than tires and such
    - P90X
    - Non-alcohol dance party (some weekends)
    - Room is too small now
        - Ideally should fit 60-70 people
    - Always unlocked
        - Work groups might go there in the am, stewards go in b/c connected to dining, schedule training classes.
        - Try not to schedule too much during the day so that it remains open to all
- Craft room
    - Some formal classes
    - Volunteer run
    - Gear
        - 4 industrial sewing machines
        - Screening station
        - Craft and supplies
    - Would like to have space to set up easels
    - Not going to have field folks fixing tents up here. They have their own sewing machines for this.
    - Currently about 300 square feet. Be great if larger.
    - Small counter in there
    - Once was the smoking lounge so you can tell the craft room was shoehorned in. A proper space is desired.
    - Some craft room supplies are included in rec budget but others bring items down by individuals
- Band rooms
    - Always have a waiting list during peak times
    - Because it's currently below a work center, has to be used only after hours due to noise transmission
    - Lots of desire for individual spaces
    - Sound is a big thing. Live instruments = lots of noise and vibration.
    - Could be used as quiet, Individual spaces when not used for band
- Gerbil gym
    - Cardio gym
    - No formal classes going in there
    - Boxing area connected to this.
    - Light weights in there
    - Spin classes (4 pax)
    - Currently has poor / no ventilation. One of the original buildings.
- Weight Room in 155
    - Love for this space to be connected to other workout spaces
- Gear issue
    - About ~20'x12'. Users can check out a variety of items.
        - Skis / snowboards / climbing shoes / etc as well as Playstation / Wii (put down deposit)
        - Guitar, instruments
        - Costumes
    - Great benefit is that it's shipped down once
    - Some bands will hand carry items. Otherwise APO it like shipping to an air base. Sometimes sets grow over time.
    - Used daily
- Bike share program

        - Iteration 1 was bike racks outside, no locks on bikes, take as you want. B/c lack of bikes (15-20) people were stashing them inside dorms / work centers.
        - Iteration2 locked bikes, made them checked out via gear issue. Problem was gear issue wasn't open and people needed bikes.
        - Problem was honor system was that once bikes broke, people ditched it and never told anyone. Made maintenance hard.
    - Had a ceramic studio
        - Kiln is still there but in a milvan
        - Still have a few wheels which could be reused.
    - Had a bowling alley.
        - Requests for this but really not a requirement
    - Library
        - Moved from yoga space to lounge / dorm space
        - No formalized classes
        - Will have art shows
        - Quiet space is required
        - Books are available for check out (formal check out process and librarian)
        - Used for puzzles and similar tasks
    - Radio station
        - Navy actually supplies equipment.
        - NSF provides air travel for 2 pax to come check equipment. Provide coordination of DJs.
        - Navy provides b/c they're decommissioning lots of gear.
        - NSF has contract with armed forces radio net.
        - Armed forces willing to provide this (tv feeds, radio feeds, equipment) b/c airmen are down there.
        - IT working the numbers on moving away from this and then be run from IT.
  - When tore down the old rec spaces, there was a (possible) increase in drinking. There were more non-alcoholic activities there.
  - At one point, due to lack of spaces, people moved into the dorm lounges, which made policies happen to stop items in lounges.
  - Dunbar
    - Consolidate gerbil gym and weight facility
    - Bouldering cave people ask for all the time
    - A few users ask about ceramics so consider these in new design

Social Spaces

- Tracy presents social spaces
  - Grantees like warm, wood, etc
  - When thinking of spaces, think what makes a space appealing such as colors, finishes, materials, configurations, etc
  - Surrounded by wood is cozy (coffee house)
    - Has nooks
    - Lower light
    - Historical artifacts adds character
  - User doesn't want to see wood on floor since hard to maintain (chemicals, etc). No bamboo at all. Too dry.
  - White boards are good
  - Users indicated more windows are always a great thing but need to mind the coverings.
  - Dunbar
    - Indicates that need to mind what DV's will think.
    - Mind the refresh rate. Might be longer than you expect.
    - No janitorial services (hence house mouse)
  - Color theory. (think green, fall colors)

    - Don't get too bleached or hospital like
    - Users provided buzz words for social spaces
        - Warm
        - Comfortable
        - Fresh
        - Clean (from sitting in dingy, cold wind. Maintain clean. Materials that can be easily cleaned)
    - Users provided delegate-centric buzzwords
        - Professional
        - Efficient
        - Not extravagant
        - "Permanence"
    - Dunbar - chalet has plaques and memorabilia. These were great as they displayed the history of McMurdo.
    - On a long corridor, color for each pod helps
    - Ben said it should reflect where you are. That is to say it'd be great to incorporate Antarctica in the space. Think about if nature can provide patterns, designs, etc to be integrated.
    - Joe asked about exterior hang out spaces. There are small, impromptu spaces now which would be great to retain.
    - Ben said to capitalize on certain environments.
    - Dunbar - since environment is static, people just stare at moveable items (waves, fire, etc)
- The existing "light room"
    - Extra lights in social spaces
    - Prevent SADD
    - Think circadian rhythm
    - Need to connect to outside world in winter over

Lounge Discussion

- Rick presents Lounge
- Bar usage at present
    - Saturday night, over packed
    - Music nights
    - Band stand
    - Station for a DJ / mixing board
    - Gallaghers is intended for 100 but fills to maybe 200
    - Southern is smaller (maybe 100?)
    - Trivia / bingo / DJ dance / Sunday mimosas
    - Training room for safety meetings
    - Right now, sound systems brought in
        - Great if could build into facility
    - Acoustically really loud
        - Need acoustical isolation (lots)
- Two bar user types are noticed: 'brown coats' and 'red coats' .
    - What happens when push two together?
    - Social bar and sit and sipping bar
    - Possibly scoot beverage between the two spaces
        - Possibly have band rooms be close to loud bars?
    - Have Sunday night science lecture in these spaces still?

- Overall session download

Wed August 5 (3.3)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

7:30 am – Sidebar discussion with Dave Winkler, Brandon Neahusan, Kevin Gibbons, Tony Wheeler and Jon DeLay regarding BIM Revit standards and BIM management team requirements. Discussed the need for BIM Revit oversight.

- Refer to sign in sheet for new attendees
- Danny Rauchenstein – PDC (Ferraro sub)
- Anne Shaver – OZ

- Dave Winkler reviews schedule

- Rick presents the MP to the attendees
  - Ben has concern with Ice Core Storage
    - Doesn't like additional penetrations
  - The SAR may need to move down to maintain the concourse width the full length
  - Maintain air quality. Mind the vehicular traffic.
    - If can find electric carts that can work, NSF very open to this.

- Ben surprised with the office space requirements for FSS

- Rick P kicks off meeting – summary of Day 2 activities and break out sessions

- Mike Day presents supply/kitchen interaction from Day 2

- Summary of previous day's discussion regarding dining, central warehouse and server
  1. Kitchen storage directly connected to warehouse will provide greater efficiency for kitchen and supply staff

- Ben – what will happen to bulk goods like tires, mattresses, etc.?

- Shaggy – overall strategy is to have the container go where it's needed immediately – what do you do with tires and tracks for bulldozers?

- Kim – locations for all those things – smaller tires are kept outside after being shrink-wrapped – treads depend on rubber/pieces – Kress tires and Delta tires are inside tanks

- Shaggy – there's a certain logic for putting stuff together in Port Huaneme – try to get it as close as possible to where it's used

- Mike – bulk food and t-shirts would go into a bin and would hopefully be done

- Ben – wood product, stainless steel, stuff for fabrication in trades – also coming on container, where would it be?

- Shaggy – this would go right into the trade shops from the central yard – would still be potential to keep stock outside or in OSA, but won't be running like every day to replenish bench stock

- General discussion between Ben and Mike regarding the flow of frozen food through the warehouse and into the kitchen

- Kim – mentions "kitting" of the food as discussed on Day 2 – some could be kit, some could be bulk

- Ben – main point was that there are other things going on in the warehouse and wanted to make sure that what we're talking about is going to be efficient

- Steve – thinks we'll be suggesting the warehousing component based on the warehouse consultants coming in

- Kim – explains customer service component of central warehouse in response to Ben's question – wouldn't be a full-time manned position

- Mike – brings up the point of selling beverages out of the beverage warehouse – one person to work retail and then go over to the beverage warehouse in the afternoon

- Dunbar – would be hard since they're looking at extending store hours – thinks it would be a challenge on staffing – thinks it makes sense to keep store and beverage together – maybe go with a "retail warehouse" instead of just beverage warehouse

- Rick presented Central Services blocking plan

- Tracy presents
  - Worker Archetypes
    - Resident (more than 50% at desk)
    - Flex (less than 50%)
    - Mobile (work outside the office 50% of time, touchdown at desk)
    - Group (collaboration space)
  - Presented various desk types based on worker archetypes

- Dunbar presented org chart for Summer 14-15 and indicated which staff members need to be located in the C&C and to what adjacencies need to be achieved

- Group discussed the requirement for need to have to be in an office / cube land versus what can be done away from the cube. Could move some work away from the office if have data connectivity (hard wire or wifi).

- Financial (Leslie)
  - Two ATMs
  - A room for payroll discussion
  - Need a room with a safe
  - Can't go cashless at Pole b/c of connectivity
  - Joe indicated that have some problems with credit cards and the sensitive information required to run credit cards

- ATMs are a bit of a safety net for McM operation

- Rick presents recreation and skills development download

- Recreation / Skills development
  - Recreation / Skill Development / Benefits of recreation opportunities
    - Stress relief / mental well being
    - Maintain sense of physical state
    - Social interaction
    - Extension of workplace

- Social spaces

- Lounges
  - Need for concurrent different activity levels and demographic

    - Suggestion of two spaces
    - Accoustical separation

- Interior design character
    - Goals:
        - Local population – warmth, comfortable, clean, fresh, uplifting
        - NSF – professional, efficient, timeless, performance
        - Overarching goal – “of its place”
            - Reflective of local physical environment
    - Color/Materials
        - Base palette reflective of local physical environment (color and texture)
        - Use of warm tones/textures to enhance wayfinding and create sense of place within larger context

- Ben – with focus on engineering, curious to find out what the engineering perspective would be – efficiency of mechanical and electrical systems, daylight harvesting, etc.

- Dan H downloads on electrical thoughts – mentions occupancy sensors – is there any point in time where warehousing could be segregated to help on energy?

- Ben – wondering if we could capitalize on the climate control aspect of cooling

- Kevin B – goal is to reduce to the extent possible the need for artificial cooling – use the environment – biggest mechanical challenge is the large core building with the different and separate uses – will need to segregate spaces – need flexibility in design – take advantage of separate functions – follow the people around with the mechanical systems

- Ben – agrees, doesn’t want systems fighting each other – systems need to be integrated – if there are penetrations through roof need to accommodate into floor plan – wants to stay as energy-efficient as possible, buildings are major perpetrators of this currently

- Dunbar – wants to make sure we don’t lose track of the fact that it’ll see 4 or 5 hurricane-force storms a year

- Kevin – with respect to daylighting, a no-brainer in CONUS – at MCM, it might be substantially different

- Dan H – mentions the LED swap out – will look for progressive but “true” technology

- Keith – also don’t lose sight of the fact that it’s dark 6 months of the year

- Tracy presents the interior dining concept
    - Tracy (Oz) reviewed office and open office space furniture
    - Steve Dunbar review the current McM org chart and Central Services Facility space programming requirements

- Morning break

- Aaron Seal attends Crary breakout session

- On Phone
- Bev Walker
- Michael Davis
- Karen – PDC civil enginer
- Robert – PDC electrical engineer
- Matt Emerson – PDC structural

- Keith Johnson
- Tim Briggs
- Nathan Hoople
- Kim Boyer
- Anne Burton
- Danny R – PDC
- Joe F – FCA
- Kim C – FCA

Civil

- Dunbar
  - Jetty has been impacted so the water pull has been hard. The tanks on the hill have provided a buffer.
- Ben
  - Indicated that there are some existing to remain fuel lines
- Dale
  - Layout of present fuel system provides opportunity for a loop. If they remain on fuel oil boilers for back up.
- Mark
  - Defines day tank at McM are really 'building supply tank'
- Tanks
  - Don asks have water tanks sitting at high enough elevation for head pressure?
  - Aaron said domestic water supply should be able to be supplied by head. Fire pump be needed at bottom of loop. Kbres, haven't fully crunched the numbers but suspect will need a pump.
  - Ben surprised by the need for the pump.
  - Aaron said, yes, could elevate a tower but need to verify with structural
  - Ben was led to believe that no pumps needed. Now need redundancy, maintenance, etc. All adds costs
  - Once bldg designs are more locked down, then can do the final calcs and provide input for recommended tank location.
  - Ben asked how temperature of water is maintained.
    - Aaron indicated heat trace on exposed piping. Tuck utilities inside building where possible to minimize heat trace.
    - For in tank temp, latent heat from treatment plant (reverse osmosis, 45-50 degrees) will be a constant input to tanks. Tanks are otherwise circulating. Dick Armstrong suggested hot box outhouse to provide additional heat when required.
  - Dale said design of tanks includes heavy insulation. Minimized heat loss. Tanks are in N/S Dakota.
  - Ben asked to explain the throughput of water.
    - Aaron indicated holding time. Dunbar said warm enough in holding tanks to get disease. Dale said in water tank, barely active below 60 degrees.
    - Not splitting potable and fire water.
    - Kevin indicated that loop will circulate even when no demand.
  - How is water disinfected when comes out. Chlorinate water before storage. Go in once a year and inspect. Clean every 3-4 years. Some use soda ash, calcium carbonate bed. It'll deposit in tanks but that's why cleaning at 3-4 intervals.
  - Andre indicated the existing tanks and flow rates.
  - Mark said to think about if can empty one tank over winter. Then can clean on a yearly basis. If no reason to take glycol recovery system only up to tank, can add to loop instead. Kbres said Dick Armstrong's concept was to add a little heater in the dog house.
  - Andre asked about how fill. Aaron said dedicated fill line. It is a single point failure system. Think about redundant fill lines.
  - Dale said with a loop system circulating constantly, could add water at any point and then fill via that method, no fill line. Kbres said that want to keep pressurized system separate from fill. If elevate tanks to supply for faucet, then only add fire pump jockey pump / inline domestic pump when fire needed.

- Is there a demand limiting plan to minimize the diurnal surge and reduce the demand. 40-50,000 per day spikes at 630-700 and 1700-1800. The treatment plant is sized to that already. And we'll be reducing population over time. Anthony said (2) RO's 24/7. One RO is 27 gallons a minute. 76,000 gallons per day. Netting 26,000 storage.
- Mark said rotating a 1,000,000 in a one week period.
- Need to find out what requirements are for fire for water at building. Possibly investigate adding more, local pumps at buildings.
- Can fire requirements be changed based upon materials installed? Kbres said try to centralize for cost.
- Believe keeping the local water plant domestic storage. 200,000 total gallons. There's a phasing aspect that we're not really touching on today. Anthony said need to make sure have enough contact time with chemicals prior to moving to storage tank. With an active tank, never get that time. Mark said consider keeping them all. Mark will design system to see which tanks an go.
- Joseph questioned the heat transmission to permafrost.
- When transferring fuel, constantly patrol walking and monitoring.
  - Be careful when transfer and pipes are in facilities.
  - Maggie said new monitoring techniques may be possible.
  - Ben asked to be shown fuel path. One way transit of fuel up a hill, once a year. Why not using the fuel fill pipe to feed? Mark indicated dry the fill line. Possibly be able to use fill?
- Do you have to leave civil lines charged?
- Dale said secondary containment. (8, 2x6, 4) on rack. Exposed to elements. If leave fuel in fuel system, SPCC (spill containment) might require continual monitoring and/or have it secondary contained. Mark said these are not now. Even supply lines are not double containment at present. NSF has accept this since the Navy days. There has been a risk assessment. Dale said new distribution could be secondary containment. Merrick to need directive (secondary containment or not). From fuelie perspective, if add secondary containment, cut down on man hours required.
- Sanity sewer.
  - Straight forward, go downhill. Try to use gravity as much as possible. Final elevations will be critical in determining this. Trying to avoid lift station as much as possible.
- Sea water
  - Slight modifications to routing. Intake needs to be vetted. Right now, 2 to town + 2 to Crary. Issue has been that take whole system down due to pump physical proximity to each other. At present, Crary will retain dedicated feed. Ben said there are technologies that allow for maintaining the temp. Look critically at chillers (or such) to maintain the temp.
- Utilidor
  - Minimal underground utilities. Typically under vehicle crossings, perhaps some main corridors.
  - Some will have to remain above ground for costs, maintenance.
  - Andre (?) said UG utilities are a lot hard to fix when fail. Think busted sewage pipe. Dale said advantages are that they're now insulated. Minus 30 F for UG is better delta than above grade. Dale said his initial calcs show can possibly eliminate heat trace. Ben raised that heat transfer may be problematic. Need to verify heat transfer. Dale indicated the longest item to be maneuvered would be 20'. Worst case scenario is water break.
  - Dunbar said above grade pipe is always leaking and being worked on.

- Joe F Lots of fill to be brought in – demo of existing buildings at the site – thinks there was blasting involved

- Ben – did they compact fill?

- Joe – thinks they compacted with a D8

- Tim – done in lifts and watered it as they brought it up – same technique as they used at the dorm pads

- Joe – they located the specs and basis of design documents just recently

- Tim – talks about the drainage component regarding the civil work around Crary

- Presentation of next slide show – what's been discussed over the last couple of weeks and how they'll reshape Crary

- Kim – make a 2 story section for storage opportunities? – they have to go out almost every single day to get things for grantees – not enough space for material needed – also not enough space to process the cargo that's always coming – also store personal items in OSA over-winter – don't know as they need indoor storage, but at least closer – storage would be for Crary specifically, unique requirements – chemical storage seems very tight

- Joe – new loading dock may need a hydraulic lift on it

- Keith – brings up point that existing electrical panel is in the old fire tank area – could be impacted/relocated with new sky bridge coming from Central Services

- Kim – confirms that there is "a lot" of activity between Crary and Field Science Support – incoming C-17 cargo, but also cargo coming/going to Deep Field, South Pole, etc. – there is a lot of movement between science cargo world and Crary – definitely daily but could also be happening all day long

- Tim – asks about the potential for an "air lock" type system/vestibule

- Kim – thinks we'd be digging out the loading docks all the time – potential for covering?

- Bev – doesn't see too much snow on the loading docks but stuff sitting on ground does have issues

- Joe – wants to bring road down the plan east (Chalet) side of the building – some serious concerns over the grading in this area

- Bev- had also mentioned having a mud room on phase 1 to try and help keep things cleaner – on the sea water line, have the one jetty with the one line into the sound – 4 pumps, 2 for town and 2 for science – the only backup pump system is only deployable through the sea ice (which isn't necessarily there all the time) – pretty significant erosion from a storm a couple of seasons ago – some wondered if the pumps/intake were damaged during this event – could have made the "kink" in the pipe more significant – potential re-route of utilities around/through Crary – science requirements: wanting the water coming into the aquarium to mimic what's coming out of the sound – within aquarium itself having systems to mitigate issues they're currently seeing – were some discussion on comparisons to Palmer aquarium system – reference to filtered and un-filtered lines – does future science need filtered water coming into the room?

- Matt (PDC) asks about vibration and if there was anything to ever mitigate that

- Joe – yes, when vehicles go by it vibrates – also mention that doors shutting will shake lab equipment – helos do as well – mostly a concern in the Phase 1 bio lab – could be a concern in Phase 2 as well – they have stiffened the special equipment rooms – to his knowledge, no structural modifications since it was built

- Bev – doors are an issue, but further away you get from them it gets better – building does move quite a bit even with palette jacks, hand trucks, etc. going up and down the spine – mentions air tables as a mitigation technique – also heard from groups about balances as well and instruments they're trying to calibrate – sometimes even the wind on a windy day will prohibit this kind of work – for groups that need vibration-free, they will send them outside the building – field gravity hut is away from high traffic vehicle routes – groups will use this for calibration

- Tim – Crary seems to be in pretty good shape for its age – thinks this is related to the exclusivity of the building – grantees are taking care of it

- Joe – wonders if new road on chalet side would increase the vibration concerns – might need to explore stiffening
- Keith – wonders if envelope of Crary will be modified as well
- Joe – will need some remediation regardless, but potentially a whole new skin – he likes the skin system on Pole – 4 layer system with none of the seams lining up
- Keith – the underfloor area definitely needs some attention
- Joe – thinks that if we could get everything out of the floor space (other than waste) it would help the cause – need more access panels
- Keith – they do get quite a bit of wind infiltration, will freeze crawl spaces
- Joe – big concern is the budget to re-wrap the building
- Danny – new envelope would go a long way in helping the building efficiency
- Lunch break
- Afternoon session lodging and associated services
- Oz lead a programming discussion on new and renovated dorm buildings
- An option of reallocating space from the new south dorm among the five other dorm buildings due to site grading concerns.
- Rick P presents master plan concept for rooms
- Erin – biggest advocate of making all rooms standard – but still have the issue of the bay side views on the southernmost dorm
- Joseph – have formed a courtyard area between new dorms and central services – potential for just linking all dorms to central services?
- Joe H – might be more windflow in here, but won't see sun and could be snow packed
- Dunbar – brings up the point that stretchers on 3rd floors are currently difficult to get out – would like stairs wide/situated enough to ease this
- Christine asks about codes
- Ben – no ADA, everyone should be able-bodied – 2012 codes are currently the driving factor
- Joseph – asks if any buildings will be going cold in the winter
- Joe H – all LCDs/TVs and stuff is DNF – would have to move all this in the winter – maybe drop to 40 degrees?
- General discussion on pros and cons of going cold in winter
- Ben – thinks it's not "if" but "for sure" on some dorms going cold
- James – talks about rotating through the buildings on going cold – a different one each year – 209 normally their winter dorm and ages about 4 times as fast

- Keith – digital thermostats need to be pulled too (currently doing this in 210)

Heat Loop

- Kevin presents the heat loop
- Dale, assume for an island type building. Kbres, that is correct.
- Need to choose manufacturer that allows for speed change. Mark says ASC has looked at this.
- Amery surprised can get performance out of modulating microturbine. Most of elec savings was not reflected in fuel savings due to part load efficiencies of microturbine.
- Ben asked if multiple feed points.
- OT said plant is still presumed to be providing.
- Amery indicated could look at flywheels or inertial-less motors.
- Dunbar said running fly wheel currently.
- Andre said this does not strike this as intuitive so how troubleshoot?
- Kbres said now a good time to talk temp. Would like to run a cooler loop (170 vs 180) for efficiency. Andre ok with this so long as addressed up front.
- Dale said utilize building floor as radiant system. Kbres said when envelope is better, can have a less hot floor so better for all folks.
- Mark said glycol is whole system. NSF has to understand that not only is heat recovery loop there, it's to whole campus.
- Neil indicated that at SP, when add a gallon of fuel, capturing a lot of heat. A little more energy use versus heat production. Expect McM to be 75% energy and 25%. The new facilities will have more fuel for power versus fuel for heat.
- Ben to Neil. Always power priority. In a new facility, it'll always be better R values.
- Dale said could use the heat to pre-heat outside air.
- Dual fuel boilers
- Mark said if get enough electric power, add a bank of electric boilers and heat loop that way.
- Be nice to not have to react to the wind.
- Consider controls for demand load throttling (grid controlled domestic water heater)
- Ben likes standardized equipment.
- Level of automated control.
    - To what degree do we automate and what items do we want as manual?
- Lessons learned from microturbine. ASC is restarting this again next week.

Electrical

- Orlando presents electrical
- Neil said shoot for 300,000 gallons
- Maggie said 3 year fuel storage would be excellent
    - Need to find what each fuel drop costs
- 12-12.5 kWh/gallon
    - 116 gallons / hr
    - 1,000,000 gallons / year
- Neil
    - CHP at IT Ops, medical,
    - Harrington said we'll pair with criticality, load (thermal and power)
- Ben
    - Nice line diagram
    - Easily convey and lay work centers to this graphic

Comm

- Keith presents site IT&C loop
- Ben asked is dual home run is typical

    - Joe said yes for critical, especially for data center
    - Attach to loop at two attachment
- Joe described the key cross connects as phasing progresses. Critical facilities will have to remain (or their components) need to remain in operation.
- Ben asked if need loop to north (by tanks)
- Joe said could but ok. RF discussion
- Keith asked what the real maintainability concern is. Joe said if cable plant was designed robust enough, easy to add a building. Thermal expansion and contraction kills. That's why go in basket tray.
    - Prefer basket tray everywhere. Easily access cable plant in lieu of pulling (frozen) cable out.

Environmental Demo

- Shaggy presented the environmental discussion
- Discussed the sampling methods for facilities and soils. Results will determine the level of remediation.
- James asked if testing for molds? Performing standard tests.
- Mark, will test include ground penetrating radar so know where ice caps are?
- If works for ASC advantage, consider looking at demo specific contractor where they own the trash.
- From phone, is there a timeframe for demo. Shaggy discussed the phasing plan.
    - Antarctic Treaty meets every June. Level info needs to be in 4 months before meeting. Comments are submitted. Final CEE doc is put together and then need to wait 3 months for action to start.
- Ben, what about pier? On Phone, if anything done in ocean, this work also falls under Marine Mammal Protection Act (run by NOAA). Could take 8 months for review, once docs in.
    - Incidental harassment authorization. If potential for lethal, could take up to 18 months to obtain.
    - Shaggy said post charrette, really need to lock down the deadlines and durations so as not to provide a hiccup.
    - James said assessment only said asbestos as a yes or no. Need something more in depth.
- DPH do we need to consider if some elements can be removed and stored for spares to be used during phasing process.
- Ted (phone) not fully aware of the phasing but said good to shoot for a two year process. Polly said timeline is right and has been shared with committee.
- James, is this one submittal? Might be worth breaking up Palmer and McM. Maggie indicated this may be a NSF decision.
- Seal - any other guidelines such as EPA? Polly said NEPA (?) states need to provide docs following a public comment timeline period. For this level, need to provide. This timeline has been provided along with the timeline to NSF.

Dorms

- Rick provided overview of the dorms

- Showed the potential new dorm layout (4 extended dorms versus 6 equal-sized dorms)

- When providing each dorm room with LCD, VOIP phone, etc, need to keep equipment from freezing.
    - Few electronics can handle past -40. McM will see -60. This means each room's gear either has to be moved at the end / beginning of each season or place the dorms into a 'caretaker status'
    - Each room has a thermostat that is digital that needs to be pulled out if allowed to freeze

- Paint may or may not peel when freezing. Have seen this at present station but other users have indicated that there are paints (used by Italian site) which don't do this

- Need to run a scenario about caretaker vs going cold and see how both scenarios affect costs for utilities as well as costs for staff work and equipment wear and tear replacement costs.

- Saunas near the gym are ok. Might not have to be in the dorms. Shaggy indicated that this function really more associated with the gym

- Need to have the ability to hang posters in rooms so the walls don't take too much of a beating.

- Afternoon break

- Afternoon session physical security and monitoring led by Baker (Lance)

- Proposed security – access control was discussed in terms of which areas and work centers require physical security and monitoring

- Electronic card key technology is the preferred access control; ANG still prefers a traditional lock and key.

- Camera and video monitoring

- Joseph – in addition to those listed, think trade shops and cargo/supply need to have some method of security

- Joe H – anything involving cash

- Joseph – all management offices as well

- Dunbar – NSF manager has a safe – He (Steve) has a safe but he never uses it

- Joseph – thinks key cards are the way to go, but can't have the "cheap" ones

- Steve – ability to re-program key cards is a serious benefit

- Keith – have to replace about 300-400 locks a season

- Steve – current brass key system does not work – lots of turnover (40%)

Physical Security

- Presented by Lance

- ACS to trades, supply (for inventory), finance
- Rather see keycard over keys
    - Dorms sees 300-400 each year
- Electronic key system would require audits

- Session break

- Afternoon download amongst ASC and A/E's

- Shaggy downloads on VMF and Traverse Ops – Traverse Ops started as a warehouse on the hill – wasn't going to be anything (no services etc.) – morphed into what is now a full facility – VMF was also going to use Traverse Ops for storage – VMF is an old facility and is pretty cramped and for years and years the ventilation system was supposed to passively refrigerate – has been blocked by various things (snow, etc.) – beams started to delaminate and the footings started to shift – suggestion is to de-rate the floor – no more big vehicles – get the fire tanks out of there – doesn't think the MEC staying in IT Ops is a good idea either – got pretty muddy on how the ANG function worked and was an oversight in the MP – if Traverse Ops has become a full facility, what would it take to make it a shared VMF/Traverse facility – VMF goes to small generators and big generators – light vehicle maintenance all in one spot – will have to turn around some cost comparisons really quick – thinks we owe a snow management plan – everything traverse does is completely separate (mechanics, people, food, etc.) – time to re-think how it's going to go

- Dunbar – biggest inefficiency he sees is maintenance cycles – working on one or two vehicles at a time – do over the course of the winter – if they want a big facility, they need to remember that they leave

- Shaggy – want flexibility in the way we approach this and think about it – we're now asking them to do thing differently

- Ben – where do they maintain equipment now? And couldn't they still do that?

- Shaggy – in VMF – the way the bays are laid out, if you have something disabled it's a matter of jockeying things around

- Steve – it's a matter of how they schedule their work – we can't confidently say how big a heavy shop we need and how big a traverse building we need

- Shaggy – fleet modernization is going to play a huge role now

- Steve – they're no longer rebuilding engines and transmissions on the ice – packaged and sent CONUS – this function goes out of VMF

- Shaggy – touches on equipment used for construction – does NSF buy that fleet and leave them there? – what about maintenance?

- Shaggy summarized the meeting agenda for the next day (30 July 2015).
    - Existing heavy vehicle maintenance facility (VMF) is being rethought in terms of re-programming for only light vehicle maintenance operations.

RMI Aaron's call

- Amory B. Lovins presentation
- Radical Energy Efficiency by Integrative Design
- "Fully Burdened Cost of Fuel and Electricity" report
- Reinventing Fire (2011) by Amory
- Integrative design
- www.retrofitdepot.org
- Plumbing
    - Big pipes, small pumps
    - Layout pipes first, then the equipment
- General is start at the end and ripple upstream
- www.asknature.org
- Biomimicry
- Opportunities
    - End use structure for electricity (and water and heat)
    - Air to air heat exchanger and exhaust air heat pumps (recover heat + h20)
    - Heat delivery (radiant vs turbulent induction air vs underfloor displacement)
    - Heating volume vs personal comfort (e.g. Hyperchairs, radiant mats, etc)
    - For efficient envelopes, suggest only providing some air and use radiant
    - Low friction pipe and duct system
    - Small, superefficient pump and fan systems
    - Drive systems (~35 measures, not 1, hence 3x savings @1/5 cost/kWh)
    - Lab equipment

- Data center and all IT equipment
  - Passive refrigeration
  - Radical water efficiency
  - Lighting design (nancy clanton)
- Labs
  - Caltech Linde + Robinson Lab (09 retrofit)
  - Wet lab
- Lighting
  - Natural daylighting
  - Circadian lighting
- Right steps in the right order
  - Lighting
    - Improve visual quality of tank
    - Improve geometry of space, cavity reflectance's
    - Improve lighting quality (cut veiling reflections and discomfort glare)
    - Optimize lighting quantity
    - Harvest and distribute natural light
    - Optimizes luminaire
- Space cooling
  - Cool the people, not the space
  - Expand comfort envelope (>_ 6 comforrt variables, not just air temp)
  - Minimize unwanted heat gains
  - Passive cooling
  - Active cooling (non fridg
- www.10xE.org
- Www.rmi.org/stanford
- Look up www.rmi.org/rmi/library/ integrative design and 10xEPrinciples
- Design efficiency
  - Task elimination…why are we doing this
    - Eliminate *muda.*
  - Demand before supply
  - Downstream before upstream
  - Application before equipment
  - People before hardware
  - Passive before active
  - Quality before quantity
  - Right steps, right order, right time
- Practical designs
- No compromise
  - The pelican
  - Nature optimize
- Helpful design hints
  - You can only get to simplicity through complexity
  - Make simple but not simpler
  - Move the boundary out until you find the solution

Thurs August 6 (3.4)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

- Ches Goldston
- Jim McKeith – UTMB and medical
- Erin Oliver – pharmacy technician
- Mike Wendall – HR

- Aaron presented the recap

- Rick (Oz) presented the daily recap of admin for Central Services
    - Presented updated blocking diagram.
    - Dunbar says EOC should be near Command & Control. Also consider moving the senior officer's office on the corner near the prime real-estate
    - Discussed that the EOC / C&C need to be able to see into each other
    - Like to see a bit more collaboration space
    - Ben said like a little breathing room in the cube area. Additionally, provide a double loaded corridor in cubes.

- Rick presents overview of admin space

- Kim (FC) presents Crary Lab
    - Presented the updated Crary Lab blocking diagram
    - Questioned the 'facilities engineer' space in Phase III

- Joe Levi leads discussion on fire station and discusses their needs/requirements

Fuel

- ASC presented on the status of fuel use at McM.
- Hutch
    - EUI is useful for a single building. For a city, not great single metric
    - Think about metrics that reflect whole system

Medical / Fire

- Rick presented the Medical / Fire background for plans

- Fire equipment
    - 3 bays for 2 full size pumper engines, one for ambulance or smaller vehicle
    - One light vehicle stays outside during summer months
    - Airport rescue fleet lives outside during wintertime
        - 6 med/large apparatus vehicles (4 of them are modified Ford F-550's)
        - Location is to allow for checking on them. 2 of them can't go cold so must stay inside.
    - It'd be easier if equipment could be inside but understand indoor space is a premium
    - Ladder truck may be needed pending what the final facility heights are
        - Have no ladder truck presently. Have a 35' but too long to carry. Carry a 24'.
    - Current engines are 4 years old.
        - 3 bays with 2 full size pumper vehicles and an ambulance or other light vehicle; outside – 6 medium to large size apparatus
        - 6 fire fighters/EMT plus 3 supervisors (chief, asst chief, fire prevention officer)
        - 3 minute response time is the goal
        - Need appropriate ceiling clear height to service the fire apparatus

    - Need hose drying tower – ideally 53’ to 54’; or hose drying equipment in lieu of a tower
    - Bunker gear – storage needed for various fire fighting and breathing apparatus
    - Fire chief – Neil – concerned with size of interior spaces of new facilities; will require hose reel stations within the buildings.
    - Neil – prefer to keep future fire trucks fairly simple
    - Floor should be designed with drains to accommodate water from testing, leaking equipment
    - Need a decontamination space
    - Oxygen tank filling operation was discussed
    - Admin areas –
    - Fire station dorms need to accommodate 8 people

- Staff
  - Bulk of folks work out at airfield
  - Live at airfield during duty shift and then back at the dorms when not on shift
  - At McM staff 1 fire engine of 4 people, 2 to ambulance / roving.
    - This occurs year round, winter and summer.
  - Also have 3 other office personnel during the business day (chief, asst chief, captain)
    - Seasonally have fire prevention officer and fire equipment maintenance worker
  - For most facilities, fire department provides monthly inspections.
  - Review building plans, but usually have this function back in Denver
  - NSF requires a 3 minute response time
    - At present, spread out facilities make this harder.
    - With new master plan, could be a lot of on foot calls
    - Chow hall is a bit far if get a call. Need to leave dining, run to firehouse and then out. Justification for kitchen in fire station

- Need to verify the ceiling height in bay. Might need to be quite high if working on ladder truck. Most heavy automotive work would be at VMF.

- Hose drying needs to be addressed. Currently using a homemade system.
  - Ideally have clearance height of 50' plus 5' of rigging.
  - Drying every time used: training, call, etc.
  - They make mechanical hose dryer systems. Had on in McM previously but not effective.

- Bunker gear
  - Total staff of 54, 48 are using bunker gear. Need to provide more than that to accommodate different sized gear for staff. Probably 100 sets of bunker gear total. Needs to be locked in a storage area. Active gear in a full size locker.
  - Don't have to store inactive gear here. Can store the remainder for the 100 sets somewhere else.

- Have SCBA
  - All items live on a duty vehicle.
  - Most emergency response tools have spares that need storage

- Tools
  - Work bench.
  - Fire extinguisher maintenance. Keep separate from breathing air. Needs a compressor, special tools, spare parts, inventory list, counter space.

- Apparatus bay
  - Great if could wash truck in bay. Drains in floors.
  - James (ASC) indicated it'd be good to have a single spot in town to wash vehicles. Could be in VMF.
  - Water will be on floor from fire trucks in bay during testing so a drain is ideal anyway.

- Decon
  - Haz shower is not a decon corridor as fire sees it. Outdoor wet decon is not really ideal in this atmosphere. Need to have a location where the flow of pax works.
  - Possibly move haz shower to south end of bay. There are really two needs. Fire needs to hash out this requirement internally before providing direction.

- Laundry
  - NFPA has a requirement for a separate washer/dryer for bunker gear.
  - Could collocate the bunker washer / dryers with regular washer / dryer.
  - Currently the fire staff clean the bunker gear themselves.

- Storage and breathing air compressor
  - 4500 psi for SCBA tanks. Water dive tanks (SCUBA) don't go this high so probably can't / don't want to use their equipment for filling SCBA tanks.
  - Could have a single compressor with dive but need to be careful and hash out the details.

- Radio storage / distribution would not be in this facility

- Admin / Training
  - Layout as presented is efficient for Neil
  - Can training be done at other locations in town? Neil indicated possibly but also have weekly / daily hand over meetings here. Possibly allow other groups to schedule time in training room.
  - Ben Roth asked if Fire / Medical could write out a schedule for routine meetings to aid with scheduling needs
  - Keep company officer workstation at location shown that when working, people that come in can find a body to talk to. Traditionally called a 'watch room'.
  - Joe asked if the training room and conference room be combined? Neil said with the right tables / chairs, it's possible.

- Dorms / Restrooms
  - Neil likes to see 8 dorm rooms. Contains bed, small desk, small locker.
  - Two showers in men, two showers in women lockers. Mimic south pole design.
  - Bathroom downstairs can be a unisex restroom. No need for separate men / women roos.

- Kitchen
  - Could pick up prepared food from main galley. Provide fridge, sink, etc.
  - Don't have to prepare meals but for folks that are tied to the fire station, this is a huge morale booster. Traditionally, kitchen is the heart of the fire house. Andre says he'd be upset to see the kitchen go.
  - Ben asked if could combine kitchen and day room for a better space.

- Living room / day room
  - Plan for 8 pax min (b/c 8 on shift)

- Morning Break

- Joe Levi leads discussion on medical center

Medical

- Jim (medical) runs through the medical plans

- Charts are stored locally and are not electronic as of yet

- Flow for walk in patients
  - Have a doorbell / ring bell sign on desk if no one there
  - If not too sick, fill out forms in waiting room. Ideally take people directly to exam room.
  - Pending the type of work, could go to xray.
  - Charting done while in the exam room

- Flow for ambulance
  - From fire bay directly to exam room. Keep a path / adjacency for this flow.

- Floor plan discussion
  - Don't see resuscitation, hospitalization on plan.
  - Need a hospital type room. Ideal might be 3-4 and then expand to exam if needed.
  - Quarantine is needed as well.
  - Don't plan for population but event size.
  - Hospital rooms would need a bathroom (ex, Nora virus)
  - Resuscitation room is larger (think ER size room with all folks can get around the bed)
    - Best located to the ambulance entrance

- Additional floor plan requirements
  - Need lab, radiology (xray), pharmacy, hospital, equipment storage, move kitchenette away from work area, need linen storage and possibly washer / dryer (sometimes central wash won't take contamination), need medical inventory, biomed tech, supply storage (two different ones…central supply and day to day supply), field kit storage, O2 storage, telemedicine room, conference MCI training room, etc

- Discussed Rx tracking and allotments
  - All medical (especially on call) have access to Rx labs
  - Narcotics safe (only physician and pharmacist)
  - Narcotics cabinet (licensed caregivers only)
  - Gen pharm (anyone who works in medical)

- Military will sometimes hop in and help care for patients when event requires this

- Need sinks everywhere (every room, outside rooms)

- Field camp medical kits (need storage for these)
  - 40 small boxes
    - Ammo box size
  - 4-5 major field kits (traverse, WISSARD, etc)
    - Larger pelican cases
  - Need space to build these and store drugs for kit
    - Ideally need a table to build these

- "Sticker method" for equipment / supply requests. It's primitive but works. Great if it had a RFID / barcode item. That way folks in Texas (medical branch) could monitor supply. Maximo good for all but narcotics on hand. Looking at pharmacy software but right now it's all paper logged.

- Please move the dive chamber. When they run it, it's very, very loud due to compressors.

- Add a bay door into the gym for mass casualty.

- For medivacs, need to walk besides them. Need to look at hallway widths.

Dentistry

- Jim representing dental

- Need chair, working area, attached dental lab, own compressor needs (want to remote those a bit for noise), xray is located in space.

- Do cleanings, PQ, stored up dental care that hasn't been moved off Ice.
  - Typical flow has been 80 patients in a 6 week period
    - Replace crowns, 2x wisdom tooth removal, fillings, broken teeth, etc

- Jim can get dentist (he's on retainer) to verify the space requirements.

- Admits that probably won't ever get DaVinci robot but remote consults are a good item.

- Physical therapy
  - It's bulky equipment so would be nice to have a dedicated space for it all rather than try and move it around in a shared room

- Usually dentistry has items like local anesthesia in a locked cabinet

ETC and new plan

- Medical gasses
  - Currently wheel O2 tanks but rather have piped in

- Great if flight crew had a dedicated room / space to store gear. If they have to leave in a hurry, then know exactly where there items are.
  - IV pump, ventilator, etc. Need to be charged. Pelican case is open and plugged in. Shelf in supply room would work well. There are a total of 6 cases. Not all need power. If field medical, take two small ones. If going back to NZ, take the big box.
  - Need a redundant set for when one is used. Currently took over dive chamber (dive master not happy) to store items.

- Rick presents the updated medical floor plan
  - Still need laundry and more storage

- Lunch break

- Afternoon session

- On phone
- Maggie Knuth – NSF
- Jake Watson – Baker PM
- Chris Clark – Baker Project Architect
- Rick Campbell – Traverse Ops Coordinator
- Dennis Barry – Ferraro Structural
- Tony Buchanan – MEC ASC
- Mike – VMF and AGE supervisor
- Cory – Traverse Manager

Lighting

- Nancy Clanton discussed lighting trends

- VMF and Traverse Ops

- Rick P presents master plan and current state – topic is accommodating VMF and Traverse needs – also want to accommodate ANG and AGE functions as well – is it combined, is it separate? – challenges with current floor system of VMF to handle heavy equipment

- Shaggy – wants to start with quick synopsis on flow – just run us through how many pieces of equipment, personnel, timing, general activities, etc.

- Cory – overview of fleet and their job – traverse modules – MCM to south pole – deliver 144,000 gallons – 100,000 is what they aim for per traverse – potential for 300,000 amongst the 3 traverses – supplying fuel and supplies to pole – averaging 25 days from MCM to pole – stay two weeks to offload and do maintenance – then come home empty – would love to see function of them bringing stuff back – 15-20 days on trip home – currently running 3 traverses, don't think they could get a 4th – 1st traverse out the door generally at Halloween – "Spot 2" comes 2-3 weeks later – on polar plateau about 300 miles – transition/climb from ice shelf to plateau is where they normally cross paths with other traverse – some older and newer models of tractor, but all Cat tractors – have been upgraded for Antarctica – they do have implements on them to help out (blades, etc.) – 2 radar vehicles – would see at ski resorts for grooming – use to map in front of them for crevasses – usually go about 6 mph – flagged route with waypoints on the trail – avoid heavily crevassed areas – road will move a bit here and there – usually 4 mechanics on each traverse – Spot 1 has a mountaineer, Spot 2 does not – 10 total on Spot 1, 9 total on Spot 2 – 4 operators on each – with 3 traverses, they take up a lot of the bay space at pole – can do most of their stuff at their camps/pods/modules at pole but do need heated bay space from time to time – operators can be split in half, can help the fuelies at pole (only 1 or 2 fuelies at pole) – the other 2 will just help pole like digging out berms for equipment/cargo – will work a little bit helping digging out fuel tanks and various projects – pole capitalizes on their presence – keep track of those hours and what they're doing – when they get back to MCM, they assess what they need to do for winterizing – fixing berms – out by Pegasus – a bay or two will be cleared in VMF – usually pull into bay 1 and bay 2 – will always have tractors in there from the time they get back until they're ready to winterize – Spot 3 is Spot 1 re-do, leave right around New Year's – usually back late February/early March

- Rick C – Spot 1 about 19 December return to MCM – refill bladders, back to pole, fuel download, etc. – 3 mechanics per team, two heavy wrenches and a shop – operators can help on maintenance too – Building 183 is a big player for them – not only VMF

- Cory – going into prep for traverse – incinerator building 183 they're working on getting food – have a cold reefer by the ballpark – all dry goods in a milvan outside 183 – bring inside and split out the food – disperse back out – then do staging for Spot 3 food and this is critical – ANG has fuel drops in 183 – they will put what they can outside – all DNF food is left there – meeting in building 175 2nd floor – this is where their offices are – go to Building 183 after all training is done – quite a bit of inside work to do – set their tool sheds on the sleds but on big air cushions with a wooden deck – they build the decks in 183 – then they set those down and start getting them put together – going on during WinFly – build HMW (high molecular weight polyethylene) rolled up 2 at a time – IT-28 is used to pick these up and push it out, put tow plates on them – steel plates that they sandwich plastic through – describing the sled that carries the fuel bladder inside building 183 – will also patch bladders in 183 – bladders are stored outside on a berm, they'll pull one at a time into 183 – at end of previous season, they know if the bladders are leaking – have a checklist – at end of season they're patching them up out in the field for winterization – they stay in the field – if they're leaky, they're put on an outside rack at 183 – they do have an element of winter staff – recondition and RFI (ready for issue) stuff over the winter – will take each individual HMW piece and put it on a trailer to where they're fueling – have to pin them down at fuel pits – fuelies come in but their operators help as well – as they get ones filled, they will stage for departure – when they get access to fuel, they drop what they're doing in 183 to fuel – only have 4 tractors up at the beginning of the season – don't fire them all up since once they're running they need to stay heated and such – have to wait until WinFly to get parts and such – bay 1 and 2 of the VMF is where they're getting things fired up around WinFly – 2 mechanics each bay plus night shifts – two tractors at a time being worked on – 4 plug-ins at 193 they use to keep tractors warm – two weeks of Marble Point/Black Island traverses – typically this is Spot 2 platform – radaring crevasses – by main body, all tractors including Spot 1 are getting up to speed – issues finding plug-ins in town – try to wait to fire up tractors until they can fire up the generator units – generator provides electricity for all modules (plugging in tractors, snow melting, tools, heat, etc.) – 48 bladders per traverse, 6 tractors for bladders – other 2 tractors are for living/support modules – staging area is usually out by the ice runway – happy camper area at mile marker 3 toward Willy's

Heat Loop

- Kevin presents the heat loop

Smart City

- Ray Thom (Baker) presented Smart City
- Metering points
  - Add water and water temp
- Wind
- Dunbar - 20 to 50 electric vehicles
  - Ray indicate use as battery bank
- Locate desk in command and control
  - Constantly receiving alarms
  - Locate dashboard in generator plant
- Neil said drill down to incorporating occupancy sensors
- Belgium has structured demand side management to run on renewables
  - Schneider electric build this for them
    - Security
    - Water treatment, support
    - Science
    - Daily life
    - Entertainment
- Dartmouth has a polar bear visual for energy usage

- 3 south pole traverses per season
  - Spot 1
    - Out at Halloween
  - Spot 2
    - Depart ???
  - Spot 3
    - Depart at new years

- Timeline for Pole traverse
  - 25 day to get to pole from McM
  - 2 week stay to offload fuel and mechanical check up
  - Then gear up and come home empty
  - 15-20 days home

- Path
  - Shuttle loads up first main climb then continue as one unit

- Traverse vehicles
  - 8 tractors, 2 with cranes, a few with winches, half with blades
  - Models are almost all the same (Cat Challenger MT865)
    - Agriculture based but fixed to run in arctic
  - 2 radar vehicles
    - Main is a 'prenof' …15 ft aluminum boom with ground penetrating radar
      - Think a unit like you'd see at a ski resort

            - Moves at 6 mph so have time to stop
        - Have a virtually flagged route that they follow
        - Avoiding heavily crevassed routes
    - 48 bladders per traverse, 3,000 gallons per bladder
    - Milvans for living
        - 2x35kw generator, snow melt, and then separate incinerator toilet

- Traverse team (have two total, each uses 4 tractors)
    - ~10 people total per team
        - 1 field supervisor / mountaineer ride in radar vehicle
        - 3 mechanics (1 lead, 2 sub)
        - 5 drivers

- When at Pole
    - Most of smaller work can be done outside
    - More involved work done inside in conditioned space
    - When workers not working on tractors, help around Pole digging items out, various projects, etc. Pole capitalizes on presence of larger machines

- At McMurdo
    - Some tractors go right into shops (might be pulling a tractor in if broke in field)
        - VMF anticipates this and clears up space for this. Traverse team calls ahead as well.
    - Then make tractors available for work around town
    - Building 183 is also used for traverse preparation
        - Build food pallets and store outside
        - Build dry good foods in milvan outside 183
        - Staging third traverses food in here as well
            - But has to time carefully b/c ANG does fuel drop here and need to vacate when ANG arrives
        - Prepare tool sheds (these are on air cushions when traverse)
            - High molecular weight (HMW) polyethylene sheet
    - One tractors turn over, want to keep them running

- Staging
    - One group goes out and fills the crevasse (32 miles away)
    - Another group start prepping in town
    - Then able to go to Pole

- Wishes
    - Be great to unroll, ballast down, and pin out HMW in warm area (~8'x60')
        - Roll out 4 at a time would be ideal but 2 is good
        - Need overhead crane to move
        - Each weights 2500 lbs for each roll (5000 lb pallet for double roll)
        - Using machinery to stretch out
        - Life cycle is 3 years
        - 2-3 weeks to unroll
    - Bring in bladders to be prepared
        - Need 4 people
        - Don’t really roll back up during season

- Personnel
    - Building 175 is their temp conference room (office and 4 desks)
        - Do admin type operations here

        - Daily morning meeting 45 min
            - 20 Aug to mid Nov
    - When on traverse, only bring cold weather gear for the trip. Remainder of personal items are stored in McM.
    - Food
        - Arrive on dedicated pallets. Stored in two areas.
        - Prepped at 183. Have 2-3 people get it together
        - Divvied up into 3 traverses
        - Then push into milvans until Nov and then the milvans go to science folks
        - This is just for personal consumption

- For VMF
    - 2 tractors worked on 24/7 in Bay 1 and Bay 2
        - Mid-august until Halloween
    - But also help science traverse tractors get processed in Bay 1 / 2 at same time
    - Post Halloween, drop down to 1 bay.
    - Then two bays again for routine maintenance at end of year
    - Four bays would be excellent. Then not have to have two shifts
        - Lead mechanic is pulling 14 hours day
        - But could hire a second lead
    - Shaggy - Why are VMF and SPT (south pole traverse) mechanics separate?
    - Vehicles to service
        - 5 WISSARD (science platform)
        - 17 tractors
        - 2 radar tractors
    - Great to have a space where can unroll the HMW, bladders, etc.
        - Great to mix batch of glue and then patch all at once

- Rooms when back in town
    - Get it reassigned sometimes

- Sometimes get to keep room as well.

- Shaggy – starts asking about things that are outside that they could do inside

- Cory – HMW and rolling it out and pinning down in a warm area – would be huge – they see cracks since the HMW can be wavy – will take up bay space and crane time – would want to roll out 4 at one time, but 2 is probably more realistic – some type of OH crane to pick them up – can't pick up by hand, too heavy – would need something to push them out – requires equipment to move around no matter what – right now, they're tying to a palette, chaining that to palette and using a loader to unroll – 5,000# with the double roll – make around 6 sheets (3 rolls) per season to replace – manufacturer rolls them in the US – unroll only once

- Rick – have talked about using Christchurch to unroll but they don't have space in the aircraft

- Cory – 30-45 minute morning meetings – every morning at B175 – meeting all of WinFly (2 months) up until they leave – office with 4 desks currently – rest of crew at WinFly is 16 people total – do leave some personal stuff in town in a milvan when they leave – 2 or 3 people going through the food – go through frozen, dry goods and DNF – divvied up for the 3 spots – take it from 183 and into the modules at pole traverse staging area – everything getting loaded into there straight from the module – this is for their consumption, not for pole – town/supply gets it into their system and it gets pulled and put into the reefer at ballpark until they get their portable reefer module up and running

- Shaggy – asks about the space and timing of their operations

- Cory – 2 tractor positions in VMF from mid-August to about Halloween when spot 1 leaves – 2 mechanics per tractor, working day and night – work on 5 more tractors for science traverse – once spot 1 is out the door, they're working spot 2 and science traverse – WIZZARD takes off usually around Thanksgiving – the 2 VMF bays are pretty much occupied all season – 4 bays would be nice, they wouldn't have to run the 24 hour session – wouldn't need to run a night shift – only 1 lead mechanic with WinFly

- Shaggy – why are VMF and spot mechanics separate?

- Cory – as of right now, they're the only ones with those tractors – also doing other stuff out of the building – about two weeks of down time between leaving/arrival – it's quiet during this time but when they get back they're going right to work – has 17 tractors and 2 radar vehicles and 5 from WIZZARD (science traverse) – August 15th through Thanksgiving

- Rick – during this August-October push, they're supporting ice runway moves, Marble Point, Black Island – get stretched a little thin – do radar training – October 10-20 they have about half the crew out in the shear zone (crevasse hunting)

- Cory – two mechanics in past working over the winter and it helped – now have the April flight for all of spot 1 to be on – so from August to April they've got a pretty good crew working on stuff – this is then only two months where a mechanic is there "over winter" – NOT shared tool sets – they have very specific tools – they have whole tool boxes full of stuff very specific to the tractor – would still need the "non-mechanical" space for food sorting, bladder layout, etc. – got rid of a big labor cost with going to single-tractor type fleet (e.g. elimination of the Case tractors)

- Whole first floor of B132 would be adequate for their storage (warehouse only, not HMW layout and such) – if they had that, it would be about what they need – not a whole lot of DNF (GPS, GPR, food product)

- Rick – between 183, VMF and offices in 175 plus warehouse space, take up a lot of real estate – like the location of 183 since they're close to pier

- Discussion moves on to VMF function

- Jeff – working toward right-sizing the fleet for now and for the future – 25 pickups that stay in town, don't leave the island/ice shelf – looking to replace with side-by-side ATVs and electric – other pickups do go out to airfield and such – looking at forklift fleet as well – almost every work center has a forklift – typically not the same age, size, style, etc. – thinking of consolidating forklift fleet

- Tony – will still need trades trucks

- Maggie – loader fleet and light vehicle pool is being streamlined – anything else?

- Jeff – bulldozer fleet is streamlining now – shuttle operations would be something to explore as well

- Shaggy – discussion on offload process in consideration of 850 population – one main thing is the way it's all packaged in Port Huaneme – could make more homogeneous – consolidation of VMF warehousing function still needs to be addressed as well – ideally a cargo container would be by function (food, carpentry, etc.) – currently get all kinds of different stuff in the containers

- Ben asks about challenges that affect efficiency

- Jeff – Bay 1 and 2 are pretty much taken up all season by traverse – competing for bay space – they have way too much old equipment, it breaks – major constraint is throughput through the VMF, need space – in summer, sometimes they can work outside – spreading science throughout the season would help them out – parts availability is also a challenge – have to retrieve from one of the many storage locations – all summer long this is a two shift operation – bay 6 is lift bay (for smaller vehicles) – would have to have a whole separate discussion on construction crews/equipment down there – sometimes they do need to flip vehicles around if bays are full – like if a fire truck goes down, they need to tow a disabled vehicle out of VMF to fix the more critical item – maybe 6 times a season – they've been actively retro-ing vehicles out in the last few years – they're working on an assessment of trucks and loaders to see if they still need everything – exploring electric vehicles but constrained on cold effects to batteries

- Maggie – looking at primarily for summer, would store in winter and use conventional trucks
- Jeff – working on bulldozers – but loaders will still be needed for airfield and LDB functions – snow operations would still be the same as well – the heavy airfield vehicles are generally driving the function/size of the VMF
- Rick P – so could remove pickups all day long and they'd still need the same space?
- Jeff – yes
- Shaggy – anything that will increase what they're doing?
- Maggie – from the science side of the house, clambering for an additional traverse platform – potential for another 5 heavy tractors? – earth station could change some of the earthwork and maintenance needing to be done – doesn't see LDB additional building being a big impact
- Steve Dunbar – doesn't think we'll need to be going to the new earth station site a lot (they don't currently for Black Island) – could get up there with a Pisten Bully if needed
- Afternoon break
- Jeff – parts storage is currently chock full and represents bench stock, stuff they need all the time – low bay, low ceiling light duty shelving – regardless of final configuration, they would still use this – lay out stuff used a lot closer to front and such – potential for mezzanine – they have one currently but not really rated to hold anything – there's room to grow upward – atmospheric tanks in mech room are still in use but soon to not have them – no funded project to replace them – two boilers in there
- FCA talks to the microturbine project that would remove one boiler – but microturbine would take up most of that space
- Jeff – got rid of transmission rebuild function a couple of years ago – can fit a pickup, Pisten Bully in here and do "clean work" (windshield replacement, etc.) – locker room concept needs to be maintained – don't want them going back to town in their clothes – do support science from the machine shop function – do for MCM and for south pole – machine shop is still running lathe and mill, no CNC machine – as fleet modernizes, they wouldn't need to make many parts any more
- Cory – hose rebuild is a big deal for them
- Jeff – Cat certified hoses need to be kept very, very clean – hose bench currently occupies about 12' – hoses currently stored off-site, fittings in a different spot – storage and haz waste are generally Ok – break room works for right now – for just VMF admin space, and an office for traverse – moved all of the library function to the flams area within the bays – freed up office 5 and made a computer kiosk area – office 4 is VMF supervisor (1 person) – VMF foreman in office 3 (2 desks) – traverse mechanics in office 2 (2 desks) – office 1 is admin, more stuff to do before they got maximo, single scheduler in here – mechanic fills out paperwork – currently only housing 1 person/service writer – supervisor and foreman need privacy – tool room houses specialized tools, moved all field tools in here too – looking at all tools running through this position – separate since it's critical/expensive stock – talking about moving hose function into VMF as well, would be collocated with tool attendant – hose build and test – current state would not allow this, not enough room in tool room for hose

function too – general discussion on welding function – lift bay 6 for oil changes – have 2 walkaround machines that suck up the oil into barrels – eliminated touch points as they used to dump into makeshift drums – vehicle washing is done in the bays – not ideal by any means – oil/water separator on the 175 side of VMF – trench drain for water freezes up when heat trace goes out, just happened last week – have a makeshift waste oil storage area up by the tire bay 5 – probably 40% PM maintenance and rest is ad hoc emergency maintenance – a lot of it depends on season: early season is flat tires and jumping batteries – once summer hits, shifts into emergency style maintenance – blown transmissions and engines – 7 mile difference from Willy's to Pegasus is actually a huge impact

- Rick – comments that showers should be a part of the new facility
- Jeff – along with industrial laundry
- Rick – for parts storage 115 – 3 at day, 2 at night – do VMF and Fleet Ops as well as fire, fuels, AGE, water, wastewater, etc. etc. – need to consider in the part storage function
- Jeff – 15 day shift and 10 at night – lots of folks coming in to use restroom – they're like the "truck stop" for this side of town
- Shaggy – let's shift gears and focus on requirements – modern vehicle exhaust system is a given – bridge crane as well
- Jeff – oil evacuation for waste oil – also hydraulic fluid – environmental is a big factor for them – and fluid dispensing – two bridge cranes currently – only issue currently is when one breaks down – hampers their ability – would like to have a "car washing" function – wash engines and such as well – try to keep clean to limit amount of tracking onto snow
- General discussion on washing function
- Steve – wherever it is (outside or inside), needs to have a functional oil/water separator
- Jeff – having a centralized wash facility for town would be nice – dirt from oil/water separator goes to a trap – they clean out about 3 times a week and it goes into the waste stream
- Steve – dirt is run through a "cooker" and used as loose fill for construction
- Jeff – drainage is a huge issue now – settlement of floor has caused slopes to trench drains to be jacked up – doesn't drain anymore and they have to squeegee it out – snow melt adds to this as well
- Tony – suggests that lighting is better
- Currently forced air heating
- Jeff – what they have now isn't bad
- Jeff – constrained on pull-through bays – want a wireless capability work platform in each bay – removing existing flams would help this
- Tony – generators are 16-18' wide (airfield white elephants) – doors are currently 16' tall
- General discussions about next steps (charrette report, solutions, etc.)
- Maggie – reminds the group that fleet ops hasn't been included yet

- Steve – brings up the outside space required for vehicle staging
- Jeff – current challenge is space in front of bays 1-5 (waiting for repair) – these are staged out front – stuff across the street is generally waiting for a part – in summer, this area is always full – sometimes there are incidents where these get hit – need to look at close to, but out of the way for vehicle staging
- Services ~250 pieces of rolling stock
- Charging hybrid cars
    - 120V vehicles
    - Might be better to charge near the trades bldg
- Competing for bay space
- Session break – A/E download

Fri August 7 (3.5)

Overflow and Internal Management Meetings

- Refer to sign in sheet for new attendees

- Opening remarks from Shaggy (ASC)
    - Mechanical Equipment Center (MEC) needs to move to another location
    - FSTOP – Field Science Training Ops Program
    - Happy Camper – outdoor survival training
    - Returning personnel are required to take a 4 hour refresher survival class.
    - FSTOP group will eventually end up working out of the Field Science Support building
    - ANG – Air National Guard
    - AGE – Aircraft ground equipment (generators and heaters); equipment has to be stored indoors; small staff of 3-4 people;

- Shaggy – talks to phasing for entire MP – have to get IT out of b189 and get that centralized – fallacy in phase 1 was that MEC could stay with the IT function – need to move the MEC and the field safety training program – MEC has relatively small footprint for today's bay sizes – trucks and snow machines are different mechanics-wise – want to get the pickup trucks out of the fleet, move to side-by-sides and smaller vehicles – won't be very different but will be different than what they do today – SBSs would never go up to the VMF – on VMF, should actually be shrinking their fleet – particularly in terms of pickups and caterpillar loaders – but the fleet building the ice roads and the runways won't really be changing – VMF, other than pickups, should be staying about the same – on traverse, they've already added 5 platforms for science travers – refers to report coming from National Research Council – thinks there may be more coming down with more science platforms – need to be focused on the spatial requirements – runs through sketch of traverse ops made by Rick – double-loaded to fit 4 vehicles – thinks traverse out to field camps will gain steam – much more efficient and cheaper than fixed-wing – thinks we give up a touch point on food and let traverse have space in their building – building would need heat, but not 75 degrees – good ventilation for the plastics and glues they're working with

- First step is to build out SSC (IT Ops) so need a place to park MEC and FSTOP – MEC needs to go somewhere immediately

- IT out of existing and add to B004

- Rick – we know VMF and traverse need common things – crane, bays, parts storage – need to also remember Fleet Ops – Fleet Ops just drives the equipment

- Shaggy – FSTOP needs a place to park just until Field Science Support is done – will only need a space for a couple/few years

- Shaggy – ANG and AGE – ANG needs storage and a minor workshop – very specific requirements on their parts – ASC does not currently touch ANG stuff – AGE equipment can't ever be outside – could generally be anywhere in town – but there's a synergy between VMF and ANG with generator work – VMF repairs AGE stuff right now

- Plan on site planning discussion for airfield

VMF + MEC

- Breakdown of first phasing step
    - Part of B004 will be occupied while IT is moving in
    - Move Mech Equip Center (field issued gear) and Field Safety Training Program (FSTP) (just front piece of SSC, second floor).

        - MEC is a small footprint. Crystal ball says truck fleet will reduce in size but no guarantee.   Snowmobile mechs also service the side by side. They'll never hit the VMF.
    - VMF
        - Should be shrinking fleet. Especially with pickup truck, caterpillar, front end loader.
        - Fleet that does roads and runways will probably stay the same.
    - Traverse Ops
        - Already added 5 new platforms for science traverse. National Research Council report on Science Study Funds to NSF (will come out in a month….get link from Shaggy) and will list other areas of research which may affect Traverse Ops requirements.
        - Charrette drawing which shows (2) 12' wide x 80' bays seem to be properly sized.
            - Moving by land is always cheaper than by fixed wing so having space for vehicles is critical.
        - Need heat (not 75 degree), need proper ventilation.
    - FSTP
        - Just needs conference rooms, gear storage and a few offices.
    - Common reqs between Traverse and VMF.
        - Bays, meeting space, bays, parts storage.
    - Fleet Ops
        - Offices for supervisors. Room for 30 for day shift meeting.
        - Find where this can be combined.
        - Possibly integrate Fleet Ops and someone else for the day meetings?
    - Fleet parking
        - Locate adjacent to VMF / Fleet Ops and Traverse
        - Rick presented various scenarios for this
    - FSTP
        - Ultimately end up in Field Science Support
        - 1 mountaineer just reads GPR
        - 4 mountaineers
        - For new folks, take Happy Camper
            - First day: 0700 - 1700. Everyone does this - Inside classroom training
            - Two day: out in field then come back into town next am. Outside survival training
            - Happens from WINFLY to Halloween
        - For returning folks, do a 4 hour refresher classs. Run back to back to back. Only can run one at a time for now.
        - Need a space to train on rock climbing (could be in bay or in gym)
    - All these items are really Phase 0 as they need to happen prior to any other facility shifts

- ANG and AGE (Aircraft Ground Equipment)
    - Small footprints within the facilities
    - ANG
        - No offices. But 3 people in and out of there.
        - Storage and minor workshop. Bench space.
        - Currently have 1 floor in 156.
        - Props and skis. No wash bay. Just store big equipment.
    - AGE
        - Staff of 3-4
        - Only serves LC-130.
        - Generally big generators and heaters (herman nelson). The box with the big tube.
        - Stuff can never be outside. Stored inside as well.
        - Take up first floor of 157 (~5000 sq ft)
        - Could be anywhere in town. VMF and MEC can both work on the generators / heaters. VMF repairs their items now but MEC is more appropriate.
        - Equipment goes to airfield at beginning of season.

Medical, Dental, and Fire

- Rick presented the Medical / Dental updated plan
- Joe presented the Fire updated plan
- October 19-22 is current tentative date for Palmer Facilities charrette (pier wouldn’t need to be charretted)

Charrette Week 4

Denver/ASC, August 10-14

Mon August 10 (4.1)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

- Ken Bell – responsible for trash management
- Orlando Trujillo
- Dale Jacobs – mechanical estimator ASC
- Ron Carpenter – ASC
- Mark Furnish – haz waste management
- Mark Bartram
- Ted Durr – ASC environmental
- Kimmy Christensen – environmental
- Floyd Dial
- Refer to sign in sheet for new attendees

- Phone

- Laura Jo – Safety

- Morning session

- Rick P presents summary of last week's work

- Internal Planning Session
    - Dave Winkler provided an overview of the week's charrette meeting agenda
    - Shaggy summarized Rocky Mountain Institute's (RMI) role and presentation scheduled for later this week
    - Dave Winkler asked for comments on the draft design schedule

- Progression into architectural standards and guiding principles presented by Rick

- Dave Winkler led off with self-introductions
- Dave Winkler reviewed the week's charrette agenda
- Winkler presented the updated schedule
- Rick Petersen (Oz) reviewed the high points of the week 3 agenda (reference Oz' slides)
- Rick Petersen reviewed the architectural design guiding principles
- RP provided an overview of the other international research stations
- Discussion on possible forms and features; Joe Levi reminded the group that standardization and constructability should remain in the forefront of the design approaches
- Design team needs to consider snow drifting, scouring, snow removal and potential damage caused by snow removal equipment
- Programming discussion continued on the McM Core Facilities group of facilities.

Guiding Principles

- Rick presented the architectural guiding principles
    - Architect understands that it has to be integrated with engineering
    - Has to look and be environmentally friendly
- Shaggy / Ben touch on the stature, permanence and durability

- Ben indicated that the station needs to stand apart as "American"
- Rick shared images of other non-US stations
- Discussion surrounding form and function and the impacts on snow / utility access

- Morning break

Chapel

- Rick presented the Chapel design

- Lunch

Supply

- Rick presents the Supply Chain

- Afternoon discussion on flow of waste, people and vehicles

- General discussion on waste handling

- Rick Petersen opened with an overview of material flows throughout the new station
- RP – design team needs confirmation of loading dock height for Central Services Facility vs. grade in yard to plan north
- ASC (Kim) described the current ship offload process
- Current offload locations are galley pad, ballfield and cargo yard (for South Pole station)
- Current food offload process is a 4-5 24 hour process
- Current freezer is undersized so organization is critical
- Currently 400-500 milvans are offloaded per season
- Multiple milvan offload for certain milvans
- Approx. 25 milvans are not offloaded immediately; they are dried for 24 hours during winter season
- ASC to provide a breakdown on count of milvans that are offloaded
- Waste handling processes are envisioned to change in order to reduce number of touches and reduce the weight of food waste required to be shipped back to CONUS and incinerated.
- A new bailer would ideally be located at the back of the food warehouse/galley
- There was discussion about process to move cardboard waste from Central Services Facility to Waste Handling Facility (which may now include a waste to energy system in the scope of the facility)
- Recycling processes are envisioned to change to a co-mingled system
- Kevin Breslin asked if the waste handling stream was optimized, some of the waste could be used to generate waste to heat system

- Ken Bell – they would have a dewaterer there tomorrow if they could – intuitive on ROI for dewatering – would reduce weight (at least of food waste) by 50% - suggests putting a cardboard baler at the kitchen area so they don't need to get it all the way up to waste barn to process – would love to have a chute that just goes to a 20' container underneath the places they're collecting

- General discussion regarding the use of chutes and containers – could create lots of issues with visual clutter, mess/smell, etc.

- Kim/Pete – thinking about 40' between containers would be sufficient – they currently park them back to back so they can unload from either side

- Afternoon break

- Facility Operations (Warehouses, Material Handling Equip., adjacencies, shop space)

- Central services warehouse operations were discussed
- Ben Roth asked the group to consider a consolidated warehouse operation serves the three primary warehouse areas (central services, science support and trades)

Laydown / Storage Discussion

- Airfield
    - Gary deferred to Pete for space requirements at airfield
    - Build most of pallets at field, basically need temp controlled areas
        - 10 DNF
        - 5 DNT
    - Some pallets that come in for Pole can be stored at the airfield
    - Potentially include provisions for GPS / RFID tracking for stored ite

- Airfield discussion

Tues August 11 (4.2)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

- Mark Neeley – construction manager
- Nate Williams – ASC Environmental

- General overview of Day 1 activities presented by Rick

- Recap of high points from previous day's meetings
  - Rick Petersen summarized the high points from yesterday's discussions
  - Ship offload process was discussed and diagrammatically
  - Dan Harrington suggested that conditioned warehouse space could be contracted potentially reducing the amount of conditioned space as the season progresses
  - Consider "spyder attachment" for sea container movement options
  - New grantee cargo outdoor storage space was requested
  - Provided new layout for container yard

- Aaron Seal attends the airfield breakout session

- DS – presents report and findings from DC

- Gary – brings up Day 1 discussion about having waste handling capability at airfield

- Don recapped the DC SAC plan and the move to two fields

- Gary mentioned that Mark (waste manager) wants a space for waste
  - Could be a lean-to again the dining or restroom area
  - Don indicated that there is now a space allocated for trash and haz waste

- Refer to Airfield PDF for additional mark ups on the consolidated plan from Gary

- Power side discussion
  - Wiring to galley (galley was on the end)
    - Used 4/0 cabling. Avoid this if possible.

- REILS and PAPI are LED. Approach is still needed to approve for switch.

- Temporary edge lights

- DS – will keep that in mind

- General discussion on the sketch that Gary Cardullo provided to the team

- Gary – wants to collocate the bathroom for nasty weather – with exterior door and interior door so passengers aren't coming through the office area

- Gary envisioning his sketch would be one building – bathroom would not be running water, would service with honey bucket – C-17s average about 3 a week during their active season – question is still whether there's a separate PAX terminal

- Pete – make a 2nd floor and make that the PAX terminal? – would also want an area to hold at least 3 palettes – don't really need DNT out at Pegasus – big DNT need is going into field and pole

- Gary – WX observer but no ATCT for uncontrolled airfield – no air traffic per se at Pegasus

- Pete – PAX terminal for about 50 people would be appropriate – would just work around this when the high season comes through

- Gary – talks plug line requirement – would think about 15 slots for fire trucks and such

- Pete – can park on both sides – most equipment has more than one plug

- Pete – buildings at Pegasus are on skis

- Gary – January/February this year they pulled it out and reset the grade for the buildings out there – going to sit for a period of time – plug line would be off to a side, would help since vehicles next to building promote drifting – 1 WX observer, 1 airfield manager, 6 fleet ops people total, 3 AGE, 8 ARFF – ARFF most of time just come out and get vehicles ready – most of their time within vehicle – common area would be Ok for them while they're out there – ATO is similar, come out ahead of flight – unload the cargo that is going off-continent

- Pete – only time they're out there for an extended period is when they're doing night vision flights or if there are multiple flights in a row – do need ability to get on computer, but can use fleet ops office for this – 2 fuels, 7 ATO

- Gary – wanted to keep AGE, fleet ops, etc. away from the PAX operation – 8 people for the dining area – structure has to be on skis – this might be a building to use waste heat on – ONLY if set up simply – does NOT want what LDB has – has to be mobile with a simple disconnect

- Need comm/mechanical in the spaces/sketch

- Confirmed that this is interchangeable with Alpha airfield and would likely be built at Alpha since they're starting to get that up to speed this season

- Maggie – confirms that comms at Pegasus would look the same as Williams Field in the new setup (they're currently different but they want to standardize)

- Gary – wants to talk to Maggie about the 3-story structure and whether ANG really needs this or if they could do smaller, multiple units

- Joe H – would put up a 30' tower with microwave and transmitters – as long as they are near the complex, they're fine – would be power requirement off the power plant – don't want to interfere with operations – could be a couple hundred yards from nearest facility

- Maggie – talks to building sizes – they have basic information on what size is "too big" – depends on function, ski design, ground pressure – will need to be iterative – first design for most efficient and see what the impact will be – do NOT want to be close or over the size/weight of the LDB buildings

- General discussion on heights and weights of buildings

- Keith – says they looked into deadmen on the taller buildings (– looked like they could take up to 140 mph winds with no dead men
- Maggie – has mixed feelings on a science building at the airfield – doesn't necessarily want another building, but understands the need for storage out there – keep it flexible so it can be used for things other than science in the future?
- Maggie – currently running generators all summer – once they're up, they stay up – but currently trying to quantify the winter requirement (for Pegasus) – could be having flights every other week
- Airfield session ends – Aaron Seal joins waste handling session
- Ken Bell – two biggest sources of cardboard are kitchen and supply – with regard to baler locations – put a downstroke baler close and have a loading dock in proximity – currently do about 100 tons of cardboard on an annual basis
- General discussion on balers and wood chip boiler – boiler needs it loose so is there a need for a baler?
- Ken – need to figure out wood to cardboard ratio – bales are nice because you know what it weighs and such – other option is to have a compactor style truck and dump it on the floor – would like to see one waste person in charge in an office – would have office/break room in waste management area – does not want equipment operators going to get equipment – would ideally do this with fleet ops – doesn't know what numbers look like – ideally everything goes into 20' containers to handle by fleet ops
- Kyle – ideally eliminate Ken's role
- Ken – today they have 11 people – would prefer rolloff containers with compactor systems – would help with all California offload functions
- Ben – why does everything need to go all the way to Fortress Rocks? – concerned with labor and distance and the number of containers
- Generally, it doesn't but just nice open laydown
- Mark Furnish – could maybe get waste containers around/down to 300?
- Ken – have to treat WWTP separately, tires/mattresses have to be removed, urine/graywater, etc. – half a dozen commodities that need to be treated separately – just all related to his staffing numbers – ferrous/non-ferrous sort on scrap metal – best if this sorting occurs on-ice – simple magnet and crushing to separate and transport – would be liquid discharge from compactor, need to incorporate drains and such – people mixing food waste in to the stream places the station at risk with regard to the mixed recyclables – thinks 3 people in solid waste by the time they're done?
- RP transitions to Traverse Ops
- Rick presents overview to new folks
- Discussion with users
- Track 1: Waste Operations, Hazardous Waste, Fuels

  - Need to pay special attention to fire protection system, including proper air monitoring, for haz waste facility
  - Haz material storage tanks will require proper secondary spill containment (i.e. double wall tank (preferred))
  - Haz material storage yard will require spill containment per EPA standards
  - Current thought from ASC is that the haz waste facility and fuels facility would be combined into a single facility.
  - Due to fueling operations and potential for fuel fumes, electrical equipment would likely need to be explosion proof

- Lunch Break

- Track 1: Trades (Equipment and Layout)

  - Dale Jacobs (ASC) – Discussed requirement for outside access (overhead door) at several locations on the north and east walls of the trades facility
  - 97 people anticipated to be home based out of trades shops, but not all will work in the facility; workforce fluctuates throughout the calendar year; projected workforce numbers were discussed, but difficult to predict future needs due to uncertain facility and infrastructure maintenance during the phased construction and beyond
  - Action item (Oz/Merrick) – generate an equipment requirements list with space requirements including clearances for each particular space; also need to identify

- Aaron Seal attends afternoon Field Science Support breakout

- Mark Bartram – brings up using radiant heat in the floor – also uses lower temp glycol (140 degrees)

- Discussion on internal areas and high bay storage

- Make note of cleaning area as laid out by Bija – internal fixtures/plumbing

- Discussion on cargo process and how things come through Field Science

- Case M4K = "Pickle"

- Brief discussion on emergency helipad – needs to be near one of the FD entrances – generally just a flat spot but prefer not to land in the road – closer the better – maybe just indicate a "no build" area

- Don presents the floor plan
- Shaggy describes the Alley
  - Use this for 'exterior' space
- Missing true Fab Shop (done in 136 now but very limited and not right sized)
- Overhead crane in Trades Assembly area
  - Add an overhead door at Plumbing location
- Welding should be moved to sheet metal and plumbing. Fumes need to be exhausted out of building. Some mobile welding can be done as well. These shops will have largest material (pipe, sheet metal).
  - Sheet metal will have press and bender and rather not drag items around.
- Alleyway
  - Shaggy - all of B136 will be gone
  - Use for building floor panels for RacTent but not building the whole RacTent
  - 136 pad would be deck space for staging, check-in, etc
- Trades
  - Want material close to where use it but this isn't a requirements.

- Shaggy reminded it's a different skills mix than currently have. Town projects should be 'gone' at this point. Think along the lines of college campus, military installation, hospital, what kinds of skills would be there.
- Riggers
  - Steel, towers, cables, clamps, etc. Not comms shop. Fairly heavy stuff.
  - If intent to keep materials in there, need a way to get directly out to a car.
  - Either need direct access to the outside or fork lift path to move it south
- Controls technicians might be missing from this
  - Add a few monitors / work stations
  - They're interact with the UT (utility tech) folks
- Dale like to see offices above individual trade shops. Look out into trades assembly. Joe Levi said it might be able to be added to first floor in each shop.
- Sheet metal shop needs close access to sheet metal stock. Might need some rolling stock nearby.
- Dale provided a marked up Trades plan.
- Joe Harrigan
  - Riggers do a lot now is metal fabricating. Be nice to be near welding / metal guys.
  - Also do a lot of mounts for field folks
- Flip top four from Riggers to Fire Alarm on the north / south axis.
- Riggers get a boom truck inside
- A total of 97 bodies (between Keith and Dale) currently.
  - Facility maintenance numbers are
    - UT (20)
    - Carps (30-35)
    - Plumb (6)
    - Sheet (5)
    - Elec (6-7)
    - Riggers (3)
    - Fire (3)
    - Alt energy (3)
  - By comparison, Shaggy said NREL for 450,000 sq ft has a maintenance staff of 26.
  - At the current level of science supported, 29-33 folks needed. Between late Oct to end of Nov, majority of the carps move to the field. The rest of trades stay in town for, say, 90%.
    - At WINFLY, there's a rush.
- As McM goes year round (if) then these trades would be used more
- Dale Whitestone Report for maintenance for campus
- Joe L presented an updated truck pull in plan
- Electricians
  - Pipe bender
  - Stored conduits
  - Spools of wire
  - Bench
  - Bench stock cabinets
  - Band saw
- Utility Tech
- Trades Assembly
  - Joe
    - Antenna riggers, alternative energy folks will assemble and then stage it. They'll also bring it items like wind generators (sits on an engine stand).
    - There may also be many smaller items in this space as well.
  - Dale likes the 'swing space' approach to this area. Available to all shops for odd items.
- Joe
  - Done some calcs for IT and made some assumptions for synergies. Maybe pull together all the shop supervisors and figure out what the synergies would be.

- Concourse ("alley")
  - Use some of this for storage (temp?)
- Carpentry Shop
  - Sq footage ok. Maybe need to massage equipment types.
  - Needs more tool storage (might not be inside)
    - Quite a tool supply for this shop
    - More than hand tools. Safety, harnesses, etc.
    - Store a lot of camping gear and survival gear
  - Need a secured storage area for field pack tagged to go out. Locate in space that's there.
    - Field kit = survival gear, tent, sleeping bag, etc. About 3' by 1' dia. Like a wall of lockers.
    - BFC does really small camps. Field carpenters are setting up large camps.
  - Need glass replacement.
  - Electrical is piecemeal
    - Drop cords are good.
  - Overhead duct work for dust collection
  - Grantees requests product all over the place
    - Special sized crates.
    - Present shop can do basically all home items (cabinets to furniture)
  - Test propane stoves for field but not storing propane in here.
  - Class / div
    - Bldg 171 is the current hazardous storage. There is no replacement for this building as of yet. To be worked out and then req's fed to responsible engineering team.
  - Paint
    - 3 painters. Not a lot of painting being done there. Paint prep and mix.
    - Spray booth
    - Stenciling.
  - Grantees ask about how items are coming along. Make sure done to spec.
  - Offices
    - Less offices and more
    - Admin is the scheduler
    - Need spaces to do timesheets, bank of computers.
      - Like currently done at B136
      - Have 12 in a small sq ft
  - Morning conference / meeting will be held in one of the open spaces
  - Desk and workstation would suffice for foreman. Might be nice to have an office for some privacy.
  - Noise
    - Sheet metal and welding will have noise.
    - Lots of noise in carpentry as well.
    - Like not to have too much noise transmission
    - For metal areas, have a single office space (with good STC rating)
  - Private spaces
    - At end of season, do one on one session for reviews. Aside from reprimanding, not too much private. Need a few spaces.
  - Collaboration spaces
    - Every week, have a superintend meeting
    - When group going to field, have a meeting for execution plan. 2-3 times per week. 20 pax.
  - Break room
    - If had a fridge, microwave, coffee pot in break room, would use it.
    - Don’t size for whole group. Some will go to Galley anyway.
    - Size it for 10-12 pax

- Bathrooms
  - Needed
  - Size for 50/50 male/female
- HVAC
  - Radiant heating for large areas
    - 65 for most spaces
  - Office area
    - 65 degrees
  - Storage space
    - Just above freezing
- Welding in plumbing / sheet metal
  - Need permit anywhere else on station to do hot work
  - Ensure arch / hvac can support welding to code
  - Sometimes drag portable welder to larger equipment in space
- Tool room
  - Lockable
  - A stash of various tools
  - If need a unique (CNC machine) it'll be stashed over at the VMF
- Waste stream
  - Most of it comes from carpentry shop
  - Fluctuates throughout the year
  - Waste goes to two containers only (trash and recyclables)
  - Flip top (4x6), 3 a week
    - Sheet metal / plumbing would need one (could be a bin outside)
- Work day
  - Seems to indicate that they are a regular day (8-5 type). No night shifts indicated

Debrief

- Joe L presents the Trades
  - Orders of trades at plan north will be swapped around
  - Dust collection has a lot of junk come out of it. Don't dump it into Concourse

- Hazardous waste has not been figured out.

Wed August 12 (4.3)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

- Shaggy provides brief introductions and opening statements

- Anthony Andrade – utilities manager
- Mike Casey – control systems, DDC
- Eric Bratt
- Robert Hutchinson ("Hutch") – RMI
- Amory Levins
- Others from RMI

- Phone
- Laura Jo

- Revised program of Field Science Support Facility reviewed

- Revised program of Trades Facility reviewed

- Rick presents overview of afternoon session from Day 2

- Ben comment on field science support – concerned about access to ice core storage directly to the outside – additional penetration

- Bill – wonders about SAR projecting into the concourse – Rick says that's a great point

- Ben – makes comment on maintaining air quality within the building

- Merrick presents utility strategies

- Aaron Seal provided an overview of the existing and proposed utility systems
- Dale Jacobs – current fuel distribution system allows for fuel oil boilers in the new station
- Mark Bartram – made the distinction that "day" fuel tanks are really building backup fuel supply fuel tanks
- Ben Roth – suggested design team re-think the location of the water storage tank to eliminate the need for a fire water pump and required redundancy
- Current RO water treatment plant uses chlorine to disinfect the water
- Based on current RO treatment capacity, it is anticipated that it will take approximately 1 month to fill each tank
- Mark Bartram – may need to consider water storage capacity for fire event when one tank is drained and cleaned for scheduled maintenance
- Comments made to review the need for a dedicated water storage tank pipe if looped system can be used to fill tanks and supply fire and domestic water to the station
- Fuel distribution system overview was presented
- Fuel tanks for the station are currently filled once per year
- Ben Roth asked if the fuel fill tank pipes could be re-used in the station fuel piping distribution system
- It was noted that if the Crary sea water pumps go down then the station sea water pumps must be taken offline as well; the solution to this may need to be provided outside of the program
- Below grade and above grade utilidor strategies were discussed
- Question was raised if above grade utilidors should be preferred throughout the station where practical for ease of maintenance are possibly increased

- Kevin Breslin presents CHP and waste heat

Utilities – Heat Recovery Strategy

- Kevin Breslin presented an overview of the heat recovery strategy
- Question posed as to how this system would be maintained
- Heat recovery strategy was presented
- CHP Plant and Heat Recovery
  - Maintenance
    - Standardized equipment?
    - Continuity of staff
  - Which buildings should be on the loop
    - Will that change over time
  - Future uses for process heat?
    - Wastewater treatment
  - Level of automated control?
  - Lessons learned from other microturbine projects?
    - Paul Sheppard indicated that the current planned pilot microturbine project is scheduled to resume and will be a good test bed for the project

- Dale – asks about heat exchanger, is this an "island" concept? – Kevin confirms that this first system is building-specific, not connected to outside loop (will be in later slides)

- Question about "ramping up" – is it a change of speed?

- Mark B – modulate with the speed of the system

- Will have to confirm the manufacturer requirements

- Anthony – asks if power plant, microturbine and boilers could be running at same time – Kevin confirms that yes we would conceivably

- Amory – speaks to turbine efficiencies

- Kevin – ones we've been looking at have pretty flat efficiency curves from 50-100%

- Steve – confirms that they already have a flywheel

- Dave S – how do we maintain and troubleshoot? – wants things to be intuitive

- Mark B – caveat is that glycol is this whole system – in our scenario, every building is connected to glycol loop – point of failure

- Neil – talks about fuel for power production and fuel for heating – will talk more tomorrow, but point is that South Pole has a little bit more electricity production than thermal use – like 55/45 – at MCM would expect 75/25 electric production to heat production – what they're actually seeing is inverted proportions with way more heat production since things aren't efficient – with new facilities, expect more electric production – want to try and get it setup so electric production is equal to heat production

Power strategies

- Orlando presents power distribution. Orlando Trujillo presented an overview of the power strategies
- Keith presents comm distribution. Keith Binkley presented an overview of the communication strategies

- Lunch Break

- Shaggy presents demolition concept

- Shaggy provided an overview of the demolition anticipated as part of scope

- ASC plans to deploy an expert to assess the hazardous material abatement

- Environmental impact statement requirements and timelines were discussed

- 104 buildings down there right now and demolishing the vast majority of them – they have a register of haz materials, but not sure how accurate it is – talks to encapsulated ACM versus potential removal – will be deploying technicians this season to perform the assessment – geotech will be down there as well – they'll be testing the bore holes for POLs

- Mark – asks about GPR?

- Shaggy confirms that GPR is a part of what he's thinking about – part of geotech scope as well as CRREL function – intent is to find the legacy dump sites, ice lenses, etc. – reiterates the desire to work with the landscape

- Shaggy speaks to Phase 0 – will need laydown areas for the new buildings – big retro operation

- Ron Carpenter – makes point that demo contractors will be enticed (to a point) by taking title to demo'd materials – will need to figure out how to get this back to CONUS

- Polly (on phone) – looking into timing for environmental processes – related to Treaty – asks on timeframe for actual demo?

- Shaggy – we do and it's a part of the phasing plan

- Polly – will need to do that as a part of the environmental impact assessment – critical that timing is right for the EIA process – Antarctic Treaty meets usually every June – anything for project would need to be in 4 months before the treaty – missing the deadline means you're stuck for a year – ideally EIA would start with the scoping of the project

- Ben – brings up the fact that some is in Palmer as well

- Polly – for the pier, if there's noise in the ocean (explosives, etc.) falls under marine mammal protection act (NOAA) – NOAA would then need to review the EIA – could take 8 months for review after documents are received

- Ted – clarification: up to 8 month period is for non-harmful – if there's potential for harmful/lethal "take", could be up to 18 months

- Dale Jacobs – is there something we could be doing now that would help our process?

- James – there was something produced, but wasn't necessarily complete

- Ron – brings up the volume of materials as well (furniture, desks, etc.)

- Ted – if everything's good, takes 24 months to get a CEE/EIS decision

- Polly – NEPA requires that an EIS is submitted following a public comment period – fall under that for this level – runs simultaneously with Treaty stuff – did this for project Ice Cube

- Rocky Mountain Institute Presentation – Energy Efficiency Strategies

- Schedule review

- Dave Winkler reviewed the current draft schedule with Ben Roth and the team
- Several questions were brought up
    - Will the design teams be allowed to sole source preferred material and equipment manufacturers
    - Who will develop the BIM Revit standards?
    - Does NSF have preferred facility standards or specifications? No, according to Ben Roth
    - Design packages will need to be coordinated in terms of product specifications? Ex. wall hung or floor mounted toilets?
    - Luke with Baker recommended that the D-B-B packages be used as the model specifications for the D-B RFP packages. No consensus was reached.

Thurs August 13 (4.4)

7:00-8:00 (ASC /A-E Firms) Set-up and confirm day's objectives

8:30 am – Introductions and Summary of Day's Agenda

- Shaggy provided an overview of the goals of the program highlighting RMI's role in terms of helping to establish energy strategies
- Aaron summarized the utility strategy for McM MP 2.0

9:00 am – Building Efficiency and Performance Specification

- Neil with ASC – Power Summary
- Steve Dunbar – one goal would be to reduce fuel needs so that the fuel re-supply ship is required only every other or every third year
- RMI – need to consider building in flexibility for power and other utilities in order to take advantage of future technologies
- Goals
    - Fuel reduction goal – 300,000 - 500,000 gallons per year

3:15-5:00 - (Baker/ RMI) Smart Grid

- Smart city concepts were discussed including a SCADA system
- Scott Base is and will continue to be a power generation and load source to the new McMurdo Station power grid and smart city system

Fri August 14 (4.5)

Overflow and Internal Management Meetings

QUESTIONNAIRES

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:		**Research Focus:**	
Respondent:		**Contact Phone No:**	
Antarctica Research Location:		**E-Mail:**	

1. What is the nature of your scientific research?

2. What is the size of your team at McMurdo Station?

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

4. Describe how your team currently works at or interacts with McMurdo Station?

5. What is good about your experience at McMurdo?

6. Are there areas that could be improved for your research experience at McMurdo?

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

14. Do you have special requirements for frozen storage of samples/specimens?

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

16. Do you need to observe the assembly of goods?

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

18. Does your work require privacy (acoustic or visual)? If so please explain:

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

General Information – Work Center

Date:	**August 4th, 2015**	**Work Center:**	Fuels
Respondent:	**Alex Morris**	**Contact Phone No:**	720-568-2216
Work Center Location:	**Bldg 141 McMurdo**	**E-Mail:**	alexander.morris.contractor@usap.gov

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

Transfer, issue and test fuel. High focus on spill prevention. Operate the pipeline system and fuel delivery vehicles. Monitor and maintain the pipeline and tank farm systems. Operate, monitor and maintain all fuel delivery systems at the airfields and at field camps.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

24-26 people. Supervisor x 1 Foreman x 2 Coordinator x1 Fuels Operator x12 Lead Fuels Operators x5 Fuels Mechanic x 1

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

none

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

none

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

no

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

Yes, the supervisor's office should be seperated from the main gathering point in the office by a door. The foreman and the coordinator need to be co-located and not seperated by a wall. There should be a break room as well. Also need a lab that can be closed off. Approximate size of 10ftx10ft.

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

Supervisor requires a private office, coordinator and foreman office would ideally be a space large enough to accommodate 16-18 people comfortably.

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

Supevisor meets with employees, as does the foreman. "A special common are with small rooms" hmmmm..... sounds a little weird. Sounds like something people would not look forward to.

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

none

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

Storage areas would ideally be in a segregated room. Need room for personal storage lockers for 30 people, need room for up to 20 people to stretch at one time. Supervisor, foreman and coordinator "offices" should be in one location, adjacent to each other. Supervisor needs a private office.

30. What are the working hours of your group?

7:30am to 5:30pm, mostly. Some folks start earlier (5:30am) others later (12:30pm), and sometimes there are other shifts when needed.

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

Training room would be swell. Could be shared with other occupants of the same building.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

Fuels has extraordinary requirements. Over ½ of our equipment is reused each year, meaning it has residual fuel in it, and it therefore has a fuel odor which is not desireable to most. Fuels equipment needs to be segregrated from other materials/supplies as the odor will permeate anything in the building. Size of the storage area is roughly 1,000sq ft, with racked storage.

33. Do you have any sensitive document or specialized equipment storage needs?

Fuel testing equipment needs to be kept warm, dry and clean. Needs to be in room with explosion proof plug-ins and lights.

34. Do you have any hazardous material storage requirement? Describe and quantify.

Yes. Typical work center hazardous material storage (gasoline, glycol, oil, paint, WD-40, Loc-tite, etc).

35. Do you anticipate a future change in storage requirements?

Unknown

36. Do you have or require any safes or mechanized storage equipment?

None

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same number of staff, possibly a few less.

38. Does your work require privacy (acoustic or visual)? If so please explain:

none

39. What future technological advances are you aware of in your organization that could effect the way you work?

none

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Yes. 6-pak stake bed pick-up with a lift gate. Delta II fuel delivery vehicle, International 5500 fuel delivery vehicle, Pisten Bully. Ideally these vehicles would have plug-ins at the building. Need access to the building with a loader to move fuel hose reels and bases into and out of the building. Bases are 8'6" square, the reels are approximately 76" tall, combined they are approximately 96" tall. Also need to be able to get the pick-up truck into the building to allow for easy loading and unloading of materials and equipment. Need exterior space for the storage of milvans, pumps, hose reels and bases. This is a lot of real estate.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

Need a Haz Waste sump (10'x20') or close location to same.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Need to be able to get a loader/fork lift into the building with reels/bases and other Fuels equipment and material.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage		X		NI	
Carpentry Shop	X		General carpentry services as needed, rare that this actually happens	NI	
Field	X		Sea Ice training, other snow craft trainings, survive	NI	

Science Support			alive kind of trainings		
Trades/ Assembly	X		Minimal, but some with plumbers, pipefitters	NI	
Electronics Shop		x		NI	
Field Science support Layout		X		NI	
Hazardous Cargo	X		Fuels drums bound for the field and other locations are processed for shipping by Haz Cargo	NI	
Science Cargo	X		Some equipment and samples sent through Science Cargo, 5-10 times per season	NI	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

Need explosion proof lighting and electrical outlets in the fuel lab. Need 240volt power to run the reels and bases in the building

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

none

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Currently have six desk top computers and two lan drops. This basically meets the needs of the department. The computers are standard email/LAN setups. No special requirements.

47. Which rooms, if any, in your group or section require large specialty equipment?

The main portion of the building needs to be big enough to accommodate the hose reels and bases. Ideally the fuel truck could be parked inside as well to allow for keeping it warm in very cold weather.

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

Offices and meeting rooms. Connections per room would depend on the number of desks in that office.

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

Need office copier/scanner/fax. Small size is fine.

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

nope

51. Is there equipment that requires separate electrical power or isolated grounding?

nope

52. Is there equipment that requires a specialized signal reference ground system?

nope

53. Is there equipment that requires special temperature and/or humidity control?

Stuff in the lab would ideally be kept warm and dry.

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

Is it an option?

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

nope

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

none

57. Is there any hazardous waste in your space and how is it handled?

Heaps. Lots and lots of fuel soaked absorbents, some waste fuel stored for short periods, haz waste sump has collection points for fuel & dirt/snow/materials/plastic etc. Waste fuel drums are also kept here. Generally 4 drums for waste jet fuel, a few drums for waste mogas.

58. Are any isolation rooms required? If so, size and type

nope

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

none

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

nope

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

We'd like steady, reliable power, same as anyone else. We won't expire a cruel, nasty death without it.

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

Regular TV to watch weather and flight movements.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

none

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

nope

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

Need HF radios for communicating with fuelies out in the field.

66. Do you have large scale battery charging requirements?

none

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining							
Large Lounge	X		Could be used as morning meeting space and location for training/education	Med	daily	In the building	
Laundry							
Ball Court/Rec							
Music Room							
Skills Development							
Multi - Purpose Weight/cardio							

1000 SF Multi-purpose							
600 SF Multi-purpose							
Lockers	X		Need storage space for fuelie gear/ECW stuff	Hi	Daily	In the building	
Chapel							

67. What works well in the current system?

Current building suits the needs of the department. The building allows for testing and maintenance of fuel equipment, gives space for individuals to store ECW gear, allows for most fuels materials to be close at hand. Fuelies like having a bathroom.

68. What works not so well in the current system?

Radio communications system. Would be nice if the building were about 20ft longer (currently about 90ft long).

69. Are there needs not met with Master Plan 2.0?

unknown

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Fuels is a fairly straight forward work center. Like earth girls, we're easy. We would ideally have a building that is pretty close to what we have now. It would be swell if the hoses and hardware could be segregated ina separate room in the building to help keep the smell down. The offices would ideally have a bit more space for meetings. The fuel lab should have running water so as to clean lab glass. The floor needs to support forklifts moving the 6k lb reels and base units into and out of the building. Ideally there'd be a shop for testing and maintaining pumps (fan to blow exhaust out).

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science
Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**2015-08-14**	**Research Focus:**	Evironemental Monitoring
Respondent:	**Andrew Klein**	**Contact Phone No:**	979 845 5219
Antarctica Research Location:	**McMurdo & Palmer Stations**	**E-Mail:**	klein@geog.tamu.edu

1. What is the nature of your scientific research?

We have investigated the localized environmental impacts of science and operations at McMurdo and Palmer Stations

2. What is the size of your team at McMurdo Station?

Typically 4 individuals with some years an additional teacher

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

We worked at McMurdo annually from 1999-2001 and again from 2003-2013 and again in 2015. It is unclear what our future depolyments will be

4. Describe how your team currently works at or interacts with McMurdo Station?

The focus of our research has been McMurdo Station itself so compared to most science groups we have interacted with it quite a bit. We have collected over 2000 soil samples in and around McMurdo Station and collect sediment samples at 9 or more sites in the shallow marine environment using station divers. We have also collected snow and other environmental samples over the years. We utilize vehicular access to the sea ice and typically have used trucks and vans in ours sampling around the station as well as done much of the collection on foot. We have also done heliocopter travel to the Dry Valleys and other locations across McMurdo Sound. We operate out of Crary and all our samples are shipped back via the vessel at the end of the season.

5. What is good about your experience at McMurdo?

The support staff! In all seriousness the support staff at McMurdo (and Palmer) make it the best supported science we have done. Most shortcomings in the system they have helped us overcome. Crary Lab space and support has been great to work with and Dive support is spectacular.

Consistency in proceedures and personnel in Crary/BFS/Science Cargo are great. If you have some experience on the ice, you can get a pretty good idea of how things can be accomplished. This can help minimize your time on the ice and hopefully help you minimize your impact on facilities and equipment.

Having worked at McMurdo for so long, like all groups we have adapted (evolved?) our proceedures to the existing infrastructure and support sytem. We feel we have been able to do this quite successfully and hopefully have mimized our impact on the station.

Compared to most groups our analytical and support needs are probably on the low end for science groups. But one thing we did learn early on, in part to PQ issues, is that it was possible to move a lot of the analytical work we had planned to do on station back to the states. This had very positive benefits in terms of our deployment times and hazardous waste generation for example.

6. Are there areas that could be improved for your research experience at McMurdo?

1) Better facilities outside of Crary for storage of field clothing and equipment so these items do not have to be brought into actual lab spaces and the ability to clean & stage field collection gear outside the lab space.
2) Sea Ice vehicles parked in close proximity to sea ice with some building near those stored on the sea ice for overnight equipment storage.
3) Improved dormatories and improved consistency year-to-year on expected accomodations. Individual rooms would be great and probably cut down on lost time due to illness and generally tiredness.
4) Improve the Bag Drag experience.

Perhaps better consideration of the deployment process from US to McMurdo and determine how Christchurch could be used more efficiently and be more flexible in allowing science teams to spend time before and after in Christchurch. One year our team did the refresher course in Christchurch. It was fine and would have been great had the space been more suited to the experience. The only problem was that it took the entirety of the stay in Christchurch and left no time to do last minute shopping etc. Because our deployment is typically short, we have requested with varying degrees of success to add an additional day in Christchurch to the beginning of the deployment simply to have one day with no USAP requirements. This has enabled us to arrive on the ice much better rested and we have found we lose less days to illness or simply fatigue during our time at McMurdo.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

We are probably close to holding the record for the number of labs in Crary we have occupied over the years – we have occupied labs in all three phases. Overall, Crary has worked very well for us. The one thing that would improve Crary greatly for those working locally is improved staging space in Crary so that ECW gear and field equipment do not have to be stored in halls or labs. It would also greatly cut down the amount of debris our group has tracked into Crary over the years.

.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

The current lab setup is generally pretty good for general use. Adjusting the height of the lab benches would make it a bit easier to accommodate computer and other use that might not require standing heights of the benches.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

Sharing of lab spaces has been fine with us and the current system appears to work well because of the great science support.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

Other then Fume hoods, none really. Again sharing is preferable to dedicated space when it comes to specialized equipment.

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

One of the things that our group has enjoyed most about Crary is actually sharing lab space with other groups. As a point of reference, we typically only require ½ a lab (2 benches) and have shared with scientists, the ASC environemental group and one year even the Crary Techinican. It has offered the opportunity to share ideas etc and is part of what makes Crary a scientific community.

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

The only organims we have used in our work has been a bioluminescent bacteria (Vibrio fischeri) that is part of the MicroTox Bioassy system.

14. Do you have special requirements for frozen storage of samples/specimens?

We typically package samples for shipping the day they are collected and store them immediately in shipping containers. We typically store ~200 soil samples at -20C and a a much smaller amount of material at +4C.

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

Based on the planning and Charrette, I would envison our team utilizing space in the new dive facility as well as a similar amount of space we have been using in Crary. We would have a limited need for using the layout space for field deployments as most of our work would be local with possible trips to the Dry Valleys.

The largest change I envison to our work flow would be to restrict the amount of clothing & field equipment we would need to bring into Crary lab space on a daily basis if cleaning of field equipment etc could be accomplished in the revised dive space or in an improved field staging area in Crary.

16. Do you need to observe the assembly of goods?

No

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

For our own work, we anticipate similar sized groups in the future, but from a long-term monitoring perspective our belief has been that the number of individuals on station would be decreasing over time

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

None

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

We have utlized Piston Bullies (or Sprytes), pickups/vans and snowmobiles – all pooled in recent years. A typical workday is take equipment out in the morning return and unload at lunch, go out again and repeat the process in the evening. It would be nice to have loading docks that can better accommodate a larger range of vehicles – e.g. a lot of the existing loading docks are at heights not well suited to pickups or Piston Bullies so there is lifting/lowering of heavy objects that could be minimized.

What is probably missing most is additional space where stuff can be left overnight near vehicle storage rather than having to transport into lab space.

We are happy with pooled vehicles and the sharing system seems to work fairly well. The largest issue is probably the need to fuel vehicles nightly – especially Piston Bullies as the process can be time consuming.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

Structured walkways between buildings would be nice to cut down on debris and allow material to be handcarted between buildings when feasible.

Science groups are currently sometimes (often?) faced with the decision of hand carrying items between buildings or waiting for the availbility of a pooled vehicle which can affect daily planning.

One thing that could affect how vehicles are used in the future is Shuttle Service at McMurdo. Having a dependible and timely shuttle service between station and the snowmobiles for example does affect the decision making process for science groups. For example because shuttles have not been as reliable the past few years, a science group is more apt to reserve a Crary Truck to shuttle materials.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Not for our purposes

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	Y		Distribution of Field equipment	P	Non
Carpentry		N			

Shop					
Field Science Support	Y			P	
Trades/ Assembly	N				
Electronics Shop	N				
Field Science support Layout	N				
Hazardous Cargo	Y			P	Fairly limited interactions as our needs are low
Science Cargo	Y		Sample retrograde	P	None

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

<u>Mechanical & Electrical Equipment – All Groups</u>

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

No

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

None

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Each team member has a standard laptop and portable storage devices. They are deployed in offices or on lab benches depending on where we are located

47. Which rooms, if any, in your group or section require large specialty equipment?

None

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

Our group has been fine with wireless connectivity in Crary. We do not foresee large needs in connectivity

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

None. We use standard Crary equipment

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

Not perceived at this time

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

We are fine with current specialized water facilities

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

A laundry facility in Crary or modified Dive spaces would be a nice addition such as the small facility at Palmer where very dirty field clothing can be cleaned without the need to bring it into dormatory cleaning facilities.

57. Is there any hazardous waste in your space and how is it handled?

We have limited use of hazordous wates. Those used have typically been stored in fume hoods or returned to storage immediately upon use.

58. Are any isolation rooms required? If so, size and type

No

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

No

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

None

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

None

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

No

66. Do you have large scale battery charging requirements?

No

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		Eating	1	3x per day	Dorms/work spaces	
Large Lounge						Dorm	
Laundry	Y			1		Dorm	
Ball Court/Rec	Y		Minor	3	2x per week		
Music Room	N		No	3			
Skills Development	N		No	3			
Multi - Purpose Weight/cardio	Y		Minor	3	4x per week		

1000 SF Multi-purpose	N			3			
600 SF Multi-purpose	N			3			
Lockers	Y			1			
Chapel	Y		1x per week	2			

67. What works well in the current system?

Assortment of social spaces – e.g. three bars with different characters that attract different types of folks.

68. What works not so well in the current system?

Dorms...

The one thing that has struck me about McMurdo, at least in comparison to Palmer, is how poorly treated some of the facilities are. This is in part due to the anonimity of individuals but anything that could be done to ensure better treatment of rooms etc would be great!

69. Are there needs not met with Master Plan 2.0?

Saunas..

I do have some concerns that there may be a lack of small lounges in the Master Plan 2.0. Those roughly sketched out for the modified dorms seem smaller then the exisitng spaces. Given many of the rooms will be singles there might be more need for small gathering spaces.

A Libray and other contemplative spaces for older folks.

Small dining areas? While our group are short-timers I have noticed the large number of people who get their food from the Galley and then go to their rooms to eat. Would there be perhaps an advantage to having some smaller areas for people to gether for dinenr.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

While I brought this up at the first week Charrette I would like to bring up again the need for historic preservation and I do appreciate the fact that this need has been taken seriously. One of the stated design goals was that the new station needs to reflect well on the status of the U.S. Antarctic Program. Part of this is its highlighting the program's heritage.

I think many folks have argued why it might make sense to retain the Chalet. I would just add that I think David Bresnahan would appreciate that guesture. I would, however, like to argue that the Coffee House needs to be retained. Not in its current location or even necessarily as a used heated building. Having studied the historic development of McMurdo, I feel that it represents the best extant example of the early architecture of USAP and as such is worthy of protection and as an example of how far the program has come. I think New Zealand's example of keeping one of their original modules, not regularly used, is a good one. I would also point out that retaining it on site would be fitting alongside the Discovery Hut which is the 2nd oldest existing building in Antarctica. And if the new station is to service the program for the next 50 years, the coffee house will be appoarching if not 100 years old by the next rebuild.While McMurdo will never probably approach Port Lockeroy in terms of visitation in the near future, future Antarctic tourism should perhaps be considered.

Thanks!

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
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Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**8/17/15**	**Research Focus:**	Glacial history
Respondent:	**Brenda Hall**	**Contact Phone No:**	207-581-2191
Antarctica Research Location:	**Transantarctic Mts., Dry Valleys, Coast**	**E-Mail:**	BrendaH@maine.edu

1. What is the nature of your scientific research?

Most of my work is designed to study the past glacial history of Antarctica. It is heavily dependent upon field work and involves collection of geologic samples. I also occasionally have other projects involving lake history (coring lakes) and marine mammals (mummified remains).

2. What is the size of your team at McMurdo Station?

4-6 people

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Annual, since 1990.

4. Describe how your team currently works at or interacts with McMurdo Station?

Our goal is to get through McMurdo in the shortest possible amount of time to get into the field. We draw food and supplies in McMurdo and prepare cargo.

5. What is good about your experience at McMurdo?

The people/staff are amazing. They are always ready to help or solve problems.

6. Are there areas that could be improved for your research experience at McMurdo?

There are far too many 'trainings.' This takes up a significant amount of time. Many of these trainings are redundant, particularly for experienced personnel. Online training prior to deployment would be effective.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

We do not use commonly use laboratory space.
One existing shortcoming is that radioactive carbon is used as a tracer in some laboratories. This has the potential for a detrimental effect on radiocarbon dating done by other researchers. Radiocarbon samples really can not be brought into the same building. There is no easy solution to this. At minimum, laboratories should be set up so that tracer use is confined to one area.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

Not applicable to my work.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

Not important

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

None

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

No

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

No

14. Do you have special requirements for frozen storage of samples/specimens?

no

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

As mentioned, we do not work in McMurdo other than to obtain and pack supplies and cargo. It appears that this process will be streamlined under the Master Plan and that there will be more space for staging and testing of field equipment.

16. Do you need to observe the assembly of goods?

No

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

same

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

None

General Information – Work Center

Date:	**Not applicable**	**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

No

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

No

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

No

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	x		We obtain our field equipment and food from them. We have cage storage.	M	
Carpentry Shop		x			
Field Science Support	x		We obtain field equipment and food from them.	M	
Trades/ Assembly		x			
Electronics Shop	x		We obtain field radios from them.		

Field Science support Layout					
Hazardous Cargo	x		We submit hazardous cargo through them for aircraft	P	
Science Cargo	x		All our northbound samples go through Science Cargo	M	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

No

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

None

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Do not use.

47. Which rooms, if any, in your group or section require large specialty equipment?

None

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

We use only wireless.

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

We occasionally use the main photocopier in Crary, but otherwise do not use a copier.

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

57. Is there any hazardous waste in your space and how is it handled?

No

58. Are any isolation rooms required? If so, size and type

No

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

No

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

None

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

N/A

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

None

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

No

66. Do you have large scale battery charging requirements?

No

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	x		Eating		3xday		
Large Lounge		x					
Laundry	x		washing		Once a season		
Ball Court/Rec		x					
Music Room		x					
Skills Development		x					
Multi - Purpose Weight/cardio		x					
1000 SF Multi-purpose		x					
600 SF Multi-purpose		x					
Lockers		x					

Chapel		x					

67. What works well in the current system?

68. What works not so well in the current system?

There is a lot of carrying cargo from building to building and up and down stairs.

69. Are there needs not met with Master Plan 2.0?

They seem to be met.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**8/19/2015**	**Research Focus:**	Geospatial Support
Respondent:	**Cole Kelleher**	**Contact Phone No:**	612-6256194
Antarctica Research Location:	**McMurdo Station**	**E-Mail:**	Kell1026@umn.edu

1. What is the nature of your scientific research?

Our research consists of providing cutting-edge geospatial and map support on site in McMurdo to the United States Antarctic Program.

2. What is the size of your team at McMurdo Station?

Between 1 and 3 people.

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

We have annual deployments during the austrial summer to McMurdo between October and February.

4. Describe how your team currently works at or interacts with McMurdo Station?

Our team staffs an office in Crary to provide geospatial and map support to science and logistics teams in the USAP. Nearly all science groups use our services in one way or another and it is important that we are there to communicate with the community to effectively support science and logistics as well as any emergency situration such as a search and rescue. Our office in Crary provides an access point for the USAP community into our services.

5. What is good about your experience at McMurdo?

The most valuable part about our experience in McMurdo is having direct access to the science and logistics communities and vice versa. This allows to efficiently exchange knowledge with the science/logistics community.

6. Are there areas that could be improved for your research experience at McMurdo?

The areas that could be improved for our group are better access to large format printing/plotters, increased access to larger areas/rooms for meeting with large groups and map rollouts, as well as having a set of computers that have up to date geospatial software and tools for individuals/grantees to use.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

Our space needs are very minimal and the current lab spaces generally meet our needs. As mentioned above, access to larger collaboration spaces and large format printing/plotters would be desired as well as a set of desktop computers with up to date geospatial software for others to use would improve the space.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

Our group does not require flexible lab space. We only need space for our two main desktop computers and some desk space for our team during our deployments.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

It is not overly important to share space/equipment/instrumentation with other groups. However, as previously mentioned, it would be benefitial to have a common computer lab space for science teams with up to date geospatial software and geospatial data resources.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

A larger collaboration/presentation space as well as a computer lab space for grantees/users would be benefitial to our group but would not need to be dedicated to our group.

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

Yes, a shared computer lab space would be benefitial with the software/tools mentioned above.

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

No

14. Do you have special requirements for frozen storage of samples/specimens?

No

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

We see our team's role in McMurdo remaining relatively the same based on the Master Plan with enhancements relative to the accessablility of our group to the user community as well as the community's access to the resources and services we provide.

16. Do you need to observe the assembly of goods?

No

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

We anticipate the number of staff on Station during the austrial summer to remain relatively the same. (1-2)

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

The only security we require is through the McMurdo Station network as we work with sensitive high-resolution satellite imagery. A secure office (key card) is required to protect the data and hardware we maintain during our deployment.

General Information – Work Center

Date:	**8/19/15**	**Work Center:**	Polar Geospatial Center
Respondent:	**Cole Kelleher**	**Contact Phone No:**	612-626-0505
Work Center Location:	**Crary Lab**	**E-Mail:**	Kell1026@umn.edu

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

Our group provides cutting-edge geospatial and map support on site in McMurdo to the United States Antarctic Program science and logistics teams. We deploy each season to provide daily map requests, geospatial expertise, and satellite imagery vital to USAP operations and science.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

Our team is generally 1-2 people on station at any given time during the austrial summer (Oct-Jan). The purpose of each delployed individual is to provide geospatial support and the functions described above.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

Large format printing and access/communication with Crary IT is important for our group's efficiency. Most important is the availablility/access of our group to the science community.

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

Yes, we receive visitors from almost every science group as well as occasional logistics personel who are requesting maps, geospatial advice, or data. We generally receive anywhere from 5-10 visitors per day and on average it takes about an hour to serve each person.

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

No

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

No

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

We require enough desk space for 2 desktop computers and 2 laptop computers along with at least 5 ethernet ports and 5 power outlets. Our office space needs to be able to accomidate at least 5 individuals as members of our team need to meet with scientists and logistics personel often. Collaboration space is also necessary when meeting with larger science groups and access to printing services is necessary.

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

Yes, but most of our one-on-one meetings require access to our desktop computers. Larger meetings could benefit from a common area or shared space.

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

No, we only need key card access to our office in addition to locks.

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

No

30. What are the working hours of your group?

8am to 6pm

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

Yes, and yes they could be shared by others in the same building.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

We require a basic over winter storage cage in which to store our hardware, computers, etc. This would not be required if we were given a dedicated office space for our annual deployments.

33. Do you have any sensitive document or specialized equipment storage needs?

Only a lockable/key card accessible office and/or a lockable storage cage.

34. Do you have any hazardous material storage requirement? Describe and quantify.

No

35. Do you anticipate a future change in storage requirements?

No

36. Do you have or require any safes or mechanized storage equipment?

No

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

We anticipate our number to remain the same (1-2).

38. Does your work require privacy (acoustic or visual)? If so please explain:

No

39. What future technological advances are you aware of in your organization that could effect the way you work?

Increased band-width could increase the availability of services and data from our group at McMurdo Station but our inherent work will remain the same.

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Occasionally we will need a truck to move any cargo of which we have very minimal amounts (~500lb max).

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

No

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

No

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	Y		Receiving field materials if/when we have field work which is very minimal and may not occur on any given season.	NI	
Carpentry Shop		N			
Field Science Support	Y		Trainings	NI	
Trades/ Assembly		N			

Electronics Shop		N			
Field Science support Layout		N			
Hazardous Cargo		N			
Science Cargo	Y		Occasional cargo shipped between the US and McMurdo.	NI	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

We require at least 5 standard electrical outlets and 5 ethernet ports in our office space. No special requirements necessary.

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

No

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

We have two desktop computers positioned on desk space and require desk space for up to three laptop computers. No changes forseen.

47. Which rooms, if any, in your group or section require large specialty equipment?

None

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

Our office requires at least 5 LAN connections. Data speeds are never fast enough for us as we are continuously downloading satellite imagery and other data vital for science and logistics teams. Fiber optic would be

AWESOME!

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

No

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

57. Is there any hazardous waste in your space and how is it handled?

No

58. Are any isolation rooms required? If so, size and type

Only our office space.

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

We may require ~14 TB of server space to house our data. Currently we are self sufficient in storing our data on site in McMurdo and could continute to be in the future if necessary.

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

None

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

None

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

A projector, web cam, and computer would be useful in the larger common space for meetings with larger groups on site and meetings with people off site.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No CCTV required. Only key card access to our office is required.

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

No

66. Do you have large scale battery charging requirements?

No

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		Eating, presentations, common meeting place	1	Daily		
Large Lounge	Y		Group meetings, common meeting place, socializing	3	3-4 times per week		
Laundry	Y		Wash clothing and linens	4	Weekly		
Ball Court/Rec	Y		Regular exercise and recreation with groups/friends	2	Weekly		
Music Room	Y		Recreation, instrument practice, fun	5	2-4 times per week		
Skills Development	Y		Classes and common activities	6	2-4 times per week		
Multi - Purpose Weight/cardio	Y		Regular exercise and strength training	7	Weekly		

1000 SF Multi-purpose		N					
600 SF Multi-purpose	Y		Small gatherings, meetings, celebrations, special events	8	Monthly		
Lockers		N					
Chapel		N					

67. What works well in the current system?

Having a multitude of options for recreation and gatherings is great (lounges, common spaces, event space, bars, Hut 10, etc.). Very often it is benefitial to have small gatherings away from busy areas on station. A common "pick-up" space such as DJ works well as it is centerally located on station.

68. What works not so well in the current system?

Currently, the distance/route between the dorms and Crary is a hassle to navigate. Crary does not seem to have enough staging space or common/collaboration space. Additional lounges/private space would be benefitial.

69. Are there needs not met with Master Plan 2.0?

The ease of access to Crary seems to be an issue with the grand enterance positioned as a central feature. This also disrupts the flow between the Science Support building and Crary through which there will definitely be a large amount of traffic.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Creating "themes" tied to the United States throughoutstation that aren't only tied to Antarctica would help to improve the quality of life by giving people a sense of home as well as showing guests where we are from. Pedestrian traffic is the most prominent on station and should be prioritized to promote ease and flow throughout the station. Because the IT needs of sceintists in Crary are very different than those for the rest of the station and support staff it would be benefitial to maintain an IT presence within Crary Lab. Preserving some historical structures/buildings (coffee house, etc.) would help to show visitors and newcomers just how far science/support at McMurdo has come. While the physical needs of our group on station are minimal we do have specific technical needs (bandwidth, computer lab, meeting space, printing access) that are essential to providing support to the United States Antarctic Program.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science
Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**Aug 2, 2015**	**Research Focus:**	**Biology Course: includes everything except birds and mammals**
Respondent:	**Deneb Karentz**	**Contact Phone No:**	**1 415-422-2831**
Antarctica Research Location:	**McMurdo Station, Palmer Station**	**E-Mail:**	**karentzd@usfca.edu**

1. What is the nature of your scientific research?

My research focus is on the physiological ecology of phytoplankton relative to climate change (e.g., ozone depletion, ocean warming). The activities of the Biology Course taught at McMurdo include all organisms, except birds and mammals. Specific areas in the past have included biodiversity of microrganisms (including bacteria and archaea), physiological ecology of phytoplankton and macroalgae, thermal physiology of invertebrates and fish, and the biophysics of living at cold temperatures. Activities include field and lab work.

2. What is the size of your team at McMurdo Station?

35-40 people

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

The course is taught intermittently. Past sessions: 1994, 1995, 1996, 1999, 2000, 2001, 2006, 2008, 2010. Next course will be at Palmer in 2016, we are scheduled for McMurdo in 2018.

4. Describe how your team currently works at or interacts with McMurdo Station?

We live and work on station. There are frequent day trips to field locations for sampling. We have two daily lectures on station (morning and evening), and labs are used continuously seven days a week and from morning until late at night.

5. What is good about your experience at McMurdo?

McMurdo and Crary Lab have provided an excellent venue for the class. The flexibility of the lab spaces allows us to remove walls and create a lab complex out of three lab spaces. This format greatly enhances the ability of class participants to efficient utilize available resources and collaborate on various projects.

6. Are there areas that could be improved for your research experience at McMurdo?

While lab space has been adequate; office space, places to stow personal field clothing and field staging areas have been very limited for our group. See details in next question.

There is no mention of the Aquarium in this questionnaire and that is a major requirement of our group. Works well as a shared space, but each group needs dedicated tanks. Current tank configuration could be greatly improved and more flexibility in tank sizes and placement would be great. One issue that came up in the charrette was finding an alternate location for testing of ROVs.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

Dedicated and shared lab spaces in Crary have been ideal for our use. However, office space has always been an issue. There are usually 4-5 faculty with 4-6 teaching assistants and 24 participants and we are assigned 2 offices in the hall, plus one office in the lab. For the 24 student participants, space outside of the lab for them to use their personal computers or do other desktop activities has gradually shrunk over the years as spaces in Crary have become dedicated for other purposes.

We have always had a problem with stowing of field clothing. There are not enough coat hooks in the hallway to accommodate 35-40 people's gear, plus orange bags with ECW required for travel. Since we are in and out of the field, sometimes multiple times a day, it is impractical to have people go back and forth to their dorm rooms for parkas, boots, ECW, etc. Planning for places to keep these items in Crary would be a great help.

Field party staging has been another limitation for us at McMurdo. Assignment of a dedicated cage in Crary and space in the Science Support Center have been extremely helpful, but lack of space to collect specific equipment for a field trip or to easily offload field gear after a trip has been a problem in the past.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

The modular format of the curent lab spaces in Crary have been very important for us. Being able to remove walls and customize placment of lab benches have made it possible for us to make most efficient use of the available space. Every group has different needs. One thing that did not seem to be clear at the charrette is that all groups are not on station for the entire season. The Biology Course runs the month of January, with an advance team arriving in December. So, during the season the labs are "reformatted" as groups come and go. Being able to move everything around easily is important.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

I would not say that sharing is impotant, but we have usually had no issues in sharing certain spaces and equipment. Microscope rooms, current instrument rooms (e.g., with spectrophotometers, fluoromenters, freeze dryeers, etc.), autoclaves, etc. are easily shared, and there is no reason to have multiples.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

The exisiting shared spaces that are set aside for specific instruments (e.g., microscopes, spectrophotometers, etc.) have worked very well for us. A shared cell culture room with a laminar flow hood would be a nice addition to the lab.

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

No. While this may be the trend in university research facilities, it does not seem like a practical way to set up labs at McMurdo. We often have experimental setups that stay on the lab bench for the entire duration of the course, and other research groups do the same thing. Sharing general lab space with mutliple groups would not be an ideal situation. McMurdo is a field station; it is not a typical university research lab. There was discussion at the charrette about enhancing collaboration between groups by setting up labs without walls. Opportunities for interaction between groups is important; but providing more social spaces outside of the library in Crary would be a much better way to facilitate group interactions.

For us and other science groups, time on station is limited and we have a lot of work to do. I would rather have people focused on their work in the lab, not being distracted by being in a wide open area with other groups. In the past, it has also been important for us to have some level of security on who can go in and out of the lab area and who has access to our lab materials and instruments.

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

Yes. Many of our experiments are with live organisms – bacteria, plankton, invertebrates and fish.

14. Do you have special requirements for frozen storage of samples/specimens?

Yes. -20 and -80 freezers are required.

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

The consolidation of buildings and centralization of services should be an advantage for us. The placement of the main entry way for Central Services to be between Crary and Field Science Support is potentially a problem. There will be a lot of foot traffic between those buildings, including movement of materials.

I am also concerned about some of the discussion on remodeling Crary into open labs with glass walls. As mentioned above, this would not be an ideal work space for our project.

16. Do you need to observe the assembly of goods?

Not sure what this is referring to?

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same number in our field team

18. Does your work require privacy (acoustic or visual)? If so please explain:

Yes. We have some assays and experiemental procedures that require a darkened room.

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

Probably the same requirements as other groups – assurance that equipment, computers and experiments are not disturbed. We have experienced thefts and inadvertant "borrowing" of lab materials in the Crary Lab and would want to have restricted access to our lab areas.

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Yes – pickup trucks, snowmobiles, pisten bullies. Having the pick up truck next to Crary is important, we load up the truck with field gear and transport to the snowmobile staging location. We do need access to a loading dock for leaving and returning from the field. Some items are very heavy and is necessary for the loading dock to be level with truck bed.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

As mentioned and discussed at the charrette, both cargo and hand carry/checked baggage pick up and check in need to be considerd. For us, many items coming in and going out will have temperature and keep dry requriements. How we get things to and from Crary will be important.

May people are going to want outside options for walking back and forth to buidlings, so walkways need to be considered.

Overwinter storage is needed (outdoor/indoor). Current policy of clearing everything out is inefficient for science groups and it is quite expensive to ship things back and forth. Even if groups are between grants, ability to store items for future use is necessary.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

This may happen infrequently – on arrival and departure.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	x		Space for storage of field equipment we are not able to keep in Crary.	P	
Carpentry Shop	x		Construction and modification of small items for lab and fieldwork.	P	
Field Science Support	x		Standard services	M	
Trades/ Assembly		x			
Electronics	x		Usually troubleshooting of equipment	P	

Shop					
Field Science support Layout			Not sure what this means		
Hazardous Cargo	x		Delivery of reagents, shipment of preserved samples	M	
Science Cargo	x		Standard services	M	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

Some instruments will need uninterruptable power to avoid damage and loss of samples. Labs and offices need a sufficient number of power outlets.

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

We use standard lab equipment and often these instruments are powered on o=all the time.

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Desktops and laptops – standard configurations.

47. Which rooms, if any, in your group or section require large specialty equipment?

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

We will need network connections, whether hard wired or wireless I don't know – expect that technology is goong to change in the next 10 years and someone else can better answer this question. Speed and CAT-6 copper or fiber optic - I don't know this either.

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

We do need access to a copy machine and a scanner, can be multi-purpose. Does not have to be a floor model. I don't know about utility requirement, voltage, and amperage.

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

Yes, but only for maintaining cold rooms and aquaria – expect this would be built in to Crary systems.

51. Is there equipment that requires separate electrical power or isolated grounding?

Probably not.

52. Is there equipment that requires a specialized signal reference ground system?

no

53. Is there equipment that requires special temperature and/or humidity control?

Some instruments need to be operated at ambient outside temperature, we would typically have these in a cold room.

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

Yes

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

yes

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

We would only need to launder standard ECW. This can be done in dorm laundry rooms.

57. Is there any hazardous waste in your space and how is it handled?

Chemicals are handled as directed by Crary staff.

58. Are any isolation rooms required? If so, size and type

no

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

no

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

No – we would expect Crary equipment will already be set up with UPS if needed.

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

We would need standard set up for lectures – lectern, screen, LCD projector, sound system. A smart board would great, regular white boards would be also put to good use. A room for up to 50 people that can be used daily.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

no

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

no

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

no

66. Do you have large scale battery charging requirements?

no

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	x		Meals	M	everyday		
Large Lounge	x		Social interactions/parties	M	Several or or times a week		Need a space that can be use at any time of day/night with no restrictions. Science groups work long hours and is not always possible to relax at times that coincide with contractor employees.
Laundry	x		To clean clothes	M	Once a week/person		

Ball Court/Rec	x		recreation	P	everyday		
Music Room	x			NI			
Skills Development	x		Not sure what this is	NI			
Multi - Purpose Weight/cardio	x		recreation	P	everyday		
1000 SF Multi-purpose	x		Do not know what this is				
600 SF Multi-purpose	x		Do not know what this is				
Lockers	x		Storage of personal gear – not enough room in Crary for keeping ECW used in fieldwork	M	everyday		
Chapel	x			P			

67. What works well in the current system?

Dining and laundry facilities are fine.

68. What works not so well in the current system?

Very few places we can go to socialize. Bars often close and quiet hours are in force in dorm lounges at about the time we are finishing in the lab.

69. Are there needs not met with Master Plan 2.0?

Is difficult to envision how one lounge space will serve the entire Station. As mentioned in the charrette, Hut 10 is currently very much oversuscribed and there are very few places for people to socialize. With smaller dorm rooms, social space will be even more limited.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

I think it is important to keep in mind that McMurdo is a science field station – not a campus. Fieldwork is very different from what goes on at college campuses.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**25 Jul 15**	**Research Focus:**	
Respondent:		**Contact Phone No:**	
Antarctica Research Location:		**E-Mail:**	

1. What is the nature of your scientific research?

2. What is the size of your team at McMurdo Station?

10-13 people split between town and the runway.

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

4. Describe how your team currently works at or interacts with McMurdo Station?

Maintains runway navaids , precison approach lightning and landing system. ATC communication systems for MacCenter and control tower.

5. What is good about your experience at McMurdo?

6. Are there areas that could be improved for your research experience at McMurdo?

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

14. Do you have special requirements for frozen storage of samples/specimens?

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

16. Do you need to observe the assembly of goods?

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

18. Does your work require privacy (acoustic or visual)? If so please explain:

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

General Information – Work Center

Date:	**8/1/2015**	**Work Center:**	Ground Electronic Maintenance
Respondent:	**Gregory Thomas**	**Contact Phone No:**	843-740-3311
Work Center Location:	**McMurdo**	**E-Mail:**	thomasgrrg@gmail.com

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

Provide Avaiation technical supports for navigational aids equipment for daily airfield operations. Maintains meteorology equipment deploy to deep field camp and locally . Maintains commucation control system in various place in Antarctica.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

Projected McMurdo deployed size for this project is 1 0-11 technicain to support town and airfield operation. 1 GEMO Manager. .

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

GEMO Manager and Commet Supervisor with in town tech should be located in the same building. The GEM shop should be located near ASC communication shop.

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

We support are various customer. They location vary from town, airfield, field camp or as far away as the South Pole.

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

A receiving area large enough where we can stage our customer incoming or outgoing equipment and provide demostration if needed..

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

The logistics area should be large enough to store and lock high dollars test equipmet and parts.

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

McMurdo StationTwo desk for admin work and Three work benches for equipment testing and repairs. Two desk top computer. 36 L x 18 W x 72inches storage bin. Tool chest . Storage bin for laptop and PDAs . Active Runway. Space requirement was fine tune with OZ

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

Yes it can be done in the small room or either the GEMO office.

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

no

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

6-7 days 0700 to 1730

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

no

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

Warm and cold storage requirements has been provide to OZ.

33. Do you have any sensitive document or specialized equipment storage needs?

yes

34. Do you have any hazardous material storage requirement? Describe and quantify.

no

35. Do you anticipate a future change in storage requirements?

no

36. Do you have or require any safes or mechanized storage equipment?

no

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

See Question 21

38. Does your work require privacy (acoustic or visual)? If so please explain:

no

39. What future technological advances are you aware of in your organization that could effect the way you work?

Advances navaids, communication and weather system monitoring is a on going project.

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Yes, various transport to and from Station to Active runways. A loading dock for loading and off loading heavy equipment.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

Rooftop access to mount various antennas for equipment testing.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Yes, loading area for equipment arrival and for out going field equipment

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage		n			
Carpentry Shop		n			
Field Science Support		n			
Trades/ Assembly		n			
Electronics Shop		n			
Field Science support		n			

Layout					
Hazardous Cargo	y		AA Battery disposal	N/A	N/A
Science Cargo	n				

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

All rooms require multiple LAN drops for up to 4 to 6 workstations in the main office space and in the GEMO office, Commet Supervisor office space. Navaids shop should have the same .

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

large equipment and racks are covered by maintainers; SOPP IT group or SOPP GEM group

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

See question 26

47. Which rooms, if any, in your group or section require large specialty equipment?

See question 26

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

All rooms require multiple LAN drops for up to 4 to 6 workstations in the main office space and in the GEMO office, Commet Supervisor. Logistic office space will have 2 lan drop and be able to locked for equipment storage . Navaids shop should have lan drops. Information has been provide to OZ .

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

Yes, three shared printers 2 color and one b/w each are 2 to 3 sq' of counter space.. One shared copier with air crews.

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

Yes, enough power for 10 monitors, 3 workstations, and 2 large display monitors.

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

Yes

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

57. Is there any hazardous waste in your space and how is it handled?

No

58. Are any isolation rooms required? If so, size and type

No

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

SOPP IT and GEM groups will provide when requested

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

Yes, minimum UPS for weather server , communication equipment, weather equipment.

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

SOPP IT and GEM groups will providewhen requested.

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

Maybe a conference room. It will be use for remote trouble shooting.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

Equipment server room. It would be nice to have access so you can see if any of the gear status.

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

no

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

Iridium antennas mounted on the roof for aircraft communication. Back up VHF and UHF antennas for backup radio systems

66. Do you have large scale battery charging requirements?

Yes, Batteries for Runway Edge Lighting System , Automated Weather Systems Batteries. Portable Met kit.

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	y		eating	Very	Daily	N/R	None
Large Lounge	y		socializing	Very	Daily	N/R	None
Laundry	y		laundry	Very	Daily	N/R	None
Ball Court/Rec	y		Rec	Very	Daily	N/R	None
Music Room	y		Rec	Very	Daily	N/R	None
Skills Development	y		Rec	Very	Daily	N/R	None
Multi - Purpose Weight/cardio	y		Rec	Very	Daily	N/R	None
1000 SF Multi-purpose	y		Meetings	Very	Daily	N/R	None
600 SF Multi-purpose	y		Meetings	Very	Daily	N/R	None
Lockers	y		Supplies / personal storage?	Moderate	Daily	Yes to rooms	None

Chapel	y		Religion	Very	Daily	N/R	None

67. What works well in the current system?

Long history of no change

68. What works not so well in the current system?

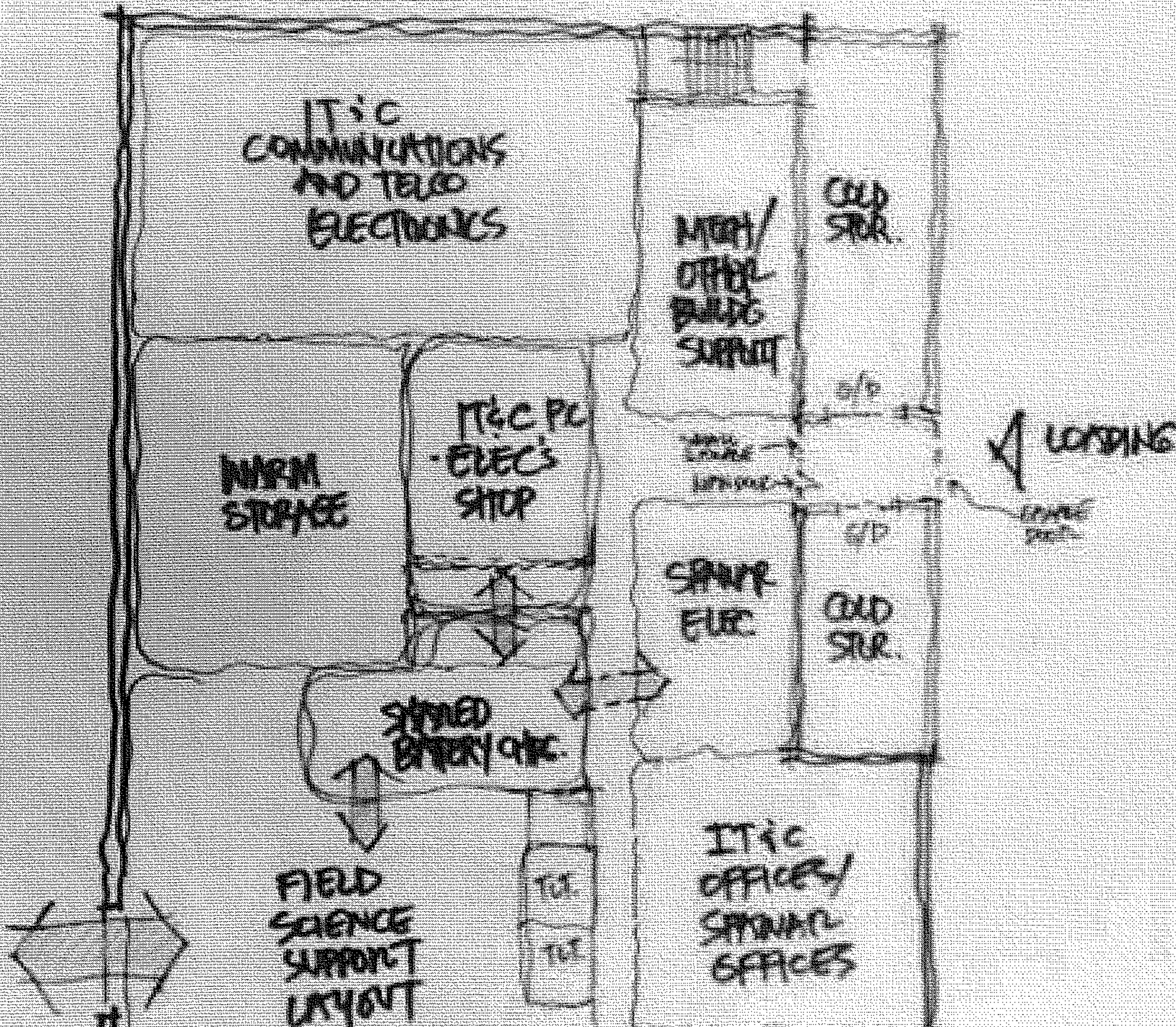
Long history of no change

69. Are there needs not met with Master Plan 2.0?

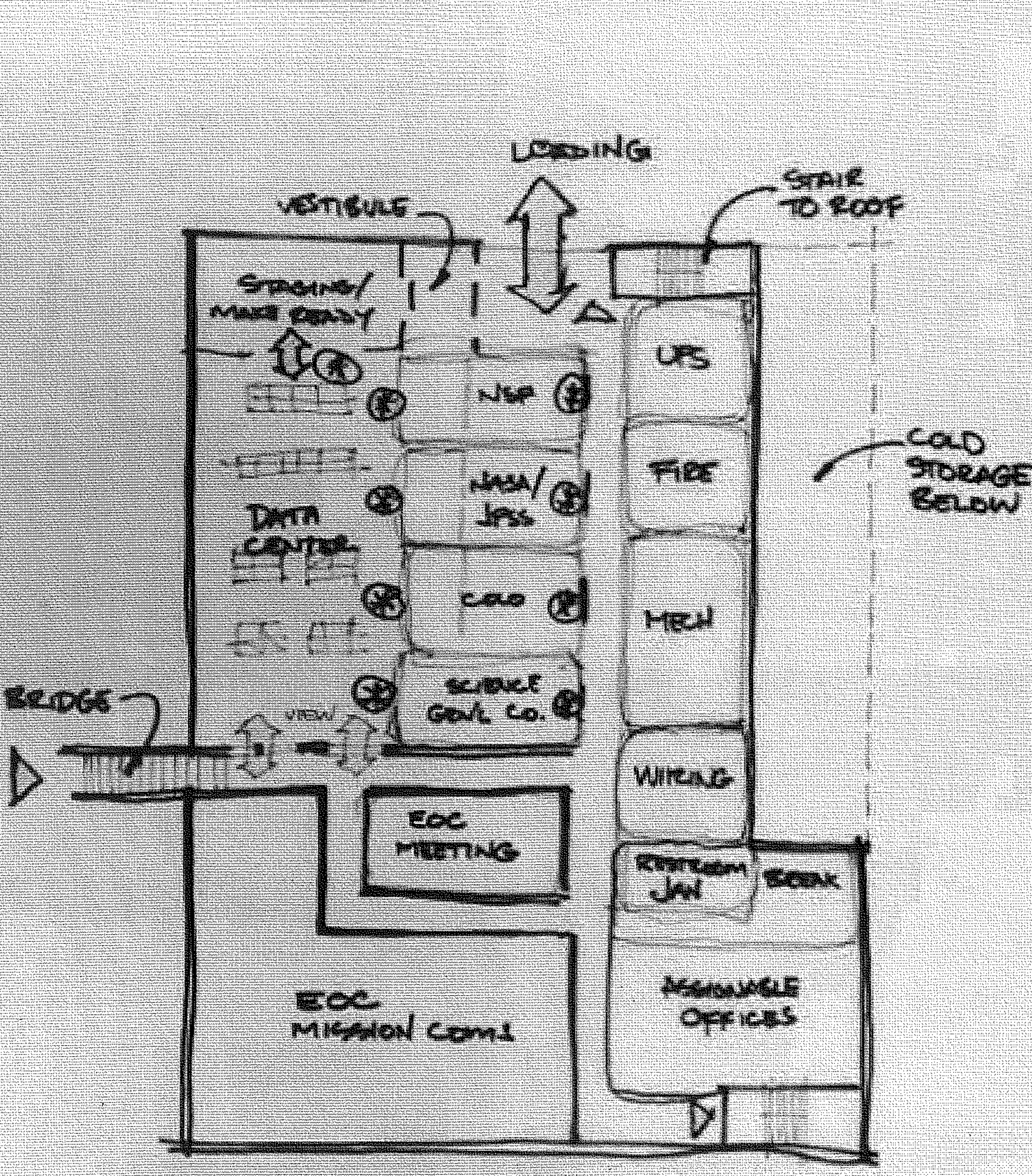
Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.



IT OPERATIONS BLDG. LEVEL 1



IT OPERATIONS BLDG
LEVEL 2

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**Aug 16, 2015**	**Research Focus:**	Glaciology
Respondent:	**Howard Conway**	**Contact Phone No:**	2069203699
Antarctica Research Location:	**West Antarctica – deep field**	**E-Mail:**	hcon@uw.edu

1. What is the nature of your scientific research?

Ice dynamics, histories of climate and ice sheet flow. We make geophysical measurements (Ice-penetrating radar, active and passive seismic, GPS, ice cores) and use these data to to constrain geophysical models. Most work is ground-based – our team of 5 or 6 people work from remote camps we set-up small tent camps. Camps are typically put in by LC-130/Twin Otter/Basler airplanes. Instruments collecting geophysical data are towed across regions of interest by skidoo.

2. What is the size of your team at McMurdo Station?

6

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Annual -1/yr

4. Describe how your team currently works at or interacts with McMurdo Station?

Work with various work centers to gather equipment and plan field operations. Work centers include: BFC (field camping equipment – including food and fuels), MEC (snow machines, generators, batteries), Science Cargo (receiving and sending cargo from both CONUS and the deep field), Crary (office space and staging space for testing UNAVCO and PASCAL equipment before deploying to the field), Science Construction (for special needs such as GPS survey poles, small huts for seismic work), Medical (collect additional medical supplies), Communications (receive field radios and iridium phones), MacOps (plan field communications), AirOps (plan field transportation) , MacWeather (planning flights).

5. What is good about your experience at McMurdo?

Personnel in all work centers are knowledgeable and helpful. They are all very professional.

6. Are there areas that could be improved for your research experience at McMurdo?

Consolidation of Work Centers (as planned in AIMS) will reduce present inefficiencies associated with getting equipment ready to go into the field.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

N/A

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

N/A

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

N/A

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

N/A

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

Shared bench space to setup and test equipment before deploying to the field would be beneficial.

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

N/A

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

N/A

14. Do you have special requirements for frozen storage of samples/specimens?

On some projects we retrieve short cores that need to be kept frozen. These are different from the deep cores retrieved by large-scale ice-coring projects such as WAIS Divide core.

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

Consolidation of Work Centers (as planned in AIMS) will reduce present inefficiencies associated with getting equipment ready to go into the field.

16. Do you need to observe the assembly of goods?

No

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Future anticipated small geophysical field projects would require about the same number of personnel (five or six people).

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

No

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Snow machines – we transport them by aircraft to the field and use them at field camp.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

No

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Yes – field carg drop off and pick up.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	Y		Field camping equipment including food and fuels	P	
Carpentry Shop	Y		Construction of field huts	P	
Field Science Support	Y		Snow machines, generators, solar power systems, batteries	P	
Trades/ Assembly		N			
Electronics Shop	Y		Field radios and phones	P	

Field Science support Layout	Y		Laying out equipment before taking to field	P	
Hazardous Cargo	Y		Lithium batteries, mogas, premix, AN8, generators, fire extinguishers	P	
Science Cargo	Y		Receiving and sending cargo to CONUS and the field	P	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

No

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

N/A

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

47. Which rooms, if any, in your group or section require large specialty equipment?

N/A

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

N/A

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

No

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

57. Is there any hazardous waste in your space and how is it handled?

No

58. Are any isolation rooms required? If so, size and type

No

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

No

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

N/A

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

N/A

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

No

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

Iridium phones for daily checks from the field to McMurdo.

66. Do you have large scale battery charging requirements?

No – battery-charging requirenments are typically 4 or 5 batteries

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		Eating	High	3/day (when in town)		
Large Lounge		N					
Laundry	Y		Washing field clothes	high	2/3 times per season		
Ball Court/Rec		N					
Music Room		N					
Skills Development		N					
Multi - Purpose Weight/cardio		N					
1000 SF Multi-purpose		N					
600 SF Multi-purpose		N					
Lockers	Y		Storage of equipment when out of town	High			

Chapel		N					

67. What works well in the current system?

Personnel in all work centers are knowledgeable and helpful. They are all very professional.

68. What works not so well in the current system?

Consolidation of Work Centers (as planned in AIMS) will reduce present inefficiencies associated with getting equipment ready to go into the field.

69. Are there needs not met with Master Plan 2.0?

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Retaining experienced and innovative people to work in the USAP is key to the vitality and success of the program. I think that the plan to minimize exposure to the environment (lack of opening windows, lack of easy access to the outdoors) has potential to create a work environment and work force that is divorced from the outside. I think that experiencing the outside environment plays an important role in developing the creative work force that exists in the program today.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
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Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**July 27,2015**	**Research Focus:**	Biology
Respondent:	**Jennifer Burns**	**Contact Phone No:**	907-786-1527
Antarctica Research Location:	**MCM/Sea Ice**	**E-Mail:**	jmburns@uaa.alaska.edu

1. What is the nature of your scientific research?

Weddell seal physiology and ecology

2. What is the size of your team at McMurdo Station?

5-7 people throughout the summer season

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Depends on funding; projects usually last 3-4 seasons; during which we are down annually

4. Describe how your team currently works at or interacts with McMurdo Station?

We live/eat in McMurdo with daily trips to/from the sea ice to access seals by helicopter and /or snow machine

5. What is good about your experience at McMurdo?

Lots of friendly and helpful folks, generally great support with gear and supply issues

6. Are there areas that could be improved for your research experience at McMurdo?

Yes – particularly staging space for daily gear prep, and ease of movements between lab and field in late season

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

Desk space for students to work is currently limited & we end up using bench space in lab as computer work areas.
A shared autoclave that existed outside any particular assigned lab would be great (so that we don't have to listen to it cycle all day long).
Limited DI / RO water
No water in fume hoods – so can clean stinky things in ventilated space

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

During any given season, we would set up the lab at the start of the season to reflect needs, and not change it. In general, the current setup has worked pretty well.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

We are happy to share specialized equipment (scintillation counter, microscopes, large centrifuges, autoclave, freezers etc). We don't have to, but it makes lots of sense to do so.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

See above; but also we do use the radioisotope room and that facility is shared (as it should be).

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

No

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No – but we do work with seal blood, tissue, and scat – so have biohazard and sharps in our lab

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

Specimens, no live animals.

14. Do you have special requirements for frozen storage of samples/specimens?

We use refrigerated, -20, and -80 storage.

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

Seems that the new plan will streamline our work

16. Do you need to observe the assembly of goods?

I don't think so? We prep our own gear daily for trips to the sea ice

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same

18. Does your work require privacy (acoustic or visual)? If so please explain:

For distance delivery of course content back to the university where I teach, a private area that can be used for teaching and outreach would be optimal. The area could be shared among researchers (i.e. does not need to be dedicated).

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

We work with radioisotopes and controlled substances, both of which require that access to benchs and/or areas be limited.

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Snow Machines for daily travel on sea ice; pickup trucks / shuttles to move gear between facilities, and to / from snow machines

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

We travel between the science lab (Crary) and the sea ice daily. Sea ice is accessed via snow machines or helicopters (in which case we travel first to the helo hanger). We have ~ 400lbs of gear each trip

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Yes for moving all the above gear!

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	X		Equipment storage (overwinter – frozen and DNF)	NI	
Carpentry Shop	X		MFG of some field gear	NI	
Field Science Support	X		Lots of support for all aspects of field work	P	
Trades/ Assembly		X			
Electronics Shop		X			

Field Science support Layout		X	?		
Hazardous Cargo	X		To/from McM	NI	
Science Cargo	X		To from McM	P	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

Not beyond cold rooms and -80 freezers

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

-80 freezers in Crary are our main use

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

We bring portable computers with us (likely will remain this way)

47. Which rooms, if any, in your group or section require large specialty equipment?

Freezer room?

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

We do need access to printers and copiers / scanners for email and documents

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

Not beyond that needed for refrigerators and freezers in Crary

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

Not in the buildings; we use medical O2 in the field with seal anesthesia

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

Yes, we need DI and nanopure in the labs

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No (but would be nice for field gear cleanup

57. Is there any hazardous waste in your space and how is it handled?

We generate some hazardous chem waste and biohazard

58. Are any isolation rooms required? If so, size and type

We use the radio-isotope facility which does require restricted access

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

No

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

N/A

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

N/A

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

A conferences room or similar where we could do distance content delivery for classroom teaching, outreach, and conferencing with colleagues at the home institution would be nice to have. Computer, video conference, cameras, mics etc.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

N/A

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

N/A

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

We do need access to someplace (on the roof/sky accessible) to test VHF and UHF tags and instruments

66. Do you have large scale battery charging requirements?

No

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	X		Dining, Sunday Science lectures, some briefings	High	Daily		
Large Lounge	X		Get togethers	High	weekly		
Laundry		X					
Ball Court/Rec		X					
Music Room		X					
Skills Development		X					
Multi - Purpose Weight/cardio	X		Cardio workouts	High	daily	dorms	
1000 SF Multi-purpose		X					
600 SF Multi-purpose	X						
Lockers		X					

Chapel		X					
Coffee House	X		Social times, R & R	High	Daily		
Hut 10	X		Social times, R & R	Med	Monthly		

67. What works well in the current system?

Botht he cardio gym and coffee houses are places that are heavily used and quite appreciated – despite all their inherent flaws (small, dark, bad ventilation etc etc). Separation of functions so that there are breaks between the work and off-work spaces is appreciated. 24/7 access to most spaces is great

68. What works not so well in the current system?

Many spaces (gym, coffeehouse, bars etc) are not well ventilated / lit – so when heavily used for R & R can get rank. Lounge areas in dorms are nice, but can be really loud for dorm residents b/c soundproofing is poor (ditto dorm hallways). Shared bathrooms need some cubicle space where we can stash toiletries. We need multiple small areas where groups can go for R & R – often it is hard to find an open lounge.

69. Are there needs not met with Master Plan 2.0?

An outdoor gathering space / deck for appreciating the nice evenigns would be great. Some quiet, separate space would also be nice – so that there was somewhere we could get 'away' from the main station.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**8/22/15**	**Research Focus:**	Geology/Ecology
Respondent:	**Joseph Levy**	**Contact Phone No:**	315-825-8484
Antarctica Research Location:	**MCM, Dry Valleys**	**E-Mail:**	joe.levy@utexas.edu

1. What is the nature of your scientific research?

I work on permafrost and soil science, groundwater processes, and ecology in the MDV. I mostly dig holes, instrument the soil column, and sample water and soil.

2. What is the size of your team at McMurdo Station?

4-8 persons, depending on the year.

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Individual projects (3 years) usually have 1-2 field seasons. By having multilpe active projects, I am in MCM every year.

4. Describe how your team currently works at or interacts with McMurdo Station?

MCM is a stopover and preparation site for us on the way out the field, the primary lab facility we use for instrument preparation and sample analysis mid-season, and the center for stabilizing our samples for shipment at the end of the season. I am typically on station ~1 week at the start of the season, several days scattered throughout the mid-season, and ~1 week at the end of the season.

5. What is good about your experience at McMurdo?

Support at MCM is outstanding, largely because of the can-do attitude of the support staff and the abundant supplies that can be brought to bear to solve problems in a timely manner (whether it's a new plywood instrument box for one that got smashed in transit or 500 sample bottles that are needed to take advantage of a break in the weather for sampling). I like that all the critical supplies for science support, including camp gear, science consumables, food, etc. are on site and do not need to be flown in from off continent.

The one-on-one interactions with work center staff also help a great deal. It means that each team is treated as an indivudual whose mission matters, not just another group in a long line of groups.

6. Are there areas that could be improved for your research experience at McMurdo?

More timely delievery of warehoused items (e.g., sample bottles, lab consumbales) would be great. We're often sitting waiting for items to come out of the Crary cargo system and into our lab so we can wash and pack them. It would be great if all science gear were staged and ready to be used (opened, prepared, re-packed) the way BFC camp gear is.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

What I like about the bench space in the lab is that it is entirely multi-purpose. It's less important to me to be able to move things around as it is to have stable work spaces with power that I can prepare an instrument on one day, and then use to filter water samples the next.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

I use several shared instruments, e.g., the muffle furnace, but the act of sharing them is not what makes them useful. It is having access to them that is important.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

Specialty lab space, rather than speciallty pods (modules that could be used in a regular lab to make it more specialized), seems like a recipe for either prescribing the kinds of science that occur at MCM or creating dead space that is not used when that flavor of science is not funded. It would be nice to be able to turn a general lab into a specialized lab, rather than dedicating a space to a given technique.

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

No. Ever live somewhere with a communal kitchen? It's usually a mess because even if everyone is organized, they're often organized in different ways, so clutter and mess accumulate. This happens in shared lab spaces, too. Large, shared facilities will become messy and prone to contamination. One person's errors (mixing reagents up, or using the wrong kind of cleaner) will propagate into other peoples' work, creating sloppy science, compromising samples, and promoting unneccessary risk.

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No.

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

No.

14. Do you have special requirements for frozen storage of samples/specimens?

-20˚C, -4˚C, and +4˚C space.

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

Based on the charrette, I forsee a lot of wheeling carts from the lab space, through the main entry way hallway, to field science support. All science-related gear needs to move through my lab. Instruments need to be unpacked from science cargo, tested, calibrated, etc., and then moved back into the helo cargo system to go out into the field. The same happens for samples. Water, soil, ice, etc. come in from the field through helo ops, and go into the lab for storage and processing. The move back and forth between environemtnal rooms and the lab, before being stabilized and re-packed for shipment home. Instruments coming in from the field are cleaned and checked in the lab and then re-packed for shipment north.

I also foresee a lot of sweaty runs up the hill to catch helos, while hauling 40 lbs of field gear. It's going to be a very long walk on a gravel road.

16. Do you need to observe the assembly of goods?

?

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

I foresee the same size science teams. This is because diverse specialties are needed in the field, but also because anyting less than 3-4 persons is not a safe size for a field team for long deployments.

18. Does your work require privacy (acoustic or visual)? If so please explain:

No, but some sound-muffling to keep music or loud noise from one lab from spilling over into another lab would be great.

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

None.

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Pickup trucks. For moving field and science gear from source (cargo, BFC, Crary) to helos, and back. Staging space so that all the science gear can be weighed and tagged at once, and so that all camp gear can be weighed and tagged at once, would be great.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of	Interact	Services provided	Adjacencies	Special

Support Services	Y	N			conditions
Field Science Equip Storage					
Carpentry Shop					
Field Science Support					
Trades/ Assembly					
Electronics Shop					
Field Science support Layout					
Hazardous Cargo					
Science Cargo					

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

47. Which rooms, if any, in your group or section require large specialty equipment?

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

51. Is there equipment that requires separate electrical power or isolated grounding?

52. Is there equipment that requires a specialized signal reference ground system?

53. Is there equipment that requires special temperature and/or humidity control?

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

Deionized water is needed for sample processing (we measure the ion content of water and ice samples, so DI is needed to not contaminate the science).

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

57. Is there any hazardous waste in your space and how is it handled?

58. Are any isolation rooms required? If so, size and type

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

66. Do you have large scale battery charging requirements?

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining							
Large Lounge							
Laundry							
Ball Court/Rec							
Music Room							

Skills Development							
Multi - Purpose Weight/cardio							
1000 SF Multi-purpose							
600 SF Multi-purpose							
Lockers							
Chapel						Not right next to the lab entrance, please. It's a little bit weird.	

67. What works well in the current system?

68. What works not so well in the current system?

69. Are there needs not met with Master Plan 2.0?

There are not many dedicated spaces for informal interactions in MP2.0. I forsee a lot of "drinking on the front porch" in this plan—folks sitting out on chairs and couches in hallways and nooks in the main building after hours. If these spaces are anything like the current hallways at MCM (e.g., bldg 155), they will be gritty and dirty (the jannitorial staff has been reduced) and not very inviting. Little social nooks in a work building may also interfere with the work being done in that building. Having multiple spaces to segment off social and informal interations away from the main work being done in the MCM buildings would be extremely beneficial for promoting interactions.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**August 12, 2015**	**Research Focus:**	geology/volcanology
Respondent:	**Kurt S. Panter**	**Contact Phone No:**	419 372 7337
Antarctica Research Location:	**McMurdo, Erebus and remote field**	**E-Mail:**	kpanter@bgsu.edu

1. What is the nature of your scientific research?

The project scheduled for this season (2015-16) will be to describe and collect rock samples from several extinct volcanoes that are located in the La Gorce Mountains on the upper portions of Scott Glacier. So this is a remote field camp. The research objective is to use our findings to better understand ice sheet history (climate) and the deep origins and causes of volcanism in this region.

2. What is the size of your team at McMurdo Station?

4

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

I have only performed research in McM one time and that was in 2007 with ANDRILL (SMS project). This was two months on base. Otherwise the other 8 seasons that I have spent in Antarctica have been off-base (Erebus Hut and remote field camps in the McMurdo Sound area and Marie Byrd Land). The 9 previous times that I have been down to the Ice through McM have been scattered over a 27 year period beginning in 1988.

4. Describe how your team currently works at or interacts with McMurdo Station?

This year we will be in and out of McMurdo as quickly as we can. We will be taking the required training, gathering and inspecting our field gear/equipment and will be in McM for a week, tops.

5. What is good about your experience at McMurdo?

The social interaction is great. This is both professional as well as in general. If there is free time I always enjoy climbing Ob Hill and going to Arrival heights. There also can be time for focused office work in a quiet environment.

6. Are there areas that could be improved for your research experience at McMurdo?

The major improvement that I see is the streamlining of operation in getting field parties in and out of McM. Secondarily, is having better common social and professional space.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

For the current project, no. And when I was involved in ANDRILL I though the space was adequate.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

Since I do not use the lab space much, I really do not have a strong opinion on this. I believe that built-in flexabilty is always a plus but sometimes such a design compromises everyone's research so it must be carefully planned.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

Well as long as there is some careful oversite and a devoted lab manager then this works very well.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

None for me in McM

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

NA

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

NA

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

NA

14. Do you have special requirements for frozen storage of samples/specimens?

NA

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

I was very impressed with how the discussion and proposed changes were coming about. The flow-through for field parties getting equiped and 'shipped-out' to their field sites as fast and efficently as possible was well on its way in the design (and modifications suggested).

16. Do you need to observe the assembly of goods?

NA

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same

18. Does your work require privacy (acoustic or visual)? If so please explain:

If I am working in McM it is very nice to have a quiet area to work. Doesn't have to be visually private.

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

NA

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Regular vehicle use (truck) in McM is minimual and mainly needed for moving equipment/supplies in preparation for deployment into the field and then redistributing equipment/supplies on our return from the field. It has been important to get trucks up to loading docks at Crary lab.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

None that I can think of. Maybe I am not understanding the question. Certainly nothing of speciality is needed for what I do. It would be good to have specific areas designated for field parties when then are deploying and then when they come back from the field.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Loading areas/docks of course.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage		N			
Carpentry Shop	Y		Supplies - rock boxes	M	None
Field Science Support	Y		Supplies - skidoos and generators, field equipment (tents, stoves, climbing equipment, etc). And instructions & inspections.	M	None
Trades/ Assembly		N			
Electronics	Y		radios/communications and instructions of use	M	None

Shop					
Field Science support Layout			Not sure what this is???		
Hazardous Cargo	Y		Supplies - fuel for snowmobiles, for coleman stoves, fire extinguishers, matches/paste, etc.	M	
Science Cargo	Y		Shipping of rock samples and instructions.	M	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

None

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

No

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Just personal laptops

47. Which rooms, if any, in your group or section require large specialty equipment?

None

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

None

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

NA

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

57. Is there any hazardous waste in your space and how is it handled?

No

58. Are any isolation rooms required? If so, size and type

No

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

No

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

None

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

NA

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

As long as there is common space for audio/video presentations that will be fine. Our group would not require anything devoted.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

No

66. Do you have large scale battery charging requirements?

No

Living & Social Spaces

Name of Activity	Interact Y	 N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		To eat and socialize	high	high– **while we are in town**		
Large Lounge	Y		To interact socially and professionally with others	high	high **- while we are in town**		
Laundry	Y		For personal use	high	high **- while we are in town**		
Ball Court/Rec	Y		Games and parties	Moderately important	moderate - **while we are in town**		
Music Room							
Skills Development							
Multi - Purpose Weight/cardio	Y		For personal use	high	moderate - **while we are in town**		

1000 SF Multi-purpose							
600 SF Multi-purpose							
Lockers	Y		To keep personal items and change of clothing	Moderately important	Mod **- while we are in town**		
Chapel							

67. What works well in the current system?

Freedom of access to the outside. Attending the Charrette I was worried that the redesign is like a 'space ship' with limited devoted exits to the outside.

68. What works not so well in the current system?

The efficiency of movement and scattered locations for gathering equipment/supplies for deployment into the field (and returning from the field). Right now you have to travel all over town and requires use of vehicles for bulky or heavy pieces.

69. Are there needs not met with Master Plan 2.0?

Perhaps in reference to question 67.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

I voiced most of my comments during the Charrette in Arlington last month.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science
Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**07/31/2015**	**Research Focus:**	Antarctic Atmospheric Science
Respondent:	**O-283 - Matthew Lazzara (PI), Lee Welhouse, David Mikolajczyk, Carol Costanza**	**Contact Phone No:**	(608) 262-0436
Antarctica Research Location:	**McMurdo, South Pole, and WAIS. Multiple deep field AWS sites.**	**E-Mail:**	mattl@ssec.wisc.edu aws@ssec.wiscedu

1. What is the nature of your scientific research?

Studying the surface meteorology and climatology of Antarctic using Automatic Weather Stations (AWS) and via observations from orbiting weather satellites.

2.
3.

3. What is the size of your team at McMurdo Station?

2 to 6 per summer season

0.
1.

4. What is the frequency of your research at McMurdo? Annual? Describe frequency in terms of years.

Annual for the last 35 years

0.
1.

4. Describe how your team currently works at or interacts with McMurdo Station?

We have office and lab space in Crary Lab that we work in during the summer from November to February every year. We complete day trips to our AWS via trucks, snowmobile, helo, and twin otter.

0.
1.

5. What is good about your experience at McMurdo?

Generally good communications, friendly workers, working near the helo pad, and all resources are available for our research needs.

0.
1.

6. Are there areas that could be improved for your research experience at McMurdo?

Less movement of cargo.

0.
1.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

We would like to be able to eat and drink in our lab space, or possibly work in a larger office space that could accommodate at most 4 people just outside/near our lab space.

0.
1.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

It would be helpful to be able modify our lab space. Right now I can imagine that we would change our lab set-up more often than every 4 years.

0.
1.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

We do collaborate with IRIS PASSCAL and UNAVCO since our research goals are very similar. It would be ideal if we could continue to be in the same area as their lab spaces or co-located if possible.

0.
1.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

We need to charge 20 to 40 100-amp hour gel cell batteries every season. We have been sharing space with IRIS PASSCAL and UNAVCO in the past, which has worked well.

0.
1.

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

That is what we currently do. We share spaces with POLENET, IRIS PASSCAL and UNAVCO, which is helpful because we are often sharing time for Twin Otter or Helo flights with POLENET, PASSCAL, and UNAVCO. We also share expertise and when we are in a pinch, we share/loan some equipment.

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12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No

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1.

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

No

0.
1.

14. Do you have special requirements for frozen storage of samples/specimens?

No

0.
1.

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

We would work best in our current space in Phase II of Crary Lab if there is to be an electronics/physical sciences lab space that will be available, or we would like to move with PASSCAL and UNAVCO to the refurbished building 004 – Field science building.

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1.

16. Do you need to observe the assembly of goods?

Yes we need to do initial assembly of the AWS instrumentation.

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1.

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Yes somewhere between 2 and 6 people per summer season

0.
1.

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

0.
1.

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

The ability to lock our office or lab space would be necessary.

0.
1.

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

0.
1.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by sub-groups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

0.
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22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

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23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

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24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

0.
1.

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

0.
1.

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

0.
1.

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

0.
1.

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

0.
1.

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

0.
1.

30. What are the working hours of your group?

0.
1.

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

0.
1.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

0.
1.

33. Do you have any sensitive document or specialized equipment storage needs?

0.
1.

34. Do you have any hazardous material storage requirement? Describe and quantify.

0.
1.

35. Do you anticipate a future change in storage requirements?

0.
1.

36. Do you have or require any safes or mechanized storage equipment?

0.
1.

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

0.
1.

38. Does your work require privacy (acoustic or visual)? If so please explain:

0.
1.

39. What future technological advances are you aware of in your organization that could effect the way you work?

0.
1.

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition

space from outside to inside would look like.

Yes we regularly use the Crary Truck and sometimes we use the big-wheeled trucks outside of SRC. Yes, we need to have the truck within walking distance of our work space. Yes, we need a loading dock for movement of our ~70 lbs batteries and 7 foot tower sections. Right now we use the loading dock at Crary Phase II with a garage door, which works very well!

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1.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

No

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1.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Yes, we need to be near a loading dock for almost daily transfer of equipment to storage, airfield, helo pad, etc. or be within easy distance working with science cargo

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Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	Y		Outdoor shed used for storage during the field season and winter storage	M	
Carpentry Shop		N		P	Historically used, future is unknown.
Field Science Support	Y		Equipment for camping, shovel, sleds, etc.	M	
Trades/ Assembly		N		NI	
Electronics Shop		N		P	Historically had minor

					help and advice from the Electronic shop, future is unknown.
Field Science support Layout		N		P	This may be used more in the future, pending.
Hazardous Cargo		N		NI	
Science Cargo	Y		Preparations for cargo going out to the airfield and vessel (inter- and intracontinental)	M	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

No, however, uninterruptable power supplies (UPS) have been used in the past, and may in the future.

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45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

Crary Truck, Hand Dolley, Fork Dolley (pooled resources) without any foreseeable increase in requirements. These items are used 3 to 4 times a week, for approximately one hour each use.

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1.

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

We have servers (herbie.usap.gov and emperor.usap.gov) at JSOC and howard.usap.gov at T-Site. These servers are on racks and howard.usap.gov is getting replaced this summer season 2015-2016. The function they accomplish will be needed for the foreseeable future. In the future: some sort of Grantee rack computing "DMZ" will be needed along with some level of ability for some computing to be co-located with equipment (e.g. at T-site, at Mac Weather, etc.).

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1.

47. Which rooms, if any, in your group or section require large specialty equipment?

None, other than the future possibility of a Grantee rack computing "DMZ" and keeping some equipment co-located at key sites like T-site, perhaps Mac Weather server room, etc.

0.
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48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

Yes in our office and lab areas, 5 at max, no requirements in speed now (been used to using 10 mbits/s to 100 mbits/, however having up to 1 gigabits/s will be desired in the future, possibly CAT-6 and better yet fiber optic if available.

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49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

No not necessary, but a nice feature if available.

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1.

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No, other than what is needed to support a Grantee rack ("DMZ") space.

0.
1.

51. Is there equipment that requires separate electrical power or isolated grounding?

Yes, for testing instrument for limited amounts

0.
1.

52. Is there equipment that requires a specialized signal reference ground system?

No

0.
1.

53. Is there equipment that requires special temperature and/or humidity control?

No

0.
1.

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

0.
1.

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No

0.
1.

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

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1.

57. Is there any hazardous waste in your space and how is it handled?

Old Batteries, 40 or 100 amp hour gel cell batteries on occasion. They are brought to waste management currently.

0.
1.

58. Are any isolation rooms required? If so, size and type

No

0.
1.

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

> In short, yes, this is needed. Currently, we use 2 rack-mounted systems, in the current JSOC facility, one at T-site (co-located with antenna equipment, and some co-located at the direct broadcast satellite reception sites. While the exact future of all of these resources is unclear, the need to have this ability will be required in some fashion in the coming years. Having a Grantee DMZ rack mounted area is really key, and when appropriate having the ability to co-locate equipment will also be key. Exact cabling (under floor or overhead) isn't critical., but must allow at least rack standards with cabling in the back as well as the front (when called for). An example system we run is like:
> http://www.dell.com/downloads/global/products/pedge/dell-poweredge-r720-spec-sheet.pdf
> We may in the future run equipment such as:
> http://www.ssec.wisc.edu/mcidas/software/sdi/sdi_specs.html

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1.

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

> Yes, UPS should be a part of a Grantee rack "DMZ" area. This should be provided and not require research funds to a grantee. No preference for a UPS manufacturer or model, but it must be an expandable system – to expand and contract with Grantee growth and decline over the coming years.

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1.

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

> The type of reliability that we have/are used to is roughly in between Tier I and II. So, we'd love to have higher, but not sure we have justification other than our AWS network is basically an operational asset as well as research one. Some sort of back up power system is welcome, having UPS availability and alternatives for down communications are all ideal to have. Aiming for a Tier II to Tier III for the future or be capable of being Tier III is what we should be seeking for the future.

0.
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62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

> Yes, we would like this ability to have conferences with our colleagues regarding out fieldwork. Additionally, we would like the ability to use the same system for educational outreach activities. So, video conferencing, use of computer for this ability, etc. is welcome and desired. Having a place to do this is nice for more formal

occasions as well as in our lab spaces for more informal ones. Wireless mics, and voice improvements are ideal in a formal place to accomplish this....less required in a lab space.

0.
1.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No – not at this time.

0.
1.

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No – not at this time.

0.
1.

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

Yes, we use 900MHz communications for our Automatic Weather Stations (AWS) near McMurdo. Additionally we have Argos transmitters (~401 Mhz) at other AWS and Iridium also at other AWS.

0.
1.

66. Do you have large scale battery charging requirements?

Yes, we charge between 20 to 40 100-amp hour (and on occasion 40-amp hour) batteries per summer season in our lab space

0.
1.

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		Eating	High	Daily	Dorms	
Large Lounge	Y		Social	High	4-5 times a week	Dorms	

Laundry	Y		Laundry	High	2-3 times a month	Dorms	
Ball Court/Rec	Y		Exercise and Social	Medium	Weekly		
Music Room	Y		FUN!	Medium	1-2 times a week		
Skills Devel-opment		N					
Multi -Purpose Weight/cardio	Y		Exercise	High	Daily	Dorms	
1000 SF Multi-purpose	Y		Social	Medium	2-3 times a week		
600 SF Multi-purpose	Y		Social	Medium	4-5 times a week		
Lockers		N					
Chapel	Y		Religious Practice	Medium	Weekly		

67. What works well in the current system?

Our current lab and office space setup works well for our flow of cargo. We like our location in Crary near the loading dock, which is also close to the Helo pad.

0.
1.

68. What works not so well in the current system?

There is too much movement/transition of cargo. We have to move cargo from our storage shed to Crary and then to Science Cargo. This requires a lot of time using the Crary truck and/or walking around base to collect/find our cargo.

0.
1.

69. Are there needs not met with Master Plan 2.0?

Proximity to the Helo Pad is still a concern.

0.
1.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

In order to complete our science goals efficiently, our team needs the following:

1. Lab space or office space that can accommodate 2-4 people and instrument testing
2. Lab space or office space that can charge 20-40 100-amp hour 70 lbs batteries
3. Lab space or office space that is near a loading dock and preferably a garage door
4. Lab space or office space located near Helo Pad and Science Cargo
5. Lab space or office space with Iridium and Argos cables
6. Use of trucks multiple times a week
7. 900 MHz communication capabilities for McMurdo area AWS
8. Room for 1 server at T-site and 2 servers at JSOC and other co-located locations (e.g. Mac Weather, etc.)

0.
1.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**07/31/15**	**Research Focus:**	NASA Orbital Mission Science
Respondent:	**Bruce Thoman**	**Contact Phone No:**	301-286-3353
Antarctica Research Location:	**McMurdo Station**	**E-Mail:**	bruce.e.thoman@nasa.gov

1. What is the nature of your scientific research?

Support of the NASA the MG1 antenna that is used primarily for data recovery from polar orbiting science satellites, both of NASA and of foreign entities.

2. What is the size of your team at McMurdo Station?

Two persons on site at all times with one to two weeks overlap for crew rotation. One additonal team member for a two week period in austral summer for antenna mechanical maintenance. Occasional engineering team site deployments for system upgrades.

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Annual, we've been onsite continuously since 1995.

4. Describe how your team currently works at or interacts with McMurdo Station?

MG1 provides launch and early operations phase (LEOP) support for launches from Vandenberg Air Force Base for satellite missions that require downrange telemetry support from McMurdo. MG1 also provides telemetry and command for satellite housekeeping and recovery from satellite operational emergencies.

5. What is good about your experience at McMurdo?

Good support from local USAP community

6. Are there areas that could be improved for your research experience at McMurdo?

Not applicable to us.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

Not applicable to us.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

Not applicable to us.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

Not applicable to us.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

Not applicable to us.

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

Not applicable to us.

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No.

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

No

14. Do you have special requirements for frozen storage of samples/specimens?

No

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

We see little to no change with local interface and working relationships.

16. Do you need to observe the assembly of goods?

No

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

We expect the same number, but it could increase depending on antenna asset increase

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

Controlled access is required to meet NIST guidelines for Physical access controls (key card access, monitoring, physical barriers).

General Information – Work Center

Date:	**07/31/15**	**Work Center:**	NASA MG1
Respondent:	**Bruce Thoman**	**Contact Phone No:**	301-825-3353
Work Center Location:	**JSOC Building 189**	**E-Mail:**	bruce.e.thoman@nasa.gov

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

Same as 1 above

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

Same as 2 above

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

Network Operation Center (NOC) should be nearby. A loading dock should be nearby

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

Local visitor tours are given. Off-ice management, operations, maintenance and engineering support personnel visit during season. Personnel numbers vary, days of visits are also variable

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

A waiting area should accommodate approximately 8 visitors at a time

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

Yes, NASA operations area and primary offices require separate, secure areas from other areas. Secondary offices should be nearby.

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

A closed office to accomodate 3 workers. Separate shared office/deskspace for up to four additional workers.

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

Infrequently. Can use a room in a common area.

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

NASA Data Center and primary office area needs security doors (with stud hinge or equal)

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

Physical adjacency is highly desireable.

30. What are the working hours of your group?

Operation is 24/7. Although most work is done during normal McMurdo working hours. 24/7 immediate access is required.

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

Yes, sharing is Ok

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

Physically secured climate controlled storage (in/adjacent to JSOC operations) Also cold (Milvan) storage and existing B-71 allocations.

33. Do you have any sensitive document or specialized equipment storage needs?

No

34. Do you have any hazardous material storage requirement? Describe and quantify.

Rarely – only batteries and small amounts of chemicals like adhesives and cleaners (e.g., epoxy, or alchohol) A flammables locker is used.

35. Do you anticipate a future change in storage requirements?

Likely no change, although an additional antenna would require some additional storage area.

36. Do you have or require any safes or mechanized storage equipment?

No

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same, although an additional antenna might require one or two additional staff

38. Does your work require privacy (acoustic or visual)? If so please explain:

Private operations area and primary office.

39. What future technological advances are you aware of in your organization that could effect the way you work?

None

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Yes, Mattrack, Pisten bully pax, pickup truck, van. Access to garage door/loading dock is need to drop off large crates for unpacking in an envornmentally controlled environment.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

Yes, access to garage door/loading dock is need to drop off large crates for unpacking in an envornmentally controlled environment. Neither Flags nor PA systems are needed.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Yes, access to garage door/loading dock is need to drop off large crates for unpacking in an envornmentally controlled environment.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage		N			
Carpentry Shop	Y		Periodically requests metal shop, machine shop, carpenter shop, and electrical shop services. These requests are typically for urgent fabrication or parts modification for project use.		
Field Science Support	Y		No actual normal requirement but must say yes to get the snow school training and sea ice training. This was a new requirement set forth by the contractor to get the required training. Also with the past events and future safety, MGS pulls food from the food room to stock Building 71 with a small amount of emergency supplies every year. There has been occasion where MGS personnel were asked to assist at Black Island on troubleshooting/restoration efforts.		
Trades/	Y		Periodically requests metal shop, machine shop,		

Assembly			carpenter shop, and electrical shop services. These requests are typically for urgent fabrication or parts modification for project use.		
Electronics Shop	Y		Sometimes an electrician is needed for repairs or work to existing hardware.		
Field Science support Layout		N			
Hazardous Cargo		N			
Science Cargo	Y		T–927 has many cargo air requirements to and from McMurdo. Place holders for typical cargo requirements for the season are contained in the SIP.		

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

Yes, Operations area UPS shall meet or exceed manufacturer's specs and shall be able to provide a minimum of 30 minutes of reserve power to operational equipment at any time. MGS and JPSS currently utilize 2 Mitsubishi 2033A UPS located in on the first floor of building 189 (JSOC) and building 71 (MG1). JPSS also utilizes 2 APC MGE Galaxy 3500 UPS units.

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

Nothing unusually large or heavy. JSOC operational equipment and MG1 antenna componenets run continuously 365 days a year.

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Various computer systems too numerous to list here. Do not see a reduction in numbers in the future.

47. Which rooms, if any, in your group or section require large specialty equipment?

N/A

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

All Administration, Operations and Maintenance Areas require LAN (Cat-6 copper, Fiber, and WiFi)

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

Xerox 8560 multi funtion printer - Electrical requirements 110 - 240 V, 50/60 Hz. Power consumption (operating) 230 W. Power consumption (power save) 43 W, Dimensions (WxDxH)16 x 21 x 14.5 in. (406 x 533.4 x 368 mm) We

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

Yes, for all operational systems in building 189 and 71. We do not have the specific loading infoamtion at this time.

51. Is there equipment that requires separate electrical power or isolated grounding?

All Technical Operations Systems must be on UPS and Backup Generator

52. Is there equipment that requires a specialized signal reference ground system?

All Operations Systems need to interface to a signal ground. This should be separate from the safety ground except where they join at a single common point.

53. Is there equipment that requires special temperature and/or humidity control?

Yes, all equipment in JSOC and Ops room in Building-71 (Radarsat)

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

De-ionized water is needed by current humidification systems

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

57. Is there any hazardous waste in your space and how is it handled?

Rarely – only batteries and small amounts of chemicals like adhesives and cleaners (e.g., epoxy, or alchohol) It is turned in to Haz Waste department as needed.

58. Are any isolation rooms required? If so, size and type

No

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

NASA's Operations areas require standard computer room systems such as raised floor, under floor cabling and ventilation (positive pressure plenum). Power and signal cables are under floor. Signal ground radial (green insulated wire of appropriate size) should run parallel with equipment rows.

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

Building UPS - Operations area UPS shall meet or exceed manufacturer's specs and shall be able to provide a minimum of 30 minutes of reserve power to operational equipment at any time. MGS and JPSS currently utilize 2 Mitsubishi 2033A UPS located in on the first floor of building 189 (JSOC) and building 71 (MG1). JPSS also utilizes 2 APC MGE Galaxy 3500 UPS units.

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

Tier IV reliability is required.

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

Plantronics CA10CD equipment wireless microphone equipment

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

Yes, we need secure routing of communication cabling. Unclassified Certification is sufficient.

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

No

66. Do you have large scale battery charging requirements?

No

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y			1			
Large Lounge	Y			1			
Laundry	Y			1			
Ball Court/Rec	Y			2			
Music Room	Y			2			
Skills Development	Y			2			
Multi - Purpose Weight/cardio	Y			1			

1000 SF Multi-purpose	Y			2			
600 SF Multi-purpose	Y			2			
Lockers	Y						
Chapel							

67. What works well in the current system?

Most everything

68. What works not so well in the current system?

Occasional lack of notification for planned maintenance work that has potential to cause outages of some sort.

69. Are there needs not met with Master Plan 2.0?

Unknown at this time.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	July 29, 2015	Research Focus:	Geology
Respondent:	John Goodge	Contact Phone No:	2187267491
Antarctica Research Location:	Transantarctic Mountains	E-Mail:	jgoodge@d.umn.edu

1. What is the nature of your scientific research?

Field-based geology and geophysics, mainly in the TAM and adjacent areas of the polar plateau. Occassional brief field work in the Dry Valleys and other areas near McMurdo. We plan to run a set of field trials for a new drilling system near McMurdo in 2016-17 (RAID).

2. What is the size of your team at McMurdo Station?

Typically 4-6, for a small tent-based remote field party; infrequently up to 12-15 for larger projects (airborne geophysics and drilling)

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Average once every 3 years

4. Describe how your team currently works at or interacts with McMurdo Station?

We are transients. Mostly our objective upon arrival is to prep for remote field activities as quickly as possible. Very occassionally we work out of McMurdo directly with either helo or Twin Otter support on day trips. To prep for the field, our goals center around: organizing and packing gear for cargo; checking out and testing skidoos, generators, tents, radios, etc.; going through field safety and other training. Our main work 'area' is in a triangle between the BFC, field cargo, and the MEC. We also require some work/office space where we can do planning, work on the project, stow valuables, and work online.

5. What is good about your experience at McMurdo?

The support staff are incredibly dedicated and engaged in helping us get done what we need to do. Once you are familiar with the system, most everything we need is available and in good condition.

6. Are there areas that could be improved for your research experience at McMurdo?

More light inside buildings! Cleaner work environment. Added secure storage (daily and while in the field). Easier movement of cargo from one work center to another.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

Should distinguish between those folks who are truly based in McMurdo and especially who have labs (bio, UNAVCO, balloons, etc.) and those who are passing through. Although there are magical and worthwhile synergies that develop by mixing folks together under one Crary roof, it seems most logical in the new master plan framework to provide adequate officing space for the transient population closer to where they will be doing most of their work while in McMurdo. This would mean that rather than Crary, these folks might be allocated space in the new science support center.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

Does not really apply in my case. Very rarely have I needed anything like what I would call a lab.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

Does not really apply in my case.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

In most cases I am moving geological samples straight through retro cargo once back in McMurdo. However, for at least one project in the past we used dirty labs in lower Crary for sample layout, description, cleanup and repackaging. Mostly what's helpful is table area space. For future drilling projects, we MIGHT need access to a lab/facility for laying out rock core for description and characterization, including benches or tables, lighting, and other equipment.

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

No, at least in terms of traditional Crary space

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

No

14. Do you have special requirements for frozen storage of samples/specimens?

No

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

Much improved situation! See #4 and #6 above. Based on the plans shared at the charrette, I envision having all my activities under one roof – checking out gear; organizing gear; stowing project equipment (cages); processing field gear for cargo; saftey training; setting up and testing gear; drawing food (and possibly alcohol) allocation; officing nearby when not actively working on field gear; staging gear for helo or other fixed-wing flights. The rest of our time will be spent sleeping, eating, exercising, and socializing.

16. Do you need to observe the assembly of goods?

No

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

I expect about the same

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

Ability to secure personal belongings. I assume secure areas would be provided for instruments/equipment of value. For personal belongings (e.g., cameras, laptops, data drives, wallet, passport, etc.) someone like me needs two types of secure storage: (1) in a lockable office or cubby/locker when I go to meals, am working away from a desk, working at other work centers, or on a shakedown; and (2) lockable storage for personal belongings (suitcase, duffel) containing things I do not take to the field (this would be storage for 1-8 weeks; even with leaving some things in CHCH, I still have some clothing and other items used in MCM but not taken to the field, and in the past we've only been able to toss things in a triwall in our cage – not ideal).

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

I am transient. No regular vehicle use. Occassional use of a pickup or track vehicle to deliver goods, but this will be very minimal in a "new" MCM where everything is under one roof. So basically, no.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

Exterior walkways are a must! I would think an outside PA system would be useful for safety/emergency calls. Yes, drop-off points or common muster points for shuttles, etc., would be good.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Only as defined for the joint cargo/science support center.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below. I DON'T GET THIS – ISN'T IT A MATTER OF RECORD WHAT STUFF COMES FROM WHAT SHOP? BELOW I'VE INDICATED WHAT THE NEW FACILITY SHOULD INCLUDE. ALSO, IT WOULD BE HELPFUL TO DEFINE EACH OF THE SERVICES LISTED BY THEIR FUNCTION AND/OR CURRENT LOCATION – SOMETIMES ONE PERSON'S X IS ANOTHER PERSON'S Y.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science	Y		This is a must to replace the 'cages' in the BFC/Cargo area. Should be secure areas with good lighting and	Should be near new	

Equip Storage			good ventilation, a wide entry door, shelving or racks, hooks, message boards, etc. If this refers to the field equipment that we currently check out from the BFC, MEC and Comm's, then that's what we take from them.	BFC and USAP Cargo.	
Carpentry Shop	Y		Accessible to grantees in order to meet carps about project needs.	Does not have to be immediately adjacent to SSC.	
Field Science Support	Y				
Trades/ Assembly		N			
Electronics Shop	Y		Need access to field radios (HF, handheld) and Iridium.	Should be in SSC.	
Field Science support Layout	Y		Not sure what this means; there is a great need for space to lay things out for inspection, testing, or repair. This includes tents, sleds, antennas, stoves, etc. More and more, projects will need long spaces to lay out long cables and such.	Should be near grantee field gear storage.	
Hazardous Cargo	Y		We run our haz cargo through this office (mostly fuels and such).	Should be affiliated with Science Cargo, but does not have to be immediately adjacent.	
Science Cargo	Y		General system is for grantees to bring their packed cargo to the Science Cargo support area for recording, tagging, etc. I presume most of these same functions will continue, but more streamlined?	Should be co-located with SSC.	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

No

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

N/A

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Laptops only and peripherals

47. Which rooms, if any, in your group or section require large specialty equipment?

None

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

None

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

Yes, typical office copier/scanner

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No

57. Is there any hazardous waste in your space and how is it handled?

No

58. Are any isolation rooms required? If so, size and type

No

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

No

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

UPS is always good but not required to run a laptop.

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

N/A

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

Small conference rooms should be equipped with video projection system and internet connection to use for small group presenations, skype/GTM videoconferencing, etc.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

No

66. Do you have large scale battery charging requirements?

No

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		When I'm hungry	H	Daily		
Large Lounge	Y		General but infrequent use	L	?		
Laundry	Y		Dorm laundry	H	?	Dorm	
Ball Court/Rec	Y		Exercise	H	Daily		
Music Room		N					
Skills Development		N					
Multi - Purpose Weight/cardio	Y		Exercise	H	Daily		
1000 SF Multi-purpose	?						
600 SF Multi-purpose	?						
Lockers	Y		For personal belongings when not in room or work	M	Daily	Exercise areas	
Chapel		N					

67. What works well in the current system?

68. What works not so well in the current system?

Running back and forth from work area to dorm to exercise to dorm to galley to work – going outside on every trip and all the back and forth would be reduced by having more things under one roof.

69. Are there needs not met with Master Plan 2.0?

I'm sure! Nothing comes to mind right now except lots of internet bandwidth.

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science
Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information – Work Center

Date:	**07-29-2015**	**Work Center:**	Plumbing
Respondent:	**Dale Jacobs**	**Contact Phone No:**	720-568-2303
Work Center Location:	**McMurdo Station**	**E-Mail:**	Dale.Jacobs.contractor@USAP.gov

1. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

The plumbing work center supports all station locations providing all necessary service , repair, installation and coordination of same for all water systems, sanitary sewer, hydronic heat, vacuum and medical gas systems required by grantees durring deployment, station support personel and distinguished visitors.

2. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

The typical metals trade foremen are working managers for a crew of 5 to 12 plumbers, pipefitters, welders and apprentices from the shop office.

3. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

The plumbing shop is best co-located near the metals welding and pipe shop, sheetmetal shop and other trades to a lesser degree of interaction. Since all water conveyance systems are heat traced to prevent freezing the electrical and plumbing foremen typicaly work closely and coordinate often for repairs.

4. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

The trades shop often is visited by support staff and grantees requiring any specialized welding, fabrication or service of equipment or work order items scheduled through the work order planner or facilities engineering.

5. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

Not typicaly, shop areas should however, be seperated from any walk in visitors for obvious safety reasons.

6. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

The pipe shop typicaly requires physical seperation from clerical work offices due to noise and fumes generated from the work shop durring welding, grinding and use of chemicals such as plastic solvents and cements.

7. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

The foreman can best manage their shops if direct lines of sight and viewing of the shop spaec is provided from the foremans office while coordinating manpower and materials scheduling tasks from a computer terminal at the office desk or by field radio to logistics, fire house dispatch or facilities management. An open space foremans trade office with desks and filing cabinets for reports and reference publications (code books and maintenance manuals) serves the function of direct coordination amoung the trades formen. The pipe and metals shop have extensive requirements for design of a functional and safe working enviroment: 1. An overhead door to accommodate forklift delivery of containers directly into the plumbing shop rather than driving through other work shop spaces for safety and conveinance for shop threading or welding

of 21 ft lengths of pipe and a shop pipe rack adjacent to pipe threading machine along one wall of the shop for less than full length shop stock.

2. The shop service utility/ pick-up type vehicle will typicaly be parked inside the shop when not in the field to allow loading and unloading of materials and tools durring both summer and winter seasons. Having space for the vehicle in the shop accomodates the need for quick response to emergancy call-out repairs after normal work scheduled hours. An area drain in the drive in bay will accommodate vehicle snow melt durring times of vehicle return from field locations.
3. An overhead 5 ton bridge crane for this shop would be helpful but not necessairly a requirement.
4. 20 amp, 120 volt, convienance outlets for stationary tools and work benches are required. As well as 60 amp 240 volt recepticals for stationary welding machines.
5. The pipe / metals shop should be enviromently separate from the wood shop due to oils for pipe threading, welding and wood dust seperation for safety and fire concerns.
6. A radiant floor heating system in the shop area is suggested as a best case method for heating the shop to a maximum of 65 degrees F as well as a heated ventalation make-up air system for recommended shop air changes.
7. A fume hood or evacuation exhaust system is necessary for the welding shop work benches as well as accomodations for spark and flash shields surrounding the work bench area.
8. A common pipe trades tool room with racks and shelves to organize and store the extensive amount of power and hand tools is required for a shop of up to 12 workers.(3 welders / pipefitters, 3 sheetmetal workers, 4 plumbers +)
9. The personell count for a combined trades shop is approximatly 97 workers by my count and appropriate sanitary requirements need to accommodate an estimated work force split of 70% men to 30% women exclusive of supply and clerical staff.

8. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

The foremen often deals with personnel issues for their assigned crews so having a private meeting conference room with a table and chairs for coordination meetings or meetings with management or clients adjacent to the combined formens office would be benificial but not a requirement.

9. Is there one group or areas that need special security requirements outside the use of standard door hardware?

Tool room security.

10. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

Marerials storage both outside and inside in close proximity is helpful for conveinance and efficiency.

11. What are the working hours of your group?

7:00 AM to 5:00 PM daily with coffee breaks mid morning and mid afternoon. Foreman is paged from Fire House for emergancy call out or his designated emploiee.

12. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

Shared spaces for these purposes is prefered and are typicaly scheduled with all other departments in common facilities.

13. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

Pipe threading machine 3 ft. x 4 ft. floor space with 2 ft. x 21 ft. clear to 4 ft above floor each end for loading pipe. Metal work benches 4 ft x 10 ft. one minimum each of 3 metals shops. Drill press 4 sq. ft. floor area clear. Sheet metal break aligned with one end of work table and at same elevation, sheet metal shear aligned opposite end of work bench. 2200 sf existing sheetmetal shop is crowed at present additional floor space and ergonomic layout is critical to work flow and safety.

14. Do you have any sensitive document or specialized equipment storage needs?

Yes, crew HR files may be kept in foreman's office desk or file cabinet.

15. Do you have any hazardous material storage requirement? Describe and quantify.

Cutting oil and solvent cement if less than one gallon quantities, sealed containers for storage, open when in use.

16. Do you anticipate a future change in storage requirements?

No

17. Do you have or require any safes or mechanized storage equipment?

No

18. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same or Less after all new construction.

19. Does your work require privacy (acoustic or visual)? If so please explain:

Interior sound deadining for shops to reduce noise levels of large spaces

20. What future technological advances are you aware of in your organization that could effect the way you work?

Moving away from steel interior duct to rigid fiberglass would eliminate much of the shop fabrication and also moving toward use of press fitting connections for fuel oil lines inside and outside buildings and the use of plastic materials for wet sprinkler systems would also eliminate threading pipe.

Exterior Space Requirements – All Groups

21. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Yes, the shop uses one pickup for service and hauling materials to site as well as tools and crew. There are no transition requirements except adding block heater plug lines for all vehicles parked outside near the shops. One overhead garage door for the metals shop at least 10 to 12 ft wide and 12 to 14 ft high for materials delivery with bollards at each side of entrance.

22. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

A pageing PA system from the administrative assistant desk or customer counter would be helpful for contacting the foreman if somewhere within the trade shops.

23. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

No.

Functional Requirements – All Groups

24. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	Y		Service, support, calibration and emergency repairs.	**NI**	
Carpentry Shop	Y		Coordination of construction and equipment resources	**NI**	
Field Science Support	Y		Coordination of construction and equipment resources	**NI**	
Trades/ Assembly	Y		Coordination of construction and equipment resources	**NI**	
Electronics				**NI**	

Shop					
Field Science support Layout	Y		Coordination of construction and equipment resources	**NI**	
Hazardous Cargo	Y		Transport and storage of compressed gas cylinders for welding and cutting, oxygen, acetylene, CO_2 and Argon	**NI**	
Science Cargo		N			

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

25. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

See existing equipment list for all shop facilities.

26. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

A shippment container size unit is the largest box used by or within the plumbing, sheetmetal or welding shop areas..

27. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

All foremen have a PC work station on their desk, a phone and a radio base charger.

28. Which rooms, if any, in your group or section require large specialty equipment?

A bridge crane in the asembly area capable of reaching at least one large overhead door whould be helpful.

29. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

N/A

30. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

N/A

31. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

N/A

32. Is there equipment that requires separate electrical power or isolated grounding?

Welders require separate load breakers and circuits.

33. Is there equipment that requires a specialized signal reference ground system?

N/A

34. Is there equipment that requires special temperature and/or humidity control?

N/A

35. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

Oxygen and acetlyne are both used in the metals shop and plumbing work centers as well as Argone and Co2.

36. Is there equipment or processes that require special water (distilled, deionized, etc.)?

N/A

37. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

N/A

38. Is there any hazardous waste in your space and how is it handled?

Used glycol based heat transfer fluid is stored in 55 gallon drums on site for waste disposal as well as drained fuel oil containers.

39. Are any isolation rooms required? If so, size and type

The metals welding and plumbing shops should be isolated from other adjoining shops due to grinding dust and welding fumes

40. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

N/A

41. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

N/A

42. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

N/A

43. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

PA system for all shop areas.

44. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

N/A

45. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

N/A

46. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

N/A

47. Do you have large scale battery charging requirements?

An electric fork lift charger for supply and trade shop use located within the trades area for after hours recharging of this type of equipment.

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	y		An enclosed passageway between the trade shops and the dinning hall for breaks would be appreciated if possible.	2	2 x daily	Trades shops	
Large Lounge		N					
Laundry		N					
Ball Court/Rec		N					
Music Room		N					
Skills Development		N					
Multi - Purpose Weight/cardio		N					
1000 SF Multi-purpose		N					
600 SF Multi-purpose		N					

Lockers	Y		Yes, personal lockers sized for each member of the trades group would be helpful for changing work cloths and small tool box storage combined security.				
Chapel		N					

48. What works well in the current system?

Not much due to space constraints.

49. What works not so well in the current system?

Not having separate and adequate space for construction and maintenance functions.

50. Are there needs not met with Master Plan 2.0?

No, the master plan will be several orders of magnitude improvement to the existing facilities from all perspectives.

Opportunities

51. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**7/30/15**	**Research Focus:**	Atmospheric Science
Respondent:	**Melissa Nigro**	**Contact Phone No:**	5183692997
Antarctica Research Location:	**McMurdo**	**E-Mail:**	melissa.nigro@colorado.edu

1. What is the nature of your scientific research?

I study atmospheric boundary layer dynamics in the Antarctic. I used observations from automatic weather stations and unmanned aerial vehicles to conduct my research.

2. What is the size of your team at McMurdo Station?

4 people

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Annual

4. Describe how your team currently works at or interacts with McMurdo Station?

We are based in McMurdo where we prep our instruments. We use snowmobiles, helos, and Twin Otters to access our field sites. We also use the deep field camps and South Pole station to access our field sites.

5. What is good about your experience at McMurdo?

In general, the current setup seems to work pretty well for our project. See below for specific things that could be improved.

6. Are there areas that could be improved for your research experience at McMurdo?

We use the loading dock/garage areas to stage our equipment. These areas tends to get very crowded. In the redesign, I am not sure if it is possible to expand these areas.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

In general, the lage lab benches work well for our project. Space is always limited, but I guess that is expected during the busy McMurdo summer season.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

I don't think this is necessary for our project.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

We do not need to share lab space with other groups. Although, it is nice for us to be located near the UNAVCO team since we use some of their equipment.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

N/A

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

N/A

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

No.

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

No.

14. Do you have special requirements for frozen storage of samples/specimens?

No.

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

I do not see our working conditions changing with the redesign.

16. Do you need to observe the assembly of goods?

I am not sure what you mean by this question.

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same.

18. Does your work require privacy (acoustic or visual)? If so please explain:

No.

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

It is nice to have a lock on the door to our lab.

General Information – Work Center

Date:	**7/30/15**	**Work Center:**	Crary
Respondent:	**Melissa Nigro**	**Contact Phone No:**	5183692997
Work Center Location:	**McMurdo**	**E-Mail:**	melissa.nigro@colorado.edu

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

We deploy to McMurdo once or twice a year. We use Crary to prep our instrumentation and then we use snowmobiles, helos, Twin Otters, deep field camps, and South Pole Station to access our field sites.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

4 field personnel

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

It is nice for us to be located near UNAVCO, but not completely necessary. We also work with the Carp Shop, FSTP, BFC, and Science cargo.

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

No

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

No.

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

It is nice for us to have one or two offices and a dedicated lab area.

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

We need lab space and one or two closed door offices.

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

N/A

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

N/A

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

We should all be located in the same lab space.

30. What are the working hours of your group?

In general, 6:00 AM to 11:00 pm 7 days a week, but we could work any hours of the day.

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

No.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

We currently have a shed on the Science Cargo line and a cage in DNF. We will need to keep this amount of storage.

33. Do you have any sensitive document or specialized equipment storage needs?

See answer to #32.

34. Do you have any hazardous material storage requirement? Describe and quantify.

We store batteries. I am not sure if that qualifies for special storage requirements.

35. Do you anticipate a future change in storage requirements?

No.

36. Do you have or require any safes or mechanized storage equipment?

No.

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Same.

38. Does your work require privacy (acoustic or visual)? If so please explain:

No.

39. What future technological advances are you aware of in your organization that could effect the way you work?

We are converting more of our stations to Freewave communications. This would require antennaes and a dedicated computer to be placed at McMurdo.

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Yes. We use the Crary truck to transport our equipment. We also use Pisten Bullies, snowmobiles, and MEC trucks to access our field sites.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

I don't think so.

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Yes. We need a decent amount of space in the loading areas.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	Y		We store our equipment on the Science Cargo line.		
Carpentry Shop	Y		They make battery boxes and automatic weather station snow anchors for us.		
Field Science Support	Y		We get equipment and training for the field from FSS.		
Trades/ Assembly	Y		Sometimes we need something special made for the field.		
Electronics Shop		N			
Field Science support Layout			I am not sure what you mean by this category		
Hazardous Cargo	Y		We sometimes have to ship old batteries north.		

Science Cargo	Y		We ship our equipment north at the end of the season.		

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

No.

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

N/A

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

We have a computer running to receive our Freewave communications from our automatic weather stations.

47. Which rooms, if any, in your group or section require large specialty equipment?

N/A

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

I believe our computer that receives the Freewave communications requires a LAN connection. Everyone else in our group uses the Crary wireless internet.

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

We use the printer and copier in Crary.

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No.

51. Is there equipment that requires separate electrical power or isolated grounding?

No.

52. Is there equipment that requires a specialized signal reference ground system?

No.

53. Is there equipment that requires special temperature and/or humidity control?

We currently have a cage in DNF storage and we would like to keep it.

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

No.

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

No.

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

No.

57. Is there any hazardous waste in your space and how is it handled?

We use batteries.

58. Are any isolation rooms required? If so, size and type

No.

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

No.

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

N/A

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

N/A

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

No.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

No.

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

No.

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

No.

66. Do you have large scale battery charging requirements?

Yes.

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		Eating	1	3 times/day		
Large Lounge	Y		Hang out and relax	4	3 times per week		
Laundry	Y		Washing clothes	2	Once per week		
Ball Court/Rec	Y		Group exercise classes	5	Once per week		
Music Room		N					
Skills Development		N					
Multi - Purpose Weight/cardio	Y		Exercise	3	3 times per week		
1000 SF Multi-purpose		N					
600 SF Multi-purpose		N					
Lockers		N					
Chapel	Y		Go to mass	6	Once per week		

67. What works well in the current system?

The dining area, rec center, and chapel work well in the current system.

68. What works not so well in the current system?

I always seem to have to wait for access to a washing machine and dryer to do laundry. And the current weight center/cardio room is often crowded with poor ventilation.

69. Are there needs not met with Master Plan 2.0?

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science
Programming Questionnaire

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General Information – Science
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We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:		**Research Focus:**	
Respondent:		**Contact Phone No:**	
Antarctica Research Location:		**E-Mail:**	

1. What is the nature of your scientific research?

2. What is the size of your team at McMurdo Station?

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

4. Describe how your team currently works at or interacts with McMurdo Station?

5. What is good about your experience at McMurdo?

6. Are there areas that could be improved for your research experience at McMurdo?

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

14. Do you have special requirements for frozen storage of samples/specimens?

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

16. Do you need to observe the assembly of goods?

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

18. Does your work require privacy (acoustic or visual)? If so please explain:

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage					
Carpentry Shop					
Field Science Support					
Trades/ Assembly					
Electronics Shop					
Field Science support Layout					
Hazardous Cargo					

Science Cargo					

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

44. Quantify number of meetings **per week**:

Number of Participants:	**Less than 1 Hour**	**1-3 Hours**	**3+ Hours** Specify Duration	**Open Area or Closed Room**	**Special Needs or Equipment :**
2-4					
6-8					
10-12					
14-20					
20-30					
30-50					

Mechanical & Electrical Equipment – All Groups

45. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

46. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

47. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

48. Which rooms, if any, in your group or section require large specialty equipment?

49. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

50. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

51. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

52. Is there equipment that requires separate electrical power or isolated grounding?

53. Is there equipment that requires a specialized signal reference ground system?

54. Is there equipment that requires special temperature and/or humidity control?

55. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

56. Is there equipment or processes that require special water (distilled, deionized, etc.)?

57. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

58. Is there any hazardous waste in your space and how is it handled?

59. Are any isolation rooms required? If so, size and type

60. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

61. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

62. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

63. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

64. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

65. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

66. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

67. Do you have large scale battery charging requirements?

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining							
Large Lounge							
Laundry							
Ball Court/Rec							
Music Room							
Skills Development							
Multi - Purpose Weight/cardio							

1000 SF Multi-purpose							
600 SF Multi-purpose							
Lockers							
Chapel							

68. What works well in the current system?

69. What works not so well in the current system?

70. Are there needs not met with Master Plan 2.0?

Opportunities

71. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.

Antarctic Infrastructure Modernization for Science Programming Questionnaire

As discussed in the recent design charrette, it would help us ensure we have captured all requirements if you would prepare an Programming Questionnaire for the Antarctic Infrastructure Modernization for Science (AIMS) project. The questionnaire is a vital step in the design of the new McMurdo Station and all of the services it provides since the detailed information you provide will help the design team understand and respond to each user groups needs. Please answer the questions as fully as you can and provide full names for acronyms as we may not be familiar with your function.

Please return this questionnaire by August 21, 2015 so we can include in the Charrette Report as applicable. Return completed forms to Aaron Seal, Project Engineer for Merrick at aaron.seal@merrick.com and Christine Eldridge, Project Coordinator for OZ Architecture at celdridge@ozarch.com. Feel free to submit further information or clarification at any point in time. Direct any questions to Aaron & Christine.

The questionnaire is divided into the following sections:
General Information – Science
General Information – Work Center
Exterior Space Requirements – All Groups
Functional Requirements – All Groups
Mechanical & Electrical Equipment – All Groups
Living & Social Spaces
Opportunities

We appreciate your time and effort in completing this evaluation form.

Sincerely,

OZ Architecture

Merrick & Company

Ferraro Choi and Associates

Michael Baker International

General Information - Science

Date:	**08/24/15**	**Research Focus:**	Marine Physiology
Respondent:	**Anne Todgham**	**Contact Phone No:**	530-752-1897
Antarctica Research Location:	**McMurdo Station**	**E-Mail:**	todgham@ucdavis.edu

1. What is the nature of your scientific research?

We investigate the response of marine fishes to changes in environmental conditions. Our research in McMurdo involves animal collection in the field, experiments in the Crary aquarium and environmental rooms as well as analyses in the labs in Phase I.

2. What is the size of your team at McMurdo Station?

4-5 people

3. What is the frequency of your research at McMurdo? Annual? Describe freqency in terms of years.

Grants provide funding for two years of field work in McMurdo and then one year at the home institution

4. Describe how your team currently works at or interacts with McMurdo Station?

We collect animals in the field (sea ice) most days using piston bullys, snow machines and fish huts. We run experiments on the collected animals for 1-2 months in the aquarium room. We perform physiological performance experiments on animals (heart rate, oxygen consumption) in the environmental rooms as well as microscopy of live animals in the environmental rooms. We conduct sea water and biochemical analyses in the labs in Phase I of the Crary.

5. What is good about your experience at McMurdo?

We are very well supported by the ASC contractors.
Facilities are excellent for the research we are trying to do.
Very flexible lab space to accommodate groups of different sizes and needs.
Fantastic common resources/core labs.

6. Are there areas that could be improved for your research experience at McMurdo?

Improved movement of science cargo to us at the start of the field season.
More versatile aquarium space that is flexible in floor plan and tank sizes.

7. Are there shortcomings or problems with the existing laboratory building and what recommendations might you make for new lab space?

Environmental rooms closer to the aquarium room.
Crary is heavily used by everyone. The idea from the Charette to move some of this use to other buildings for technical events as well as deep field teams is good.
More desk space for field team members.

8. How important is it to have laboratory spaces that can be easily modified / changed to allow for changes in your research needs? If you had the ability to easily change your lab set-ups (re-organize benches), how frequently do you think that might happen?

Moderately important. The current lab modularity is great. Once we set up the lab we do not change it throughout of field season.

9. How important is sharing of lab space/equipment/specialty instrumentation with other researchers/lab groups in the research work that you do?

Sharing of chemistry lab space is difficult for groups of our size with diverse needs in a lab space. Sharing of aquarim space works well for our group. Common core labs with shared equipment and instrumentation is very important.

10. What type of specialty lab support space might be required to support your research lab work and should this lab support space be dedicated only to your group or could it be shared with other lab research groups?

Environmental rooms (shared between 1-2 groups) Labs in the aquarium phase (dedicated but could be smaller and still functional).

11. Would shared research lab space (multiple lab users in the same large lab area) be a benefit for your lab group?

As long as it was clear what group had what space, it would be fine. Currently space is at a bit of a premium and so everyone fills what they are given. My concern is that if there was a shared space with groups arriving at different times, there might be less space available for a later group.

12. Does your lab group get involved in any bio-hazard related work requiring special BSL2 and BSL 3 level lab space?

NO

13. Does your lab group use live animals/specimens in your research work and what kind would be used?

YES, fishes and invertebrates

14. Do you have special requirements for frozen storage of samples/specimens?

Storage of samples at -80, -20 and +4C. Environmental rooms (set to -1C and +4C) needed for experimentation

15. Describe how you see your team working at McMurdo Station based on Master Plan 2.0 and the discussions at the AIMS Charrette.

The new plan is fantastic! I would love to see the aquarium room get an overhaul with additional space for tanks and aquarium rack systems of different sizes as well as new environmental rooms on Phase III. The new Sea Ice facility by the existing Diver Locker would greatly facilitate our sea ice work and decrease the congestion in the current field party staging areas. Storage space here would be important.

16. Do you need to observe the assembly of goods?

Unclear what you mean here. Do I trust the BFC to assemble my field gear – yes. But room to look it over to make sure everything is complete is important for safety.

17. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

Currently I feel that McMurdo is running at a low level of staffing compared to previous years (i.e. last two years vs. 2006-2007 field season). Everyone is working really hard but you can tell that we are stretching the system. I worry if the number of staff would decrease much more in the future.

18. Does your work require privacy (acoustic or visual)? If so please explain:

No

19. Describe any special Security requirements that would be critical to your daily activities and unique to your area:

None that I can think of at the moment.

General Information – Work Center

Date:		**Work Center:**	
Respondent:		**Contact Phone No:**	
Work Center Location:		**E-Mail:**	

20. Please describe the function of your group and the general nature of your work on both an annual and day to day basis.

21. What is the size of your team at McMurdo Station? Provide a personnel breakdown of your group by subgroups (as appropriate) and their present personnel count. Please specify job functions. Provide an organizational chart if possible.

22. Are there any groups or functions to which your group must be adjacent? Please identify and indicate if this adjacency needs to be physical (e.g. in the same building) or operational (e.g. direct communications capabilities with another group).

23. Does your group receive visitors, grantees or customers during regular operations? What type of visitors or customers do you receive? How many per day and how long does it take to serve your average customer or visitor?

24. Do you require a customer receiving area such as a staffed counter or a receptionist with waiting area? How many people will be in the waiting area?

25. Is there more than one group or groups of offices that need to be separated by walls or in different parts of the building?

26. Describe your office / technical requirements for your staff (ie: shared desk space, open or closed office, work area):

27. Do any members of your group meet with people one-on-one and, if so, can this be done in a special common area with small rooms?

28. Is there one group or areas that need special security requirements outside the use of standard door hardware?

29. Could parts of your group be located in separate areas of the building such as storage, equipment, conference room, or some other rooms? If so, please list particulars. Or do you require physical adjacency for all areas?

30. What are the working hours of your group?

31. Are large conference, briefing or training rooms required? Can they be shared in common with other groups or occupants of the same building? Identify the number of occupants.

32. What are your general storage needs? Any extraordinary requirements? Please provide equipment dimensions and weights for any unusual equipment storage needs.

33. Do you have any sensitive document or specialized equipment storage needs?

34. Do you have any hazardous material storage requirement? Describe and quantify.

35. Do you anticipate a future change in storage requirements?

36. Do you have or require any safes or mechanized storage equipment?

37. In the future, do you anticipate the same number of staff, more staff or less staff at McMurdo Station?

38. Does your work require privacy (acoustic or visual)? If so please explain:

39. What future technological advances are you aware of in your organization that could effect the way you work?

Exterior Space Requirements – All Groups

40. Does your group regularly use vehicles? If so, which types? Will they need to be kept adjacent to your physical building? Are there any requirements to get vehicles into or up to your facility (e.g. garage door, loading docks, maintenance bay)? Please provide information to clarify what the exterior space and transition space from outside to inside would look like.

Piston Bullies (parked close to field gear important) Snow machines (parking on sea ice transition works) Occasional use of pooled trucks to move equipment (proximity more flexible)

41. Are there any site features that need to be considered such as drop-off points, flags, exterior PA systems, walkways, recreational items, etc.?

42. Does the facility require any loading areas or loading docks for bulk deliveries of supplies, equipment, etc.?

Loading dock in Aquarium Phase to unload animals collected in the field. A loading dock with two doors would help maintain temperatures in the aquarium room that currently fluctuate widely when doors are opened.

Functional Requirements – All Groups

43. What goods & services do you currently receive from other departments? ie: supplies, hands on instructions, equipment inspections, etc. Refer to table below.

Name of Support Services	Interact Y	N	Services provided	Adjacencies	Special conditions
Field Science Equip Storage	Y		Storage of items not in daily use over a given season. Currently stored in the BFC cage. Overwinter storage of equipment is likely different but important.	P	
Carpentry Shop	Y		Help with aquarium fabrication, construction of wooden over winter boxes.	NI	
Field Science Support	Y		Trainings and Sea Ice conditions	P	
Trades/		N			

Assembly					
Electronics Shop	Y		Only if a key piece of equipment breaks	NI	
Field Science support Layout		N			
Hazardous Cargo	Y		Shipment of chemicals or preserved specimens home	NI	
Science Cargo	Y		Cargo southbound and northbound	P	

Adjacencies: **M** = Mandatory **P** = Preferred **NI** = Not Important

Mechanical & Electrical Equipment – All Groups

44. Are any special electrical outlets required (such as uninterruptable power, unusual voltages)? Is there any equipment requiring multiple utility outlets and where will these be used?

Uninterupted power to aquarium room for long-term experiments is preferred. Uninterupted power to -80C freezers. Significantly more power (115V) to Phase III of Crary for small pumps, immersion circulators etc. More dedicated circuits required. Power (115V) in the Environmental Rooms in Crary.

45. List any large specialty equipment used by your group or section and corresponding space, weight, and utility requirements. Do you foresee an increase or decrease in equipment requirements? Does equipment run continuously at full load for over 3 hours? For energy consumption planning, how many hours per day/week/month is the equipment estimated to be used?

N/A

46. What computer hardware do you have, what are their electrical data, and how are they positioned (floor stand, desk, etc.)? What change in computer equipment do you foresee? Time frame?

Nothing major. We just bring our laptops for desk use or to hook up to specialized equipment we bring down. Nothing unusual.

47. Which rooms, if any, in your group or section require large specialty equipment?

NA

48. Which rooms in your organization require LAN connection? How many connections per room? What data speeds are required now and within the next 10 years? CAT-6 copper or fiber optic?

Don't know specifics. The ability to lecture remotely to school and university classrooms for public outreach and university teaching requirements is very important.

49. Is there a copy machine or similar (multi-purpose scan, copy, email, etc.) in your function? If so, list physical size, utility requirement, voltage, and amperage.

?

50. Does your organization have a requirement for emergency (generator) backup power (longer term than UPS power can provide protection)? If so, please list areas and types of loads and voltages.

No

51. Is there equipment that requires separate electrical power or isolated grounding?

No

52. Is there equipment that requires a specialized signal reference ground system?

No

53. Is there equipment that requires special temperature and/or humidity control?

No

54. Will any medical or laboratory gases be needed (air, oxygen, vacuum, etc.)?

Yes (CO_2, air, N_2)

55. Is there equipment or processes that require special water (distilled, deionized, etc.)?

Yes, Molecluar biology grade, deionized.

56. Will a laundry facility be needed for your group specifically adjacent to your function? If so, please list anticipated requirements on usage and frequency.

Not necessary but would be nice for our field gear in the new Sea Ice Facility. Our gear gets "fishy" and the seal and penguin folks are very smelly!

57. Is there any hazardous waste in your space and how is it handled?

Yes. We generate waste containers as needed.

58. Are any isolation rooms required? If so, size and type

An isolated behaviour room down in Phase III of the Crary would be helpful for behavioural assays. Prefereably this would either have running seawater or have cold room capacity (i.e. an environmental room).

59. Is there a server/data acquisition room (or rooms) needed within your facility? If so, please provide information on the number of server racks or cabinets and their respective sizes. Please list if there is a preference for cabling and power into the racks/cabinets (under floor, overhead, data fed from front, power fed from back, etc). Please list the expected electrical load of each rack/cabinet (server equipment information is helpful here).

Unknown.

60. Please list any UPS requirements (cabinet mounted, central UPS, redundant UPS, etc.) that should be considered in the design. Is there a preference for UPS manufacturer and model? Will the UPS units be provided by research funds?

Unknown

61. Please describe the power reliability needed for server rooms or other critical loads (N+1 generator, dual path to support redundant power supply servers, etc.). If known, please state the power system topology that the design should be based on, either Tier I, II, III or IV reliability. Where does the tier label come from for a user request?

Unknown

62. Is there any part of your facility that requires special audio/video presentation and communication systems? If so, please list the desired function of the system and include sources used (computer, video conference, etc.). Please list special features of the system that would affect the infrastructure design (voice reinforcement, wireless mics, etc.).

An AV room (s) for lecturing remotely or skype meetings with collaborators off continent would be helpful. Ideally this room would be located in Crary.

63. Is there any part of your facility that requires special security systems such as closed circuit television (CCTV) or card/PIN or biometric access control? If so, which staff is responsible for monitoring access control and CCTV cameras? Is CCTV recording required?

NA

64. Is there any part of your facility that requires a protected distribution system (PDS) for secure routing of communication cabling? If so, please list areas served and if systems need to be 'red' or 'black' certified.

NA

65. Does your organization require special communication systems such as satellite uplink/downlink, microwave, etc.? If so, where is the head-end equipment located? And which areas does it serve? Are antennas required on the roof or on the ground?

NO

66. Do you have large scale battery charging requirements?

NO

Living & Social Spaces

Name of Activity	Interact Y	N	Type/use of space	Rank of Importance	Frequency of use	Preferred Adjacencies	Special Conditions
Dining	Y		Dining with a view would be amazing		Daily		
Large Lounge	Y				Weekly		
Laundry	Y				Weekly or more frequently for field gear		
Ball Court/Rec	Y				Weekly		
Music Room		N					
Skills Development	Y				Weekly		
Multi - Purpose Weight/cardio	Y				Daily		
1000 SF Multi-purpose	Y				Weekly		
600 SF Multi-purpose	Y				Weekly		

Lockers	Y				Daily		
Chapel							

67. What works well in the current system?

3 different bars/spaces for different activities

68. What works not so well in the current system?

69. Are there needs not met with Master Plan 2.0?

Opportunities

70. Comments: Please provide any other information that you think would help the design team in further understanding your needs.

The Grantee Charette was really useful and I feel as a community we got a lot from it. I would like to remain involved in the redesign of the aquarium facility on Phase III of Crary as I hope to continue to be a heavy user of this space. I am also happy to continue to be involved in the development of the Sea Ice Facility.

Thank you for completing the Antarctic Infrastructure Modernization for Science Programming Questionnaire.