Appendices – Volume 2

SONOMA COUNTY WASTE MANAGEMENT AGENCY COMPOST FACILITY

Draft Environmental Impact Report
State Clearinghouse No. 2008122007

Prepared for
Sonoma County
Waste Management Agency

December 2011

ESA

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Appendix available in color on website:
http://www.recyclenow.org/agency/reports.asp

Appendix AIR-1

Site 5A (Proposed Project) Criteria Pollutant and GHG Emissions

ESA

APPENDIX AIR-1

Site 5A (Proposed Project) Criteria Pollutant and GHG Emissions

Introduction to the Air Quality Models and Results

The URBEMIS2007, version 9.2.4, model was used to quantify criteria pollutants and CO_2 from project construction. For project operations, URBEMIS2007 was also used to calculate ROG, NOx, CO, PM10, PM2.5, and CO_2 from off-road equipment and area sources, as well as fugitive dust. Equipment mix and hours are based on the existing Sonoma Compost facility equipment and fuel usage estimates. On-road vehicle emissions were calculated with EMFAC2007 emission factors and incorporate trip generation data provided in the traffic report for this project. VOC emissions from composting are based on the CIWMB emission factor of 2.6 pounds per day per ton of compost (CIWMB, 2007).

Finally, the project building sizes and electricity usage rates estimated by the South Coast Air Quality Management District (SCAQMD, 1993) were used to determine project electricity usage. This electricity usage was then used to find indirect CO_2 emissions from electricity generation through emission factors from the *California Climate Action Registry General Reporting Protocol* (California Climate Action Registry, 2009). Composting emissions of methane (SCAQMD, 2001) were also included in the GHG quantification and analysis.

Results of the URBEMIS2007 modeling (daily and annual), EMFAC2007 emission factors, and GHG analysis are presented below for both the 2011 and 2030 analysis years. Data are shown for both the windrow and aerated static pile (ASP) composting options, which differ in the off-road equipment, VOC emissions from composting, and GHG estimates. On-road traffic would be the same for both composting options. Existing facility emissions are also depicted below and were projected based on year 2011 (which is a conservative estimate of emissions) operations. This Appendix is separated into the following sub-sections:

- URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2010 (CONSTRUCTION) AND 2011 (OPERATIONS) – WINDROW COMPOSTING OPTION
- URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2030 – WINDROW COMPOSTING OPTION
- URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2011 – ASP COMPOSTING OPTION
- URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2030 – ASP COMPOSTING OPTION
- EMFAC2007 MODEL RESULTS FOR PROJECT OPERATIONS (YEAR 2011 WEEKDAY AND SATURDAY)
- EMFAC2007 MODEL RESULTS FOR PROJECT OPERATIONS (YEAR 2030 WEEKDAY AND SATURDAY)
- EMFAC2007 MODEL RESULTS FOR EXISTING OPERATIONS (WEEKDAY AND SATURDAY)
- PROJECT WINDROW COMPOSTING EMISSIONS
- PROJECT ASP COMPOSTING EMISSIONS
- EXISTING WINDROW COMPOSTING
- PROJECT GHG ANALYSIS (YEAR 2011) WINDROW COMPOSTING
- PROJECT GHG ANALYSIS (YEAR 2030) WINDROW COMPOSTING
- PROJECT GHG ANALYSIS (YEAR 2011) ASP COMPOSTING
- PROJECT GHG ANALYSIS (YEAR 2030) ASP COMPOSTING
- EXISTING FACILITY GHG ANALYSIS
- REFERENCES

URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2010 (CONSTRUCTION) AND 2011 (OPERATIONS) – WINDROW COMPOSTING OPTION

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Construction (2010) Ops (2011) - Windrow.urb924

Project Name: sonoma compost 2010-2011 Const and Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (lbs/day unmitigated)	8.62	69.08	39.35	0.02	350.09	4.04	354.13	73.12	3.72	76.84	7,218.15
2010 TOTALS (lbs/day mitigated)	8.62	58.26	39.35	0.02	87.28	2.43	89.71	18.24	2.23	20.47	7,218.15
2011 TOTALS (lbs/day unmitigated)	4.12	38.11	16.24	0.00	60.01	1.48	61.49	12.54	1.40	13.94	5,554.65
2011 TOTALS (lbs/day mitigated)	4.12	38.11	16.24	0.00	28.40	1.48	29.88	5.93	1.40	7.34	5,554.65

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/4/2010-1/29/2010 Active Days: 20	2.15	12.34	9.34	0.00	0.01	1.04	1.05	0.00	0.96	0.96	1,203.41
Asphalt 01/04/2010-02/08/2010	2.15	12.34	9.34	0.00	0.01	1.04	1.05	0.00	0.96	0.96	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 2/1/2010-2/8/2010 Active Days: 6	**8.62**	**69.08**	**39.35**	0.02	350.08	**4.04**	**354.13**	73.12	**3.72**	**76.84**	**7,218.15**
Asphalt 01/04/2010-02/08/2010	2.15	12.34	9.34	0.00	0.01	1.04	1.05	0.00	0.96	0.96	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Mass Grading 02/01/2010-11/26/2010	6.47	56.74	30.02	0.02	350.07	3.00	353.07	73.12	2.76	75.88	6,014.74
Mass Grading Dust	0.00	0.00	0.00	0.00	350.00	0.00	350.00	73.09	0.00	73.09	0.00
Mass Grading Off Road Diesel	5.59	43.59	23.62	0.00	0.00	2.52	2.52	0.00	2.32	2.32	3,963.89
Mass Grading On Road Diesel	0.80	13.03	4.14	0.02	0.07	0.47	0.54	0.02	0.44	0.46	1,872.56
Mass Grading Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28

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Time Slice 2/9/2010-8/13/2010 Active Days: 134	6.47	56.74	30.02	0.02	350.07	3.00	353.07	73.12	2.76	75.88	6,014.74
Mass Grading 02/01/2010-11/26/2010	6.47	56.74	30.02	0.02	350.07	3.00	353.07	73.12	2.76	75.88	6,014.74
Mass Grading Dust	0.00	0.00	0.00	0.00	350.00	0.00	350.00	73.09	0.00	73.09	0.00
Mass Grading Off Road Diesel	5.59	43.59	23.62	0.00	0.00	2.52	2.52	0.00	2.32	2.32	3,963.89
Mass Grading On Road Diesel	0.80	13.03	4.14	0.02	0.07	0.47	0.54	0.02	0.44	0.46	1,872.56
Mass Grading Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 8/16/2010-11/26/2010 Active Days: 75	7.80	66.35	37.92	**0.02**	**350.09**	3.59	353.68	**73.12**	3.30	76.42	7,189.23
Building 08/15/2010-12/31/2010	1.32	9.60	7.90	0.00	0.01	0.59	0.61	0.00	0.54	0.55	1,174.49
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34
Mass Grading 02/01/2010-11/26/2010	6.47	56.74	30.02	0.02	350.07	3.00	353.07	73.12	2.76	75.88	6,014.74
Mass Grading Dust	0.00	0.00	0.00	0.00	350.00	0.00	350.00	73.09	0.00	73.09	0.00
Mass Grading Off Road Diesel	5.59	43.59	23.62	0.00	0.00	2.52	2.52	0.00	2.32	2.32	3,963.89
Mass Grading On Road Diesel	0.80	13.03	4.14	0.02	0.07	0.47	0.54	0.02	0.44	0.46	1,872.56
Mass Grading Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 11/29/2010-12/31/2010 Active Days: 25	1.32	9.60	7.90	0.00	0.01	0.59	0.61	0.00	0.54	0.55	1,174.49
Building 08/15/2010-12/31/2010	1.32	9.60	7.90	0.00	0.01	0.59	0.61	0.00	0.54	0.55	1,174.49
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34

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Time Slice 1/1/2011-12/30/2011 Active Days: 312	4.12	38.11	16.24	0.00	60.01	1.48	61.49	12.54	1.40	13.94	5,554.65
Fine Grading 01/01/2011- 12/30/2011	4.12	38.11	16.24	0.00	60.01	1.48	61.49	12.54	1.40	13.94	5,554.65
Fine Grading Dust	0.00	0.00	0.00	0.00	60.00	0.00	60.00	12.53	0.00	12.53	0.00
Fine Grading Off Road Diesel	4.00	37.91	12.66	0.00	0.00	1.47	1.47	0.00	1.40	1.40	5,248.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.12	0.20	3.58	0.00	0.01	0.01	0.02	0.01	0.01	0.01	305.80

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

Total Acres Disturbed: 3

Maximum Daily Acreage Disturbed: 3

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2704 hrs/year
1 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (260 hp) operating at a 0.62 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2080 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2912 hrs/year

Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

Total Acres Disturbed: 70

Maximum Daily Acreage Disturbed: 17.5

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Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 465.12

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

Acres to be Paved: 1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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Time Slice 1/4/2010-1/29/2010 Active Days: 20	2.15	9.96	9.34	0.00	0.01	0.58	0.59	0.00	0.53	0.54	1,203.41
Asphalt 01/04/2010-02/08/2010	2.15	9.96	9.34	0.00	0.01	0.58	0.59	0.00	0.53	0.54	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	9.51	6.98	0.00	0.00	0.56	0.56	0.00	0.52	0.52	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 2/1/2010-2/8/2010 Active Days: 6	**8.62**	58.26	**39.35**	0.02	87.28	2.43	89.71	18.24	2.23	20.47	**7,218.15**
Asphalt 01/04/2010-02/08/2010	2.15	9.96	9.34	0.00	0.01	0.58	0.59	0.00	0.53	0.54	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	9.51	6.98	0.00	0.00	0.56	0.56	0.00	0.52	0.52	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Mass Grading 02/01/2010-11/26/2010	6.47	48.30	30.02	0.02	87.27	1.85	89.12	18.23	1.70	19.93	6,014.74
Mass Grading Dust	0.00	0.00	0.00	0.00	87.20	0.00	87.20	18.21	0.00	18.21	0.00
Mass Grading Off Road Diesel	5.59	35.14	23.62	0.00	0.00	1.37	1.37	0.00	1.26	1.26	3,963.89
Mass Grading On Road Diesel	0.80	13.03	4.14	0.02	0.07	0.47	0.54	0.02	0.44	0.46	1,872.56
Mass Grading Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28

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Time Slice 2/9/2010-8/13/2010 Active Days: 134	6.47	48.30	30.02	0.02	87.27	1.85	89.12	18.23	1.70	19.93	6,014.74
Mass Grading 02/01/2010-11/26/2010	6.47	48.30	30.02	0.02	87.27	1.85	89.12	18.23	1.70	19.93	6,014.74
Mass Grading Dust	0.00	0.00	0.00	0.00	87.20	0.00	87.20	18.21	0.00	18.21	0.00
Mass Grading Off Road Diesel	5.59	35.14	23.62	0.00	0.00	1.37	1.37	0.00	1.26	1.26	3,963.89
Mass Grading On Road Diesel	0.80	13.03	4.14	0.02	0.07	0.47	0.54	0.02	0.44	0.46	1,872.56
Mass Grading Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 8/16/2010-11/26/2010 Active Days: 75	7.80	56.07	37.92	**0.02**	87.28	2.18	89.47	18.24	2.01	20.25	7,189.23
Building 08/15/2010-12/31/2010	1.32	7.77	7.90	0.00	0.01	0.33	0.35	0.00	0.31	0.31	1,174.49
Building Off Road Diesel	1.21	7.33	4.81	0.00	0.00	0.32	0.32	0.00	0.29	0.29	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34
Mass Grading 02/01/2010-11/26/2010	6.47	48.30	30.02	0.02	87.27	1.85	89.12	18.23	1.70	19.93	6,014.74
Mass Grading Dust	0.00	0.00	0.00	0.00	87.20	0.00	87.20	18.21	0.00	18.21	0.00
Mass Grading Off Road Diesel	5.59	35.14	23.62	0.00	0.00	1.37	1.37	0.00	1.26	1.26	3,963.89
Mass Grading On Road Diesel	0.80	13.03	4.14	0.02	0.07	0.47	0.54	0.02	0.44	0.46	1,872.56
Mass Grading Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 11/29/2010-12/31/2010 Active Days: 25	1.32	7.77	7.90	0.00	0.01	0.33	0.35	0.00	0.31	0.31	1,174.49
Building 08/15/2010-12/31/2010	1.32	7.77	7.90	0.00	0.01	0.33	0.35	0.00	0.31	0.31	1,174.49
Building Off Road Diesel	1.21	7.33	4.81	0.00	0.00	0.32	0.32	0.00	0.29	0.29	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34

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Time Slice 1/1/2011-12/30/2011 Active Days: 312	4.12	38.11	16.24	0.00	28.40	1.48	29.88	5.93	1.40	7.34	5,554.65
Fine Grading 01/01/2011-12/30/2011	4.12	38.11	16.24	0.00	28.40	1.48	29.88	5.93	1.40	7.34	5,554.65
Fine Grading Dust	0.00	0.00	0.00	0.00	28.39	0.00	28.39	5.93	0.00	5.93	0.00
Fine Grading Off Road Diesel	4.00	37.91	12.66	0.00	0.00	1.47	1.47	0.00	1.40	1.40	5,248.84
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.12	0.20	3.58	0.00	0.01	0.01	0.02	0.01	0.01	0.01	305.80

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

The following mitigation measures apply to Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 63% PM25: 63%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Excavators, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

The following mitigation measures apply to Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

The following mitigation measures apply to Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

For Cranes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Forklifts, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

3/16/2011 2:17:11 PM

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.23	0.19	0.00	0.00	0.00	276.48
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.20						
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Area Source Changes to Defaults

3/16/2011 2:17:23 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Construction (2010) Ops (2011) - Windrow.urb924

Project Name: sonoma compost 2010-2011 Const and Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (tons/year unmitigated)	0.79	6.74	3.74	0.00	37.63	0.37	38.00	7.86	0.34	8.20	720.95
2010 TOTALS (tons/year mitigated)	0.79	5.71	3.74	0.00	9.38	0.22	9.61	1.96	0.20	2.17	720.95
Percent Reduction	0.00	15.29	0.00	0.00	75.07	39.01	74.72	75.06	39.02	73.58	0.00
2011 TOTALS (tons/year unmitigated)	0.64	5.94	2.53	0.00	9.36	0.23	9.59	1.96	0.22	2.17	866.52
2011 TOTALS (tons/year mitigated)	0.64	5.94	2.53	0.00	4.43	0.23	4.66	0.93	0.22	1.14	866.52
Percent Reduction	0.00	0.00	0.00	0.00	52.68	0.00	51.41	52.67	0.00	47.37	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2010	0.79	6.74	3.74	0.00	37.63	0.37	38.00	7.86	0.34	8.20	720.95
Asphalt 01/04/2010-02/08/2010	0.03	0.16	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	15.64
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.03	0.15	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	12.73
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Mass Grading 02/01/2010-11/26/2010	0.70	6.10	3.23	0.00	37.63	0.32	37.96	7.86	0.30	8.16	646.58
Mass Grading Dust	0.00	0.00	0.00	0.00	37.63	0.00	37.63	7.86	0.00	7.86	0.00
Mass Grading Off Road Diesel	0.60	4.69	2.54	0.00	0.00	0.27	0.27	0.00	0.25	0.25	426.12
Mass Grading On Road Diesel	0.09	1.40	0.45	0.00	0.01	0.05	0.06	0.00	0.05	0.05	201.30
Mass Grading Worker Trips	0.01	0.01	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.17
Building 08/15/2010-12/31/2010	0.07	0.48	0.40	0.00	0.00	0.03	0.03	0.00	0.03	0.03	58.72
Building Off Road Diesel	0.06	0.46	0.24	0.00	0.00	0.03	0.03	0.00	0.03	0.03	44.67
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79
Building Worker Trips	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.27
2011	0.64	5.94	2.53	0.00	9.36	0.23	9.59	1.96	0.22	2.17	866.52
Fine Grading 01/01/2011-12/30/2011	0.64	5.94	2.53	0.00	9.36	0.23	9.59	1.96	0.22	2.17	866.52
Fine Grading Dust	0.00	0.00	0.00	0.00	9.36	0.00	9.36	1.95	0.00	1.95	0.00
Fine Grading Off Road Diesel	0.62	5.91	1.98	0.00	0.00	0.23	0.23	0.00	0.22	0.22	818.82
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.71

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

Total Acres Disturbed: 3

Maximum Daily Acreage Disturbed: 3

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2704 hrs/year
1 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (260 hp) operating at a 0.62 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2080 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2912 hrs/year

Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

Total Acres Disturbed: 70

Maximum Daily Acreage Disturbed: 17.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 465.12

Off-Road Equipment:

1 Excavators (168 hp) operating at a 0.57 load factor for 8 hours per day

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

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Acres to be Paved: 1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2010	0.79	5.71	3.74	0.00	9.38	0.22	9.61	1.96	0.20	2.17	720.95
Asphalt 01/04/2010-02/08/2010	0.03	0.13	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	15.64
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.03	0.12	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	12.73
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Mass Grading 02/01/2010-11/26/2010	0.70	5.19	3.23	0.00	9.38	0.20	9.58	1.96	0.18	2.14	646.58
Mass Grading Dust	0.00	0.00	0.00	0.00	9.37	0.00	9.37	1.96	0.00	1.96	0.00
Mass Grading Off Road Diesel	0.60	3.78	2.54	0.00	0.00	0.15	0.15	0.00	0.14	0.14	426.12
Mass Grading On Road Diesel	0.09	1.40	0.45	0.00	0.01	0.05	0.06	0.00	0.05	0.05	201.30
Mass Grading Worker Trips	0.01	0.01	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.17
Building 08/15/2010-12/31/2010	0.07	0.39	0.40	0.00	0.00	0.02	0.02	0.00	0.02	0.02	58.72
Building Off Road Diesel	0.06	0.37	0.24	0.00	0.00	0.02	0.02	0.00	0.01	0.01	44.67
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79
Building Worker Trips	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.27
2011	0.64	5.94	2.53	0.00	4.43	0.23	4.66	0.93	0.22	1.14	866.52
Fine Grading 01/01/2011-12/30/2011	0.64	5.94	2.53	0.00	4.43	0.23	4.66	0.93	0.22	1.14	866.52
Fine Grading Dust	0.00	0.00	0.00	0.00	4.43	0.00	4.43	0.92	0.00	0.92	0.00
Fine Grading Off Road Diesel	0.62	5.91	1.98	0.00	0.00	0.23	0.23	0.00	0.22	0.22	818.82
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.71

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

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For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

The following mitigation measures apply to Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 63% PM25: 63%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Excavators, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 15% PM10: 50% PM25: 50%

The following mitigation measures apply to Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

3/16/2011 2:17:23 PM

The following mitigation measures apply to Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

For Cranes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Forklifts, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.04	0.04	0.00	0.00	0.00	50.46
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.04						
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Area Source Changes to Defaults

URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2030 – WINDROW COMPOSTING OPTION

3/16/2011 2:19:10 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Ops (2030) - Windrow.urb924

Project Name: sonoma compost 2030

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030 TOTALS (lbs/day unmitigated)	3.86	6.08	26.94	0.01	120.03	0.18	120.21	25.07	0.17	25.24	11,112.25
2030 TOTALS (lbs/day mitigated)	3.86	6.08	26.94	0.01	56.80	0.18	56.98	11.87	0.17	12.04	11,112.25

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

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	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2030-12/31/2030 Active Days: 313	**3.86**	**6.08**	**26.94**	**0.01**	**120.03**	**0.18**	**120.21**	**25.07**	**0.17**	**25.24**	**11,112.25**
Fine Grading 01/01/2030-12/31/2030	3.86	6.08	26.94	0.01	120.03	0.18	120.21	25.07	0.17	25.24	11,112.25
Fine Grading Dust	0.00	0.00	0.00	0.00	120.00	0.00	120.00	25.06	0.00	25.06	0.00
Fine Grading Off Road Diesel	3.82	6.00	25.31	0.00	0.00	0.16	0.16	0.00	0.16	0.16	10,497.68
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.04	0.07	1.63	0.01	0.03	0.02	0.05	0.01	0.01	0.02	614.57

Phase Assumptions

Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

Total Acres Disturbed: 6

Maximum Daily Acreage Disturbed: 6

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

14 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2704 hrs/year
2 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (260 hp) operating at a 0.62 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2080 hrs/year

2 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2912 hrs/year

3/16/2011 2:19:10 PM

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2030-12/31/2030 Active Days: 313	**3.86**	**6.08**	**26.94**	**0.01**	56.80	**0.18**	56.98	11.87	**0.17**	12.04	**11,112.25**
Fine Grading 01/01/2030-12/31/2030	3.86	6.08	26.94	0.01	56.80	0.18	56.98	11.87	0.17	12.04	11,112.25
Fine Grading Dust	0.00	0.00	0.00	0.00	56.77	0.00	56.77	11.86	0.00	11.86	0.00
Fine Grading Off Road Diesel	3.82	6.00	25.31	0.00	0.00	0.16	0.16	0.00	0.16	0.16	10,497.68
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.04	0.07	1.63	0.01	0.03	0.02	0.05	0.01	0.01	0.02	614.57

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

3/16/2011 2:19:10 PM

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.23	0.19	0.00	0.00	0.00	276.48
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.20						
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Area Source Changes to Defaults

3/16/2011 2:19:24 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Ops (2030) - Windrow.urb924

Project Name: sonoma compost 2030

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030 TOTALS (tons/year unmitigated)	0.60	0.95	4.22	0.00	18.78	0.03	18.81	3.92	0.03	3.95	1,739.07
2030 TOTALS (tons/year mitigated)	0.60	0.95	4.22	0.00	8.89	0.03	8.92	1.86	0.03	1.88	1,739.07
Percent Reduction	0.00	0.00	0.00	0.00	52.68	0.00	52.60	52.67	0.00	52.31	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Construction Unmitigated Detail Report:

3/16/2011 2:19:24 PM

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030	0.60	0.95	4.22	0.00	18.78	0.03	18.81	3.92	0.03	3.95	1,739.07
Fine Grading 01/01/2030-12/31/2030	0.60	0.95	4.22	0.00	18.78	0.03	18.81	3.92	0.03	3.95	1,739.07
Fine Grading Dust	0.00	0.00	0.00	0.00	18.78	0.00	18.78	3.92	0.00	3.92	0.00
Fine Grading Off Road Diesel	0.60	0.94	3.96	0.00	0.00	0.03	0.03	0.00	0.03	0.03	1,642.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.01	0.01	0.26	0.00	0.00	0.00	0.01	0.00	0.00	0.00	96.18

Phase Assumptions

Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

Total Acres Disturbed: 6

Maximum Daily Acreage Disturbed: 6

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

14 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2704 hrs/year
2 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (260 hp) operating at a 0.62 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2080 hrs/year

2 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2912 hrs/year

3/16/2011 2:19:24 PM

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030	0.60	0.95	4.22	0.00	8.89	0.03	8.92	1.86	0.03	1.88	1,739.07
Fine Grading 01/01/2030-12/31/2030	0.60	0.95	4.22	0.00	8.89	0.03	8.92	1.86	0.03	1.88	1,739.07
Fine Grading Dust	0.00	0.00	0.00	0.00	8.88	0.00	8.88	1.86	0.00	1.86	0.00
Fine Grading Off Road Diesel	0.60	0.94	3.96	0.00	0.00	0.03	0.03	0.00	0.03	0.03	1,642.89
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.01	0.01	0.26	0.00	0.00	0.00	0.01	0.00	0.00	0.00	96.18

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

3/16/2011 2:19:24 PM

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.04	0.04	0.00	0.00	0.00	50.46
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.04						
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Area Source Changes to Defaults

URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2011 – ASP COMPOSTING OPTION

3/16/2011 2:18:10 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Ops (2011) - ASP.urb924

Project Name: sonoma compost 2011 ASP Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (lbs/day unmitigated)	3.79	35.75	14.96	0.00	40.01	1.36	41.37	8.36	1.29	9.64	5,024.70
2011 TOTALS (lbs/day mitigated)	3.79	35.75	14.96	0.00	18.94	1.36	20.29	3.96	1.29	5.24	5,024.70

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

3/16/2011 2:18:10 PM

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2011-12/30/2011 Active Days: 312	**3.79**	**35.75**	**14.96**	**0.00**	**40.01**	**1.36**	**41.37**	**8.36**	**1.29**	**9.64**	**5,024.70**
Fine Grading 01/01/2011-12/30/2011	3.79	35.75	14.96	0.00	40.01	1.36	41.37	8.36	1.29	9.64	5,024.70
Fine Grading Dust	0.00	0.00	0.00	0.00	40.00	0.00	40.00	8.35	0.00	8.35	0.00
Fine Grading Off Road Diesel	3.68	35.57	11.68	0.00	0.00	1.35	1.35	0.00	1.28	1.28	4,744.38
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.18	3.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	280.32

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

Total Acres Disturbed: 2

Maximum Daily Acreage Disturbed: 2

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2704 hrs/year
1 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2912 hrs/year

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2011-12/30/2011 Active Days: 312	**3.79**	**35.75**	**14.96**	**0.00**	18.94	**1.36**	20.29	3.96	**1.29**	5.24	**5,024.70**
Fine Grading 01/01/2011-12/30/2011	3.79	35.75	14.96	0.00	18.94	1.36	20.29	3.96	1.29	5.24	5,024.70
Fine Grading Dust	0.00	0.00	0.00	0.00	18.92	0.00	18.92	3.95	0.00	3.95	0.00
Fine Grading Off Road Diesel	3.68	35.57	11.68	0.00	0.00	1.35	1.35	0.00	1.28	1.28	4,744.38
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.18	3.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	280.32

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.23	0.19	0.00	0.00	0.00	276.48
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.20						
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Area Source Changes to Defaults

3/16/2011 2:18:23 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Ops (2011) - ASP.urb924

Project Name: sonoma compost 2011 ASP Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011 TOTALS (tons/year unmitigated)	0.59	5.58	2.33	0.00	6.24	0.21	6.45	1.30	0.20	1.50	783.85
2011 TOTALS (tons/year mitigated)	0.59	5.58	2.33	0.00	2.95	0.21	3.17	0.62	0.20	0.82	783.85
Percent Reduction	0.00	0.00	0.00	0.00	52.67	0.00	50.95	52.66	0.00	45.64	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Construction Unmitigated Detail Report:

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CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011	0.59	5.58	2.33	0.00	6.24	0.21	6.45	1.30	0.20	1.50	783.85
Fine Grading 01/01/2011-12/30/2011	0.59	5.58	2.33	0.00	6.24	0.21	6.45	1.30	0.20	1.50	783.85
Fine Grading Dust	0.00	0.00	0.00	0.00	6.24	0.00	6.24	1.30	0.00	1.30	0.00
Fine Grading Off Road Diesel	0.57	5.55	1.82	0.00	0.00	0.21	0.21	0.00	0.20	0.20	740.12
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.73

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

Total Acres Disturbed: 2

Maximum Daily Acreage Disturbed: 2

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2704 hrs/year

1 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2912 hrs/year

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2011	0.59	5.58	2.33	0.00	2.95	0.21	3.17	0.62	0.20	0.82	783.85
Fine Grading 01/01/2011-12/30/2011	0.59	5.58	2.33	0.00	2.95	0.21	3.17	0.62	0.20	0.82	783.85
Fine Grading Dust	0.00	0.00	0.00	0.00	2.95	0.00	2.95	0.62	0.00	0.62	0.00
Fine Grading Off Road Diesel	0.57	5.55	1.82	0.00	0.00	0.21	0.21	0.00	0.20	0.20	740.12
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.73

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

3/16/2011 2:18:23 PM

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.04	0.04	0.00	0.00	0.00	50.46
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.04						
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Area Source Changes to Defaults

URBEMIS2007 MODEL RESULTS FOR PROJECT YEAR 2030 – ASP COMPOSTING OPTION

3/16/2011 2:16:06 PM

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Ops (2030) - ASP.urb924

Project Name: sonoma compost 2030

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030 TOTALS (lbs/day unmitigated)	3.54	5.55	24.84	0.01	80.03	0.16	80.19	16.72	0.16	16.87	10,052.12
2030 TOTALS (lbs/day mitigated)	3.54	5.55	24.84	0.01	37.88	0.16	38.03	7.91	0.16	8.07	10,052.12

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

3/16/2011 2:16:06 PM

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2030-12/31/2030 Active Days: 313	**3.54**	**5.55**	**24.84**	**0.01**	**80.03**	**0.16**	**80.19**	**16.72**	**0.16**	**16.87**	**10,052.12**
Fine Grading 01/01/2030-12/31/2030	3.54	5.55	24.84	0.01	80.03	0.16	80.19	16.72	0.16	16.87	10,052.12
Fine Grading Dust	0.00	0.00	0.00	0.00	80.00	0.00	80.00	16.71	0.00	16.71	0.00
Fine Grading Off Road Diesel	3.51	5.48	23.35	0.00	0.00	0.15	0.15	0.00	0.15	0.15	9,488.76
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.07	1.50	0.01	0.03	0.01	0.04	0.01	0.01	0.02	563.36

Phase Assumptions

Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

Total Acres Disturbed: 4

Maximum Daily Acreage Disturbed: 4

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

14 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2704 hrs/year
2 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2912 hrs/year

3/16/2011 2:16:06 PM

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2030-12/31/2030 Active Days: 313	**3.54**	**5.55**	**24.84**	**0.01**	37.88	**0.16**	38.03	7.91	**0.16**	8.07	**10,052.12**
Fine Grading 01/01/2030-12/31/2030	3.54	5.55	24.84	0.01	37.88	0.16	38.03	7.91	0.16	8.07	10,052.12
Fine Grading Dust	0.00	0.00	0.00	0.00	37.85	0.00	37.85	7.90	0.00	7.90	0.00
Fine Grading Off Road Diesel	3.51	5.48	23.35	0.00	0.00	0.15	0.15	0.00	0.15	0.15	9,488.76
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.03	0.07	1.50	0.01	0.03	0.01	0.04	0.01	0.01	0.02	563.36

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

3/16/2011 2:16:06 PM

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.23	0.19	0.00	0.00	0.00	276.48
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.20						
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Area Source Changes to Defaults

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 5A\Ops (2030) - ASP.urb924

Project Name: sonoma compost 2030

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030 TOTALS (tons/year unmitigated)	0.55	0.87	3.89	0.00	12.52	0.02	12.55	2.62	0.02	2.64	1,573.16
2030 TOTALS (tons/year mitigated)	0.55	0.87	3.89	0.00	5.93	0.02	5.95	1.24	0.02	1.26	1,573.16
Percent Reduction	0.00	0.00	0.00	0.00	52.67	0.00	52.57	52.66	0.00	52.17	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Construction Unmitigated Detail Report:

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CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030	0.55	0.87	3.89	0.00	12.52	0.02	12.55	2.62	0.02	2.64	1,573.16
Fine Grading 01/01/2030-12/31/2030	0.55	0.87	3.89	0.00	12.52	0.02	12.55	2.62	0.02	2.64	1,573.16
Fine Grading Dust	0.00	0.00	0.00	0.00	12.52	0.00	12.52	2.61	0.00	2.61	0.00
Fine Grading Off Road Diesel	0.55	0.86	3.65	0.00	0.00	0.02	0.02	0.00	0.02	0.02	1,484.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.01	0.01	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.00	88.17

Phase Assumptions

Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

Total Acres Disturbed: 4

Maximum Daily Acreage Disturbed: 4

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

14 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2704 hrs/year
2 Water Trucks (275 hp) operating at a 0.5 load factor for 2.5 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Forklifts (93 hp) operating at a 0.3 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (580 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2496 hrs/year

2 Other Equipment (139 hp) operating at a 0.62 load factor for 2.4 hours per day; Engine Built/Rebuilt in 2025 with average useage of 2912 hrs/year

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2030	0.55	0.87	3.89	0.00	5.93	0.02	5.95	1.24	0.02	1.26	1,573.16
Fine Grading 01/01/2030-12/31/2030	0.55	0.87	3.89	0.00	5.93	0.02	5.95	1.24	0.02	1.26	1,573.16
Fine Grading Dust	0.00	0.00	0.00	0.00	5.92	0.00	5.92	1.24	0.00	1.24	0.00
Fine Grading Off Road Diesel	0.55	0.86	3.65	0.00	0.00	0.02	0.02	0.00	0.02	0.02	1,484.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.01	0.01	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.00	88.17

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2030 - 12/31/2030 - Off-road Equipment Ops

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.04	0.04	0.00	0.00	0.00	50.46
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.04						
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Area Source Changes to Defaults

EMFAC2007 MODEL RESULTS FOR PROJECT OPERATIONS (YEAR 2011 WEEKDAY AND SATURDAY)

MILEAGE BETWEEN SONOMA COUNTY TRANSFER STATIONS AND PROPOSED COMPOST SITE

	MOM Trucks	**PROJECT COMPOST SITE** 3/4 of a mile up Twin House Ranch Road Petaluma, CA	% of trips
TRANSFER STATIONS	**Annapolis** 33549 Annapolis Road Annapolis, CA 95412 707) 886-5204	90.1	0.50%
	Guerneville 13450 Pocket Dr. Guerneville, CA 95446 (707) 869-3878	38.7	7.90%
	Healdsburg 166 Alexander Valley Rd Healdsburg, CA 95448 (707) 433-0321	45.9	41.60%
	Sonoma 4376 Stage Gulch Rd Sonoma, CA 95476 (707) 996-6597	10.7	50.00%
			100.00%

Assuming Source ~ Waste Centroid	Distance to Project (Miles)
Haul Trucks	22
Self Haul Vehicles	22
Compost Sales	22
Bio Fuel/Ag Trucks	22
Employees	22
	Distance to Project (Miles)
MOM Trucks (Weighted Avg from abov	28.0

Project Weekday -- Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost
grams/mile

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

LDA	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 56 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 44 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032		
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	44	139	6116	1.29	39.95	3.08	5216.28	0.43	19.03	1.08
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038		
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	44	40	1760	0.33	8.80	2.36	2145.27	0.15	5.48	0.31
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239		
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	56	7	392	0.30	3.77	5.28	1153.69	0.21	1.22	0.07

Total Trips 186

	2011 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	2	44	8	6370	1	1	25.73	1.47	lbs/day
tons/year	0	6	1	751	0	0	3	0	tons/year
				metric tons					

Project Saturday -- Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost
grams/mile

LDA	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 56 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 44 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

Emission Factors

				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032		
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	44	181	7964	1.69	52.02	4.01	6792.42	0.56	24.78	1.41
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038		
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	44	8	352	0.07	1.76	0.47	429.05	0.03	1.10	0.06
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239		
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	56	5	280	0.21	2.70	3.77	824.07	0.15	0.87	0.05

Total Trips 194

	2011 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	2	55	8	7616	1	1	26.75	1.52	lbs/day
tons/year	0	1	0	180	0	0	3	0	tons/year
				metric tons					

EMFAC2007 MODEL RESULTS FOR PROJECT OPERATIONS (YEAR 2030 WEEKDAY AND SATURDAY)

Project Weekday -- Air Quality Analysis for Mobile Emissions Year 2030
Sonoma Compost
grams/mile

LDA	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.008	0.512	0.029	345.618	0.028
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.014	0.817	0.055	432.488	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.02	0.886	0.152	553.908	0.039
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.097	0.871	1.124	1332.589	0.108

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 56 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 44 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2030

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
LDV	2030 emissions (grams/mile)			0.011	0.6645	0.042	389.053	0.0315	dust	dust
	2030 emissions (pounds/mile)			2.43E-05	1.46E-03	9.26E-05	8.58E-01	6.94E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day		Mobile Source Emissions (lbs/day)				lbs/day	lbs/day
	44	275	12100	0.29	17.73	1.12	10378.25	0.84	37.65	2.15
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
MDT	2030 emissions (grams/mile)			0.02	0.886	0.152	553.908	0.039	dust	dust
	2030 emissions (pounds/mile)			4.41E-05	1.95E-03	3.35E-04	1.22E+00	8.60E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day		Mobile Source Emissions (lbs/day)				lbs/day	lbs/day
	44	79	3476	0.15	6.79	1.16	4244.70	0.30	10.82	0.62
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
	2030 emissions (grams/mile)			0.097	0.871	1.124	1332.589	0.108	dust	dust
	2030 emissions (pounds/mile)			2.14E-04	1.92E-03	2.48E-03	2.94E+00	2.38E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day		Mobile Source Emissions (lbs/day)				lbs/day	lbs/day
	56	14	784	0.17	1.51	1.94	2303.26	0.19	2.44	0.14

Total Trips 368

	2030 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	0	19	3	12682	1	1	50.91	2.90	lbs/day
tons/year	0	3	0	1496	0	0	7	0	tons/year
				metric tons					

Project Saturday -- Air Quality Analysis for Mobile Emissions Year 2030
Sonoma Compost
grams/mile

LDA	ROG	CO	NOx	CO2	PM10
2030	0.008	0.512	0.029	345.618	0.028
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.014	0.817	0.055	432.488	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.02	0.886	0.152	553.908	0.039
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.097	0.871	1.124	1332.589	0.108

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 56 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 44 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2030

				Emission Factors					
			ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2030 emissions (grams/mile)		0.011	0.6645	0.042	389.053	0.0315		
	2030 emissions (pounds/mile)		2.43E-05	1.46E-03	9.26E-05	8.58E-01	6.94E-05	3.11E-03	1.77E-04
Miles/Trip	Trips/day	Miles/day		Mobile Source Emissions (lbs/day)				lbs/day	lbs/day
44	353	15532	0.38	22.75	1.44	13321.89	1.08	48.33	2.75
			ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2030 emissions (grams/mile)		0.02	0.886	0.152	553.908	0.039		
	2030 emissions (pounds/mile)		4.41E-05	1.95E-03	3.35E-04	1.22E+00	8.60E-05	3.11E-03	1.77E-04
Miles/Trip	Trips/day	Miles/day		Mobile Source Emissions (lbs/day)				lbs/day	lbs/day
44	16	704	0.03	1.38	0.24	859.69	0.06	2.19	0.12
HDT			ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2030 emissions (grams/mile)		0.097	0.871	1.124	1332.589	0.108		
	2030 emissions (pounds/mile)		2.14E-04	1.92E-03	2.48E-03	2.94E+00	2.38E-04	3.11E-03	1.77E-04
Miles/Trip	Trips/day	Miles/day		Mobile Source Emissions (lbs/day)				lbs/day	lbs/day
56	10	560	0.12	1.08	1.39	1645.18	0.13	1.74	0.10

Total Trips 379

	2030 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	0	24	3	14967	1	1	52.27	2.98	lbs/day
tons/year	0	1	0	353	0	0	7	0	tons/year
				metric tons					

EMFAC2007 MODEL RESULTS FOR EXISTING OPERATIONS (WEEKDAY AND SATURDAY)

MILEAGE BETWEEN SONOMA COUNTY TRANSFER STATIONS AND EXISTING SITE

		EXISTING COMPOST SITE 550 Meacham Rd Petaluma, CA	% of trips
MOM Trucks			
TRANSFER STATIONS	**Annapolis** 33549 Annapolis Road Annapolis, CA 95412 707) 886-5204	67.5	0.50%
	Guerneville 13450 Pocket Dr. Guerneville, CA 95446 (707) 869-3878	20.9	7.90%
	Healdsburg 166 Alexander Valley Rd Healdsburg, CA 95448 (707) 433-0321	30.7	41.60%
	Sonoma 4376 Stage Gulch Rd Sonoma, CA 95476 (707) 996-6597	19	50.00%
			100.00%

Assuming Source ~ Waste Centroid (Todd Rd and Highway 101)	Distance to Project (Miles)
Haul Trucks	8
Self Haul Vehicles	8
Compost Sales	8
Bio Fuel/Ag Trucks	8
Employees	8
	Distance to Project (Miles)
MOM Trucks (Weighted Avg from above)	24.3

Existing Weekday -- Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost
grams/mile

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

LDA	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 49 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 16 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032		
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	139	2224	0.47	14.53	1.12	1896.83	0.16	6.92	0.39
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038		
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	40	640	0.12	3.20	0.86	780.10	0.05	1.99	0.11
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239		
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	49	7	343	0.26	3.30	4.62	1009.48	0.18	1.07	0.06

Total Trips 186

	2011 - On-road Vehicle Exhaust per day						Fugitive Dust		
	ROG	CO	Nox	CO2	PM10	PM2.5	PM10	PM2.5	
lbs/day	1	18	6	2906	0	0	9.98	0.57	lbs/day
tons/year	0	2	1	343	0	0	1	0	tons/year
				metric tons					

Existing Saturday -- Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost
grams/mile

LDA	ROG	CO	NOx	CO2	PM10
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 49 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 16 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

Emission Factors

				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032		
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	181	2896	0.61	18.92	1.46	2469.97	0.20	9.01	0.51
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038		
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	8	128	0.02	0.64	0.17	156.02	0.01	0.40	0.02
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239		
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	49	5	245	0.19	2.36	3.30	721.06	0.13	0.76	0.04

Total Trips 194

	2011 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	1	21	5	3191	0	0	10.17	0.58	lbs/day
tons/year	0	1	0	75	0	0	1	0	tons/year
				metric tons					

PROJECT WINDROW COMPOSTING EMISSIONS

Project Windrow Composting Emissions

Emissions from Composting Year 2011

	Emission Factors (lbs/ton of material)	
	VOC	Ammonia
Composting	2.6	0.83

	Annual Throughput (tons)	Emissions (lbs/day)	
	Proposed Project	Proposed Project	
		VOC	Ammonia
Composting	100,000	712	227

a) Daily emissions calculated from annual emissions divided by 365 days.

ROG Emissions from Composting

	VOC Emissions (lbs/day)
	Proposed Project
Composting	712

Emissions from Composting Year 2030

	Emission Factors (lbs/ton of material)	
	VOC	Ammonia
Composting	2.6	0.83

	Annual Throughput (tons)	Emissions (lbs/day)	
	Proposed Project	Proposed Project	
		VOC	Ammonia
Composting	200,000	1,425	455

a) Daily emissions calculated from annual emissions divided by 365 days.

ROG Emissions from Composting

	VOC Emissions (lbs/day)
	Proposed Project
Composting	1,425

PROJECT ASP COMPOSTING EMISSIONS

Project ASP Composting Emissions

Emissions from Composting Year 2011

	Emission Factors (lbs/ton of material)	
	VOC	Ammonia
Composting	2.6	0.83

	Annual Throughput (tons)	Emissions (lbs/day)	
	Proposed	Proposed Project	
	Project	VOC	Ammonia
Composting	100,000	712	227

a) Daily emissions calculated from annual emissions divided by 365 days.

ROG Emissions from Composting

	VOC Emissions (lbs/day)
	Proposed
	Project
Composting	36

Emissions from Composting Year 2030

	Emission Factors (lbs/ton of material)	
	VOC	Ammonia
Composting	2.6	0.83

	Annual Throughput (tons)	Emissions (lbs/day)	
	Proposed	Proposed Project	
	Project	VOC	Ammonia
Composting	200,000	1,425	455

a) Daily emissions calculated from annual emissions divided by 365 days.

ROG Emissions from Composting

	VOC Emissions (lbs/day)
	Proposed
	Project
Composting	71

EXISTING WINDROW COMPOSTING

Existing Composting Emissions
Windrows

Emissions from Composting Year 2011

	Emission Factors (lbs/ton of material)	
	VOC	Ammonia
Composting	2.6	0.83

	Annual Throughput (tons)	Emissions (lbs/day)	
	Proposed	Proposed Project	
	Project	VOC	Ammonia
Composting	100,000	712	227

a) Daily emissions calculated from annual emissions divided by 365 days.

ROG Emissions from Composting

	VOC Emissions (lbs/day)
	Proposed
	Project
Composting	712

PROJECT GHG ANALYSIS (YEAR 2011) WINDROW COMPOSTING

Project (Year 2011) Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions		
	pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	101,420	51	46
URBEMIS2007 Off-road Emissions	1,733,040	867	786
Total Emissions (area sources + vehicles)	**1,834,460**	**917**	**832**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Estimated Project Annual Electrical Use: 362,880 kWh (kilowatt hours)/year annual average
363 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual Project Electricity mWh	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	363	145	1	145
Nitrous Oxide (N2O)	0.0037	363	0.0	296	0
Methane (CH4)	0.0067	363	0.0	23	0
		Total Indirect GHG Emissions from Project Electricity Use=			**145**

Windrow Emissions of Methane

Estimated Project Annual Compost: 100,000 tons per year

	Emission Factor lb/ton	Annual Project tonnage	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Methane (CH4)	0.83	100,000	37.6	23	866
		Total GHG Emissions from Windrow Composting=			**866**

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Non-Road Sources (CO2 equivalent Metric Tons)

Area Sources	**46**	2.5%
Off-road Equip	**786**	42.7%
Windrow	**866**	47.0%
Electrical Use	**145**	7.9%
Total=	**1,843**	100.0%

Notes and References:

Total Emissions from Indirect Electricity Use
Formula and Emission Factor from The California Climate Action Registry Report Protocol 2009

Pg. 35 (CCARRP) gives Equations

Pg. 95 (CCARRP) gives CO2 output emission rate (lbs/mWh)
724.12 (lbs/mWh)

Pg. 94 (CCARRP) gives CO2 equivalency factors

Pg. 95 (CCARRP) gives Methane and Nitrous Oxide electricity emission factors (lbs/mWh)
Methane - 0.0302 (lbs/mWh)
Nitrous Oxide - 0.0081 (lbs/mWh)

lbs/metric ton = 2204.62

Annual kWh Calculations for Project Emissions of Electricty Used by the project

Total GHG Emissions From Industrial Electricity Use		
Miscelaneous* (kWh/sq ft/Year)	square footage	kWhours per year
10.5	34,560	362,880

*Electricity Usage Rates from Table A9-11-A South Coast AQMD CEQA Air Quality Handbook 1993 - Usage Rate is Average for SCE and LADWP

PROJECT GHG ANALYSIS (YEAR 2030) WINDROW COMPOSTING

Project (Year 2030) Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	101,420	51	46
URBEMIS2007 Off-road Emissions	3,478,140	1,739	1,578
Total Emissions (area sources + vehicles)	**3,579,560**	**1,790**	**1,624**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Estimated Project Annual Electrical Use: 362,880 kWh (kilowatt hours)/year annual average
363 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual Project Electricity mWh	Annual GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	363	145	1	145
Nitrous Oxide (N2O)	0.0037	363	0.0	296	0
Methane (CH4)	0.0067	363	0.0	23	0
		Total Indirect GHG Emissions from Project Electricity Use=			**145**

Windrow Emissions of Methane

Estimated Project Annual Compost: 200,000 tons per year

	Emission Factor lb/ton	Annual Project tonnage	Annual GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Methane (CH4)	0.83	200,000	75.3	23	1732
		Total GHG Emissions from Windrow Composting=			**1732**

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Non-Road Sources (CO2 equivalent Metric Tons)

Area Sources	**46**	1.3%
Off-road Equip	**1,578**	45.1%
Windrow	**1,732**	49.5%
Electrical Use	**145**	4.1%
Total=	**3,500**	100.0%

Notes and References:

Total Emissions from Indirect Electricity Use
Formula and Emission Factor from The California Climate Action Registry Report Protocol 2009

Pg. 35 (CCARRP) gives Equations

Pg. 95 (CCARRP) gives CO2 output emission rate (lbs/mWh)
724.12 (lbs/mWh)

Pg. 94 (CCARRP) gives CO2 equivalency factors

Pg. 95 (CCARRP) gives Methane and Nitrous Oxide electricity emission factors (lbs/mWh)
Methane - 0.0302 (lbs/mWh)
Nitrous Oxide - 0.0081 (lbs/mWh)

lbs/metric ton = 2204.62

PROJECT GHG ANALYSIS (YEAR 2011) ASP COMPOSTING

Project (Year 2011) Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions		
	pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	101,420	51	46
URBEMIS2007 Off-road Emissions	1,567,700	784	711
Total Emissions (area sources + vehicles)	**1,669,120**	**835**	**757**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Fans for ASP system
1 hp motor running for an hour = .745 kwh
2x50 hp motors, 50%load 24-7 326310 kwh/year

Estimated Project Annual Electrical Use: 689,190 kWh (kilowatt hours)/year annual average
689 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual Project Electricity mWh	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	689	275	1	275
Nitrous Oxide (N2O)	0.0037	689	0.0	296	0
Methane (CH4)	0.0067	689	0.0	23	0
		Total Indirect GHG Emissions from Project Electricity Use=			**275**

ASP Emissions of Methane

Estimated Project Annual Compost: 100,000 tons per year

	Emission Factor lb/ton	Annual Project tonnage	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Methane (CH4)	0.83	100,000	37.6	23	866
		Total GHG Emissions from Windrow Composting=			**866**

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Non-Road Sources (CO2 equivalent Metric Tons)

Area Sources	**46**	2.4%
Off-road Equip	**711**	37.5%
Windrow	**866**	45.6%
Electrical Use	**275**	14.5%
Total=	**1,898**	100.0%

Notes and References:
Total Emissions from Indirect Electricity Use
Formula and Emission Factor from The California Climate Action Registry Report Protocol 2009

Pg. 35 (CCARRP) gives Equations

Pg. 95 (CCARRP) gives CO2 output emission rate (lbs/mWh)
724.12 (lbs/mWh)

Pg. 94 (CCARRP) gives CO2 equivalency factors

Pg. 95 (CCARRP) gives Methane and Nitrous Oxide electricity emission factors (lbs/mWh)
Methane - 0.0302 (lbs/mWh)
Nitrous Oxide - 0.0081 (lbs/mWh)

lbs/metric ton = 2204.62

2010 Construction 458.53 tons
416 metric tons

Annual kWh Calculations for Project Emissions of Electricty Used by the project

Total GHG Emissions From Industrial Electricity Use

Miscelaneous* (kWh/sq ft/Year)	square footage	kWhours per year
10.5	34,560	362,880

*Electricity Usage Rates from Table A9-11-A South Coast AQMD CEQA Air Quality Handbook 1993 - Usage Rate is Average for SCE and LADWP

PROJECT GHG ANALYSIS (YEAR 2030) ASP COMPOSTING

Project (Year 2030) Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions		
	pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	101,420	51	46
URBEMIS2007 Off-road Emissions	3,146,320	1,573	1,427
Total Emissions (area sources + vehicles)	**3,247,740**	**1,624**	**1,473**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Fans for ASP system
1 hp motor running for an hour = .745 kwh
4x50 hp motors, 50%load 24-7 652620 kwh/year

Estimated Project Annual Electrical Use: 1,015,500 kWh (kilowatt hours)/year annual average
1,016 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual Project Electricity mWh	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	1,016	405	1	405
Nitrous Oxide (N2O)	0.0037	1,016	0.0	296	1
Methane (CH4)	0.0067	1,016	0.0	23	0
		Total Indirect GHG Emissions from Project Electricity Use=			**405**

ASP Emissions of Methane

Estimated Project Annual Compost: 200,000 tons per year

	Emission Factor lb/ton	Annual Project tonnage	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Methane (CH4)	0.83	200,000	75.3	23	1732
		Total GHG Emissions from Windrow Composting=			**1732**

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Non-Road Sources (CO2 equivalent Metric Tons)

Area Sources	**46**	1.3%
Off-road Equip	**1,427**	39.5%
Windrow	**1,732**	48.0%
Electrical Use	**405**	11.2%
Total=	**3,610**	100.0%

Notes and References:

Total Emissions from Indirect Electricity Use
Formula and Emission Factor from The California Climate Action Registry Report Protocol 2009

Pg. 35 (CCARRP) gives Equations

Pg. 95 (CCARRP) gives CO2 output emission rate (lbs/mWh)
724.12 (lbs/mWh)

Pg. 94 (CCARRP) gives CO2 equivalency factors

Pg. 95 (CCARRP) gives Methane and Nitrous Oxide electricity emission factors (lbs/mWh)
Methane - 0.0302 (lbs/mWh)
Nitrous Oxide - 0.0081 (lbs/mWh)

lbs/metric ton = 2204.62

EXISTING FACILITY GHG ANALYSIS

Existing Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions		
	pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	101,420	51	46
URBEMIS2007 Off-road Emissions	1,733,040	867	786
Total Emissions (area sources + vehicles)	**1,834,460**	**917**	**832**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Estimated Project Annual Electrical Use: 17,052 kWh (kilowatt hours)/year annual average
17 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual Project Electricity mWh	Annual GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	17	7	1	7
Nitrous Oxide (N2O)	0.0037	17	0.0	296	0
Methane (CH4)	0.0067	17	0.0	23	0

Total Indirect GHG Emissions from Project Electricity Use= 7

Windrow Emissions of Methane

Estimated Project Annual Compost: 100,000 tons per year

	Emission Factor lb/ton	Annual Project tonnage	Annual GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Methane (CH4)	0.83	100,000	37.6	23	866

Total GHG Emissions from Windrow Composting= 866

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Non-Road Sources (CO2 equivalent Metric Tons)

Area Sources	**46**	2.7%
Off-road Equip	**786**	46.1%
Windrow	**866**	50.8%
Electrical Use	**7**	0.4%
Total=	**1,705**	100.0%

Notes and References:

Total Emissions from Indirect Electricity Use
Formula and Emission Factor from The California Climate Action Registry Report Protocol 2009

Pg. 35 (CCARRP) gives Equations

Pg. 95 (CCARRP) gives CO2 output emission rate (lbs/mWh)
724.12 (lbs/mWh)

Pg. 94 (CCARRP) gives CO2 equivalency factors

Pg. 95 (CCARRP) gives Methane and Nitrous Oxide electricity emission factors (lbs/mWh)
Methane - 0.0302 (lbs/mWh)
Nitrous Oxide - 0.0081 (lbs/mWh)

lbs/metric ton = 2204.62

Annual kWh Calculations for Existing Emissions of Electricty Used

Total GHG Emissions From Industrial Electricity Use		
Miscelaneous* (kWh/sq ft/Year)	square footage	kWhours per year
10.5	1,624	17,052

*Electricity Usage Rates from Table A9-11-A South Coast AQMD CEQA Air Quality Handbook 1993 - Usage Rate is Average for SCE and LADWP

REFERENCES

Bay Area Air Quality Management District (BAAQMD), 1999. *BAAQMD CEQA Guidelines: Assessing the Air Quality Impacts of Projects and Plans*, December 1999.

California Climate Action Registry, 2009. *General Reporting Protocol*, January 2009.

California Integrated Waste Management Board (CIWMB), 2007. *Emissions Testing of Volatile Organic Compounds from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley*. October 31, 2007, revised May 2008.

South Coast Air Quality Management District (SCAQMD), 2003. *South Coast AQMD CEQA Air Quality Handbook.*

South Coast Air Quality Management District (SCAQMD), 2001. *Ammonia and Volatile Organic Compound (VOC) Emissions from a Greenwaste Composting Operation*.

Appendix AIR-2

Site 5A (Proposed Project) Health Risk Assessment

ESA

APPENDIX AIR-2

Site 5A (Proposed Project) Health Risk Assessment

Exposure levels of toxic air contaminants (TACs) generated by operation of the proposed facility were estimated by conducting dispersion modeling of potential TAC sources at the project site. TAC emission sources evaluated in this health risk assessment were based on information contained in the air quality section, and they include: diesel exhaust from heavy duty equipment used onsite; diesel exhaust from on-road haul trucks; and fugitive TAC emissions from composting activities. The emissions from these sources were input to the USEPA approved dispersion model AERMOD (Version 09292) to calculate ambient air concentrations in the area surrounding the project site.

TAC Emissions

Emission rates for TACs were determined for each potential source at the proposed project site. **Table 1** lists the TACs of concern and their associated sources.

TABLE 1

SOURCES OF TACS AT THE SONOMA COMPOST SITE

TAC	Source	Acute	Chronic	Carcinogen
Diesel Particulate Matter (DPM)	Heavy duty equipment; haul trucks	No	Yes	Yes
Ammonia	Composting piles	Yes	Yes	No
Methylene Chloride	Composting piles	Yes	Yes	Yes
Methyl Ethyl Ketone (MEK)	Composting piles	Yes	No	No
Methyl Chloroform	Composting piles	Yes	Yes	No
Toluene	Composting piles	Yes	Yes	No
Xylene	Composting piles	Yes	Yes	No
Benzyl Chloride	Composting piles	Yes	No	Yes
Formaldehyde	Composting piles	Yes	Yes	Yes
Acetaldehyde	Composting piles	Yes	Yes	Yes

SOURCES: Environmental Science Associates, 2009; OEHHA, 2003; and OEHHA, 2008.

Composting Emissions

Speciation profiles developed for the Andrade Road compost facility in Alameda County were utilized in this analysis (ACWMA, 2006). These profiles were developed based on source test data from the Inland Composting and Organics Recycling facility located in Colton, California.

Approximately 80 percent of material processed at the Inland Composting facility is curbside green waste with the remainder consisting primarily of wood waste. Since materials processed at the site are similar to those that would be handled at the proposed project site, it was assumed that speciation profiles would be representative. **Table 2** presents estimated daily emissions for the windrow option with and without pseudo-biofilters as well as emissions under the ASP option.

Ammonia is also a TAC of concern from composting activities, and it can form from the composting of nitrogen-containing green waste. Emissions of ammonia from the windrow option were estimated assuming an emission rate of 0.24 pounds per ton of material processed for open windrow composting (Norcal Waste Systems, 2006). **Table 2** presents estimated daily emissions assuming a maximum daily throughput of approximately 548 tons (200,000 tons per year / 365 days per year).

TABLE 2

TAC EMISSIONS FROM COMPOSTING ACTIVITIES

Pollutant	Daily Emissions (lb/day)		
	Windrow	Windrow with pseudo-biofilter	ASP
Methylene Chloride	2.1	0.5	0.1
MEK	43.5	10.9	2.2
Methyl Chloroform	1.1	0.3	0.1
Toluene	2.2	0.3	0.1
Xylene	1.1	0.6	0.1
Benzyl Chloride	24.8	6.2	1.2
Formaldehyde	2.6	0.3	0.1
Acetaldehyde	208.0	52.0	10.4
Ammonia	131.5	32.9	6.6

SOURCE: Environmental Science Associates, 2009, based on speciation profiles in ACWMA report, 2006.

DPM Emissions

DPM would be emitted from haul trucks traveling to and from the site as well as from equipment used onsite. PM2.5 emission rates for on-road vehicle exhaust and off-road equipment exhaust presented in the air quality section were used to represent DPM emissions. On-road emissions were adjusted to represent emissions generated within one mile of the project site.

PM2.5 Emissions

PM2.5 would be emitted from haul trucks traveling to and from the site as well as from equipment used onsite and fugitive emissions from surface disturbance and unpaved movement. PM2.5 emission rates for on-road vehicle exhaust, off-road equipment exhaust, and fugitive dust presented in the air quality section were used to represent PM2.5 emissions.

Modeling Methodology

GIS was used to determine the geographic locations of the emissions sources and sensitive receptors for the proposed project. The nearest workers would be located at the Riverside Equestrian Center approximately 2,000 feet south of the proposed project and at the Sleepy Hollow Dairy approximately 3,000 feet east of the site. The closest residential receptor would be located approximately 3,600 feet northeast of the site.

Five consecutive years of meteorological data from the BAAQMD's Sonoma Baylands meteorological station were used to prepare hourly surface files for use in AERMOD.

Source and receptor elevations were derived from the Santa Rosa-West and Santa Rosa-East 1 degree digital elevation models. These elevations were processed and imported using AERMAP, an accessory program to AERMOD.

Composting Emissions

Emissions from composting activities were modeled as series of volume sources. It was assumed that emissions from composting activities would be released 24 hours a day, even when other activities are not taking place.

DPM Emissions

Emissions from haul trucks were modeled as a line source extending from the project site to Lakeville Highway via Twin House Ranch Road. It was assumed that emissions would be released from a height of 3 meters and that the roadway width would be approximately 10 meters.

Emissions from heavy duty diesel equipment operating onsite were modeled as two groups of volume sources, one representing emissions from equipment used during initial processing and one representing emissions from the windrow turner. The ASP composting option assumed that no emissions would occur from the windrow turner source as this piece of equipment would not be required under the ASP option. A release height of 5 meters was assumed for all off-road equipment.

PM2.5 Emissions

PM2.5 emissions from haul trucks were modeled as a line source as was DPM. It was assumed that emissions would be released from a height of 3 meters and that the roadway width would be approximately 10 meters.

PM2.5 emissions from heavy duty diesel equipment operating onsite were modeled as volume sources as was DPM. A release height of 5 meters was assumed for all off-road equipment.

Emissions from fugitive sources were modeled as series of volume sources. It was assumed that construction emissions would be released 12 hours a day for 5 days per week. Average annualized surface disturbance is 5 acres.

Emissions from fugitive sources were modeled as series of volume sources. It was assumed that operational emissions would be released 12 hours a day for 7 days per week at the peak surface disturbance.

Health Risk Exposure

Health risks were evaluated based on methodologies recommended by OEHHA as well as the BAAQMD.

Non-Cancer Risk

Non-cancer adverse health risk, both for acute (short-term) and chronic (long-term) risk, is measured against a hazard index (HI), which is defined as the ratio of the predicted incremental exposure concentration from the proposed project to a published reference exposure level (REL) that could cause adverse health effects as established by OEHHA. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated for each organ system. If the overall HI for the highest-impacted organ system is greater than one, then the impact is considered to be significant.

Table 3 presents acute and chronic RELs and target organs for each of the TACs that would be emitted under implementation of the proposed project.

TABLE 3

ACUTE AND CHRONIC REFERENCE EXPOSURE LEVELS

Compound	Acute REL (µg/m^3)	Acute Target Organs	Chronic REL (µg/m^3)	Chronic Target Organs
Ammonia	3,200	Eyes; Respiratory	200	Respiratory
Methylene Chloride	14,000	Cardiovascular; Nervous	400	Cardiovascular; Nervous
MEK	13,000	Eyes; Respiratory	--	--
Methyl Chloroform	68,000	Nervous	1,000	Nervous
Toluene	37,000	Nervous; Eyes; Respiratory; Reproductive	300	Developmental; Nervous; Respiratory
Xylene	22,000	Nervous; Respiratory; Eyes	700	Nervous; Respiratory; Eyes
Benzyl Chloride	240	Respiratory; Eyes	--	--
Formaldehyde	55	Sensory; Eyes	9	Respiratory
Acetaldehyde	470	Sensory; Bronchi; Eyes; Nose; Throat	140	Respiratory
DPM	--	--	5	Respiratory

-- No REL.

SOURCE: OEHHA, 2008.

Acute Risk

Table 4 presents one-hour average TAC concentrations estimated at the maximum exposed worker under the proposed project as well as the associated HQ for each TAC. The maximum exposed worker receptor was modeled at the Riverside Equestrian Center. The maximum HI would target the eyes. As shown, the maximum acute HI under the windrow option would be

1.59, which exceeds the BAAQMD threshold of 1 and would therefore constitute a significant impact. However, application of pseudo-biofilters would reduce the acute HI to approximately 0.43, which is below the significance threshold. Furthermore, the acute HI for the ASP option would be 0.085, which is well below the BAAQMD threshold. Therefore, acute impacts to worker receptors from windrow composting would be less than significant with mitigation requiring pseudo-filters. Also, impacts from the ASP option would be less than significant.

TABLE 4

NON-CANCER ACUTE RISK (WORKER)

	Windrow		Windrow w/ biofilter		ASP	
Compound	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]
Ammonia	350.90	1.10E-01	87.73	2.74E-02	17.55	5.48E-03
Methylene Chloride	5.49	3.92E-04	1.37	9.80E-05	0.27	1.96E-05
MEK	116.09	8.93E-03	29.02	2.23E-03	5.80	4.47E-04
Methyl Chloroform	2.95	4.34E-05	0.74	1.08E-05	0.15	2.17E-06
Toluene	5.90	1.59E-04	1.47	3.98E-05	0.29	7.97E-06
Xylene	2.95	1.34E-04	0.74	3.35E-05	0.15	6.70E-06
Benzyl Chloride	66.02	2.75E-01	16.51	6.88E-02	3.30	1.38E-02
Formaldehyde	6.91	1.26E-01	1.73	3.14E-02	0.35	6.28E-03
Acetaldehyde	555.12	1.18E+00	138.78	2.95E-01	27.76	5.91E-02
Maximum HI *(Eyes)*		***1.59***		***0.43***		***0.085***

[a] C_{air} = concentration in air. Concentrations represent one-hour peak concentrations expressed in micrograms per cubic meter ($\mu g/m^3$)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 5 presents one-hour average TAC concentrations estimated at the maximum exposed resident under the proposed project as well as the associated HQ for each TAC. As with worker exposure, the maximum HI for residents would target the eyes. As shown at the bottom of the table, the maximum acute HI under the windrow option would be 0.15, which is well below the BAAQMD threshold of 1. Furthermore, the acute HI for the windrow option with pseudo-biofilters and the ASP option would be 0.040 and 0.0079 respectively. Therefore, acute impacts to residential receptors would be less than significant.

TABLE 5

NON-CANCER ACUTE RISK (RESIDENT)

Compound	Windrow C_{air} [a]	Windrow HQ [b]	Windrow w/ biofilter C_{air} [a]	Windrow w/ biofilter HQ [b]	ASP C_{air} [a]	ASP HQ [b]
Ammonia	32.78	1.02E-02	8.20	2.56E-03	1.64	5.12E-04
Methylene Chloride	0.51	3.66E-05	0.13	9.16E-06	0.03	1.83E-06
MEK	10.85	8.34E-04	2.71	2.09E-04	0.54	4.17E-05
Methyl Chloroform	0.28	4.05E-06	0.07	1.01E-06	0.01	2.02E-07
Toluene	0.55	1.49E-05	0.14	3.72E-06	0.03	7.44E-07
Xylene	0.28	1.25E-05	0.07	3.13E-06	0.01	6.26E-07
Benzyl Chloride	6.17	2.57E-02	1.54	6.42E-03	0.31	1.28E-03
Formaldehyde	0.65	1.17E-02	0.16	2.94E-03	0.03	5.87E-04
Acetaldehyde	51.86	1.10E-01	12.96	2.76E-02	2.59	5.52E-03
Maximum HI ***(Respiratory and Eyes)***		***0.15***		***0.040***		***0.0079***

[a] Concentrations represent one-hour peak concentrations expressed in micrograms per cubic meter (µg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Chronic Risk

Table 6 presents annual average TAC concentrations estimated at the maximum exposed worker receptor under the proposed project as well as the associated HQ for each TAC. As with acute risk, the maximum exposed worker receptor was modeled at the Riverside Equestrian Center. The maximum chronic HI would target the respiratory system. As shown, the maximum chronic HI under the windrow option would be 0.031, which is well below the BAAQMD threshold of 1. Furthermore, the HI for the windrow option with pseudo-biofilters and the ASP option would be 0.0088 and 0.0029 respectively. Therefore, chronic impacts to worker receptors would be less than significant.

TABLE 6

NON-CANCER CHRONIC RISK (WORKER)

Compound	Windrow C_{air} [a]	Windrow HQ [b]	Windrow w/ biofilter C_{air} [a]	Windrow w/ biofilter HQ [b]	ASP C_{air} [a]	ASP HQ [b]
DPM	0.0072	1.45E-03	0.0072	1.45E-03	0.0072	1.45E-03
Ammonia	1.5935	7.97E-03	0.3984	1.99E-03	0.0797	3.98E-04
Methylene Chloride	0.0249	6.23E-05	0.0062	1.56E-05	0.0012	3.12E-06
Methyl Chloroform	0.0134	1.34E-05	0.0033	3.35E-06	0.0007	6.70E-07
Toluene	0.0268	8.92E-05	0.0067	2.23E-05	0.0013	4.46E-06
Xylene	0.0134	1.91E-05	0.0033	4.78E-06	0.0007	9.56E-07
Formaldehyde	0.0314	3.49E-03	0.0078	8.72E-04	0.0016	1.74E-04
Acetaldehyde	2.5209	1.80E-02	0.6302	4.50E-03	0.1260	9.00E-04
Maximum HI ***(Respiratory)***		***0.031***		***0.0088***		***0.0029***

[a] Concentrations represent annual average concentrations expressed in micrograms per cubic meter (µg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 7 presents annual average TAC concentrations estimated at the maximum exposed residential location under the proposed project as well as the associated HQ for each TAC. As with worker exposure, the maximum chronic HI for residents would target the respiratory system. As shown at the bottom of the table, the maximum chronic HI under the windrow option would be 0.0047, which is well below the BAAQMD threshold of 1. Furthermore, the HI for the windrow option with pseudo-biofilters and the ASP option would be 0.0014 and 0.00056 respectively. Therefore, chronic impacts to residential receptors would be less than significant.

TABLE 7

NON-CANCER CHRONIC RISK (RESIDENT)

	Windrow		Windrow w/ biofilter		ASP	
Compound	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]
DPM	0.0017	3.36E-04	0.0017	3.36E-04	0.0017	3.36E-04
Ammonia	0.2365	1.18E-03	0.0591	2.96E-04	0.0118	5.91E-05
Methylene Chloride	0.0037	9.25E-06	0.0009	2.31E-06	0.0002	4.63E-07
Methyl Chloroform	0.0020	1.99E-06	0.0005	4.98E-07	0.0001	9.95E-08
Toluene	0.0040	1.32E-05	0.0010	3.31E-06	0.0002	6.62E-07
Xylene	0.0020	2.84E-06	0.0005	7.11E-07	0.0001	1.42E-07
Formaldehyde	0.0047	5.18E-04	0.0012	1.29E-04	0.0002	2.59E-05
Acetaldehyde	0.3742	2.67E-03	0.0936	6.68E-04	0.0187	1.34E-04
Maximum HI *(Respiratory)*		***0.0047***		***0.0014***		***0.00056***

[a] Concentrations represent annual average concentrations expressed in micrograms per cubic meter (μg/m³)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Cancer Risk

The maximum incremental cancer risk from exposure to TACs was calculated following the guidelines established by California Office of Environmental Health Hazard Assessment (OEHHA, 2003). The equation used to determine exposure to TACs through inhalation is demonstrated below:

$$\text{Dose-inhalation} = \frac{C_{air} * \{DBR\} * A * EF * ED * 10^{-6}}{AT}$$

Where:

Dose-inh = Dose of the toxic substance through inhalation in milligrams per kilogram of body weight per day (mg/kg-day)

10^{-6} = Micrograms to milligrams conversion, Liters to cubic meters conversion

C_{air} = Concentration in air ($\mu g/m^3$)

{DBR} = Daily breathing rate (L/kg body weight – day)

A = Inhalation absorption factor

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

AT = Averaging time period over which exposure is averaged in days (25,550 days for a 70 year cancer risk)

The dose through inhalation calculation shown above yields a value that represents the quantity of a substance inhaled by an individual expressed in milligrams per kilogram of body weight per day (mg/kg-day). To determine cancer risk, the dose through inhalation is multiplied by a cancer potency slope factor of the particular TAC which has the unit $(mg/kg\text{-}day)^{-1}$. Therefore, multiplying the estimated dose by the cancer potency slope factor yields a unitless value that represents chances per million of an individual developing cancer from exposure to a given TAC.

The following five carcinogens would be emitted under the Proposed Project: (1) DPM; (2) Methylene Chloride; (3) Benzyl Chloride; (4) Formaldehyde; and (5) Acetaldehyde. Annual average concentrations for all chemicals except benzyl chloride at the maximum exposed worker and residential receptors shown in **Table 6** and **Table 7** above for estimating non-carcinogenic impacts were used to determine incremental cancer risk from the proposed project. The maximum annual average concentration of benzyl chloride at the maximum exposed worker and residential receptor were estimated to be 0.2998 $\mu g/m^3$ and 0.0445 $\mu g/m^3$ respectively for the windrow option; 0.0750 $\mu g/m^3$ and 0.0111 $\mu g/m^3$ respectively for the windrow with biofilter option; and 0.0150 $\mu g/m^3$ and 0.0022 $\mu g/m^3$ respectively for the ASP option. Cancer risks at worker receptors were analyzed assuming an exposure frequency of 245 days per year (5 days per week/49 weeks per year) for 40 years with a worker breathing rate of 149 L/kg bodyweight – day. Cancer risks at residential receptors were analyzed based on the 80th percentile adult breathing rate of 302 L/kg-day. Exposure frequency for residents was assumed to be 350 days per year and exposure duration was assumed to be 70 years.

Table 8 below shows the OEHHA established cancer potency slopes associated with each carcinogenic compound associated with the proposed project and the associated dose through inhalation for both workers and residents. Cancer risk for each individual TAC was then determined by multiplying the cancer potency slope by the dose through inhalation factor. As shown, the maximum cancer risk would not exceed the BAAQMD threshold of 10 in one million at any worker or residential receptors under the windrow option, the windrow option with pseudo-biofilters or the ASP option. Impacts would be less than significant.

TABLE 8

CANCER RISK AT WORKER AND RESIDENTIAL RECEPTORS

Compound	Cancer Potency Slope (mg/kg-day)$^{-1}$	Worker Dose-inh (mg/kg-day)	Worker Cancer Risk (per million)	Resident Dose-inh (mg/kg-day)	Resident Cancer Risk (per million)
Windrow					
DPM	1.1	0.41	0.455	0.49	0.535
Methylene Chloride	3.5E-03	1.42	0.005	1.07	0.004
Benzyl Chloride	1.7E-01	17.13	2.913	12.89	2.191
Formaldehyde	2.1E-02	1.79	0.038	1.35	0.028
Acetaldehyde	1.0E-02	144.07	1.441	108.36	1.084
Total Cancer Risk from Windrow			***4.85***		***3.84***
Windrow with Mitigation					
DPM	1.1	0.41	0.455	0.49	0.535
Methylene Chloride	3.5E-03	0.36	0.001	0.27	0.001
Benzyl Chloride	1.7E-01	4.28	0.728	3.22	0.548
Formaldehyde	2.1E-02	0.45	0.009	0.34	0.007
Acetaldehyde	1.0E-02	36.02	0.360	27.09	0.271
Total Cancer Risk from Windrow w/ Mitigation			***1.55***		***1.36***
ASP					
DPM	1.1	0.41	0.455	0.49	0.535
Methylene Chloride	3.5E-03	0.07	0.000	0.05	0.0002
Benzyl Chloride	1.7E-01	0.86	0.146	0.64	0.110
Formaldehyde	2.1E-02	0.09	0.002	0.07	0.001
Acetaldehyde	1.0E-02	7.20	0.072	5.42	0.054
Total Cancer Risk from ASP			***0.68***		***0.70***

SOURCE: Environmental Science Associates, 2010

PM2.5 Concentration

The maximum annual PM2.5 concentration as a result of the project construction would be 0.02 µg/m^3, which would not exceed the BAAQMD threshold of 0.3 µg/m^3 and would therefore constitute a **less than significant** impact. The maximum annual PM2.5 concentration as a result of the project operations would be 0.07 µg/m^3, which would not exceed the BAAQMD threshold of 0.3 µg/m^3 and would therefore constitute a **less than significant** impact.

Cumulative

The BAAQMD's BAAQMD CEQA Air Quality Guidelines (dated May, 2010) provides estimate impacts from significant roadway within Sonoma County such as Routes 1, 12, 37, 101, 116, 121, and 128. Estimated impacts within a distance of 1,000 feet were developed for each of these roadways. The Site 5A is not located within 1,000 feet of any of these roadways. Thus, the impact from these roadways is not expected to significantly contribute to the overall impact at the receptors of interest.

References – Health Risk Assessment

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Appendix AIR-3

Site 40 Alternative Criteria Pollutant and GHG Emissions

APPENDIX AIR-3

Site 40 Alternative Criteria Pollutant and GHG Emissions

Introduction to the Air Quality Models and Results

The majority of assumptions, methodology, and results are the same for the Site 40 Alternative as for the project (see Appendix AIR-1 for this information). Thus, results of the URBEMIS2007 modeling (daily and annual) for operations, VOC emissions from windrow and ASP composting, and GHG analyses from indirect electricity and methane generation for the Site 40 Alternative and existing are not included in this Appendix. In addition, existing on-road traffic assumptions and emission factors can also be found in Appendix AIR-1. From an air quality perspective, the primary difference between the Site 40 Alternative and the project are construction emissions and the vehicle trip lengths to the different sites. Therefore, the URBEMIS2007 results for the Site 40 Alternative construction (year 2010) and EMFAC2007 emission factors for the Site 40 Alternative are presented below for both the 2011 and 2030 analysis years.

This Appendix is separated into the following sub-sections:

- URBEMIS2007 MODEL RESULTS FOR SITE 40 ALTERNATIVE YEAR 2010 (CONSTRUCTION)
- EMFAC2007 RESULTS FOR SITE 40 ALTERNATIVE OPERATIONS (YEAR 2011 WEEKDAY AND SATURDAY)
- EMFAC2007 RESULTS FOR SITE 40 ALTERNATIVE OPERATIONS (YEAR 2030 WEEKDAY AND SATURDAY)

URBEMIS2007 MODEL RESULTS FOR SITE 40 ALTERNATIVE YEAR 2010 (CONSTRUCTION)

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 40\Site 40 Construction (2010).urb924

Project Name: sonoma compost 2010 Const Site 40

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (lbs/day unmitigated)	7.57	65.64	34.64	0.03	285.12	3.55	288.66	59.56	3.27	62.82	7,147.08
2010 TOTALS (lbs/day mitigated)	7.57	56.53	34.64	0.03	71.12	2.28	73.40	14.87	2.10	16.96	7,147.08

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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Time Slice 1/4/2010-1/29/2010 Active Days: 20	2.15	12.34	9.34	0.00	0.01	1.04	1.05	0.00	0.96	0.96	1,203.41
Asphalt 01/04/2010-02/08/2010	2.15	12.34	9.34	0.00	0.01	1.04	1.05	0.00	0.96	0.96	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 2/1/2010-2/8/2010 Active Days: 6	**7.57**	**65.64**	**34.64**	0.03	285.11	**3.55**	**288.66**	59.56	**3.27**	**62.82**	**7,147.08**
Asphalt 01/04/2010-02/08/2010	2.15	12.34	9.34	0.00	0.01	1.04	1.05	0.00	0.96	0.96	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Mass Grading 02/01/2010-11/26/2010	5.42	53.30	25.31	0.03	285.10	2.51	287.61	59.55	2.31	61.86	5,943.67
Mass Grading Dust	0.00	0.00	0.00	0.00	285.00	0.00	285.00	59.52	0.00	59.52	0.00
Mass Grading Off Road Diesel	4.16	33.67	17.48	0.00	0.00	1.79	1.79	0.00	1.65	1.65	3,007.48
Mass Grading On Road Diesel	1.20	19.54	6.21	0.03	0.10	0.71	0.81	0.03	0.65	0.69	2,808.84
Mass Grading Worker Trips	0.05	0.09	1.61	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.35

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Time Slice 2/9/2010-8/13/2010 Active Days: 134	5.42	53.30	25.31	0.03	285.10	2.51	287.61	59.55	2.31	61.86	5,943.67
Mass Grading 02/01/2010-11/26/2010	5.42	53.30	25.31	0.03	285.10	2.51	287.61	59.55	2.31	61.86	5,943.67
Mass Grading Dust	0.00	0.00	0.00	0.00	285.00	0.00	285.00	59.52	0.00	59.52	0.00
Mass Grading Off Road Diesel	4.16	33.67	17.48	0.00	0.00	1.79	1.79	0.00	1.65	1.65	3,007.48
Mass Grading On Road Diesel	1.20	19.54	6.21	0.03	0.10	0.71	0.81	0.03	0.65	0.69	2,808.84
Mass Grading Worker Trips	0.05	0.09	1.61	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.35
Time Slice 8/16/2010-11/26/2010 Active Days: 75	6.75	62.90	33.21	**0.03**	**285.12**	3.10	288.22	**59.56**	2.85	62.41	7,118.16
Building 08/15/2010-12/31/2010	1.32	9.60	7.90	0.00	0.01	0.59	0.61	0.00	0.54	0.55	1,174.49
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34
Mass Grading 02/01/2010-11/26/2010	5.42	53.30	25.31	0.03	285.10	2.51	287.61	59.55	2.31	61.86	5,943.67
Mass Grading Dust	0.00	0.00	0.00	0.00	285.00	0.00	285.00	59.52	0.00	59.52	0.00
Mass Grading Off Road Diesel	4.16	33.67	17.48	0.00	0.00	1.79	1.79	0.00	1.65	1.65	3,007.48
Mass Grading On Road Diesel	1.20	19.54	6.21	0.03	0.10	0.71	0.81	0.03	0.65	0.69	2,808.84
Mass Grading Worker Trips	0.05	0.09	1.61	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.35
Time Slice 11/29/2010-12/31/2010 Active Days: 25	1.32	9.60	7.90	0.00	0.01	0.59	0.61	0.00	0.54	0.55	1,174.49
Building 08/15/2010-12/31/2010	1.32	9.60	7.90	0.00	0.01	0.59	0.61	0.00	0.54	0.55	1,174.49
Building Off Road Diesel	1.21	9.16	4.81	0.00	0.00	0.58	0.58	0.00	0.53	0.53	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34

Phase Assumptions

Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

Total Acres Disturbed: 57

Maximum Daily Acreage Disturbed: 14.25

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 697.67

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

Acres to be Paved: 1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

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CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/4/2010-1/29/2010 Active Days: 20	2.15	9.96	9.34	0.00	0.01	0.58	0.59	0.00	0.53	0.54	1,203.41
Asphalt 01/04/2010-02/08/2010	2.15	9.96	9.34	0.00	0.01	0.58	0.59	0.00	0.53	0.54	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	9.51	6.98	0.00	0.00	0.56	0.56	0.00	0.52	0.52	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 2/1/2010-2/8/2010 Active Days: 6	**7.57**	56.53	**34.64**	0.03	71.12	2.28	73.40	14.87	2.10	16.96	**7,147.08**
Asphalt 01/04/2010-02/08/2010	2.15	9.96	9.34	0.00	0.01	0.58	0.59	0.00	0.53	0.54	1,203.41
Paving Off-Gas	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	9.51	6.98	0.00	0.00	0.56	0.56	0.00	0.52	0.52	979.23
Paving On Road Diesel	0.02	0.32	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.90
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Mass Grading 02/01/2010-11/26/2010	5.42	46.57	25.31	0.03	71.11	1.70	72.81	14.86	1.56	16.43	5,943.67
Mass Grading Dust	0.00	0.00	0.00	0.00	71.00	0.00	71.00	14.83	0.00	14.83	0.00
Mass Grading Off Road Diesel	4.16	26.94	17.48	0.00	0.00	0.99	0.99	0.00	0.91	0.91	3,007.48
Mass Grading On Road Diesel	1.20	19.54	6.21	0.03	0.10	0.71	0.81	0.03	0.65	0.69	2,808.84
Mass Grading Worker Trips	0.05	0.09	1.61	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.35

Time Slice 2/9/2010-8/13/2010 Active Days: 134	5.42	46.57	25.31	0.03	71.11	1.70	72.81	14.86	1.56	16.43	5,943.67
Mass Grading 02/01/2010-11/26/2010	5.42	46.57	25.31	0.03	71.11	1.70	72.81	14.86	1.56	16.43	5,943.67
Mass Grading Dust	0.00	0.00	0.00	0.00	71.00	0.00	71.00	14.83	0.00	14.83	0.00
Mass Grading Off Road Diesel	4.16	26.94	17.48	0.00	0.00	0.99	0.99	0.00	0.91	0.91	3,007.48
Mass Grading On Road Diesel	1.20	19.54	6.21	0.03	0.10	0.71	0.81	0.03	0.65	0.69	2,808.84
Mass Grading Worker Trips	0.05	0.09	1.61	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.35
Time Slice 8/16/2010-11/26/2010 Active Days: 75	6.75	54.34	33.21	**0.03**	71.12	2.03	73.15	14.87	1.87	16.74	7,118.16
Building 08/15/2010-12/31/2010	1.32	7.77	7.90	0.00	0.01	0.33	0.35	0.00	0.31	0.31	1,174.49
Building Off Road Diesel	1.21	7.33	4.81	0.00	0.00	0.32	0.32	0.00	0.29	0.29	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34
Mass Grading 02/01/2010-11/26/2010	5.42	46.57	25.31	0.03	71.11	1.70	72.81	14.86	1.56	16.43	5,943.67
Mass Grading Dust	0.00	0.00	0.00	0.00	71.00	0.00	71.00	14.83	0.00	14.83	0.00
Mass Grading Off Road Diesel	4.16	26.94	17.48	0.00	0.00	0.99	0.99	0.00	0.91	0.91	3,007.48
Mass Grading On Road Diesel	1.20	19.54	6.21	0.03	0.10	0.71	0.81	0.03	0.65	0.69	2,808.84
Mass Grading Worker Trips	0.05	0.09	1.61	0.00	0.01	0.00	0.01	0.00	0.00	0.01	127.35
Time Slice 11/29/2010-12/31/2010 Active Days: 25	1.32	7.77	7.90	0.00	0.01	0.33	0.35	0.00	0.31	0.31	1,174.49
Building 08/15/2010-12/31/2010	1.32	7.77	7.90	0.00	0.01	0.33	0.35	0.00	0.31	0.31	1,174.49
Building Off Road Diesel	1.21	7.33	4.81	0.00	0.00	0.32	0.32	0.00	0.29	0.29	893.39
Building Vendor Trips	0.02	0.28	0.24	0.00	0.00	0.01	0.01	0.00	0.01	0.01	55.77
Building Worker Trips	0.10	0.16	2.85	0.00	0.01	0.01	0.02	0.00	0.01	0.01	225.34

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 63% PM25: 63%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

The following mitigation measures apply to Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

The following mitigation measures apply to Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

For Cranes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Forklifts, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

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NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Site 40\Site 40 Construction (2010).urb924

Project Name: sonoma compost 2010 Const Site 40

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (tons/year unmitigated)	0.68	6.37	3.24	0.00	30.65	0.31	30.96	6.40	0.29	6.69	713.31
2010 TOTALS (tons/year mitigated)	0.68	5.52	3.24	0.00	7.64	0.21	7.85	1.60	0.19	1.79	713.31
Percent Reduction	0.00	13.29	0.00	0.00	75.06	33.81	74.64	75.04	33.82	73.27	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2010	0.68	6.37	3.24	0.00	30.65	0.31	30.96	6.40	0.29	6.69	713.31
Asphalt 01/04/2010-02/08/2010	0.03	0.16	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	15.64
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.03	0.15	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	12.73
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Mass Grading 02/01/2010-11/26/2010	0.58	5.73	2.72	0.00	30.65	0.27	30.92	6.40	0.25	6.65	638.94
Mass Grading Dust	0.00	0.00	0.00	0.00	30.64	0.00	30.64	6.40	0.00	6.40	0.00
Mass Grading Off Road Diesel	0.45	3.62	1.88	0.00	0.00	0.19	0.19	0.00	0.18	0.18	323.30
Mass Grading On Road Diesel	0.13	2.10	0.67	0.00	0.01	0.08	0.09	0.00	0.07	0.07	301.95
Mass Grading Worker Trips	0.01	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.69
Building 08/15/2010-12/31/2010	0.07	0.48	0.40	0.00	0.00	0.03	0.03	0.00	0.03	0.03	58.72
Building Off Road Diesel	0.06	0.46	0.24	0.00	0.00	0.03	0.03	0.00	0.03	0.03	44.67
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79
Building Worker Trips	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.27

Phase Assumptions

Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

Total Acres Disturbed: 57

Maximum Daily Acreage Disturbed: 14.25

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 697.67

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

Acres to be Paved: 1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

2010	0.68	5.52	3.24	0.00	7.64	0.21	7.85	1.60	0.19	1.79	713.31
Asphalt 01/04/2010-02/08/2010	0.03	0.13	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	15.64
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.03	0.12	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	12.73
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Mass Grading 02/01/2010-11/26/2010	0.58	5.01	2.72	0.00	7.64	0.18	7.83	1.60	0.17	1.77	638.94
Mass Grading Dust	0.00	0.00	0.00	0.00	7.63	0.00	7.63	1.59	0.00	1.59	0.00
Mass Grading Off Road Diesel	0.45	2.90	1.88	0.00	0.00	0.11	0.11	0.00	0.10	0.10	323.30
Mass Grading On Road Diesel	0.13	2.10	0.67	0.00	0.01	0.08	0.09	0.00	0.07	0.07	301.95
Mass Grading Worker Trips	0.01	0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.69
Building 08/15/2010-12/31/2010	0.07	0.39	0.40	0.00	0.00	0.02	0.02	0.00	0.02	0.02	58.72
Building Off Road Diesel	0.06	0.37	0.24	0.00	0.00	0.02	0.02	0.00	0.01	0.01	44.67
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.79
Building Worker Trips	0.00	0.01	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.27

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 2/1/2010 - 11/26/2010 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Soil Stablizing Measures, the Equipment loading/unloading mitigation reduces emissions by:

PM10: 63% PM25: 63%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

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For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

The following mitigation measures apply to Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

The following mitigation measures apply to Phase: Building Construction 8/15/2010 - 12/31/2010 - Building Construction

For Cranes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Forklifts, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

EMFAC2007 MODEL RESULTS FOR SITE 40 ALTERNATIVE OPERATIONS (YEAR 2011 WEEKDAY AND SATURDAY)

MILEAGE BETWEEN SONOMA COUNTY TRANSFER STATIONS AND PROPOSED SITE 40

	MOM Trucks	SITE 40 COMPOST SITE Stage Gulch and Old Adobe Petaluma, CA	% of trips
TRANSFER STATIONS	**Annapolis** 33549 Annapolis Road Annapolis, CA 95412 707) 886-5204	87	0.50%
	Guerneville 13450 Pocket Dr. Guerneville, CA 95446 (707) 869-3878	35.4	7.90%
	Healdsburg 166 Alexander Valley Rd Healdsburg, CA 95448 (707) 433-0321	42.6	41.60%
	Sonoma 4376 Stage Gulch Rd Sonoma, CA 95476 (707) 996-6597	2.8	50.00%
			100.00%

Assuming Source ~ Waste Centroid (Todd Rd and Highwa)	Distance to Project (Miles)
Haul Trucks	20
Self Haul Vehicles	20
Compost Sales	20
Bio Fuel/Ag Trucks	20
Employees	20
	Distance to Project (Miles)
MOM Trucks (Weighted Avg from above)	22.4

Site 40 Weekday -- Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost
grams/mile

LDA	ROG	CO	NOx	CO2	PM10
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 45 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 40 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032		
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	139	5560	1.18	36.32	2.80	4742.07	0.39	17.30	0.99
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038		
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	40	1600	0.30	8.00	2.14	1950.24	0.13	4.98	0.28
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239		
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	45	7	315	0.24	3.03	4.25	927.07	0.17	0.98	0.06

Total Trips 186

	2011 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	1	39	7	5669	1	1	23.26	1.33	lbs/day
tons/year	0	5	1	669	0	0	3	0	tons/year
				metric tons					

Site 40 Saturday -- Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost
grams/mile

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

LDA	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 45 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 40 miles (roundtrip).

<u>EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES</u>

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032		
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	181	7240	1.53	47.29	3.65	6174.93	0.51	22.53	1.28
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038		
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	8	320	0.06	1.60	0.43	390.05	0.03	1.00	0.06
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239		
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	45	5	225	0.17	2.17	3.03	662.20	0.12	0.70	0.04

Total Trips 194

	2011 - On-road Vehicle Exhaust per day						Fugitive Dust		
	ROG	CO	Nox	CO2	PM10	PM2.5	PM10	PM2.5	
lbs/day	2	49	7	6837	1	1	24.23	1.38	lbs/day
tons/year	0	1	0	161	0	0	3	0	tons/year
				metric tons					

EMFAC2007 MODEL RESULTS FOR SITE 40 ALTERNATIVE OPERATIONS (YEAR 2030 WEEKDAY AND SATURDAY)

Site 40 Weekday -- Air Quality Analysis for Mobile Emissions Year 2030
Sonoma Compost
grams/mile

LDA	ROG	CO	NOx	CO2	PM10
2030	0.008	0.512	0.029	345.618	0.028
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.014	0.817	0.055	432.488	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.02	0.886	0.152	553.908	0.039
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.097	0.871	1.124	1332.589	0.108

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 45 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 40 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2030

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2030 emissions (grams/mile)			0.011	0.6645	0.042	389.053	0.0315		
	2030 emissions (pounds/mile)			2.43E-05	1.46E-03	9.26E-05	8.58E-01	6.94E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	275	11000	0.27	16.11	1.02	9434.77	0.76	34.23	1.95
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.02	0.886	0.152	553.908	0.039		
	2011 emissions (pounds/mile)			4.41E-05	1.95E-03	3.35E-04	1.22E+00	8.60E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	79	3160	0.14	6.17	1.06	3858.82	0.27	9.83	0.56
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.097	0.871	1.124	1332.589	0.108		
	2011 emissions (pounds/mile)			2.14E-04	1.92E-03	2.48E-03	2.94E+00	2.38E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	45	14	630	0.13	1.21	1.56	1850.83	0.15	1.96	0.11

Total Trips 368

	2030 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	0	17	3	11286	1	1	46.03	2.62	lbs/day
tons/year	0	2	0	1331	0	0	6	0	tons/year
				metric tons					

Site 40 Saturday -- Air Quality Analysis for Mobile Emissions Year 2030
Sonoma Compost
grams/mile

	Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
	0.003112	0.000177

LDA	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.008	0.512	0.029	345.618	0.028
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.014	0.817	0.055	432.488	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.02	0.886	0.152	553.908	0.039
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2030	0.097	0.871	1.124	1332.589	0.108

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 45 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 40 miles (roundtrip).

<u>EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES</u>

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2030

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
LDV	2030 emissions (grams/mile)			0.011	0.6645	0.042	389.053	0.0315	dust	dust
	2030 emissions (pounds/mile)			2.43E-05	1.46E-03	9.26E-05	8.58E-01	6.94E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	353	14120	0.34	20.69	1.31	12110.81	0.98	43.94	2.50
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
MDT	2011 emissions (grams/mile)			0.02	0.886	0.152	553.908	0.039	dust	dust
	2011 emissions (pounds/mile)			4.41E-05	1.95E-03	3.35E-04	1.22E+00	8.60E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	40	16	640	0.03	1.25	0.21	781.53	0.06	1.99	0.11
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
	2011 emissions (grams/mile)			0.097	0.871	1.124	1332.589	0.108	dust	dust
	2011 emissions (pounds/mile)			2.14E-04	1.92E-03	2.48E-03	2.94E+00	2.38E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	45	10	450	0.10	0.86	1.12	1322.02	0.11	1.40	0.08

Total Trips 379

	2030 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	0	22	2	13433	1	1	47.33	2.70	lbs/day
tons/year	0	1	0	317	0	0	6	0	tons/year
				metric tons					

Appendix AIR-4

Site 40 Alternative
Health Risk Assessment

APPENDIX AIR-4

Site 40 Alternative Health Risk Assessment

Exposure levels of toxic air contaminants (TACs) generated by operation of the Site 40 Alternative were estimated by conducting dispersion modeling of potential TAC sources at the project site. TAC emission sources evaluated in this health risk assessment were based on information contained in the air quality section, and they include: diesel exhaust from heavy duty equipment used onsite; diesel exhaust from on-road haul trucks; and fugitive TAC emissions from composting activities. The emissions from these sources were input to the USEPA approved dispersion model AERMOD (Version 09292) to calculate ambient air concentrations in the area surrounding the project site.

TAC Emissions

Emission rates for TACs were determined for each potential source at the Site 40. **Table 1** lists the TACs of concern and their associated sources.

TABLE 1

SOURCES OF TACS AT THE SONOMA COMPOST SITE

TAC	Source	Acute	Chronic	Carcinogen
Diesel Particulate Matter (DPM)	Heavy duty equipment; haul trucks	No	Yes	Yes
Ammonia	Composting piles	Yes	Yes	No
Methylene Chloride	Composting piles	Yes	Yes	Yes
Methyl Ethyl Ketone (MEK)	Composting piles	Yes	No	No
Methyl Chloroform	Composting piles	Yes	Yes	No
Toluene	Composting piles	Yes	Yes	No
Xylene	Composting piles	Yes	Yes	No
Benzyl Chloride	Composting piles	Yes	No	Yes
Formaldehyde	Composting piles	Yes	Yes	Yes
Acetaldehyde	Composting piles	Yes	Yes	Yes

SOURCES: Environmental Science Associates, 2009; OEHHA, 2003; and OEHHA, 2008.

Composting Emissions

Speciation profiles developed for the Andrade Road compost facility in Alameda County were utilized in this analysis (ACWMA, 2006). These profiles were developed based on source test data from the Inland Composting and Organics Recycling facility located in Colton, California. Approximately 80 percent of material processed at the Inland Composting facility is curbside green waste with the remainder consisting primarily of wood waste. Since materials processed at the site are similar to those that would be handled at the Site 40 site, it was assumed that speciation profiles would be representative. **Table 2** presents estimated daily emissions for the windrow option with and without pseudo-biofilters as well as emissions under the ASP option.

Ammonia is also a TAC of concern from composting activities, and it can form from the composting of nitrogen-containing green waste. Emissions of ammonia from the windrow option were estimated assuming an emission rate of 0.24 pounds per ton of material processed for open windrow composting (Norcal Waste Systems, 2006). **Table 2** presents estimated daily emissions assuming a maximum daily throughput of approximately 548 tons (200,000 tons per year / 365 days per year).

TABLE 2

TAC EMISSIONS FROM COMPOSTING ACTIVITIES

Pollutant	Daily Emissions (lb/day)		
	Windrow	Windrow with pseudo-biofilter	ASP
Methylene Chloride	2.1	0.5	0.1
MEK	43.5	10.9	2.2
Methyl Chloroform	1.1	0.3	0.1
Toluene	2.2	0.3	0.1
Xylene	1.1	0.6	0.1
Benzyl Chloride	24.8	6.2	1.2
Formaldehyde	2.6	0.3	0.1
Acetaldehyde	208.0	52.0	10.4
Ammonia	131.5	32.9	6.6

SOURCE: Environmental Science Associates, 2009, based on speciation profiles in ACWMA report, 2006.

DPM Emissions

DPM would be emitted from haul trucks traveling to and from the site as well as from equipment used onsite. PM2.5 emission rates for on-road vehicle exhaust and off-road equipment exhaust presented in the air quality section were used to represent DPM emissions. On-road emissions were adjusted to represent emissions generated within one mile of the project site.

PM2.5 Emissions

PM2.5 would be emitted from haul trucks traveling to and from the site as well as from equipment used onsite and fugitive emissions from surface disturbance and unpaved movement. PM2.5 emission rates for on-road vehicle exhaust, off-road equipment exhaust, and fugitive dust presented in the air quality section were used to represent PM2.5 emissions.

Modeling Methodology

As with the proposed project, GIS was used to determine the geographic locations of the emissions sources and sensitive receptors for the Site 40 alternative. The nearest workers would be located at a dairy farm located approximately 1,750 feet south of the Site 40 alternative site.

There would also be workers at a farm located approximately 2,500 feet north of the site. There are residential receptors located approximately 1,750 feet to the west, approximately 1,835 feet to the east and approximately 2,450 feet to the north.

Meteorological data from the BAAQMD's meteorological station at the Petaluma Airport were used to prepare hourly surface files for use in AERMOD.

Source and receptor elevations were derived from the Santa Rosa-West and Santa Rosa-East 1 degree digital elevation models. These elevations were processed and imported using AERMAP, an accessory program to AERMOD.

Composting Emissions

As with the proposed project, emissions from composting activities were modeled as series of volume sources. It was assumed that emissions from composting activities would be released 24 hours a day, even when other activities are not taking place.

DPM Emissions

Emissions from haul trucks were modeled as a line source extending from Site 40 down Bourke Road to Stage Gulch Road. It was assumed that emissions would be released from a height of 3 meters and that the roadway width would be approximately 10 meters.

Emissions from heavy duty diesel equipment operating onsite were modeled as two groups of volume sources, one representing emissions from equipment used during initial processing and one representing emissions from the windrow turner. The ASP composting option assumed that no emissions would occur from the windrow turner source as this piece of equipment would not be required under the ASP option. A release height of 5 meters was assumed for all off-road equipment.

PM2.5 Emissions

PM2.5 emissions from haul trucks were modeled as a line source as was DPM. It was assumed that emissions would be released from a height of 3 meters and that the roadway width would be approximately 10 meters.

PM2.5 emissions from heavy duty diesel equipment operating onsite were modeled as volume sources as was DPM. A release height of 5 meters was assumed for all off-road equipment.

Emissions from fugitive sources were modeled as series of volume sources. It was assumed that construction emissions would be released 12 hours a day for 5 days per week. Average annualized surface disturbance is 5 acres.

Emissions from fugitive sources were modeled as series of volume sources. It was assumed that operational emissions would be released 12 hours a day for 7 days per week at the peak surface disturbance.

Health Risk Exposure

Health risks were evaluated based on methodologies recommended by OEHHA as well as the BAAQMD.

Non-Cancer Risk

Non-cancer adverse health risk, both for acute (short-term) and chronic (long-term) risk, is measured against a hazard index (HI), which is defined as the ratio of the predicted incremental exposure concentration from the proposed project to a published reference exposure level (REL) that could cause adverse health effects as established by OEHHA. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated for each organ system. If the overall HI for the highest-impacted organ system is greater than one, then the impact is considered to be significant.

Table 3 presents acute and chronic RELs and target organs for each of the TACs that would be emitted under implementation of the Site 40 Alternative.

TABLE 3

ACUTE AND CHRONIC REFERENCE EXPOSURE LEVELS

Compound	Acute REL (μg/m^3)	Acute Target Organs	Chronic REL (μg/m^3)	Chronic Target Organs
Ammonia	3,200	Eyes; Respiratory	200	Respiratory
Methylene Chloride	14,000	Cardiovascular; Nervous	400	Cardiovascular; Nervous
MEK	13,000	Eyes; Respiratory	--	--
Methyl Chloroform	68,000	Nervous	1,000	Nervous
Toluene	37,000	Nervous; Eyes; Respiratory; Reproductive	300	Developmental; Nervous; Respiratory
Xylene	22,000	Nervous; Respiratory; Eyes	700	Nervous; Respiratory; Eyes
Benzyl Chloride	240	Respiratory; Eyes	--	--
Formaldehyde	55	Sensory; Eyes	9	Respiratory
Acetaldehyde	470	Sensory; Bronchi; Eyes; Nose; Throat	140	Respiratory
DPM	--	--	5	Respiratory

-- No REL.

SOURCE: OEHHA, 2008.

Acute Risk

Table 4 presents one-hour average TAC concentrations estimated at the maximum exposed worker under the Site 40 alternative as well as the associated HQ for each TAC. The maximum exposed worker receptors for acute exposure were modeled at the farm located to the north of the site. The maximum HI would target the eyes. As shown, the maximum acute HI under the windrow option would be 2.32, which exceeds the BAAQMD threshold of 1 and would therefore constitute a significant impact. However, application of pseudo-biofilters would reduce the acute HI to approximately 0.62, which is below the significance threshold. Furthermore, the acute HI for the ASP option would be 0.124, which is well below the BAAQMD threshold. Therefore, acute impacts to worker receptors from windrow composting would be less than significant with mitigation requiring pseudo-filters. Also, impacts from the ASP option would be less than significant.

TABLE 4

SITE 40 - NON-CANCER ACUTE RISK (WORKER)

Compound	Windrow C_{air} [a]	Windrow HQ [b]	Windrow w/ biofilter C_{air} [a]	Windrow w/ biofilter HQ [b]	ASP C_{air} [a]	ASP HQ [b]
Ammonia	511.51	1.60E-01	127.88	4.00E-02	25.58	7.99E-03
Methylene Chloride	8.00	5.72E-04	2.00	1.43E-04	0.40	2.86E-05
MEK	169.22	1.30E-02	42.31	3.25E-03	8.46	6.51E-04
Methyl Chloroform	4.30	6.32E-05	1.07	1.58E-05	0.21	3.16E-06
Toluene	8.59	2.32E-04	2.15	5.81E-05	0.43	1.16E-05
Xylene	4.30	1.95E-04	1.07	4.88E-05	0.21	9.77E-06
Benzyl Chloride	96.24	4.01E-01	24.06	1.00E-01	4.81	2.01E-02
Formaldehyde	10.08	1.83E-01	2.52	4.58E-02	0.50	9.16E-03
Acetaldehyde	809.20	1.72E+00	202.30	4.30E-01	40.46	8.61E-02
Maximum HI *(Eyes)*		***2.32***		***0.62***		***0.12***

[a] C_{air} = concentration in air. Concentrations represent one-hour peak concentrations expressed in micrograms per cubic meter (μg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 5 presents one-hour average TAC concentrations estimated at the maximum exposed resident under the Site 40 alternative as well as the associated HQ for each TAC. The maximum exposed resident was located west of the site on Periera Road. As with worker exposure, the maximum HI for residents would target the eyes. As shown, the maximum acute HI under the windrow option would be 2.38, which would exceed the BAAQMD threshold of 1. However, the acute HI for the windrow option with pseudo-biofilters and the ASP option would be 0.64 and 0.13 respectively. Therefore, acute impacts to residential receptors would be less than significant with implementation of mitigation.

TABLE 5

SITE 40 - NON-CANCER ACUTE RISK (RESIDENT)

Compound	Windrow C_{air} [a]	Windrow HQ [b]	Windrow w/ biofilter C_{air} [a]	Windrow w/ biofilter HQ [b]	ASP C_{air} [a]	ASP HQ [b]
Ammonia	523.92	1.64E-01	130.98	4.09E-02	26.20	8.19E-03
Methylene Chloride	8.20	5.85E-04	2.05	1.46E-04	0.41	2.93E-05
MEK	173.32	1.33E-02	43.33	3.33E-03	8.67	6.67E-04
Methyl Chloroform	4.40	6.47E-05	1.10	1.62E-05	0.22	3.24E-06
Toluene	8.80	2.38E-04	2.20	5.95E-05	0.44	1.19E-05
Xylene	4.40	2.00E-04	1.10	5.00E-05	0.22	1.00E-05
Benzyl Chloride	98.58	4.11E-01	24.64	1.03E-01	4.93	2.05E-02
Formaldehyde	10.32	1.88E-01	2.58	4.69E-02	0.52	9.38E-03
Acetaldehyde	828.83	1.76E+00	207.21	4.41E-01	41.44	8.82E-02
Maximum HI *(Respiratory and Eyes)*		***2.38***		***0.64***		***0.13***

[a] Concentrations represent one-hour peak concentrations expressed in micrograms per cubic meter (μg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Chronic Risk

Table 6 presents annual average TAC concentrations estimated at the maximum exposed worker receptor under the Site 40 alternative as well as the associated HQ for each TAC. Unlike acute risk, the maximum exposed receptor with regard to chronic exposure would be located at the dairy farm to the south of the site. The maximum chronic HI would target the respiratory system. As shown, the maximum chronic HI under the windrow option would be 0.025, which is well below the BAAQMD threshold of 1. Furthermore, the HI for the windrow option with pseudo-biofilters and the ASP option would be 0.0078 and 0.0032 respectively. Therefore, chronic impacts to worker receptors would be less than significant.

TABLE 6

SITE 40 - NON-CANCER CHRONIC RISK (WORKER)

	Windrow		Windrow w/ biofilter		ASP	
Compound	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]
DPM	0.0099	1.98E-03	0.0099	1.98E-03	0.0099	1.98E-03
Ammonia	1.2646	6.32E-03	0.3161	1.58E-03	0.0632	3.16E-04
Methylene Chloride	0.0198	4.95E-05	0.0049	1.24E-05	0.0010	2.47E-06
Methyl Chloroform	0.0106	1.06E-05	0.0027	2.66E-06	0.0005	5.31E-07
Toluene	0.0213	7.08E-05	0.0053	1.77E-05	0.0011	3.54E-06
Xylene	0.0106	1.52E-05	0.0027	3.79E-06	0.0005	7.59E-07
Formaldehyde	0.0249	2.77E-03	0.0062	6.92E-04	0.0012	1.38E-04
Acetaldehyde	2.0006	1.43E-02	0.5001	3.57E-03	0.1000	7.14E-04
Maximum HI *(Respiratory)*		***0.025***		***0.0078***		***0.0032***

[a] Concentrations represent annual average concentrations expressed in micrograms per cubic meter (μg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 7 presents annual average TAC concentrations estimated at the maximum exposed residential location under the Site 40 alternative as well as the associated HQ for each TAC. Unlike acute exposure, the maximum exposed resident would be located east of the site along Stage Gulch Road. As with worker exposure, the maximum chronic HI for residents would target the respiratory system. As shown, the maximum chronic HI under the windrow option would be 0.073, which is well below the BAAQMD threshold of 1. Furthermore, the HI for the windrow option with pseudo-biofilters and the ASP option would be 0.021 and 0.0071 respectively. Therefore, chronic impacts to residential receptors would be less than significant.

TABLE 7

SITE 40 - NON-CANCER CHRONIC RISK (RESIDENT)

	Windrow		Windrow w/ biofilter		ASP	
Compound	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]
DPM	0.0182	3.65E-03	0.0182	3.65E-03	0.0182	3.65E-03
Ammonia	3.7419	1.87E-02	0.9355	4.68E-03	0.1871	9.35E-04
Methylene Chloride	0.0585	1.46E-04	0.0146	3.66E-05	0.0029	7.32E-06
Methyl Chloroform	0.0314	3.14E-05	0.0079	7.86E-06	0.0016	1.57E-06
Toluene	0.0629	2.10E-04	0.0157	5.24E-05	0.0031	1.05E-05
Xylene	0.0314	4.49E-05	0.0079	1.12E-05	0.0016	2.25E-06
Formaldehyde	0.0737	8.19E-03	0.0184	2.05E-03	0.0037	4.10E-04
Acetaldehyde	5.9196	4.23E-02	1.4799	1.06E-02	0.2960	2.11E-03
Maximum HI *(Respiratory)*		***0.073***		***0.021***		***0.0071***

[a] Concentrations represent annual average concentrations expressed in micrograms per cubic meter (µg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Cancer Risk

Cancer risk associated with the Site 40 alternative was analyzed using the same methodology as described above for the proposed project. The maximum incremental cancer risk from exposure to TACs was calculated following the guidelines established by California Office of Environmental Health Hazard Assessment (OEHHA, 2003). The equation used to determine exposure to TACs through inhalation is demonstrated below:

$$\text{Dose-inhalation} = \frac{C_{air} * \{DBR\} * A * EF * ED * 10^{-6}}{AT}$$

Where:

Dose-inh	= Dose of the toxic substance through inhalation in milligrams per kilogram of body weight per day (mg/kg-day)
10^{-6}	= Micrograms to milligrams conversion, Liters to cubic meters conversion
C_{air}	= Concentration in air (µg/m^3)
{DBR}	= Daily breathing rate (L/kg body weight – day)
A	= Inhalation absorption factor
EF	= Exposure frequency (days/year)
ED	= Exposure duration (years)
AT	= Averaging time period over which exposure is averaged in days (25,550 days for a 70 year cancer risk)

The dose through inhalation calculation shown above yields a value that represents the quantity of a substance inhaled by an individual expressed in milligrams per kilogram of body weight per day (mg/kg-day). To determine cancer risk, the dose through inhalation is multiplied by a cancer potency slope factor of the particular TAC which has the unit (mg/kg-day)$^{-1}$. Therefore, multiplying the estimated dose by the cancer potency slope factor yields a unitless value that represents chances per million of an individual developing cancer from exposure to a given TAC.

As with the proposed project, the following five carcinogens would be associated with the Site 40 alternative: (1) DPM; (2) Methylene Chloride; (3) Benzyl Chloride; (4) Formaldehyde; and (5) Acetaldehyde. Annual average concentrations for all chemicals except benzyl chloride at the maximum exposed worker and residential receptors shown in **Table 6** and **Table 7** above for estimating non-carcinogenic impacts were used to determine incremental cancer risk from the Site 40 alternative. The maximum annual average concentration of benzyl chloride at the maximum exposed worker and residential receptor were estimated to be 0.2379 $\mu g/m^3$ and 0.7040 $\mu g/m^3$ respectively for the windrow option; 0.0595 $\mu g/m^3$ and 0.1760 $\mu g/m^3$ respectively for the windrow with biofilter option; and 0.0119 $\mu g/m^3$ and 0.0352 $\mu g/m^3$ respectively for the ASP option. As with the proposed project, cancer risks at worker receptors were analyzed assuming an exposure frequency of 245 days per year (5 days per week/49 weeks per year) for 40 years with a worker breathing rate of 149 L/kg bodyweight – day. Cancer risks at residential receptors were analyzed based on the 80th percentile adult breathing rate of 302 L/kg-day. Exposure frequency for residents was assumed to be 350 days per year and exposure duration was assumed to be 70 years.

Table 8 below shows the OEHHA established cancer potency slopes associated with each carcinogenic compound associated with the Site 40 alternative and the associated dose through inhalation for both workers and residents. Cancer risk for each individual TAC was then determined by multiplying the cancer potency slope by the dose through inhalation factor. As shown, the maximum cancer risk associated with the unmitigated windrow option would exceed the BAAQMD threshold of 10 in one million at residential receptors. Application of pseudo-biofilters would reduce impacts; however cancer risk at residential receptors would still exceed the BAAQMD threshold. Cancer risk associated with the ASP option would be less than significant for both worker and residential receptors. Therefore, to mitigate cancer risk associated with the Site 40 alternative, the ASP option would be required.

TABLE 8

SITE 40 - CANCER RISK AT WORKER AND RESIDENTIAL RECEPTORS

Compound	Cancer Potency Slope $(mg/kg\text{-}day)^{-1}$	Worker Dose-inh (mg/kg-day)	Worker Cancer Risk (per million)	Resident Dose-inh (mg/kg-day)	Resident Cancer Risk (per million)
Windrow					
DPM	1.1	1.04	1.147	5.79	6.371
Methylene Chloride	3.5E-03	1.13	0.004	18.30	0.064
Benzyl Chloride	1.7E-01	13.60	2.312	203.88	34.660
Formaldehyde	2.1E-02	1.42	0.030	23.02	0.483
Acetaldehyde	1.0E-02	114.33	1.143	1846.04	18.460
Total Cancer Risk from Windrow			***4.64***		***60.0***
Windrow with Mitigation					
DPM	1.1	1.04	1.147	5.79	6.371
Methylene Chloride	3.5E-03	0.28	0.001	4.58	0.016
Benzyl Chloride	1.7E-01	3.40	0.578	50.97	8.665
Formaldehyde	2.1E-02	0.36	0.007	5.76	0.121
Acetaldehyde	1.0E-02	28.58	0.286	461.51	4.615
Total Cancer Risk from Windrow w/ Mitigation			***2.02***		***19.8***
ASP					
DPM	1.1	1.04	1.147	5.79	6.371
Methylene Chloride	3.5E-03	0.06	0.000	0.92	0.0032
Benzyl Chloride	1.7E-01	0.68	0.116	10.19	1.733
Formaldehyde	2.1E-02	0.07	0.001	1.15	0.024
Acetaldehyde	1.0E-02	5.72	0.057	92.30	0.923
Total Cancer Risk from ASP			***1.32***		***9.05***

SOURCE: Environmental Science Associates, 2010.

It should be noted that the analysis above assumes residential exposure to annual average concentrations associated with peak composting operations (200,000 tons per year) over a 70 year period. Since the first 20 years of operation would only process approximately 100,000 tons per year, risk presented above is extremely conservative. However, even when adjusted to account for a lower throughput for the first 20 years, risk would still be approximately 51.5 in one million for residents under the windrow option and 17.0 in one million under the windrow option with pseudo-biofilters.

PM2.5 Concentration

The maximum annual PM2.5 concentration as a result of the project construction would be 0.05 $\mu g/m^3$, which would not exceed the BAAQMD threshold of 0.3 $\mu g/m^3$ and would therefore constitute a **less than significant** impact. The maximum annual PM2.5 concentration as a result of the project operations would be 0.19 $\mu g/m^3$, which would not exceed the BAAQMD threshold of 0.3 $\mu g/m^3$ and would therefore constitute a **less than significant** impact.

Cumulative

The BAAQMD's BAAQMD CEQA Air Quality Guidelines (dated May, 2010) provides estimate impacts from significant roadway within Sonoma County such as Routes 1, 12, 37, 101, 116, 121, and 128. Estimated impacts within a distance of 1,000 feet were developed for each of these roadways. Site 40 is located approximately 200 feet from Route 116. Thus, the impact from this roadway is expected to contribute an additional concentration of PM2.5 of 0.013 $\mu g/m^3$ and an additional cancer risk of 3.3 per one million. These values combined with the project impacts would be well below the cumulative BAAQMD thresholds of 0.8 μg/m^3 and 100 cancers per million persons and would therefore constitute a **less than significant** impact.

References – Health Risk Assessment

Alameda County Waste Management Authority (ACWMA), 2006. *Organics Processing Development Program and Project, Final Environmental Impact Report, Appendix 1 – Emissions from Compost Piles*, accessed online at: http://recycle.stopwaste.org/organics/feir-pdf/feir-appendix1.pdf, published February 2006.

Norcal Waste Systems, 2006. *Jepson Prairie Organics Compost Facility, Air Emissions Source Test*, prepared by Thomas E. Card and Charles E. Schmidt, May 2006.

Office of Environmental Health Hazards Assessment (OEHHA), 2003. *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments,* available online at: http://www.oehha.org/air/hot_spots/pdf/HRAguidefinal.pdf, accessed April 29, 2008.

OEHHA, 2008. *Acute, 8-hour and Chronic Reference Exposure Levels as on December 18, 2008*, available online at: http://www.oehha.ca.gov/air/allrels.html, accessed August 24, 2009.

USEPA, 2004. *Users Guide for the AMS/EPA Regulatory Model – AERMOD,* EPA-454/B-003-01, September 2004.

Appendix AIR-5

Central Site Alternative Criteria Pollutant and GHG Emissions

APPENDIX AIR-5

Central Site Alternative Criteria Pollutant and GHG Emissions

Introduction to the Air Quality Models and Results

The majority of the models, emission factors, and general methodology are the same for the Central Site Alternative as for the project (see Appendix AIR-1 for this information). However, the Central Site Alternative incorporates differing construction and operational Phase assumptions, such as disturbed areas, waste throughput and associated traffic, and only ASP for composting operations. These differing assumptions and results are included below.

This Appendix is separated into the following sub-sections:

- URBEMIS2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE PHASE 1 -- YEAR 2010 (CONSTRUCTION) AND 2011 (OPERATIONS) – ASP COMPOSTING
- URBEMIS2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE PHASE 2 -- YEAR 2018 (CONSTRUCTION) AND 2019 (OPERATIONS) – ASP COMPOSTING
- EMFAC2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE OPERATIONS (YEAR 2011 WEEKDAY AND SATURDAY)
- EMFAC2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE OPERATIONS (YEAR 2019 WEEKDAY AND SATURDAY)
- CENTRAL SITE ALTERNATIVE ASP COMPOSTING EMISSIONS
- CENTRAL SITE ALTERNATIVE GHG ANALYSIS (YEAR 2011) ASP COMPOSTING
- CENTRAL SITE ALTERNATIVE GHG ANALYSIS (YEAR 2019) ASP COMPOSTING

URBEMIS2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE PHASE 1 -- YEAR 2010 (CONSTRUCTION) AND 2011 (OPERATIONS) – ASP COMPOSTING

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Central Site\Phase 1 Const 2010 Ops 2011.urb924

Project Name: Central Site 2010-2011 Const and Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (lbs/day unmitigated)	6.21	54.74	28.60	0.03	50.10	2.92	53.03	10.48	2.69	13.17	6,045.91
2010 TOTALS (lbs/day mitigated)	6.21	47.37	28.60	0.03	23.76	1.90	25.66	4.97	1.75	6.72	6,045.91
2011 TOTALS (lbs/day unmitigated)	1.56	14.16	7.93	0.00	30.01	0.54	30.56	6.27	0.51	6.78	2,157.31
2011 TOTALS (lbs/day mitigated)	1.56	14.16	7.93	0.00	14.21	0.54	14.75	2.97	0.51	3.48	2,157.31

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/4/2010-1/29/2010 Active Days: 20	2.09	12.18	9.29	0.00	0.01	1.04	1.05	0.00	0.95	0.96	1,180.46
Asphalt 01/04/2010-02/08/2010	2.09	12.18	9.29	0.00	0.01	1.04	1.05	0.00	0.95	0.96	1,180.46
Paving Off-Gas	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.01	0.16	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.95
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 2/1/2010-2/8/2010 Active Days: 6	**6.21**	**54.74**	**28.60**	**0.03**	**50.10**	**2.92**	**53.03**	**10.48**	**2.69**	**13.17**	**6,045.91**
Asphalt 01/04/2010-02/08/2010	2.09	12.18	9.29	0.00	0.01	1.04	1.05	0.00	0.95	0.96	1,180.46
Paving Off-Gas	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	11.89	6.98	0.00	0.00	1.03	1.03	0.00	0.94	0.94	979.23
Paving On Road Diesel	0.01	0.16	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.95
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Mass Grading 02/01/2010-12/31/2010	4.13	42.57	19.31	0.02	50.09	1.89	51.98	10.47	1.74	12.21	4,865.45
Mass Grading Dust	0.00	0.00	0.00	0.00	50.00	0.00	50.00	10.44	0.00	10.44	0.00
Mass Grading Off Road Diesel	3.00	24.99	12.46	0.00	0.00	1.25	1.25	0.00	1.15	1.15	2,247.32
Mass Grading On Road Diesel	1.08	17.51	5.57	0.02	0.09	0.64	0.72	0.03	0.59	0.61	2,516.26
Mass Grading Worker Trips	0.04	0.07	1.29	0.00	0.00	0.00	0.01	0.00	0.00	0.00	101.88

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Time Slice 2/9/2010-12/31/2010 Active Days: 234	4.13	42.57	19.31	0.02	50.09	1.89	51.98	10.47	1.74	12.21	4,865.45
Mass Grading 02/01/2010-12/31/2010	4.13	42.57	19.31	0.02	50.09	1.89	51.98	10.47	1.74	12.21	4,865.45
Mass Grading Dust	0.00	0.00	0.00	0.00	50.00	0.00	50.00	10.44	0.00	10.44	0.00
Mass Grading Off Road Diesel	3.00	24.99	12.46	0.00	0.00	1.25	1.25	0.00	1.15	1.15	2,247.32
Mass Grading On Road Diesel	1.08	17.51	5.57	0.02	0.09	0.64	0.72	0.03	0.59	0.61	2,516.26
Mass Grading Worker Trips	0.04	0.07	1.29	0.00	0.00	0.00	0.01	0.00	0.00	0.00	101.88
Time Slice 1/1/2011-12/30/2011 Active Days: 312	1.56	14.16	7.93	0.00	30.01	0.54	30.56	6.27	0.51	6.78	2,157.31
Fine Grading 01/01/2011-12/30/2011	1.56	14.16	7.93	0.00	30.01	0.54	30.56	6.27	0.51	6.78	2,157.31
Fine Grading Dust	0.00	0.00	0.00	0.00	30.00	0.00	30.00	6.27	0.00	6.27	0.00
Fine Grading Off Road Diesel	1.46	13.98	4.65	0.00	0.00	0.53	0.53	0.00	0.51	0.51	1,876.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.18	3.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	280.32

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

Total Acres Disturbed: 1.5

Maximum Daily Acreage Disturbed: 1.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2704 hrs/year

1 Water Trucks (275 hp) operating at a 0.5 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

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1 Forklifts (93 hp) operating at a 0.3 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2912 hrs/year

Phase: Mass Grading 2/1/2010 - 12/31/2010 - Site Grading

Total Acres Disturbed: 10

Maximum Daily Acreage Disturbed: 2.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 625

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

Acres to be Paved: 0.5

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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Time Slice 1/4/2010-1/29/2010 Active Days: 20	2.09	9.80	9.29	0.00	0.01	0.58	0.58	0.00	0.53	0.53	1,180.46
Asphalt 01/04/2010-02/08/2010	2.09	9.80	9.29	0.00	0.01	0.58	0.58	0.00	0.53	0.53	1,180.46
Paving Off-Gas	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	9.51	6.98	0.00	0.00	0.56	0.56	0.00	0.52	0.52	979.23
Paving On Road Diesel	0.01	0.16	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.95
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Time Slice 2/1/2010-2/8/2010 Active Days: 6	**6.21**	47.37	**28.60**	**0.03**	23.76	1.90	25.66	4.97	1.75	6.72	**6,045.91**
Asphalt 01/04/2010-02/08/2010	2.09	9.80	9.29	0.00	0.01	0.58	0.58	0.00	0.53	0.53	1,180.46
Paving Off-Gas	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.95	9.51	6.98	0.00	0.00	0.56	0.56	0.00	0.52	0.52	979.23
Paving On Road Diesel	0.01	0.16	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.95
Paving Worker Trips	0.08	0.13	2.25	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.28
Mass Grading 02/01/2010-12/31/2010	4.13	37.57	19.31	0.02	23.75	1.33	25.07	4.97	1.22	6.19	4,865.45
Mass Grading Dust	0.00	0.00	0.00	0.00	23.66	0.00	23.66	4.94	0.00	4.94	0.00
Mass Grading Off Road Diesel	3.00	19.99	12.46	0.00	0.00	0.69	0.69	0.00	0.63	0.63	2,247.32
Mass Grading On Road Diesel	1.08	17.51	5.57	0.02	0.09	0.64	0.72	0.03	0.59	0.61	2,516.26
Mass Grading Worker Trips	0.04	0.07	1.29	0.00	0.00	0.00	0.01	0.00	0.00	0.00	101.88

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Time Slice 2/9/2010-12/31/2010 Active Days: 234	4.13	37.57	19.31	0.02	23.75	1.33	25.07	4.97	1.22	6.19	4,865.45
Mass Grading 02/01/2010-12/31/2010	4.13	37.57	19.31	0.02	23.75	1.33	25.07	4.97	1.22	6.19	4,865.45
Mass Grading Dust	0.00	0.00	0.00	0.00	23.66	0.00	23.66	4.94	0.00	4.94	0.00
Mass Grading Off Road Diesel	3.00	19.99	12.46	0.00	0.00	0.69	0.69	0.00	0.63	0.63	2,247.32
Mass Grading On Road Diesel	1.08	17.51	5.57	0.02	0.09	0.64	0.72	0.03	0.59	0.61	2,516.26
Mass Grading Worker Trips	0.04	0.07	1.29	0.00	0.00	0.00	0.01	0.00	0.00	0.00	101.88
Time Slice 1/1/2011-12/30/2011 Active Days: 312	1.56	14.16	7.93	0.00	14.21	0.54	14.75	2.97	0.51	3.48	2,157.31
Fine Grading 01/01/2011-12/30/2011	1.56	14.16	7.93	0.00	14.21	0.54	14.75	2.97	0.51	3.48	2,157.31
Fine Grading Dust	0.00	0.00	0.00	0.00	14.19	0.00	14.19	2.96	0.00	2.96	0.00
Fine Grading Off Road Diesel	1.46	13.98	4.65	0.00	0.00	0.53	0.53	0.00	0.51	0.51	1,876.99
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.18	3.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	280.32

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

The following mitigation measures apply to Phase: Mass Grading 2/1/2010 - 12/31/2010 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

3/22/2011 2:33:01 PM

NOX: 20% PM10: 45% PM25: 45%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

The following mitigation measures apply to Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth - No Summer Emissions							
Landscape	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00						
Architectural Coatings	0.00						
TOTALS (lbs/day, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3/18/2011 2:42:14 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Central Site\Phase 1 Const 2010 Ops 2011.urb924

Project Name: Central Site 2010-2011 Const and Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010 TOTALS (tons/year unmitigated)	0.52	5.27	2.44	0.00	6.01	0.24	6.25	1.26	0.22	1.48	599.20
2010 TOTALS (tons/year mitigated)	0.52	4.64	2.44	0.00	2.85	0.17	3.02	0.60	0.15	0.75	599.20
Percent Reduction	0.00	11.97	0.00	0.00	52.59	30.60	51.75	52.53	30.61	49.26	0.00
2011 TOTALS (tons/year unmitigated)	0.24	2.21	1.24	0.00	4.68	0.08	4.77	0.98	0.08	1.06	336.54
2011 TOTALS (tons/year mitigated)	0.24	2.21	1.24	0.00	2.22	0.08	2.30	0.46	0.08	0.54	336.54
Percent Reduction	0.00	0.00	0.00	0.00	52.67	0.00	51.73	52.65	0.00	48.66	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

2010	0.52	5.27	2.44	0.00	6.01	0.24	6.25	1.26	0.22	1.48	599.20
Asphalt 01/04/2010-02/08/2010	0.03	0.16	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	15.35
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.03	0.15	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	12.73
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Mass Grading 02/01/2010-12/31/2010	0.50	5.11	2.32	0.00	6.01	0.23	6.24	1.26	0.21	1.47	583.85
Mass Grading Dust	0.00	0.00	0.00	0.00	6.00	0.00	6.00	1.25	0.00	1.25	0.00
Mass Grading Off Road Diesel	0.36	3.00	1.50	0.00	0.00	0.15	0.15	0.00	0.14	0.14	269.68
Mass Grading On Road Diesel	0.13	2.10	0.67	0.00	0.01	0.08	0.09	0.00	0.07	0.07	301.95
Mass Grading Worker Trips	0.01	0.01	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.23
2011	0.24	2.21	1.24	0.00	4.68	0.08	4.77	0.98	0.08	1.06	336.54
Fine Grading 01/01/2011-12/30/2011	0.24	2.21	1.24	0.00	4.68	0.08	4.77	0.98	0.08	1.06	336.54
Fine Grading Dust	0.00	0.00	0.00	0.00	4.68	0.00	4.68	0.98	0.00	0.98	0.00
Fine Grading Off Road Diesel	0.23	2.18	0.73	0.00	0.00	0.08	0.08	0.00	0.08	0.08	292.81
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.73

Phase Assumptions

Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

Total Acres Disturbed: 1.5

Maximum Daily Acreage Disturbed: 1.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

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Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2704 hrs/year

1 Water Trucks (275 hp) operating at a 0.5 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Forklifts (93 hp) operating at a 0.3 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2496 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 1 hours per day; Engine Built/Rebuilt in 2006 with average useage of 2912 hrs/year

Phase: Mass Grading 2/1/2010 - 12/31/2010 - Site Grading

Total Acres Disturbed: 10

Maximum Daily Acreage Disturbed: 2.5

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 625

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

Acres to be Paved: 0.5

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2010	0.52	4.64	2.44	0.00	2.85	0.17	3.02	0.60	0.15	0.75	599.20
Asphalt 01/04/2010-02/08/2010	0.03	0.13	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	15.35
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.03	0.12	0.09	0.00	0.00	0.01	0.01	0.00	0.01	0.01	12.73
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30
Paving Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.32
Mass Grading 02/01/2010-12/31/2010	0.50	4.51	2.32	0.00	2.85	0.16	3.01	0.60	0.15	0.74	583.85
Mass Grading Dust	0.00	0.00	0.00	0.00	2.84	0.00	2.84	0.59	0.00	0.59	0.00
Mass Grading Off Road Diesel	0.36	2.40	1.50	0.00	0.00	0.08	0.08	0.00	0.08	0.08	269.68
Mass Grading On Road Diesel	0.13	2.10	0.67	0.00	0.01	0.08	0.09	0.00	0.07	0.07	301.95
Mass Grading Worker Trips	0.01	0.01	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.23
2011	0.24	2.21	1.24	0.00	2.22	0.08	2.30	0.46	0.08	0.54	336.54
Fine Grading 01/01/2011-12/30/2011	0.24	2.21	1.24	0.00	2.22	0.08	2.30	0.46	0.08	0.54	336.54
Fine Grading Dust	0.00	0.00	0.00	0.00	2.21	0.00	2.21	0.46	0.00	0.46	0.00
Fine Grading Off Road Diesel	0.23	2.18	0.73	0.00	0.00	0.08	0.08	0.00	0.08	0.08	292.81
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.02	0.03	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.73

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2011 - 12/30/2011 - Facility Off-road Equipment Operations

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For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

The following mitigation measures apply to Phase: Mass Grading 2/1/2010 - 12/31/2010 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Graders, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rubber Tired Dozers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Water Trucks, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

The following mitigation measures apply to Phase: Paving 1/4/2010 - 2/8/2010 - Roadway Paving/ Expansion

For Cement and Mortar Mixers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Pavers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Rollers, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

For Tractors/Loaders/Backhoes, the Use Aqueous Diesel Fuel mitigation reduces emissions by:

NOX: 20% PM10: 45% PM25: 45%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00						
Architectural Coatings	0.00						
TOTALS (tons/year, unmitigated)	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Area Source Changes to Defaults

URBEMIS2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE PHASE 2 -- YEAR 2018 (CONSTRUCTION) AND 2019 (OPERATIONS) – ASP COMPOSTING

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Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Central Site\Phase 2 Const 2018 Ops 2019.urb924

Project Name: Central Site 2018-2019 Const and Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2018 TOTALS (lbs/day unmitigated)	4.86	40.97	25.64	0.07	78.28	1.83	80.11	16.38	1.69	18.07	10,968.73
2018 TOTALS (lbs/day mitigated)	4.86	40.97	25.64	0.07	37.18	1.83	39.01	7.80	1.69	9.48	10,968.73
2019 TOTALS (lbs/day unmitigated)	1.40	2.92	13.31	0.00	80.01	0.09	80.10	16.71	0.09	16.80	5,529.43
2019 TOTALS (lbs/day mitigated)	1.40	2.92	13.31	0.00	37.86	0.09	37.95	7.91	0.09	7.99	5,529.43

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
Time Slice 1/1/2018-1/31/2018 Active Days: 23	1.29	7.46	7.79	0.00	0.01	0.53	0.54	0.00	0.49	0.49	1,197.95
Asphalt 01/01/2018-02/09/2018	1.29	7.46	7.79	0.00	0.01	0.53	0.54	0.00	0.49	0.49	1,197.95
Paving Off-Gas	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.16	7.29	6.58	0.00	0.00	0.52	0.52	0.00	0.48	0.48	979.23
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00	39.78
Paving Worker Trips	0.03	0.06	1.17	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.94
Time Slice 2/1/2018-2/9/2018 Active Days: 7	**4.86**	**40.97**	**25.64**	0.07	78.27	**1.83**	**80.11**	16.38	**1.69**	**18.07**	**10,968.73**
Asphalt 01/01/2018-02/09/2018	1.29	7.46	7.79	0.00	0.01	0.53	0.54	0.00	0.49	0.49	1,197.95
Paving Off-Gas	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.16	7.29	6.58	0.00	0.00	0.52	0.52	0.00	0.48	0.48	979.23
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00	39.78
Paving Worker Trips	0.03	0.06	1.17	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.94
Mass Grading 02/01/2018-11/30/2018	3.58	33.51	17.85	0.07	78.26	1.30	79.57	16.38	1.20	17.57	9,770.78
Mass Grading Dust	0.00	0.00	0.00	0.00	78.00	0.00	78.00	16.29	0.00	16.29	0.00
Mass Grading Off Road Diesel	1.88	13.42	9.57	0.00	0.00	0.60	0.60	0.00	0.55	0.55	2,247.32
Mass Grading On Road Diesel	1.67	20.05	7.62	0.07	0.26	0.70	0.96	0.09	0.64	0.73	7,421.21
Mass Grading Worker Trips	0.02	0.03	0.67	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.25

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Time Slice 2/12/2018-8/10/2018 Active Days: 130	3.58	33.51	17.85	0.07	78.26	1.30	79.57	16.38	1.20	17.57	9,770.78
Mass Grading 02/01/2018-11/30/2018	3.58	33.51	17.85	0.07	78.26	1.30	79.57	16.38	1.20	17.57	9,770.78
Mass Grading Dust	0.00	0.00	0.00	0.00	78.00	0.00	78.00	16.29	0.00	16.29	0.00
Mass Grading Off Road Diesel	1.88	13.42	9.57	0.00	0.00	0.60	0.60	0.00	0.55	0.55	2,247.32
Mass Grading On Road Diesel	1.67	20.05	7.62	0.07	0.26	0.70	0.96	0.09	0.64	0.73	7,421.21
Mass Grading Worker Trips	0.02	0.03	0.67	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.25
Time Slice 8/13/2018-11/30/2018 Active Days: 80	4.28	38.16	23.63	**0.07**	78.28	1.53	79.81	16.38	1.41	17.79	10,946.15
Building 08/13/2018-12/31/2018	0.71	4.65	5.77	0.00	0.01	0.23	0.24	0.00	0.21	0.22	1,175.37
Building Off Road Diesel	0.65	4.47	4.16	0.00	0.00	0.22	0.22	0.00	0.20	0.20	893.39
Building Vendor Trips	0.01	0.11	0.14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	55.82
Building Worker Trips	0.04	0.08	1.48	0.00	0.01	0.01	0.02	0.00	0.00	0.01	226.16
Mass Grading 02/01/2018-11/30/2018	3.58	33.51	17.85	0.07	78.26	1.30	79.57	16.38	1.20	17.57	9,770.78
Mass Grading Dust	0.00	0.00	0.00	0.00	78.00	0.00	78.00	16.29	0.00	16.29	0.00
Mass Grading Off Road Diesel	1.88	13.42	9.57	0.00	0.00	0.60	0.60	0.00	0.55	0.55	2,247.32
Mass Grading On Road Diesel	1.67	20.05	7.62	0.07	0.26	0.70	0.96	0.09	0.64	0.73	7,421.21
Mass Grading Worker Trips	0.02	0.03	0.67	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.25
Time Slice 12/3/2018-12/31/2018 Active Days: 21	0.71	4.65	5.77	0.00	0.01	0.23	0.24	0.00	0.21	0.22	1,175.37
Building 08/13/2018-12/31/2018	0.71	4.65	5.77	0.00	0.01	0.23	0.24	0.00	0.21	0.22	1,175.37
Building Off Road Diesel	0.65	4.47	4.16	0.00	0.00	0.22	0.22	0.00	0.20	0.20	893.39
Building Vendor Trips	0.01	0.11	0.14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	55.82
Building Worker Trips	0.04	0.08	1.48	0.00	0.01	0.01	0.02	0.00	0.00	0.01	226.16

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Time Slice 1/1/2019-12/31/2019 Active Days: 313	1.40	2.92	13.31	0.00	**80.01**	0.09	80.10	**16.71**	0.09	16.80	5,529.43
Fine Grading 01/01/2019-12/31/2019	1.40	2.92	13.31	0.00	80.01	0.09	80.10	16.71	0.09	16.80	5,529.43
Fine Grading Dust	0.00	0.00	0.00	0.00	80.00	0.00	80.00	16.71	0.00	16.71	0.00
Fine Grading Off Road Diesel	1.35	2.83	11.61	0.00	0.00	0.08	0.08	0.00	0.08	0.08	5,248.19
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.05	0.09	1.69	0.00	0.01	0.01	0.02	0.00	0.01	0.01	281.24

Phase Assumptions

Phase: Fine Grading 1/1/2019 - 12/31/2019 - Facility Off-road Equipment Operations

Total Acres Disturbed: 4

Maximum Daily Acreage Disturbed: 4

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.9 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2704 hrs/year
1 Water Trucks (275 hp) operating at a 0.5 load factor for 2.8 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2496 hrs/year

1 Forklifts (93 hp) operating at a 0.3 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2496 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2912 hrs/year

Phase: Mass Grading 2/1/2018 - 11/30/2018 - Site Grading

Total Acres Disturbed: 15.6

Maximum Daily Acreage Disturbed: 3.9

Fugitive Dust Level of Detail: Default

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20 lbs per acre-day

On Road Truck Travel (VMT): 1843.32

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/1/2018 - 2/9/2018 - Roadway Paving/ Expansion

Acres to be Paved: 1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 8/13/2018 - 12/31/2018 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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Time Slice 1/1/2018-1/31/2018 Active Days: 23	1.29	7.46	7.79	0.00	0.01	0.53	0.54	0.00	0.49	0.49	1,197.95
Asphalt 01/01/2018-02/09/2018	1.29	7.46	7.79	0.00	0.01	0.53	0.54	0.00	0.49	0.49	1,197.95
Paving Off-Gas	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.16	7.29	6.58	0.00	0.00	0.52	0.52	0.00	0.48	0.48	979.23
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00	39.78
Paving Worker Trips	0.03	0.06	1.17	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.94
Time Slice 2/1/2018-2/9/2018 Active Days: 7	**4.86**	**40.97**	**25.64**	0.07	37.18	**1.83**	39.01	7.80	**1.69**	9.48	**10,968.73**
Asphalt 01/01/2018-02/09/2018	1.29	7.46	7.79	0.00	0.01	0.53	0.54	0.00	0.49	0.49	1,197.95
Paving Off-Gas	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.16	7.29	6.58	0.00	0.00	0.52	0.52	0.00	0.48	0.48	979.23
Paving On Road Diesel	0.01	0.11	0.04	0.00	0.00	0.00	0.01	0.00	0.00	0.00	39.78
Paving Worker Trips	0.03	0.06	1.17	0.00	0.01	0.00	0.01	0.00	0.00	0.01	178.94
Mass Grading 02/01/2018-11/30/2018	3.58	33.51	17.85	0.07	37.17	1.30	38.47	7.79	1.20	8.99	9,770.78
Mass Grading Dust	0.00	0.00	0.00	0.00	36.90	0.00	36.90	7.71	0.00	7.71	0.00
Mass Grading Off Road Diesel	1.88	13.42	9.57	0.00	0.00	0.60	0.60	0.00	0.55	0.55	2,247.32
Mass Grading On Road Diesel	1.67	20.05	7.62	0.07	0.26	0.70	0.96	0.09	0.64	0.73	7,421.21
Mass Grading Worker Trips	0.02	0.03	0.67	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.25

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Time Slice 2/12/2018-8/10/2018 Active Days: 130	3.58	33.51	17.85	0.07	37.17	1.30	38.47	7.79	1.20	8.99	9,770.78
Mass Grading 02/01/2018-11/30/2018	3.58	33.51	17.85	0.07	37.17	1.30	38.47	7.79	1.20	8.99	9,770.78
Mass Grading Dust	0.00	0.00	0.00	0.00	36.90	0.00	36.90	7.71	0.00	7.71	0.00
Mass Grading Off Road Diesel	1.88	13.42	9.57	0.00	0.00	0.60	0.60	0.00	0.55	0.55	2,247.32
Mass Grading On Road Diesel	1.67	20.05	7.62	0.07	0.26	0.70	0.96	0.09	0.64	0.73	7,421.21
Mass Grading Worker Trips	0.02	0.03	0.67	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.25
Time Slice 8/13/2018-11/30/2018 Active Days: 80	4.28	38.16	23.63	**0.07**	37.18	1.53	38.71	7.80	1.41	9.21	10,946.15
Building 08/13/2018-12/31/2018	0.71	4.65	5.77	0.00	0.01	0.23	0.24	0.00	0.21	0.22	1,175.37
Building Off Road Diesel	0.65	4.47	4.16	0.00	0.00	0.22	0.22	0.00	0.20	0.20	893.39
Building Vendor Trips	0.01	0.11	0.14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	55.82
Building Worker Trips	0.04	0.08	1.48	0.00	0.01	0.01	0.02	0.00	0.00	0.01	226.16
Mass Grading 02/01/2018-11/30/2018	3.58	33.51	17.85	0.07	37.17	1.30	38.47	7.79	1.20	8.99	9,770.78
Mass Grading Dust	0.00	0.00	0.00	0.00	36.90	0.00	36.90	7.71	0.00	7.71	0.00
Mass Grading Off Road Diesel	1.88	13.42	9.57	0.00	0.00	0.60	0.60	0.00	0.55	0.55	2,247.32
Mass Grading On Road Diesel	1.67	20.05	7.62	0.07	0.26	0.70	0.96	0.09	0.64	0.73	7,421.21
Mass Grading Worker Trips	0.02	0.03	0.67	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.25
Time Slice 12/3/2018-12/31/2018 Active Days: 21	0.71	4.65	5.77	0.00	0.01	0.23	0.24	0.00	0.21	0.22	1,175.37
Building 08/13/2018-12/31/2018	0.71	4.65	5.77	0.00	0.01	0.23	0.24	0.00	0.21	0.22	1,175.37
Building Off Road Diesel	0.65	4.47	4.16	0.00	0.00	0.22	0.22	0.00	0.20	0.20	893.39
Building Vendor Trips	0.01	0.11	0.14	0.00	0.00	0.00	0.01	0.00	0.00	0.00	55.82
Building Worker Trips	0.04	0.08	1.48	0.00	0.01	0.01	0.02	0.00	0.00	0.01	226.16

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Time Slice 1/1/2019-12/31/2019 Active Days: 313	1.40	2.92	13.31	0.00	37.86	0.09	37.95	7.91	0.09	7.99	5,529.43
Fine Grading 01/01/2019-12/31/2019	1.40	2.92	13.31	0.00	37.86	0.09	37.95	7.91	0.09	7.99	5,529.43
Fine Grading Dust	0.00	0.00	0.00	0.00	37.85	0.00	37.85	7.90	0.00	7.90	0.00
Fine Grading Off Road Diesel	1.35	2.83	11.61	0.00	0.00	0.08	0.08	0.00	0.08	0.08	5,248.19
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.05	0.09	1.69	0.00	0.01	0.01	0.02	0.00	0.01	0.01	281.24

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2019 - 12/31/2019 - Facility Off-road Equipment Operations

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

The following mitigation measures apply to Phase: Mass Grading 2/1/2018 - 11/30/2018 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.02	0.23	0.19	0.00	0.00	0.00	276.48
Hearth - No Summer Emissions							
Landscape	0.12	0.02	1.55	0.00	0.01	0.01	2.81
Consumer Products	0.00						
Architectural Coatings	0.20						
TOTALS (lbs/day, unmitigated)	0.34	0.25	1.74	0.00	0.01	0.01	279.29

Area Source Changes to Defaults

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: G:\207xxx\D207312.00 - Sonoma County Compost Site\04 Working Documents\Admin Draft EIR\AQ Resources and Data\AQ data 081309\June 2010\March 2011 Revisions\Central Site\Phase 2 Const 2018 Ops 2019.urb924

Project Name: Central Site 2018-2019 Const and Ops

Project Location: Sonoma County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2018 TOTALS (tons/year unmitigated)	0.44	3.98	2.35	0.01	8.49	0.16	8.65	1.78	0.15	1.93	1,137.46
2018 TOTALS (tons/year mitigated)	0.44	3.98	2.35	0.01	4.03	0.16	4.19	0.85	0.15	0.99	1,137.46
Percent Reduction	0.00	0.00	0.00	0.00	52.51	0.00	51.53	52.40	0.00	48.38	0.00
2019 TOTALS (tons/year unmitigated)	0.22	0.46	2.08	0.00	12.52	0.01	12.54	2.62	0.01	2.63	865.36
2019 TOTALS (tons/year mitigated)	0.22	0.46	2.08	0.00	5.93	0.01	5.94	1.24	0.01	1.25	865.36
Percent Reduction	0.00	0.00	0.00	0.00	52.68	0.00	52.62	52.67	0.00	52.41	0.00

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2018	0.44	3.98	2.35	0.01	8.49	0.16	8.65	1.78	0.15	1.93	1,137.46
Asphalt 01/01/2018-02/09/2018	0.02	0.11	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	17.97
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.11	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.69
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.68
Mass Grading 02/01/2018-11/30/2018	0.39	3.64	1.94	0.01	8.49	0.14	8.63	1.78	0.13	1.91	1,060.13
Mass Grading Dust	0.00	0.00	0.00	0.00	8.46	0.00	8.46	1.77	0.00	1.77	0.00
Mass Grading Off Road Diesel	0.20	1.46	1.04	0.00	0.00	0.07	0.07	0.00	0.06	0.06	243.83
Mass Grading On Road Diesel	0.18	2.18	0.83	0.01	0.03	0.08	0.10	0.01	0.07	0.08	805.20
Mass Grading Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.09
Building 08/13/2018-12/31/2018	0.04	0.24	0.29	0.00	0.00	0.01	0.01	0.00	0.01	0.01	59.36
Building Off Road Diesel	0.03	0.23	0.21	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.12
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.82
Building Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.42
2019	0.22	0.46	2.08	0.00	12.52	0.01	12.54	2.62	0.01	2.63	865.36
Fine Grading 01/01/2019-12/31/2019	0.22	0.46	2.08	0.00	12.52	0.01	12.54	2.62	0.01	2.63	865.36
Fine Grading Dust	0.00	0.00	0.00	0.00	12.52	0.00	12.52	2.61	0.00	2.61	0.00
Fine Grading Off Road Diesel	0.21	0.44	1.82	0.00	0.00	0.01	0.01	0.00	0.01	0.01	821.34
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.01	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.01

Phase Assumptions

Phase: Fine Grading 1/1/2019 - 12/31/2019 - Facility Off-road Equipment Operations

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Total Acres Disturbed: 4

Maximum Daily Acreage Disturbed: 4

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off Road Diesel calculated using the Named Equipment EMS functions.

The Off Road Equipment was based on the Named Equipment List: C:\Documents and Settings\mxm\Application Data\Urbemis\Version9a\Data\Sonoma Compost v2.equip;Sonoma Compost
Off-Road Equipment:

7 Rubber Tired Loaders (235 hp) operating at a 0.54 load factor for 2.9 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2704 hrs/year
1 Water Trucks (275 hp) operating at a 0.5 load factor for 2.8 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2496 hrs/year

1 Forklifts (93 hp) operating at a 0.3 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2496 hrs/year

1 Other Equipment (580 hp) operating at a 0.62 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2496 hrs/year

1 Other Equipment (139 hp) operating at a 0.62 load factor for 2.6 hours per day; Engine Built/Rebuilt in 2016 with average useage of 2912 hrs/year

Phase: Mass Grading 2/1/2018 - 11/30/2018 - Site Grading

Total Acres Disturbed: 15.6

Maximum Daily Acreage Disturbed: 3.9

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 1843.32

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 1/1/2018 - 2/9/2018 - Roadway Paving/ Expansion

Acres to be Paved: 1

Off-Road Equipment:

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4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 8/13/2018 - 12/31/2018 - Building Construction

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2018	0.44	3.98	2.35	0.01	4.03	0.16	4.19	0.85	0.15	0.99	1,137.46
Asphalt 01/01/2018-02/09/2018	0.02	0.11	0.12	0.00	0.00	0.01	0.01	0.00	0.01	0.01	17.97
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.02	0.11	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	14.69
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60
Paving Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.68
Mass Grading 02/01/2018-11/30/2018	0.39	3.64	1.94	0.01	4.03	0.14	4.17	0.85	0.13	0.98	1,060.13
Mass Grading Dust	0.00	0.00	0.00	0.00	4.00	0.00	4.00	0.84	0.00	0.84	0.00
Mass Grading Off Road Diesel	0.20	1.46	1.04	0.00	0.00	0.07	0.07	0.00	0.06	0.06	243.83
Mass Grading On Road Diesel	0.18	2.18	0.83	0.01	0.03	0.08	0.10	0.01	0.07	0.08	805.20
Mass Grading Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.09
Building 08/13/2018-12/31/2018	0.04	0.24	0.29	0.00	0.00	0.01	0.01	0.00	0.01	0.01	59.36
Building Off Road Diesel	0.03	0.23	0.21	0.00	0.00	0.01	0.01	0.00	0.01	0.01	45.12
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.82
Building Worker Trips	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.42
2019	0.22	0.46	2.08	0.00	5.93	0.01	5.94	1.24	0.01	1.25	865.36
Fine Grading 01/01/2019-12/31/2019	0.22	0.46	2.08	0.00	5.93	0.01	5.94	1.24	0.01	1.25	865.36
Fine Grading Dust	0.00	0.00	0.00	0.00	5.92	0.00	5.92	1.24	0.00	1.24	0.00
Fine Grading Off Road Diesel	0.21	0.44	1.82	0.00	0.00	0.01	0.01	0.00	0.01	0.01	821.34
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.01	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	44.01

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2019 - 12/31/2019 - Facility Off-road Equipment Operations

3/18/2011 3:33:38 PM

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

The following mitigation measures apply to Phase: Mass Grading 2/1/2018 - 11/30/2018 - Site Grading

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.04	0.04	0.00	0.00	0.00	50.46
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscape	0.01	0.00	0.14	0.00	0.00	0.00	0.25
Consumer Products	0.00						
Architectural Coatings	0.04						
TOTALS (tons/year, unmitigated)	0.05	0.04	0.18	0.00	0.00	0.00	50.71

Area Source Changes to Defaults

EMFAC2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE OPERATIONS (YEAR 2011 WEEKDAY AND SATURDAY)

MILEAGE BETWEEN SONOMA COUNTY TRANSFER STATIONS AND EXISTING SITE

	MOM Trucks	EXISTING COMPOST SITE 550 Meacham Rd Petaluma, CA	% of trips
TRANSFER STATIONS	**Annapolis** 33549 Annapolis Road Annapolis, CA 95412 707) 886-5204	67.5	0.50%
	Guerneville 13450 Pocket Dr. Guerneville, CA 95446 (707) 869-3878	20.9	7.90%
	Healdsburg 166 Alexander Valley Rd Healdsburg, CA 95448 (707) 433-0321	30.7	41.60%
	Sonoma 4376 Stage Gulch Rd Sonoma, CA 95476 (707) 996-6597	19	50.00%
			100.00%

Assuming Source ~ Waste Centroid (Todd Rd and Highway 101)	Distance to Project (Miles)
Haul Trucks	8
Self Haul Vehicles	8
Compost Sales	8
Bio Fuel/Ag Trucks	8
Employees	8

	Distance to Project (Miles)
MOM Trucks (Weighted Avg from above)	24.3

Central Site Alternative Weekday: Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost -- Central Site
grams/mile

LDA	ROG	CO	NOx	CO2	PM10
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.00311195	0.000177293

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 49 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 16 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032	dust	dust
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	56	896	0.19	5.85	0.45	764.19	0.06	2.79	0.16
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038	dust	dust
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	16	256	0.05	1.28	0.34	312.04	0.02	0.80	0.05
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239	dust	dust
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	49	3	147	0.11	1.41	1.98	432.63	0.08	0.46	0.03

Total Trips 75

	2011 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	0	7	2	1197	0	0	4.04	0.23	lbs/day
tons/year	0	1	0	141	0	0	1	0	tons/year
				metric tons					

Central Site Alternative Saturday: Air Quality Analysis for Mobile Emissions Year 2011
Sonoma Compost -- Central Site
grams/mile

LDA	ROG	CO	NOx	CO2	PM10
2011	0.082	2.463	0.167	348.857	0.029
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.11	3.463	0.29	424.88	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.085	2.269	0.607	552.89	0.038
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2011	0.345	4.366	6.114	1334.979	0.239

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 49 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 16 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2011

					Emission Factors					
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
LDV	2011 emissions (grams/mile)			0.096	2.963	0.2285	386.8685	0.032		
	2011 emissions (pounds/mile)			2.12E-04	6.53E-03	5.04E-04	8.53E-01	7.05E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	72	1152	0.24	7.53	0.58	982.53	0.08	3.58	0.20
				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
MDT	2011 emissions (grams/mile)			0.085	2.269	0.607	552.89	0.038		
	2011 emissions (pounds/mile)			1.87E-04	5.00E-03	1.34E-03	1.22E+00	8.38E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	3	48	0.01	0.24	0.06	58.51	0.00	0.15	0.01
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile dust	lbs/mile dust
	2011 emissions (grams/mile)			0.345	4.366	6.114	1334.979	0.239		
	2011 emissions (pounds/mile)			7.61E-04	9.63E-03	1.35E-02	2.94E+00	5.27E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	49	2	98	0.07	0.94	1.32	288.42	0.05	0.30	0.02

Total Trips 77

	2011 - On-road Vehicle Exhaust per day						Fugitive Dust		
	ROG	CO	Nox	CO2	PM10	PM2.5	PM10	PM2.5	
lbs/day	0	8	2	1271	0	0	4.04	0.23	lbs/day
tons/year	0	0	0	30	0	0	1	0	tons/year
				metric tons					

EMFAC2007 MODEL RESULTS FOR CENTRAL SITE ALTERNATIVE OPERATIONS (YEAR 2019 WEEKDAY AND SATURDAY)

Central Site Alternative Weekday: Air Quality Analysis for Mobile Emissions Year 2019
Sonoma Compost -- Central Site
grams/mile

LDA	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2019	0.021	0.997	0.064	346.571	0.028
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2019	0.035	1.659	0.134	429.796	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2019	0.044	1.408	0.332	553.814	0.039
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2019	0.167	1.642	2.527	1345.922	0.145

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 49 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 16 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2019

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
LDV	2019 emissions (grams/mile)			0.028	1.328	0.099	388.1835	0.0315	dust	dust
	2019 emissions (pounds/mile)			6.17E-05	2.93E-03	2.18E-04	8.56E-01	6.94E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	151	2416	0.15	7.07	0.53	2067.59	0.17	7.52	0.43
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
MDT	2011 emissions (grams/mile)			0.044	1.408	0.332	553.814	0.039	dust	dust
	2011 emissions (pounds/mile)			9.70E-05	3.10E-03	7.32E-04	1.22E+00	8.60E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	43	688	0.07	2.14	0.50	840.01	0.06	2.14	0.12
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
	2011 emissions (grams/mile)			0.167	1.642	2.527	1345.922	0.145	dust	dust
	2011 emissions (pounds/mile)			3.68E-04	3.62E-03	5.57E-03	2.97E+00	3.20E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	49	8	392	0.14	1.42	2.18	1163.15	0.13	1.22	0.07

Total Trips 202

	2019 -	On-road Vehicle Exhaust per day					Fugitive	Dust	
	ROG	CO	Nox	CO2	PM10	PM2.5	PM10	PM2.5	
lbs/day	0	8	3	3231	0	0	10.88	0.62	lbs/day
tons/year	0	1	0	381	0	0	1	0	tons/year
				metric tons					

Central Site Alternative Saturday: Air Quality Analysis for Mobile Emissions Year 2019
Sonoma Compost -- Central Site
grams/mile

LDA	ROG	CO	NOx	CO2	PM10
2019	0.021	0.997	0.064	346.571	0.028
LDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2019	0.035	1.659	0.134	429.796	0.035
MDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2019	0.044	1.408	0.332	553.814	0.039
HDT	**ROG**	**CO**	**NOx**	**CO2**	**PM10**
2019	0.167	1.642	2.527	1345.922	0.145

Paved Road lbs/VMT Entrained PM10	Paved Road lbs/VMT Entrained PM2.5
0.003112	0.000177

Assumed average speed of vehicles type to be 45 mph to and from the project site.
Assumed average distance for MOM trucks to and from the project site to be 49 miles (roundtrip).
Assumed average distance for other vehicles to and from the project site to be 16 miles (roundtrip).

EMISSIONS CALCULATION FOR ON-ROAD VEHICLES DURING EXCAVATION ACTIVITIES

Emissions = Vehicle Type x Emission Factor x Miles/Trip x Trips/Day

Note: Trip length takes into account round trips
Mobile Emissions Associated with Worker and Haul Truck trips in 2019

				Emission Factors						
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
LDV	2019 emissions (grams/mile)			0.028	1.328	0.099	388.1835	0.0315	dust	dust
	2019 emissions (pounds/mile)			6.17E-05	2.93E-03	2.18E-04	8.56E-01	6.94E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	194	3104	0.19	9.09	0.68	2656.37	0.22	9.66	0.55
				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
MDT	2011 emissions (grams/mile)			0.044	1.408	0.332	553.814	0.039	dust	dust
	2011 emissions (pounds/mile)			9.70E-05	3.10E-03	7.32E-04	1.22E+00	8.60E-05	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	16	9	144	0.01	0.45	0.11	175.82	0.01	0.45	0.03
HDT				ROG	CO	Nox	CO2	PM10	lbs/mile	lbs/mile
	2011 emissions (grams/mile)			0.167	1.642	2.527	1345.922	0.145	dust	dust
	2011 emissions (pounds/mile)			3.68E-04	3.62E-03	5.57E-03	2.97E+00	3.20E-04	3.11E-03	1.77E-04
	Miles/Trip	Trips/day	Miles/day	Mobile Source Emissions (lbs/day)					lbs/day	lbs/day
	49	6	294	0.11	1.06	1.64	872.36	0.09	0.91	0.05

Total Trips 209

	2019 - ROG	On-road Vehicle Exhaust per day CO	Nox	CO2	PM10	PM2.5	Fugitive PM10	Dust PM2.5	
lbs/day	0	10	2	3529	0	0	11.02	0.63	lbs/day
tons/year	0	0	0	83	0	0	1	0	tons/year
				metric tons					

CENTRAL SITE ALTERNATIVE ASP COMPOSTING EMISSIONS

Central Site Alternative ASP Composting

Emissions from Composting Year 2011

	Emission Factors (lbs/ton of material)	
	VOC	Ammonia
Composting	2.6	0.83

	Annual Throughput (tons)	Emissions (lbs/day)	
	Proposed Project	Proposed Project	
		VOC	Ammonia
Composting	40,000	285	91

a) Daily emissions calculated from annual emissions divided by 365 days.

ROG Emissions from Composting

	VOC Emissions (lbs/day)
	Proposed Project
Composting	14

Emissions from Composting Year 2019

	Emission Factors (lbs/ton of material)	
	VOC	Ammonia
Composting	2.6	0.83

	Annual Throughput (tons)	Emissions (lbs/day)	
	Proposed Project	Proposed Project	
		VOC	Ammonia
Composting	110,000	784	250

a) Daily emissions calculated from annual emissions divided by 365 days.

ROG Emissions from Composting

	VOC Emissions (lbs/day)
	Proposed Project
Composting	39

CENTRAL SITE ALTERNATIVE GHG ANALYSIS (YEAR 2011) ASP COMPOSTING

Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	101,420	51	46
URBEMIS2007 Off-road Emissions	673,080	337	305
Total Emissions (area sources + vehicles)	**774,500**	**387**	**351**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Fans for ASP system
1 hp motor running for an hour = .745 kwh
2x50 hp motors, 20%load 24-7 130524 kwh/year

Estimated Project Annual Electrical Use: 147,576 kWh (kilowatt hours)/year annual average
148 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual Project Electricity mWh	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	148	59	1	59
Nitrous Oxide (N2O)	0.0037	148	0.0	296	0
Methane (CH4)	0.0067	148	0.0	23	0
		Total Indirect GHG Emissions from Project Electricity Use=			**59**

ASP Emissions of Methane

Estimated Project Annual Compost: 40,000 tons per year

	Emission Factor lb/ton	Annual Project tonnage	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Methane (CH4)	0.83	40,000	15.1	23	346
		Total GHG Emissions from Windrow Composting=			**346**

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Non-Road Sources (CO2 equivalent Metric Tons)

Area Sources	**46**	6.1%
Off-road Equip	**305**	40.4%
Windrow	**346**	45.8%
Electrical Use	**59**	7.8%
Total=	**757**	100.0%

Annual kWh Calculations for Project Emissions of Electricty Used by the project

Total GHG Emissions From Industrial Electricity Use Phase 1

Miscelaneous* (kWh/sq ft/Year)	square footage	kWhours per year
10.5	1,624	17,052

Total GHG Emissions From Industrial Electricity Use Phase 2

Miscelaneous* (kWh/sq ft/Year)	square footage	kWhours per year
10.5	34,560	362,880

*Electricity Usage Rates from Table A9-11-A South Coast AQMD CEQA Air Quality Handbook 1993 - Usage Rate is Average for SCE and LADWP

CENTRAL SITE ALTERNATIVE GHG ANALYSIS (YEAR 2019) ASP COMPOSTING

Greenhouse Gas (GHG) Emissions from Area Sources and Vehicles

	Annual Emissions		
	pounds (lbs.)	Tons	Metric Tons
URBEMIS2007 Area Emissions	101,420	51	46
URBEMIS2007 Off-road Emissions	1,730,720	865	785
Total Emissions (area sources + vehicles)	**1,832,140**	**916**	**831**

Indirect Greenhouse Gas (GHG) Emissions from Project use of Electricity (Power Plant Emissions)

Fans for ASP system
1 hp motor running for an hour = .745 kwh
2x50 hp motors, 55%load 24-7 358941 kwh/year

Estimated Project Annual Electrical Use: 721,821 kWh (kilowatt hours)/year annual average
722 mWh (megawatt hours)/year

Indirect GHG gases	Emission Factor lb/mWh	Annual Project Electricity mWh	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Carbon Dioxide (CO2)	878.71	722	288	1	288
Nitrous Oxide (N2O)	0.0037	722	0.0	296	0
Methane (CH4)	0.0067	722	0.0	23	0
		Total Indirect GHG Emissions from Project Electricity Use=			**288**

ASP Emissions of Methane

Estimated Project Annual Compost: 110,000 tons per year

	Emission Factor lb/ton	Annual Project tonnage	GHGs metric tons	CO2 Equivalent Factor	Annual CO2 Equivalent Emissions (metric tons)
Methane (CH4)	0.83	110,000	41.4	23	952
		Total GHG Emissions from Windrow Composting=			**952**

Total Annual Greenhouse Gas (GHG) Emission from Project Operations -- All Non-Road Sources (CO2 equivalent Metric Tons)

Area Sources	**46**	2.2%
Off-road Equip	**785**	37.9%
Windrow	**952**	46.0%
Electrical Use	**288**	13.9%
Total=	**2,072**	100.0%

Appendix AIR-6

Central Site Alternative
Health Risk Assessment

ESA

APPENDIX AIR-6

Central Site Alternative Health Risk Assessment

Exposure levels of toxic air contaminants (TACs) generated by operation of the Central Site Alternative were estimated by conducting dispersion modeling of potential TAC sources at the project site. TAC emission sources evaluated in this health risk assessment were based on information contained in the air quality section, and they include: diesel exhaust from heavy duty equipment used onsite; diesel exhaust from on-road haul trucks; and fugitive TAC emissions from composting activities. The emissions from these sources were input to the USEPA approved dispersion model AERMOD (Version 09292) to calculate ambient air concentrations in the area surrounding the project site.

TAC Emissions

Emission rates for TACs were determined for each potential source at the Central Site. **Table 1** lists the TACs of concern and their associated sources.

TABLE 1

SOURCES OF TACS AT THE SONOMA COMPOST SITE

TAC	Source	Acute	Chronic	Carcinogen
Diesel Particulate Matter (DPM)	Heavy duty equipment; haul trucks	No	Yes	Yes
Ammonia	Composting piles	Yes	Yes	No
Methylene Chloride	Composting piles	Yes	Yes	Yes
Methyl Ethyl Ketone (MEK)	Composting piles	Yes	No	No
Methyl Chloroform	Composting piles	Yes	Yes	No
Toluene	Composting piles	Yes	Yes	No
Xylene	Composting piles	Yes	Yes	No
Benzyl Chloride	Composting piles	Yes	No	Yes
Formaldehyde	Composting piles	Yes	Yes	Yes
Acetaldehyde	Composting piles	Yes	Yes	Yes

SOURCES: Environmental Science Associates, 2009; OEHHA, 2003; and OEHHA, 2008.

Composting Emissions

Speciation profiles developed for the Andrade Road compost facility in Alameda County were utilized in this analysis (ACWMA, 2006). These profiles were developed based on source test data from the Inland Composting and Organics Recycling facility located in Colton, California.

Approximately 80 percent of material processed at the Inland Composting facility is curbside green waste with the remainder consisting primarily of wood waste. Since materials processed at the site are similar to those that would be handled at the Central Site site, it was assumed that speciation profiles would be representative. **Table 2** presents estimated daily emissions for the windrow option with and without pseudo-biofilters as well as emissions under the ASP option.

Ammonia is also a TAC of concern from composting activities, and it can form from the composting of nitrogen-containing green waste. Emissions of ammonia from the windrow option were estimated assuming an emission rate of 0.24 pounds per ton of material processed for open windrow composting (Norcal Waste Systems, 2006). **Table 2** presents estimated daily emissions assuming a maximum daily throughput of approximately 270 tons (100,000 tons per year / 365 days per year) for the existing condition (windrow) and of approximately 300 tons (110,000 tons per year / 365 days per year) for the proposed condition (ASP option).

TABLE 2

TAC EMISSIONS FROM COMPOSTING ACTIVITIES

Pollutant	Daily Emissions (lb/day)	
	Windrow	ASP
Methylene Chloride	1.0	0.1
MEK	21.8	1.2
Methyl Chloroform	0.6	0.03
Toluene	1.1	0.1
Xylene	0.6	0.03
Benzyl Chloride	12.4	0.7
Formaldehyde	1.3	0.1
Acetaldehyde	104	5.7
Ammonia	65.8	3.6

SOURCE: Environmental Science Associates, 2010, based on speciation profiles in ACWMA report, 2006.

DPM Emissions

DPM would be emitted from haul trucks traveling to and from the site as well as from equipment used onsite. PM2.5 emission rates for on-road vehicle exhaust and off-road equipment exhaust presented in the air quality section were used to represent DPM emissions. On-road emissions were adjusted to represent emissions generated within one mile of the project site.

PM2.5 Emissions

PM2.5 would be emitted from haul trucks traveling to and from the site as well as from equipment used onsite and fugitive emissions from surface disturbance and unpaved movement. PM2.5 emission rates for on-road vehicle exhaust, off-road equipment exhaust, and fugitive dust presented in the air quality section were used to represent PM2.5 emissions.

Modeling Methodology

The majority of land uses surrounding the Central Site are agricultural in nature with areas of open space. Single-family rural residences are scattered in the surrounding area and often present on sites with agricultural operations, such as dairy farming and grazing. The closest residence to the Central Site composting area is approximately 500 feet northeast. Other residences are approximately 1,000 feet to the south, 4,500 feet to the east and 5,000 feet to the southeast. Dunham Charter School is located approximately 4,000 feet north of the Central Site. Urban development associated with the City of Cotati is located approximately 2.5 miles northeast of the Central Site. The Petaluma Municipal Airport is located approximately 8.5 miles southeast of the Central Site.

Meteorological data from the BAAQMD's meteorological station at the Petaluma Airport were used to prepare hourly surface files for use in AERMOD.

Source and receptor elevations were derived from the Santa Rosa-West and Santa Rosa-East 1 degree digital elevation models. These elevations were processed and imported using AERMAP, an accessory program to AERMOD.

Composting Emissions

As with the proposed project, emissions from composting activities were modeled as series of volume sources. It was assumed that emissions from composting activities would be released 24 hours a day, even when other activities are not taking place.

DPM Emissions

Emissions from haul trucks were modeled as a line source extending from Central Site eastward to Route 116. It was assumed that emissions would be released from a height of 3 meters and that the roadway width would be approximately 10 meters.

Emissions from heavy duty diesel equipment operating onsite were modeled as two groups of volume sources, one representing emissions from equipment used during initial processing and one representing emissions from the windrow turner. The ASP composting option assumed that no emissions would occur from the windrow turner source as this piece of equipment would not be required under the ASP option. A release height of 5 meters was assumed for all off-road equipment.

PM2.5 Emissions

PM2.5 emissions from haul trucks were modeled as a line source as was DPM. It was assumed that emissions would be released from a height of 3 meters and that the roadway width would be approximately 10 meters.

PM2.5 emissions from heavy duty diesel equipment operating onsite were modeled as volume sources as was DPM. A release height of 5 meters was assumed for all off-road equipment.

Emissions from fugitive sources were modeled as series of volume sources. It was assumed that emissions would be released 12 hours a day for 5 days per week. Annualized surface disturbance is 5 acres.

Emissions from fugitive sources were modeled as series of volume sources. It was assumed that construction emissions would be released 12 hours a day for 5 days per week. Average annualized surface disturbance is 5 acres.

Emissions from fugitive sources were modeled as series of volume sources. It was assumed that operational emissions would be released 12 hours a day for 7 days per week at the peak surface disturbance.

Health Risk Exposure

Health risks were evaluated based on methodologies recommended by OEHHA as well as the BAAQMD.

Non-Cancer Risk

Non-cancer adverse health risk, both for acute (short-term) and chronic (long-term) risk, is measured against a hazard index (HI), which is defined as the ratio of the predicted incremental exposure concentration from the proposed project to a published reference exposure level (REL) that could cause adverse health effects as established by OEHHA. The ratio (referred to as the Hazard Quotient [HQ]) of each non-carcinogenic substance that affects a certain organ system is added to produce an overall HI for that organ system. The overall HI is calculated for each organ system. If the overall HI for the highest-impacted organ system is greater than one, then the impact is considered to be significant.

Table 3 presents acute and chronic RELs and target organs for each of the TACs that would be emitted under implementation of the Central Site Alternative.

TABLE 3

ACUTE AND CHRONIC REFERENCE EXPOSURE LEVELS

Compound	Acute REL ($\mu g/m^3$)	Acute Target Organs	Chronic REL ($\mu g/m^3$)	Chronic Target Organs
Ammonia	3,200	Eyes; Respiratory	200	Respiratory
Methylene Chloride	14,000	Cardiovascular; Nervous	400	Cardiovascular; Nervous
MEK	13,000	Eyes; Respiratory	--	--
Methyl Chloroform	68,000	Nervous	1,000	Nervous
Toluene	37,000	Nervous; Eyes; Respiratory; Reproductive	300	Developmental; Nervous; Respiratory
Xylene	22,000	Nervous; Respiratory; Eyes	700	Nervous; Respiratory; Eyes
Benzyl Chloride	240	Respiratory; Eyes	--	--
Formaldehyde	55	Sensory; Eyes	9	Respiratory
Acetaldehyde	470	Sensory; Bronchi; Eyes; Nose; Throat	140	Respiratory
DPM	--	--	5	Respiratory

-- No REL.

SOURCE: OEHHA, 2008.

Acute Risk

Table 4 presents one-hour average TAC concentrations estimated at the maximum exposed worker under the Central Site alternative as well as the associated HQ for each TAC. The maximum exposed worker receptors for acute exposure were modeled at a dairy farm. The maximum HI would target the eyes. As shown, the maximum acute HI under the existing condition (windrow option) would be 1.34, which exceeds the BAAQMD threshold of 1. However, the acute HI for the ASP option would be 0.065, which is well below the BAAQMD threshold. Therefore, acute impacts to worker receptors from the proposed Central Site (ASP option) would be less than significant.

TABLE 4

CENTRAL SITE - NON-CANCER ACUTE RISK (WORKER)

	Windrow		ASP	
Compound	**C_{air} [a]**	**HQ [b]**	**C_{air} [a]**	**HQ [b]**
Ammonia	294.76	9.21E-02	13.51	4.22E-03
Methylene Chloride	4.61	3.29E-04	0.21	1.51E-05
MEK	97.51	7.50E-03	4.47	3.44E-04
Methyl Chloroform	2.48	3.64E-05	0.11	1.67E-06
Toluene	4.95	1.34E-04	0.23	6.14E-06
Xylene	2.48	1.13E-04	0.11	5.16E-06
Benzyl Chloride	55.50	2.31E-01	2.54	1.06E-02
Formaldehyde	5.81	1.06E-01	0.27	4.84E-03
Acetaldehyde	466.30	9.92E-01	21.38	4.55E-02
Maximum HI *(Eyes)*		***1.34***		***0.065***

[a] C_{air} = concentration in air. Concentrations represent one-hour peak concentrations expressed in micrograms per cubic meter (μg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 5 presents one-hour average TAC concentrations estimated at the maximum exposed resident under the Central Site alternative as well as the associated HQ for each TAC. As with worker exposure, the maximum HI for residents would target the eyes. As shown, the maximum acute HI under the existing condition (windrow option) would be 1.34, which exceeds the BAAQMD threshold of 1. However, the acute HI for the ASP option would be 0.065, which is well below the BAAQMD threshold. Therefore, acute impacts to residence receptors from the proposed Central Site (ASP option) would be less than significant.

TABLE 5

CENTRAL SITE - NON-CANCER ACUTE RISK (RESIDENT)

	Windrow		ASP	
Compound	**C_{air} [a]**	**HQ [b]**	**C_{air} [a]**	**HQ [b]**
Ammonia	294.76	9.21E-02	13.51	4.22E-03
Methylene Chloride	4.61	3.29E-04	0.21	1.51E-05
MEK	97.51	7.50E-03	4.47	3.44E-04
Methyl Chloroform	2.48	3.64E-05	0.11	1.67E-06
Toluene	4.95	1.34E-04	0.23	6.14E-06
Xylene	2.48	1.13E-04	0.11	5.16E-06
Benzyl Chloride	55.50	2.31E-01	2.54	1.06E-02
Formaldehyde	5.81	1.06E-01	0.27	4.84E-03
Acetaldehyde	466.30	9.92E-01	21.38	4.55E-02
Maximum HI ***(Respiratory and Eyes)***		***1.34***		***0.065***

[a] Concentrations represent one-hour peak concentrations expressed in micrograms per cubic meter (μg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 6 presents one-hour average TAC concentrations estimated at the Dunham Charter School under the Central Site alternative as well as the associated HQ for each TAC. The maximum HI would target the eyes. As shown, the maximum acute HI under the existing condition (windrow option) would be 0.23, which does not exceeds the BAAQMD threshold of 1. Furthermore, the acute HI for the ASP option would be 0.037, which is also well below the BAAQMD threshold. Therefore, acute impacts to Dunham Charter School from the proposed Central Site (ASP option) would be less than significant.

TABLE 6

CENTRAL SITE - NON-CANCER ACUTE RISK (SCHOOL)

	Windrow		ASP	
Compound	**C_{air} [a]**	**HQ [b]**	**C_{air} [a]**	**HQ [b]**
Ammonia	50.37	1.57E-02	7.67	2.40E-03
Methylene Chloride	0.79	5.63E-05	0.12	8.57E-06
MEK	16.66	1.28E-03	2.54	1.95E-04
Methyl Chloroform	0.42	6.22E-06	0.06	9.47E-07
Toluene	0.85	2.29E-05	0.13	3.48E-06
Xylene	0.42	1.92E-05	0.06	2.93E-06
Benzyl Chloride	9.48	3.95E-02	1.44	6.02E-03
Formaldehyde	0.99	1.80E-02	0.15	2.75E-03
Acetaldehyde	79.68	1.70E-01	12.13	2.58E-02
Maximum HI ***(Respiratory and Eyes)***		***0.23***		***0.037***

[a] Concentrations represent one-hour peak concentrations expressed in micrograms per cubic meter (μg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Chronic Risk

Table 7 presents annual average TAC concentrations estimated at the maximum exposed worker receptor under the Central Site alternative as well as the associated HQ for each TAC. The maximum exposed receptor with regard to chronic exposure would be located at a dairy farm. As shown, the maximum chronic HI under the existing condition (windrow option) would be 0.044, which exceeds the BAAQMD threshold of 1. However, the chronic HI for the ASP option would be 0.0080, which is well below the BAAQMD threshold. Therefore, chronic impacts to worker receptors from the proposed Central Site (ASP option) would be less than significant.

TABLE 7

CENTRAL SITE - NON-CANCER CHRONIC RISK (WORKER)

	Windrow		ASP	
Compound	**C_{air} [a]**	**HQ [b]**	**C_{air} [a]**	**HQ [b]**
DPM	0.0239	4.78E-03	0.0279	5.57E-03
Ammonia	2.1325	1.07E-02	0.1330	6.65E-04
Methylene Chloride	0.0334	8.34E-05	0.0021	5.20E-06
Methyl Chloroform	0.0179	1.79E-05	0.0011	1.12E-06
Toluene	0.0358	1.19E-04	0.0022	7.45E-06
Xylene	0.0179	2.56E-05	0.0011	1.60E-06
Formaldehyde	0.0420	4.67E-03	0.0026	2.91E-04
Acetaldehyde	3.3736	2.41E-02	0.2104	1.50E-03
Maximum HI *(Respiratory)*		***0.044***		***0.0080***

[a] Concentrations represent annual average concentrations expressed in micrograms per cubic meter (µg/m^3)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 8 presents annual average TAC concentrations estimated at the maximum exposed residence receptor under the Central Site alternative as well as the associated HQ for each TAC. As shown, the maximum chronic HI under the existing condition (windrow option) would be 0.044, which exceeds the BAAQMD threshold of 1. However, the chronic HI for the ASP option would be 0.0080, which is well below the BAAQMD threshold. Therefore, chronic impacts to residence receptors from the proposed Central Site (ASP option) would be less than significant.

TABLE 8

CENTRAL SITE - NON-CANCER CHRONIC RISK (RESIDENT)

	Windrow		ASP	
Compound	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]
DPM	0.0239	4.78E-03	0.0279	5.57E-03
Ammonia	2.1325	1.07E-02	0.1330	6.65E-04
Methylene Chloride	0.0334	8.34E-05	0.0021	5.20E-06
Methyl Chloroform	0.0179	1.79E-05	0.0011	1.12E-06
Toluene	0.0358	1.19E-04	0.0022	7.45E-06
Xylene	0.0179	2.56E-05	0.0011	1.60E-06
Formaldehyde	0.0420	4.67E-03	0.0026	2.91E-04
Acetaldehyde	3.3736	2.41E-02	0.2104	1.50E-03
Maximum HI *(Respiratory)*		***0.044***		***0.0080***

[a] Concentrations represent annual average concentrations expressed in micrograms per cubic meter (μg/m³)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Table 9 presents annual average TAC concentrations estimated at Dunham Charter School under the Central Site alternative as well as the associated HQ for each TAC. As shown, the maximum chronic HI under the existing condition (windrow option) would be 0.0027, which exceeds the BAAQMD threshold of 1. However, the chronic HI for the ASP option would be 0.00047, which is well below the BAAQMD threshold. Therefore, chronic impacts to Dunham Charter School from the proposed Central Site (ASP option) would be less than significant.

TABLE 9

CENTRAL SITE - NON-CANCER CHRONIC RISK (SCHOOL)

	Windrow		ASP	
Compound	C_{air} [a]	HQ [b]	C_{air} [a]	HQ [b]
DPM	0.0011	2.22E-04	0.0015	3.02E-04
Ammonia	0.1307	6.54E-04	0.0090	4.51E-05
Methylene Chloride	0.0020	5.10E-06	0.0001	3.53E-07
Methyl Chloroform	0.0011	1.10E-06	0.0001	7.59E-08
Toluene	0.0022	7.33E-06	0.0002	5.06E-07
Xylene	0.0011	1.57E-06	0.0001	1.08E-07
Formaldehyde	0.0026	2.86E-04	0.0002	1.97E-05
Acetaldehyde	0.2068	1.48E-03	0.0143	1.02E-04
Maximum HI *(Respiratory)*		***0.0027***		***0.00047***

[a] Concentrations represent annual average concentrations expressed in micrograms per cubic meter (μg/m³)

[b] HQ determined by dividing estimated concentration by the applicable REL (see **Table 3**).

SOURCE: Environmental Science Associates, 2010.

Cancer Risk

Cancer risk associated with the Central Site alternative was analyzed using the same methodology as described above for the proposed project. The maximum incremental cancer risk from exposure to TACs was calculated following the guidelines established by California Office of Environmental Health Hazard Assessment (OEHHA, 2003). The equation used to determine exposure to TACs through inhalation is demonstrated below:

$$\text{Dose-inhalation} = \frac{C_{air} * \{DBR\} * A * EF * ED * 10^{-6}}{AT}$$

Where:

Dose-inh	= Dose of the toxic substance through inhalation in milligrams per kilogram of body weight per day (mg/kg-day)
10^{-6}	= Micrograms to milligrams conversion, Liters to cubic meters conversion
C_{air}	= Concentration in air ($\mu g/m^3$)
{DBR}	= Daily breathing rate (L/kg body weight – day)
A	= Inhalation absorption factor
EF	= Exposure frequency (days/year)
ED	= Exposure duration (years)
AT	= Averaging time period over which exposure is averaged in days (25,550 days for a 70 year cancer risk)

The dose through inhalation calculation shown above yields a value that represents the quantity of a substance inhaled by an individual expressed in milligrams per kilogram of body weight per day (mg/kg-day). To determine cancer risk, the dose through inhalation is multiplied by a cancer potency slope factor of the particular TAC which has the unit $(mg/kg\text{-}day)^{-1}$. Therefore, multiplying the estimated dose by the cancer potency slope factor yields a unitless value that represents chances per million of an individual developing cancer from exposure to a given TAC.

As with the proposed project, the following five carcinogens would be associated with the Central Site alternative: (1) DPM; (2) Methylene Chloride; (3) Benzyl Chloride; (4) Formaldehyde; and (5) Acetaldehyde. Annual average concentrations for all chemicals except benzyl chloride at the maximum exposed worker and residential receptors shown in **Tables 7 through 9** for estimating non-carcinogenic impacts were used to determine incremental cancer risk from the Central Site alternative.

The maximum annual average concentration of benzyl chloride at the maximum exposed worker/residential, and Dunham Charter School receptor were estimated to be 0.4016 $\mu g/m^3$ and 0.0246 $\mu g/m^3$ respectively for the existing condition (windrow option) and 0.0250 $\mu g/m^3$ and 0.0017 $\mu g/m^3$ respectively for the ASP option.

As with the proposed project, cancer risks at worker receptors were analyzed assuming an exposure frequency of 245 days per year (5 days per week/49 weeks per year) for 40 years with a worker breathing rate of 149 L/kg bodyweight – day. Cancer risks at residential receptors were analyzed based on the 80^{th} percentile adult breathing rate of 302 L/kg-day. Exposure frequency for residents was assumed to be 350 days per year and exposure duration was assumed to be 70 years. Cancer risks for school children were analyzed assuming an exposure frequency of 180 days per year for 9 years with a breathing rate of 591 L/kg bodyweight – day.

Table 10 shows the OEHHA established cancer potency slopes associated with each carcinogenic compound associated with the Central Site alternative and the associated dose through inhalation for both workers and residents. Cancer risk for each individual TAC was then determined by multiplying the cancer potency slope by the dose through inhalation factor. As shown, the maximum cancer risk associated with the proposed Central Site (ASP option) are less than the existing conditions (windrow) for worker, residence, and the Dunham Charter School. Thus, the incremental cancer risk (proposed project minus existing or ASP minus windrow) would not exceed the BAAQMD threshold of 10 in one million.

TABLE 10

CENTRAL SITE - CANCER RISK AT WORKER AND RESIDENTIAL RECEPTORS

Compound	Cancer Potency Slope $(mg/kg\text{-}day)^{-1}$	Worker Dose-inh (mg/kg-day)	Worker Cancer Risk (per million)	Resident Dose-inh (mg/kg-day)	Resident Cancer Risk (per million)	School Dose-inh (mg/kg-day)	School Cancer Risk (per million)
Windrow							
DPM	1.1	1.37	1.502	6.92	7.613	0.04	0.045
Methylene Chloride	3.5E-03	1.91	0.007	9.66	0.034	0.08	0.000
Benzyl Chloride	1.7E-01	22.95	3.901	116.28	19.768	0.91	0.154
Formaldehyde	2.1E-02	2.40	0.050	12.17	0.255	0.09	0.002
Acetaldehyde	1.0E-02	192.80	1.928	976.95	9.770	7.62	0.076
Total Cancer Risk from Windrow			***7.39***		***37.4***		***0.28***
ASP							
DPM	1.1	1.59	1.751	8.07	8.872	0.06	0.061
Methylene Chloride	3.5E-03	0.12	0.000	0.60	0.0021	0.01	0.0000
Benzyl Chloride	1.7E-01	1.43	0.243	7.25	1.233	0.06	0.011
Formaldehyde	2.1E-02	0.15	0.003	0.76	0.016	0.01	0.000
Acetaldehyde	1.0E-02	12.02	0.120	60.92	0.609	0.53	0.005
Total Cancer Risk from ASP			***2.12***		***10.7***		***0.077***
Incremental Risk (ASP – Windrow)			***-5.27***		***-26.7***		***-0.20***

SOURCE: Environmental Science Associates, 2010.

PM2.5 Concentration

The maximum annual PM2.5 concentration as a result of the project construction would be 0.01 µg/m^3, which would not exceed the BAAQMD threshold of 0.3 µg/m^3 and would therefore constitute a **less than significant** impact. The maximum annual PM2.5 concentration as a result of the project operations would be 0.08 µg/m^3, which would not exceed the BAAQMD threshold of 0.3 µg/m^3 and would therefore constitute a **less than significant** impact.

Cumulative

The BAAQMD's BAAQMD CEQA Air Quality Guidelines (dated May, 2010) provides estimate impacts from significant roadway within Sonoma County such as Routes 1, 12, 37, 101, 116, 121, and 128. Estimated impacts within a distance of 1,000 feet were developed for each of these roadways. The Central Site is not located within 1,000 feet of any of these roadways. Thus, the impact from these roadways is not expected to significantly contribute to the overall impact at the receptors of interest.

References – Health Risk Assessment

Alameda County Waste Management Authority (ACWMA), 2006. *Organics Processing Development Program and Project, Final Environmental Impact Report, Appendix 1 – Emissions from Compost Piles*, accessed online at: http://recycle.stopwaste.org/organics/feir-pdf/feir-appendix1.pdf, published February 2006.

Norcal Waste Systems, 2006. *Jepson Prairie Organics Compost Facility, Air Emissions Source Test*, prepared by Thomas E. Card and Charles E. Schmidt, May 2006.

Office of Environmental Health Hazards Assessment (OEHHA), 2003. *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments,* available online at: http://www.oehha.org/air/hot_spots/pdf/HRAguidefinal.pdf, accessed April 29, 2008.

OEHHA, 2008. *Acute, 8-hour and Chronic Reference Exposure Levels as on December 18, 2008*, available online at: http://www.oehha.ca.gov/air/allrels.html, accessed August 24, 2009.

USEPA, 2004. *Users Guide for the AMS/EPA Regulatory Model – AERMOD,* EPA-454/B-003-01, September 2004.

Appendix AIR-7

BAAQMD Odor Request Response

ESA

BAY AREA AIR QUALITY MANAGEMENT DISTRICT
939 ELLIS STREET
SAN FRANCISCO, CA. 94109
ATTENTION: ADMINISTRATIVE SERVICES DIVISION
e-mail request to: ***publicrecords@baaqmd.gov***

Office Use Only
P.R.R. NUMBER
09-02-110

Direct Dial: (415) 749-4761
FAX: (415) 749-5111

PUBLIC RECORDS REQUEST FORM

ATTENTION REQUESTOR: To expedite your request for District records, please fill out this form completely. Specifically identify the type of records you are requesting from the list below. **NOTE:** There is a limit of one facility or one site address per request form.

REQUESTOR INFORMATION

NAME: Ben Frese			DATE: 2/24/2009
COMPANY: Environmental Science Associates			
MAILING ADDRESS: 2600 Capitol Avenue Suite 200			
CITY: Sacramento	STATE: CA	ZIP CODE: 95816	PHONE NUMBER: 916.564.4500

REQUESTED FACILITY INFORMATION

FACILITY NAME: Sonoma Co. Compost Facility		
FACILITY ADDRESS: 550 Mecham Rd.		
CITY:Petaluma	STATE:CA	ZIP CODE:94952
TIME PERIOD OF DOCUMENTS REQUESTED:2 years	From:2/24/07	To:2/24/09

REQUESTED RECORDS *(Check **no more than three** applicable items)*

Complaint Information	**Notice Of Violation Information**	OTHER: * * *
☐ Complaint Printout	☐ NOV Printout	Odor Complaints/Violations
☐ Specific Complaint #	☐ Specific NOV #	
Episode Information	☐ AB2588 Inventory	
☐ Episode Printout	☐ Source Test Reports	
☐ Specific Episode #	☐ Lab Report #	
Permit Application Information	☐ Review Permit Files *	
☐ Permit Application Printout	☐ Review Enforcement Files **	
☐ Specific Application #	☐ Review Rule Development Files **	
☐ Permit Conditions	☐ Asbestos Notifications	

* Subject to facility review (i.e., trade secrets).
** You will be contacted to schedule an appointment date to review records.
*** If what you are seeking is not on this Form, you may attach a letter with additional information on the request.

Cost: ***Copies: $.10 per page; Diskette $5.00; CD $10.00; Audiotape $5.00; Microfiche sheet $8.00.***
Note: After a preliminary estimate, **advance payment may be required.**

☒ I hereby agree to reimburse the BAAQMD for the direct cost of duplicating the information requested in accordance with Gov't Code Section 6253(b).

OFFICE USE ONLY:

☐ Enclosed are the records you requested.

☒ We are unable to provide the records you requested.
☒ A search was made but no records were found.

☐ We are unable to find the record you requested because the request did not include sufficient information to find it.
☐ Out of District's Jurisdiction.

Appendix ASP-1

Managed Organic Recycling (MOR) In-Vessel Aerated Static Pile Compost Covers

Appendix available in color on website:
http://www.recyclenow.org/o_reports.html

ESA

Managed Organic Recycling, Inc.

In-vessel Aerated Static Pile Compost Covers

Soil Key Composting Facility, Tenino, WA

Managed Organic Recycling, Inc
362 Foothill Blvd
San Luis Obispo, CA 93405
Ph: 805-546-8610 Fax: 805-546-8619

Managed Organic Recycling, Inc.

In-vessel Aerated Static Pile Compost Covers

MOR, Inc Compost Covers

Managed Organic Recycling, Inc (MOR) provides a complete line of compost covers for the organic feedstock industry. Our covers are designed to meet the specific needs of our clients as imposed by the compostable feedstock materials and/or regulatory requirements. Utilizing MOR's covers in an In-vessel Aerated Static Pile composting system improves both efficiency and performance of the composting process.

With the adoption of new air quality regulation by air quality management districts regarding capture efficiencies for volatile organic compounds (VOCs), ammonia (NH_3), and particulates (PM10 is lowered to PM2.5) MOR's compost covers are the cost effective answers to regulator changes in the composting industry. MOR's compost covers have been tested using Environmental Protection Agency test protocols and meet South Coast Air Quality Management District Rule 1133 for 80% capture of VOCs and ammonia.

All MOR compost covers are manufactured in the U.S. using the latest technology in seam sealing. The outside edges are protected with heavy duty PVC fabric and are fitted with a built in anchoring and cover placement machine attachment straps.

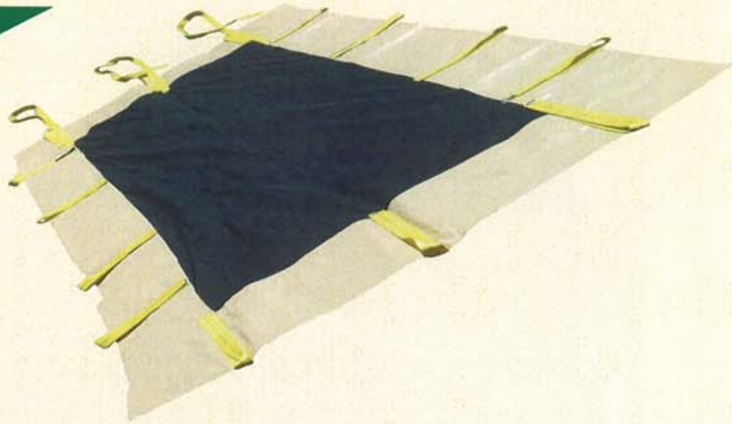
Managed Organic Recycling, Inc
362 Foothill Blvd
San Luis Obispo, CA 93405
Ph: 805-546-8610 Fax: 805-546-8619

Managed Organic Recycling, Inc.

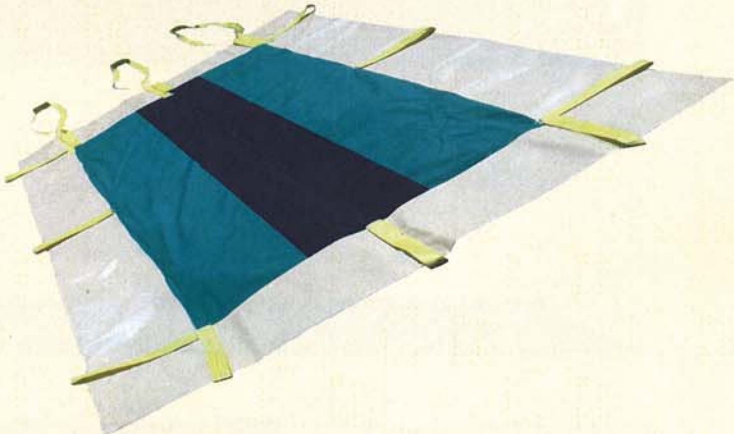
In-vessel Aerated Static Pile Compost Covers

Compost Cover Line

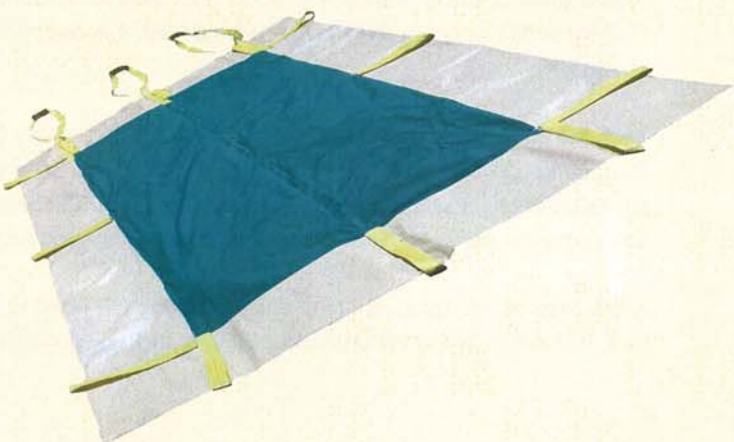
Managed Organic Recycling's (MOR) "Platinum" Cover consists of a breathable membrane laminated between two outer layers of polyester. The breathable membrane provides a barrier that most long chain molecules, fatty acids, sulfur compounds and other volatile organic compounds cannot penetrate. The two outer layers provide UV protection and wear resistance extending the life of the cover. MOR's "Platinum" Cover meets the strictest air board regulations on the capture of VOCs and NH_3.



MOR's "Gold" Cover is a combination of MOR's "Platinum" and "Silver" Covers. The top portion is constructed out of MOR's "Platinum" membrane while the remainder consists of MOR's "Silver" material. The combination of materials allows the pile to breath while protecting it from moisture and temperature losses. Ideal for moisture control in hot, windy climates, thus providing quality finished product. The "Gold" cover can also be used in stabilization and curing phases of the composting process since most odorous compounds have already be destroyed.



MOR's "Silver" Cover provides uniform composting performance in the both temperature and moisture control while protecting your product from the elements. MOR's "Silver" Cover is ideal for the stabilization phase and storage of finished product. Now composting can be done regardless of the weather.



Managed Organic Recycling, Inc
362 Foothill Blvd
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Managed Organic Recycling, Inc.

In-vessel Aerated Static Pile Compost Covers

Managed Organic Recycling, Inc Company Overview

Managed Organic Recycling, Inc (MOR) provides a complete line of compost covers for the organic feedstock industry. Our covers are designed to meet the specific needs of our clients as imposed by the compostable feedstock materials and/or regulatory requirements. Utilizing MOR's covers in an In-vessel Aerated Static Pile composting system improves both efficiency and performance of the composting process.

With the adoption of new air quality regulation by air quality management districts regarding capture efficiencies for volatile organic compounds (VOCs), ammonia (NH_3), and particulates (PM10 is lowered to PM2.5) MOR's compost covers are the cost effective answers to regulator changes in the composting industry. MOR's compost covers have been tested using Environmental Protection Agency test protocols and meet South Coast Air Quality Management District Rule 1133.

All MOR compost covers are manufactured using the latest technology in seam sealing. The outside edges are protected with heavy duty PVC fabric and are fitted with a built in anchoring and cover placement machine attachment straps.

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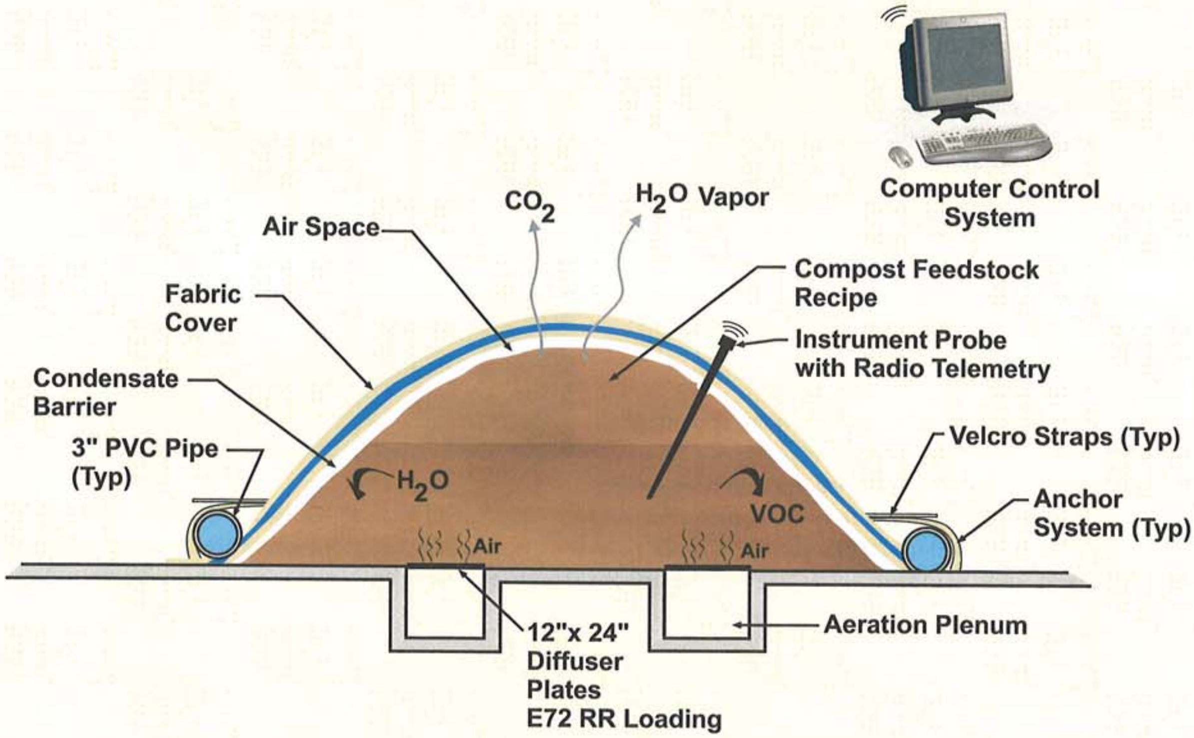
Managed Organic Recycling, Inc.

In-Vessel Aerated Static Pile (IASP) Composting System



- Aeration blower control system operates automatically to turn blowers in each compost pile on/off based on the temperature and O2 levels in the pile
- Aeration system blowers are controlled by a computer and on/off cycles are infinitely adjustable to provide aeration the each IASP compost pile around the clock.
- Large bio-solids compost piles have three combination temperature/O2 probes. Data from each probe will be averaged by the computer to effect any change in blower operational status, i.e., on/off.
- Set point for temperature is 165 degrees. If the average temperature in the pile exceeds the set point temperature the blower will be turned off.
- Set point for O2 is 16 percent oxygen concentration. If the average O2 concentration drops below 16 percent the blower will be turned on.
- Both control set points shall be adjustable through the computer.
- Computers track and plot time/temperature/O2 data for each active pile.
- Systems use radio telemetry probes such that no cabling between the field probe and computer is required.

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Managed Organic Recycling, Inc

Managed Organic Recycling, Inc (MOR) provides professional business services to the bio-solids industry, both municipal and private clients, ensuring that organic resource materials (primarily bio-solids) are recycled in an environmentally sound and beneficial way. MOR principal goal is to expand opportunities for beneficial reuse of organic resources by providing a cost-effective alternative to landfill disposal of all potential feedstock materials including bio-solids and any compostable nutrient rich organic resources.

MOR will be good neighbors in the communities they serve taking a "no smell, no noise, no negative visual appearance, no air/water quality issues" approach to the design, construction and operation of all its facilities. MOR currently produces a variety of soil amendment mixes at a composting site near Benicia, CA. The principal owners have over 50 years experience in bio-solids management activities. All have extensive expertise in wastewater treatment design and the in-vessel static pile (IASP) composting technology.

MOR offers a wide range of professional services and products. Since 2006, BASP has been involved in supplying bio-solids amended soil products to landscape contractors, vineyards, regional park districts and demonstration gardens. We also offer consulting services in:

- Compost facility design, construction and operation
- Odor control system design and construction for anaerobic digesters and other odor emission sources
- Assistance with regulatory compliance in bio-solids management

Managed Organic Recycling, Inc is a member of the U.S. Composting Council.

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Managed Organic Recycling, Inc.

Professional Services

Managed Organic Recycling offers a range of professional services to the bio-solids and soil products industry. We can assist clients in engineering, permitting, marketing, manufacturing and sale of soil amendment products. The range of services we can provide is summarized as follows:

Engineering Design Services

We can provide full service engineering for bio-solids processing and odor control facilities. We have a staff or registered professionals with experience in design of complex wastewater treatment plants, including the 100 million gallon per day Central Valley Water Reclamation Facility in Salt Lake city, UT. Our engineers have also designed recycled water treatment facilities for several municipal clients.

Bio-solids Management And Recycling

Since 1975 our engineers have been involved in planning, design and permitting of over 15 bio-solids management projects. We have designed fertilizer enrichment systems to increase the nitrogen concentration in bio-solids feedstock (Corona, CA 1995), belt filter press dewatering systems (CVWRF at Salt Lake City, UT 1981), and numerous land application sites (Silva 1997, Souza 1996, Jess Ranch 1992-2006, Sunnyvale 1992, Sacramento 1997, Stockton 1997, Red Bluff 1978, San Leandro 1994 -2006, and Patterson 2001). Over the past 15 years we have recycled over 2.5 million wet tons of bio-solids materials to land.

In-Vessel Aerated Static Pile Composting Technology

Dr. Eliot Epstein developed the aerated static pile (ASP) technology at the US Department of Agriculture in 1968. Since then he has been involved in the planning and design of over 200 composting facilities. John Bouey worked with Eliot on the first bio-solids composting pilot study in 1980 for the Central Valley Water Reclamation Facility in Salt Lake City, UT. The study showed that even raw bio-solids could be successfully composted the kill virtually all pathogens. Today Eliot and John have taken the ASP composting technology one step further by adding a cover system. Now the piles can be aerated in the positive aeration mode eliminating the need for biofilters (odor control) and produce a Class A soil amendment product in less than six weeks.

Land Reclamation

We have designed land reclamation programs for abandoned mine sites in northern California using wastewater bio-solids to increase soil fertility and texture. Designs are based on US Mine Reclamation law (SARA) to enable the site operator/owner to meet their permit obligations for mine closure. Bio-solids applied at 5 to 10 times agricultural application rates has been successful at promoting establishment of a vegetative cover and yet still be protective of underlying groundwater quality requirement.

Organic Waste And Odor Control Consulting

Managed Organic Recycling has experience in all types of organic waste handling and treatment. We have designed septage handling and treatment systems, lagoons for dairy and hog farms, and individual waste disposal systems (septic tank and leach field designs). With the new cover system for odor control we can now design cost effective odor collection and treatment (either biofilters or scrubbers) to handle any odor emission sources.

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John T, Bouey, P. E.
BSCE Purdue University, 1967
MSCE University of California, Berkeley, 1972

John has over 35 years experience in environmental engineering ranging form master planning (San Francisco Bay Basin Plan, 1974) to design of large (100 mgd) advanced wastewater treatment plants. Recently, he has been involved in recycling biosolids including land application (over 2.5 million wet tons), permitting of land reclamation sites and design of biosolids fertilizer manufacturing facilities. He has performed IASP pilot studies documenting production of Class A biosolids quality for Central Valley Water Reclamation Facility, SLC, UT and Mt. View SD, Martinez, CA.

Email Address:johnb@morcompost.com

Kenneth D. Gerlack
BS Ornamental Horticulture, California Polytechnic, San Luis Obispo, 1962

Ken has over 50 years experience in landscape construction and maintenance as owner of Contra Costa Landscaping, Inc. He has been responsible for numerous projects including golf courses, commercial sites, sports fields (Oakland Coliseum Oakland) and several large residential estates. Currently, Ken is partner in Organic Solutions, LLC a compost producer in Benicia, California. Ken's operation makes about 30,000 cubic yards of finished green waste compost annually and has a proven track record of environmental compliance with the Solano County Local Enforcement Agency.

Eliot Epstein
PhD, Soil Physics, Purdue University, 1956

Eliot has over 50 year experience in residuals management specializing in research, design and operation of compost facilities. He pioneered the development of the In-vessel Aerated Static Pile (IASP) biosolids composting technology in the late 1960's while at the US Department of Agriculture. Eliot has served as consultant to over 100 agencies, including US EPA, World Bank, California Integrated Waste Management Board, Iowa State DNR, Maryland DEQ, Oregon DEQ, Alberta Canada Environmental and Alameda County Waste Management Authority. He is also a prodigious author penning over 1000 professional papers and texts on biosolids including ***The Science of Composting (1997)*** and ***Land Application of Sewage Sludge and Biosolids (2002)***.

Jason A. Bouey
BS Business Administration, California Polytechnic, San Luis Obispo, 2002

A graduate of the Orfalea College of Business at California Polytechnic, San Luis Obispo in Management, Jason spent the last five years with VS Athletics, one of the top Track and Field apparel and equipment companies in the US. As Customer Service Manager, Jason gained extensive knowledge and hands on experience in running the day-to-day operations of a successful business. Jason to provides the business structure necessary to best manage the company's professional and plant recourses in providing quality client services for the planning, design, construction and operation of organic composting facilities throughout North America.

Email Address:jason@morcompost.com

MOR
Managed Organic Recycling, Inc.

Soil Amendment Product Testimonials

Martin Matarrese
Oakland Parks and Recreation

Martin Matarrese of Oakland Parks and Recreation is about to apply a test plot of Class A Exceptional Quality Bio -solids (MOR John's Best) at the Joaquin Miller Community Center. Ten 1.7 cubic foot buckets of CALSOIL™ were broadcast over about 200 square feet and planted with wildflower mix. Martin was familiar with CALSOIL™ having conducted successful testing with a competitor's soil mix in December 2005.

Dan Finklea
Greenhouse Construction and Landscapes

A new landscape was planted at 8 Waldec Court in Oakland, CA using 60 cubic yards of CALSOIL™ in June 2006. The landscape contractor, Dan Finklea, completed the $200,000 project by tilling the CALSOIL™ product into the native clay soil to produce a nutrient rich subsoil for the new lawn, planting beds and tree holes. Dan commented, "This is the best organic soil product he's seen in the East Bay and he will not be using any other product anytime soon."

Tom Powers
Alhambra Valley Vineyards

Tom Powers, owner of Alhambra Valley Vineyards, is using CALBIOMIX™ to amend the clay soils at his vineyard in Martinez, California. Tom tried the mix and commented that it "greatly improved the soils texture and water retention capabilities." He is now comparing the fertilizer value of CALBIOMIX™ with manure; his current soil amendment material.

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Managed Organic Recycling, Inc.

Soil Amendment Products

CALBIOMIX ™

A unique blend of Class A Exceptional Quality bio-solids feedstock material especially formulated to rehabilitate disturbed soils such as mine reclamation sites, gravel quarries and recreational/sports fields. Application of nutrients and organic material often exceed agronomic rates by 5 to 10 times to rebuild the soil profile with a single application of CALBIOMIX ™

CALSOIL ™

A receipt of Class A Exceptional Quality bio-solids, organic compost and other feedstock materials designed for unrestricted use as soil amendment on recreational fields, municipal and commercial landscape projects and home gardens.

CALTOP ™

This nutrient rich organic soil amendment material is specifically designed for golf course greens and sport field applications. Due to its fine particle size it is easily incorporated into existing grass surface (turf) and provides essential nutrients and water holding properties for healthy and sustained plant growth.

CALPLANT ™

A "time released" nitrogen fertilizer including other essential nutrients necessary for plant growth. It's "time release" quality is due to the fact that the nitrogen and other nutrients are initially bound to its base organic material which breaks down over time through microbial activity. It is specifically designed to promote healthy soil conditions for indoor container plants.

Note: Class A Exceptional Quality Bio-solids are wastewater treatment residual solids that have been treated to remove pathogens in accordance with US Environmental Protection Agency (EPA) 40 CFR 503 specifications and have very low concentrations of heavy metals.

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Managed Organic Recycling, Inc.

Cover Placement Machine

Technical Specifications

Engine – John Deer 4.5 liter engine.

Hydraulic Drive – Eaton Hydraulic Motor.

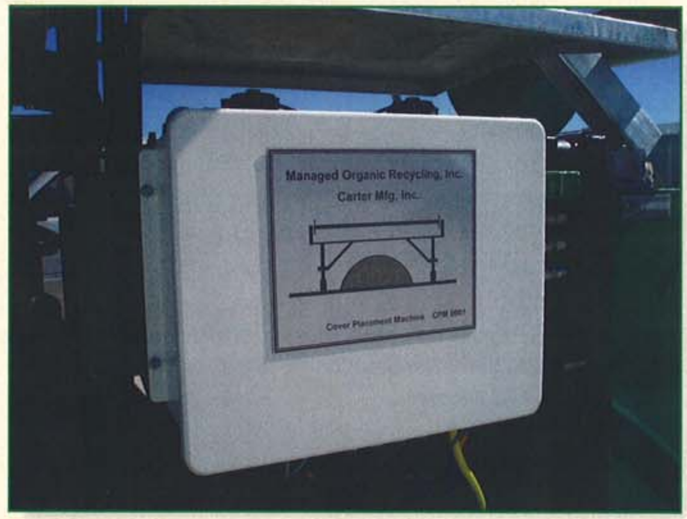
Steering System – Multi-directional steering system capable of Front, Back, and All wheel drive. Also capable of Diagonal, Cross and Roundabout drive.

Lifting Force – 8,000 lbs

Cover Rollup Speed – 0-10 ft/min

CPM Weight – 22,000 lbs

*Note CPM Model 20071 is capable of straddling a compost pile 12' H x 37' W, but can be customized according to customer specifications. For detailed information please contact Managed Organic Recycling, Inc.



Central Valley Water Reclamation Facility, Salt Lake City, UT is currently operating CPM Model 20071 # 0001.

Managed Organic Recycling, Inc Company Overview

Managed Organic Recycling, Inc (MOR) mission is to ensure that organic resource materials are recycled in an environmentally sound and beneficial manner. Through the In-vessel Aerated Static Pile (IASP) Composting System, MOR provides the Composting and Biosolids Industries with the technology and knowledge to efficiently produce value added products.

MOR provides all aspects of the In-vessel Aerated Static Pile (IASP) composting technology including planning, design, construction, equipment and operation.

From beginning to end MOR has you covered. Please visit MORCOMPOST.COM for detailed company information and additional client services.

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Managed Organic Recycling, Inc.

Cover Placement Machine

CPM Model 20071

Managed Organic Recycling, Inc is proud to introduce Cover Placement Machine Model 20071. CPM 20071 allows composting facilities that utilize In-vessel Aerated Static Pile Compost Covers and other Compost Cover Systems to increase efficiencies while extending the life of their Compost Covers.

CPM 20071 reduces pile setup time, increases efficiency requiring one operator, and extends cover life by eliminating drag in cover placement and removal.

Engine & Hydraulic Motor

CPM 20071 is powered by a John Deer 4.5 liter Engine capable of 140 horse power @ 2,400 rpm. The Eaton Hydraulic Motor is capable of lifting up to 6000 psi with 4,160 rpm @ 18 degrees.

Operation

CPM 20071's control platform provides the operator with an unobstructed top down view and a multi-directional steering system for precision operation.

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Air Quality Testing

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Air Quality Testing

Managed Organic Recycling, Inc.

MOR, Inc Testing Services

Managed Organic Recycling, Inc offers Air Quality Sampling services using the EPA recommended sampling protocols. Samples are collected, tested, and field reports are issued for Air Quality evaluation.

Available Sampling Includes:

-Volatile Organic Compounds (VOC)

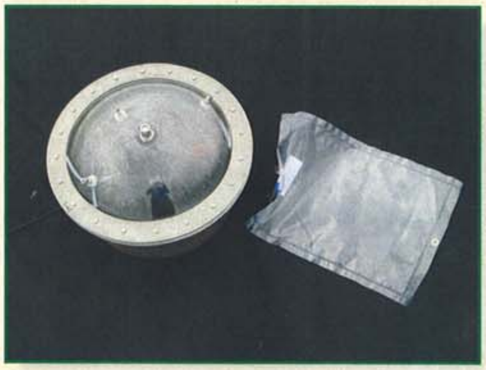
-Methane

-Ammonia

-Odor Capture

*Other Sampling available. Please contact MOR for details and pricing.

Air Quality evaluations are a key indicator of best management practices to reduce emissions in any composting facility, providing valuable data to support or refine your composting methods and operation, as well as compliance with regulatory air emission standards.



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Appendix ASP-2

Cedar Grove Organics Recycling, LLC

Appendix available in color on website:
http://www.recyclenow.org/o_reports.html

CEDAR GROVE

COMPOSTING

100% NATURAL

www.cgcompost.com

CEDAR GROVE

SYSTEMS

www.cgcompost.com

CEDAR GROVE

ORGANICS
RECYCLING, LLC

www.gogreenscene.com

CEDAR GROVE COMPOSTING

1-877-764-5748

CORPORATE OFFICE
7343 E. Marginal Way So.
Seattle, WA 98108
(206) 832-3000

MAPLE VALLEY FACILITY
17825 Cedar Grove Road SE
Maple Valley, WA 98038

EVERETT FACILITY
3620 36th Place NE
Everett, WA 98205

CEDAR GROVE SYSTEMS
www.cgcompost.com

www.cgcompost.com

CEDAR GROVE COMPOSTING
100% NATURAL
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green scene

www.gogreenscene.com

CEDAR GROVE ORGANICS RECYCLING, LLC
www.gogreenscene.com

Cedar Grove Accomplishments

- **1989** Opened, Cedar Grove Composting, as windrow systems
- **1989** City of Seattle yard waste contract started
- **1989** Pre consumer food waste program started
- **1994** Researched European technologies to deal with high volumes
- **1995** Invested in negative air+biofilter
- **1998** Initiated Environmental Management System
- **1999** Built Zone 7 (indoor building) for post consumer food pilot
- **2002** Researched Gore™ Cover Technology at Maple Valley
- **2003** Installed Gore™ Cover Technology at Maple Valley
- **2004** Sited and building Gore™ Cover Technology system, Everett, Washington
- **2004** Received post consumer food waste permit (permanent feedstock)
- **2005** City of Seattle and King county eastside cities begin collection of commercial (source separated) and residential (commingled) organics to process at Cedar Grove plants
- **2006** Cedar Grove Organics, LLC is formed to enhance commercial collection efforts
- **2007** Voted "Recycler of the Year – Most Innovative" by the Washington State Recycling Association

The leading innovator of composting and collection technologies.

CEDAR GROVE COMPOSTING 100% NATURAL
www.cgcompost.com

CEDAR GROVE SYSTEMS
www.cgcompost.com

CEDAR GROVE ORGANICS RECYCLING, LLC
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Mission Statement

To first serve our customers, without whom we would not exist; to treat them with the utmost respect and answer their needs quickly and as simply as possible. To ensure that they are getting the best service possible without compromise to local, state and federal regulations. To operate our business to the highest ethical standards as we have demonstrated since 1938.

To our employees, without whom our company would not exist; to provide a rewarding opportunity for them; to ensure that we all work together as one company with respect for each other in every capacity; to be ethical towards each other and to strive for success.

What is Cedar Grove Systems?

Cedar Grove Systems is the authorized supplier of GORE™ Cover System technology, technical consultation, on-site services and spare parts for the western United States.

Cedar Grove Composting has demonstrated significant confidence and gained valuable experience in the GORE™ Cover System technology by the successful installation and operation of two facilities in WA State. The Everett, WA facility is one the world's largest compost facilities using GORE™ Cover System technology.

In addition to acting as an authorized supplier of GORE™ Cover System technology, Cedar Grove Systems will also serve the composting and organic waste treatment community in areas such as facility design, operations, product sales, marketing and alternative consultative support in green energy technology.

W.L. Gore & Associate's "GORE™ Cover System" is centered on membrane laminate technology similar to that of its world famous GORE-TEX® fabrics. The integrated system includes GORE™ Cover, in-floor aeration, aeration blowers, oxygen and temperature sensors, controllers, computers, software, cover handling systems, training, engineering guidance, installation support and the experience gained through installing over 150 facilities worldwide.

Facilities using the GORE™ Cover System experience an up to 97% reduction in process odors when compared to uncovered systems, the GORE™ Cover retains greater than 99% of bio-aerosols. Other system attributes include a small facility footprint, low energy requirements, low operating costs, short installation times and producing stable compost in just 8 weeks.

For more information please contact:
Denise Bartlett
Business Development
Western United States
206-708-3823

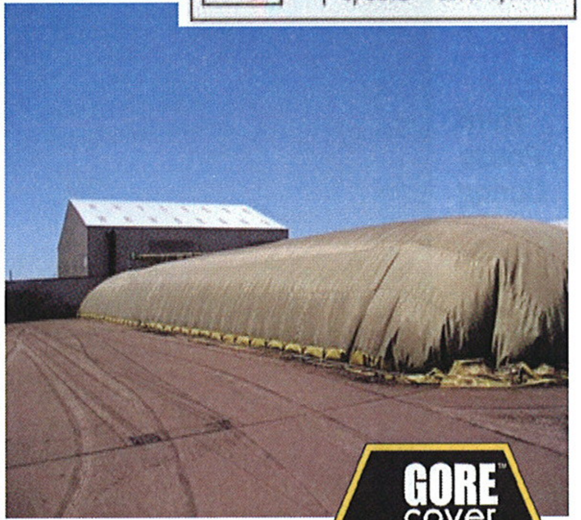
Cedar Grove Systems

7343 E. Marginal Way S.
Seattle, WA 98108

Corporate: 206-832-3000
Direct: 971-219-2220
E-mail: deniseb@emeraldnw.com

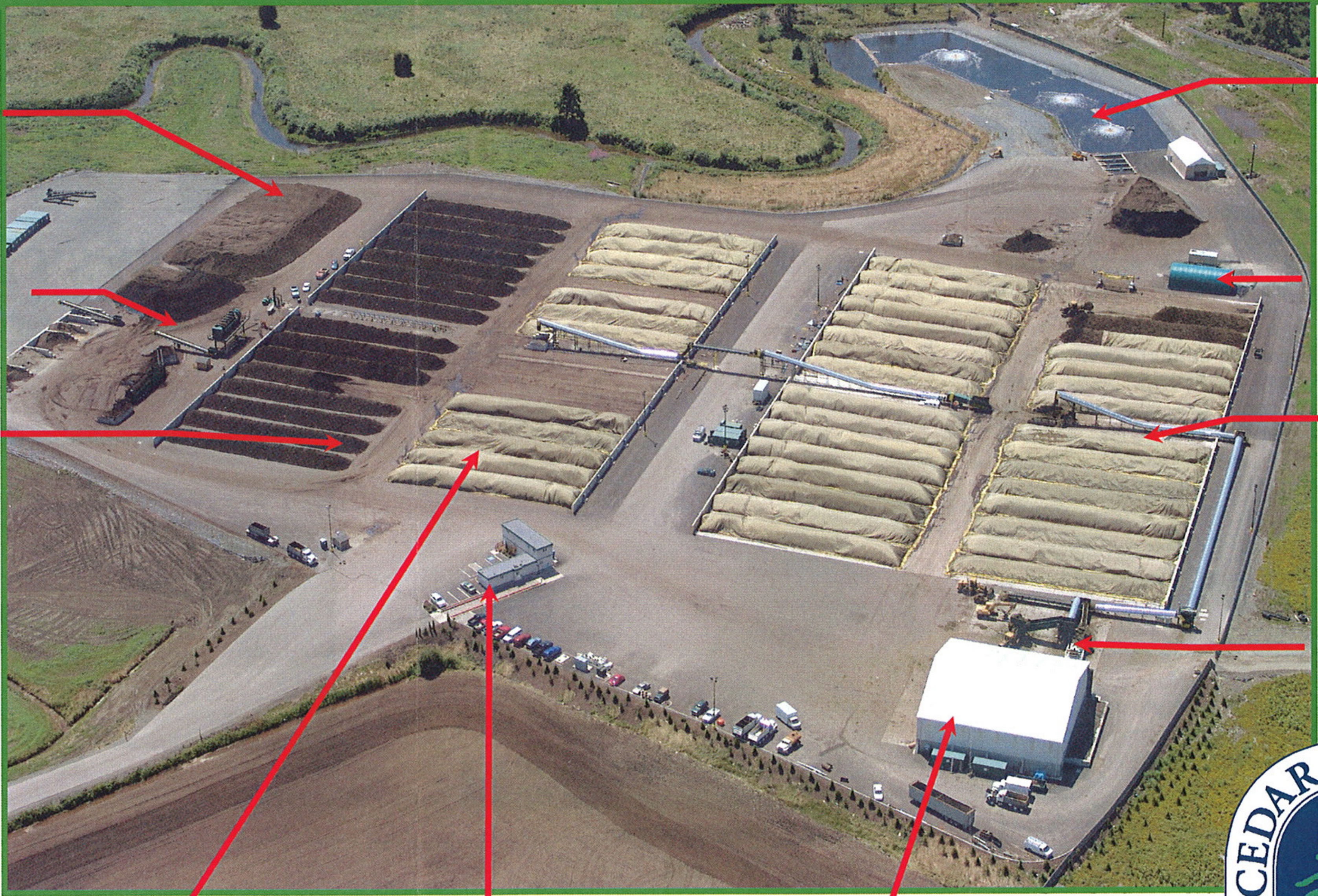
Cedar Grove Systems

Authorized Distributor of GORE™ Cover Systems



206-832-3000
www.cgcompost/systems

Aerial layout of the 164,000 ton Cedar Grove Compost facility in Everett WA opened 2003



Product Ageing

Screening

Third Phase Curing

Storm water Ponds

Leachate Tank

First Phase Composting

Grinding

Second Phase Composting

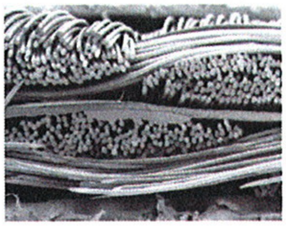
Scale House

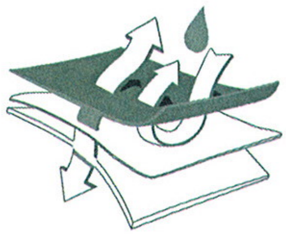
Receiving Building

www.cgcompost.com

CEDAR GROVE SYSTEMS

THE GORE™ COVER PRINCIPLE





GORE™ Covers perform better than steel container walls and better than a concrete shed or pit wall.

The waste covers consist of a specially developed GORE-TEX® membrane, laminated between two highly robust polyester layers. Because the membrane has just the right pore structure, GORE™ Cover offers more than just storage cover – it is possible to selectively influence the treatment process. The membranes used in waste treatment protect the composting material from the penetration of rainwater and yet allow CO_2 produced during the composting process to escape.

Even so, odours are extensively retained. GORE™ Covers act as a physical barrier against gaseous substances escaping from the rotting material. In addition, a fine film of condensation develops on the inside of the tarpaulin covers during the composting procedure, suppressing odours and other gaseous substances. These gases are partly dissolved in the film of water and drop back into the composting material where they continue to be broken down by bacteria.

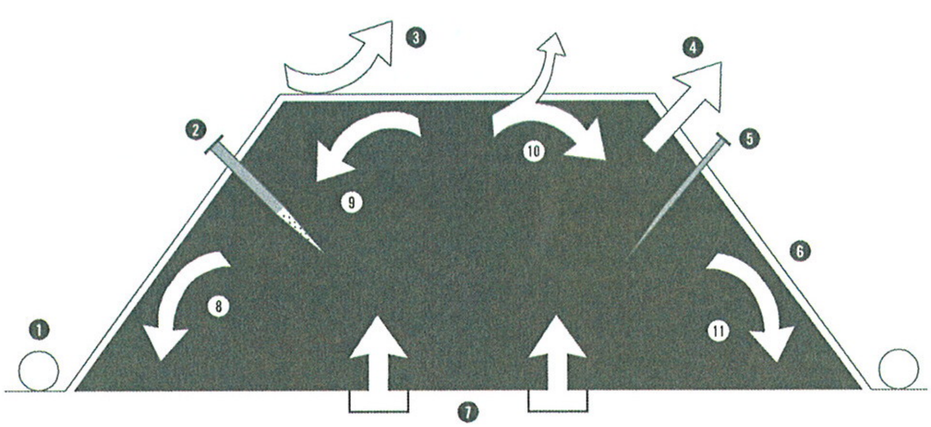
The right choice of membrane influences the extraction of moisture during composting. It prevents the final product being too wet, yet at the same time ensures that there is sufficient moisture retained to allow the material to be decomposed – particularly important in arid zones. The micro-porous structure of the GORE-TEX® membrane means that it is practically impossible for microbes to penetrate.

Numerous microbiological tests have proved that microbes can be reduced by > 99%, thus guaranteeing that workers and nearby residents are protected and safe. The insulating effect of GORE™ Cover and the pressurisation by which the system ensures even temperature distribution mean that achieving the necessary temperature for sanitising the material across the entire cross-section of the heap can be guaranteed – even during the winter months. Pathogenic micro-organisms are safely destroyed throughout the entire composting material.

PRINCIPLE OF A HEAP ENCLOSED IN GORE™ COVER AND WITH CONTROLLED PRESSURISED AERATION

GORE™ Cover improve the composting process and satisfy all requirements for certification as an efficient and controlled composting technology.

1 Tarpaulin retainer
2 O_2-measuring probe
3 Weather impact
4 CO_2
5 Temperature profile measuring probe
6 GORE™ Cover
7 Air
8 Heat
9 Odour
10 Moisture
11 Micro-organisms



W.L. GORE & ASSOCIATES GMBH. TEXTILE TECHNOLOGIES DEPARTMENT. HERMANN-OBERTH-STRASSE 24. 85640 PUTZBRUNN NEAR MÜNCHEN. TEL. +49 (0)89 46120. BZANKL@WLGORE.COM

THE PRINCIPLE OF WASTE TREATMENT WITH GORE™ COVER

Take just as much favourably priced nature as possible and as much intelligent technology as necessary. Or more precisely: GORE™ Cover technology.

It consists essentially of three components: aeration, control, and a tarpaulin. Brought together in a perfect balance, the three components interact to produce a unique, economical and reliable composting system. In order to provide the essential basic requirements for the aerobic microorganisms, medium pressure aerators are connected to either on-floor aeration pipes or to in-floor aeration ducts. The bigger the throughput of the plant, the more worthwhile the investment in aeration channels, allowing vehicular access and saving on staffing costs.

The aerators are controlled by means of oxygen and temperature parameters, for which the necessary data is obtained directly from the main body of the heap using stainless steel probes. The data is fed into the computer and stored there, documenting the course of the operation. Radio-remote monitoring of the controlled composting process is possible.

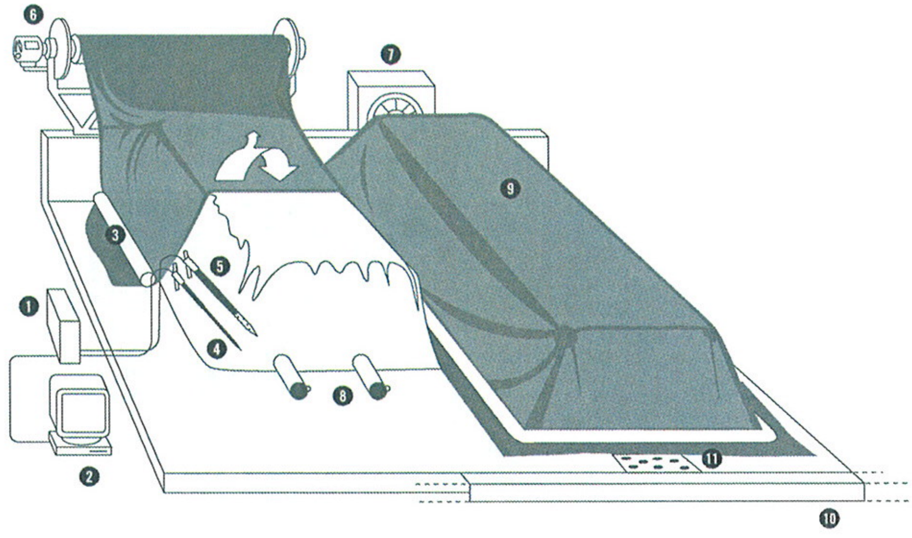
The material is first mechanically prepared and homogenised before being laid on the aeration using wheel loaders. The probes are then sunk into the material to be composted and then the GORE™ Cover is immediately pulled over the body of the heap. Various handling aids are available to make this action easier. It now remains only to fill the fire hose at the edge of the tarpaulin with water to fix it in position and within a few minutes an enclosed system is functioning.

Without the cost of any further technical maintenance and without producing any conspicious odours or microorganisms, Nature now sets to work. It is inexpensive and it is in perfect tune ecologically. Three to four weeks later you can open up the heap to find its contents have been thoroughly a decomposed degraded. All you have to do is roll back the tarpaulin onto the winding gear by radio remote control, remove the measuring probes, if necessary withdraw the aeration pipes using the wheel loaders, and place the material e.g. by a winch on the maturation field and to continue biodegradation. With the right equipment and our expertise you can save yourself the bother of watering, turning – and trouble with the neighbours.

DIAGRAM OF A PLANT: COMPOSTING TECHNOLOGY WITH GORE™ COVER AND AERATION (ON-FLOOR AND IN-FLOOR)

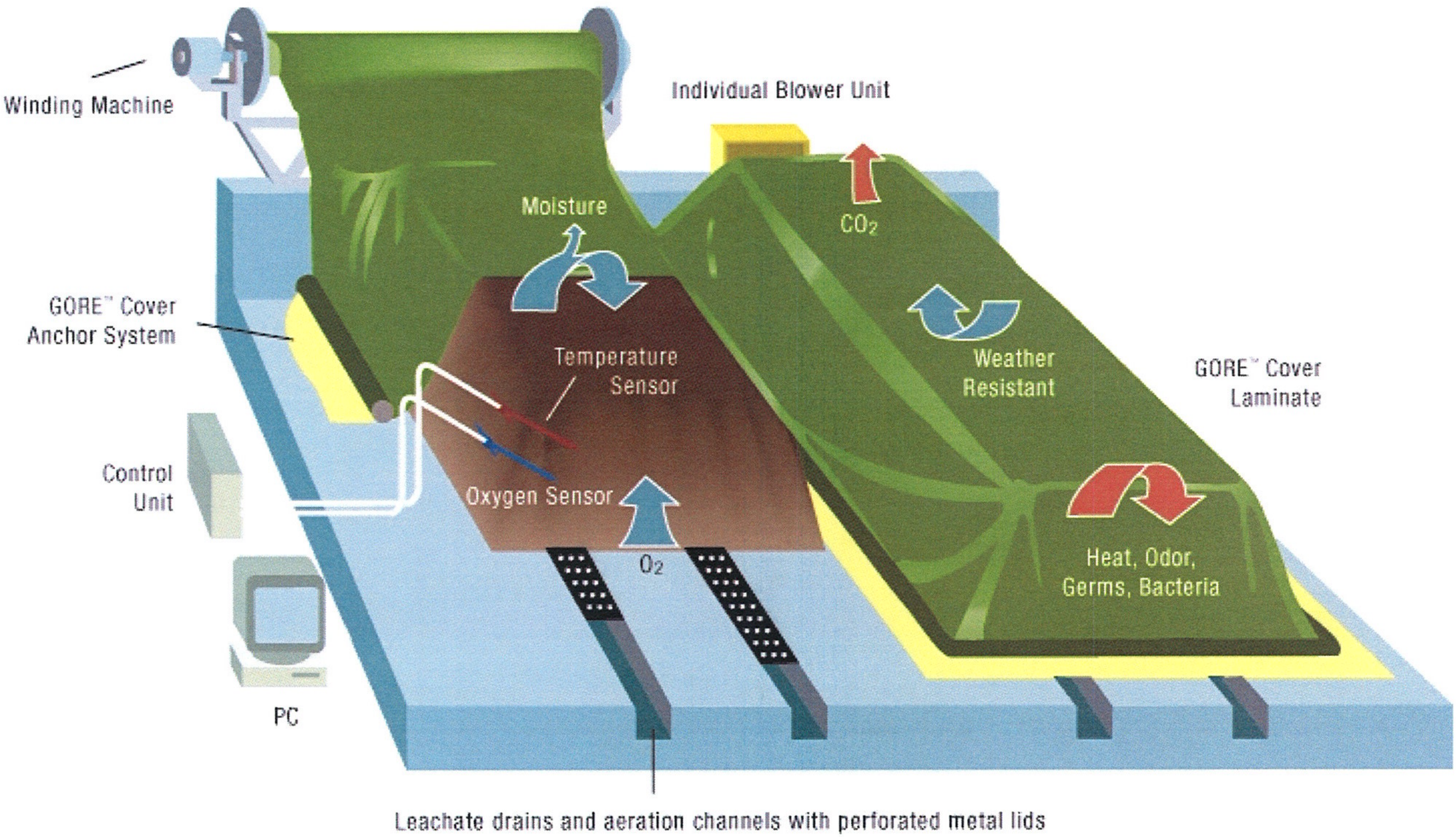
Intelligent technology allows rapid organic decomposition with integrated protection against the weather and emissions. A plant of this kind can be installed anywhere in the world within just six weeks.

1 Control unit
2 PC
3 Tarpaulin retainer
4 Temperature profile probe
5 Oxygen/temperature probe
6 Winding gear
7 Ventilator station
8 On-floor aeration pipes
9 GORE™ Cover
10 Drainage system
11 In-floor aeration channels

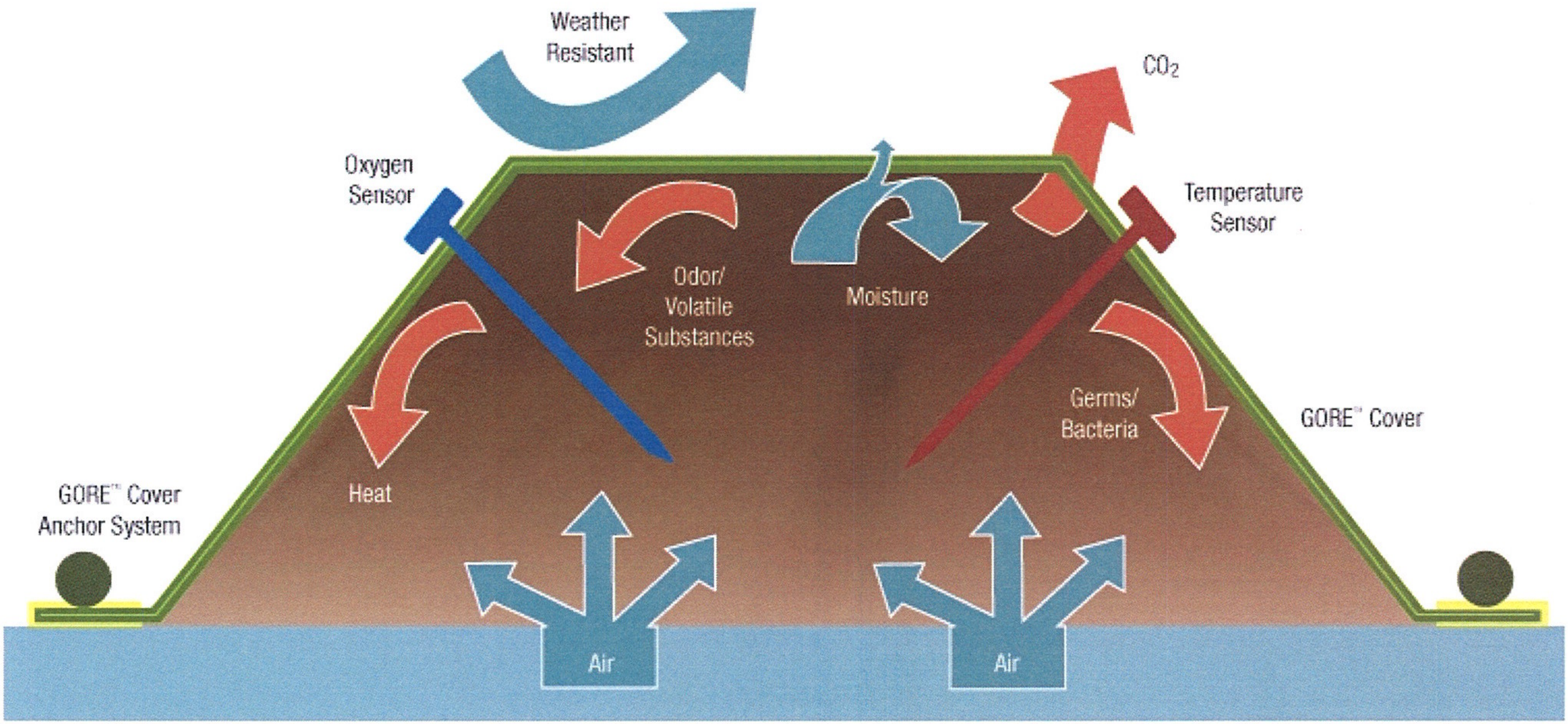


W.L. GORE & ASSOCIATES GMBH. TEXTILE TECHNOLOGIES DEPARTMENT. HERMANN-OBERTH-STRASSE 24. 85640 PUTZBRUNN NEAR MÜNCHEN. TEL. +49 (0)89 46120. BZANKL@WLGORE.COM

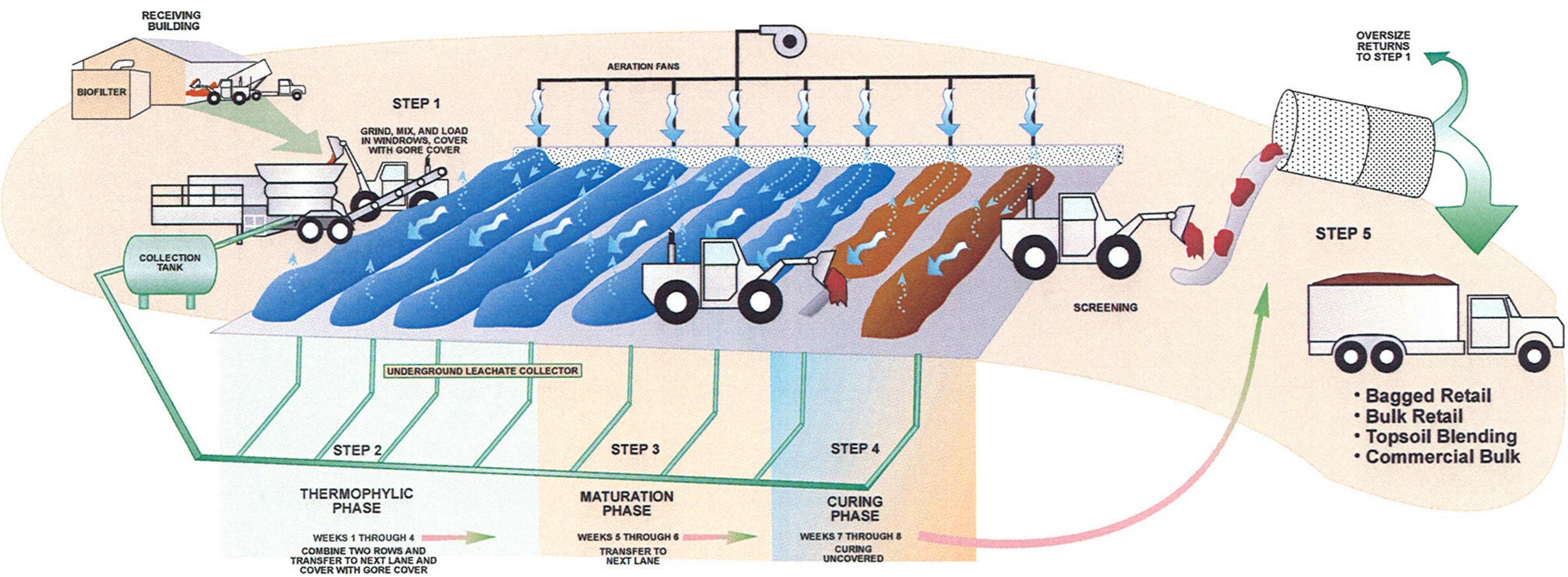
THE GORE™ COVER SYSTEM - 3D ILLUSTRATION



THE GORE™ COVER SYSTEM - CROSS SECTION VIEW



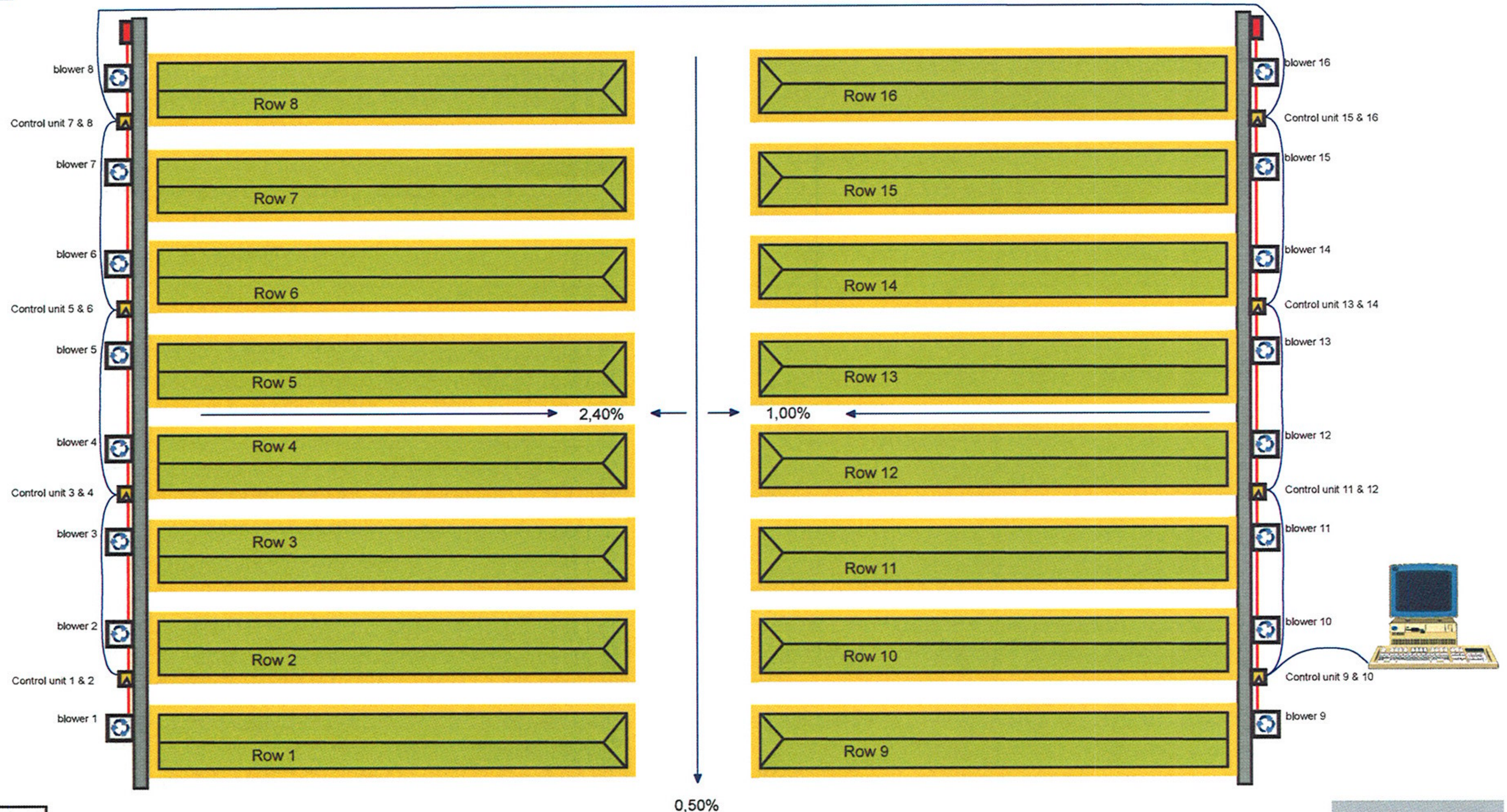
Cedar Grove Composting



Process Pictogram

555-3122-009/02(04) 4/04 (K)

Cedar Grove Composting



GORE

Creative Technologies Worldwide

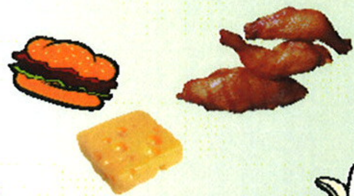
GORE COVER™ COMPOST SYSTEM

GORE cover

Commercial Compost Collection

Yes!

Food Scraps



Meat, Poultry, Fish, Shellfish & Bones

Egg & Dairy Products

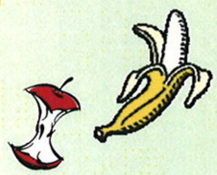


Table Scraps & Plate Scraping

Fruit & Vegetables

Bread, Dough, Pasta, Grains

Coffee Grounds, Filters & Tea Bags

Food Soiled Paper

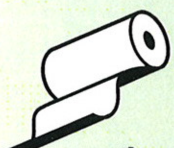
Kitchen Paper Towels

Uncoated Paper Take-Out Containers

Pizza Delivery Boxes

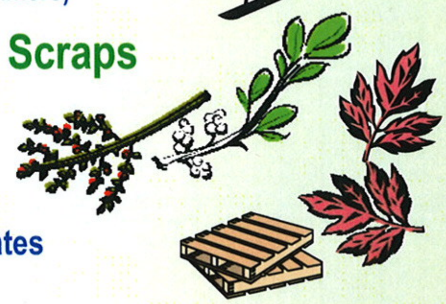
Paper Napkins

Waxed Cardboard & Paper



Uncoated Paper Cups, Plates
(No lids, straws or creamers)

Plant & Wood Scraps



Plants & Flowers
(No flower pots)

Wood Pallets & Crates
(No wire)

Landscape Vegetation
(less than 4'long & 4" diam.)

NO!

*Plastic Bags
*Plastic Tubs & Bottles
*Glass Bottles & Jars
*Metal
Produce Baskets & Netting

Burlap
Plastic Wrap
Cork
Coated or Plastic Take-Out Containers

Plastic Plates, Cups & Utensils
Latex & Plastic Gloves
Styrofoam
Foil

Wire & Rubber Bands

Grease & Liquids
Restroom Tissues & Paper Towels
Painted & Treated Wood

Pet Waste
Garbage & Hazardous Waste
*Milk and Juice Cartons
Ice Cream Cartons

(*These items are recyclable.)

Keep containers clean:

- Use paper bags, layered shredded paper, waxed cardboard boxes or approved compost bags (www.cgcompost.com).
- Rinse containers frequently into the sanitary sewer.
- Request clean containers as needed from Cedar Grove

CEDAR GROVE RECYCLING

1-877-994-4466

www.gogreenscene.com

Appendix ASP-3

Engineered Compost Systems (ECS) Aerated Static Pile Systems

Appendix available in color on website:
http://www.recyclenow.org/o_reports.html

ESA

ENGINEERED COMPOST SYSTEMS

Customer Driven Solutions

ABOUT ECS
SYSTEMS
AC COMPOSTER w/CompDog™
SV COMPOSTER™
CV COMPOSTER™
AERATE STATIC PILE
COMPONENTS
SERVICES
FACILITIES
RESOURCES
CONTACT
COMP BLOG
Links
ECS Home

ECS SYSTEMS

Aerated STATIC PILE (ASP) SYSTEMS

ECS provides complete systems as well as components for ASP facilities. ECS ASP's are used for both high-rate composting and curing compost. Our customers are processing feedstocks that include Biosolids, Food waste, MSW and Green waste.

Kelowna Biosolids Composting Facility; Single fan group supplies aeration to six temperature-controlled zones.

The ECS CompTroller (aeration control and monitoring system) and our proprietary aeration designs, aeration floor system and components are used to tailor facility specifications to our client's requirements.

ECS ASP's feature:

- energy efficient aeration design
- uniform airflow through the piles
- efficient material handling
- intuitive PC operator interface with client specified functionality

- **ASP Product Detail (PDF) >>**
- **AC Composter™ Product Detail (PDF) >>**

View some solutions met by employing **Aerated Static Pile (ASP) Systems**:

- **Kelowna, BC Biosolids Composting Facility (PDF) >>**
- **Lynden, Washington Wastewater Treatment Facility >>**
- **Land Recovery Inc. (LRI) Compost Factory (PDF) >>**
- **Port Angeles, WA; Wastewater Treatment Plant (PDF) >>**
- **Arlington, WA; Biosolids Composting (PDF) >>**
- **Biosolids Composting in Big Sky, MT (PDF) >>**
- **Facilities list >>**

Biosolids Composting Facility
Port Angeles, WA

Biosolids Composting Facility
Lynden, WA

ECS Aeration Floor
Port Angeles, WA

Partially Filled Compost Aeration Zone
Port Angeles, WA

Mariposa County, CA
Extended Curing ASP

Single fan per multiple zones

Engineered Compost Systems

AC Composter™ -- *The Affordable Road to Compliance*

- Download the AC Composter™ and CompDog™ PDF

See the AC Composter with CompDog in our short online video!.

The AC Composter™ is a Covered Aerated Static Pile (ASP) System. It was specifically designed to provide a cost effective approach for meeting today's more stringent environmental regulations for controlling odor, VOC and NH_3 emissions; and, provide operators with the broad range of process options that are found in all ECS systems.

The AC Composter™ is appropriate technology for composting virtually any feedstock (yard waste, food waste, source separated organics, biosolids and industrial wastes). It can be used for primary, secondary or curing phases of composting. And will adapt to fit any sized facility.

The AC Composter™ offers these prominent advantages:

- Near-zero fugitive odor releases;
- Broad range of aeration rates and process control options;
- Minimized evaporative water losses from biomass;
- Effective barrier to vectors (birds, rats, flies); and,
- Neat, clean and professional looking appearance;

Silver Springs Organics, LLC. Tenino, WA.
Phase I (shown above at half full) 60,000 ton/year food and yard waste
Phase II adds another 60,000 ton/year process capacity

The AC Composter™ has five (5) major components:

- The AC Cover;
- The CompTroller™ (aeration control and monitoring system);
- The Negative Only Aeration System;
- The Aeration Floor(s); and,
- Odor and Emission Control

AC Cover

The AC Cover is impermeable. It does not absorb water, become heavy when wet, and the air handling characteristics do not change as the cover becomes soiled. The AC Cover is durable and field-repairable if damaged. The AC Cover can be hand deployed and removed for smaller systems; or used with commercially available cover rollers available from ECS.

The AC Cover is designed for negative-only aeration and includes single direction air inlets. Suction from the negative-only aeration makes the AC Covers cling to the piles, making edge weights necessary only as an added precaution during high-wind events. All AC Covers include provisions for edge weights and pulling rings.

AC Composter Covers
Negative aeration makes covers cling to piles

The ECS CompTroller™ (aeration control and monitoring system)

The AC Composter uses ECS' proven CompTroller™ control technology. Compost pile temperature data is collected and stored on the CompTroller. The batches of compost are tracked through the facility from start to finish.

- Read more on the **ECS CompTroller™**
- **Download the CompTroller™ PDF**

The ECS Aeration System

ECS aeration systems are designed for a 20+ year service life. All aeration components exposed to the corrosive environment of composting are made of stainless steel or polymeric materials. Aeration to the individual zones is continuous AND automatically controlled per Operator chosen set-points.

The aeration system provides a wide range of air-volumes. At low flow rates drying and cooling are significantly reduced while the cover prevents odors from being released. At high flow rates the material can be fully oxygenated and temperature controlled prior to removing the cover to minimize odor events and improve drying for better screen yields.

AC Composter™ aeration system with ecology block push-wall

ECS Aeration Floor(s)

ECS offers several different types of aeration floors depending on the Clients' process needs and budget. Typically, ASP aeration floors are broken into two major categories:

- Below grade (in-slab); and,
- Pipe on grade (above grade).

ECS offers two in-slab aeration floor options: Low-Friction and Sparger. Both floor designs are relatively costly and require pipe and/or trench forming below concrete surfaces. Not considering their cost, in-slab floors offer these advantages:

- Most efficient air distribution;
- Collect leachate and condensate;
- Reduced labor requirements; and,
- Compatible with loading and unloading with front end loaders.

Above grade aeration floors cost less, place aeration pipes on top of the working surface, and do not (typically) have infrastructure requirements below grade. ECS offers two pipe on grade options: CompDog (pipe-less aeration); and, HDPE pipe on grade.

The CompDog™ can dramatically cut the cost of an aeration floor, and save labor costs. The CompDogs™ are constructed of heavy coated and double walled polyester material. They can be made to any length up to 90 ft long. When inflated a cross section of the CompDog™ resembles an arch with a broad (self-supporting) base. The CompDog™ is field repairable and designed for years of service.

The CompDog™ is teamed with the In-Deflator™, a device that inflates and deflates the CompDog™, has a spindle for retrieving the Dogs from the piles, and is mounted on a four wheel cart.

AC Composter™ and CompDog™ working together

Odor and Emission Control

The AC Composter™ controls odors in several ways. The negative aeration system contains VOC&requo;s and NH3 in the compost piles and virtually eliminates convective surface losses off the pile. That is, when the cover is in place and the aeration system is activated the process (exhaust) air leaving the pile is directed to a biofilter.

When it's time remove the AC Cover the aeration is increased to lower compost temperatures and raise Oxygen levels; this greatly diminishes the potential for odor releases.

A well designed and maintained biofilter is very efficient at scrubbing emissions from compost process air. If, depending on the feedstocks, a further reduction of NH3 is required, a simple wet scrubber can be added to the aeration system.

Typical ECS Biofilter designed for the AC Composter™>

Please Note:

The AC Composter™ & CompDog™, their respective components and process carry broad Patents.

The AC Covers and CompDog™ are only sold as components in an AC Composter™ system. Exceptions are made for ASP facility upgrades on a case-by-case basis.

Appendix BIO-1

Regionally Occurring Special-Status Species / Project Site (Site 5A)

ESA

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Invertebrates				
Adela oplerella Opler's longhorn moth	None	FSC	Occurs in serpentine soil in grasslands.	Unlikely. No suitable habitat exists within the project area. Grasslands within the project area do not occur on serpentine soils. The nearest CNDDB occurrence is located 5 miles NW of the study site.
Andrena blennospermatis Blennosperma vernal pool andrenid bee	None	None	Oligolectic on vernal pool flowers, especially Blennosperma. Bees nest in the uplands around vernal pools.	Unlikely. No suitable habitat exists within the project area. The nearest CNDDB occurrence is located 5 miles NE of the study site.
Calicina diminua Marin blind harvestman	None	None/FSC	Known only from Mount Burdell, Novato, Marin County. Serpentine endemic.	Unlikely. No suitable habitat exists within in the project area. The nearest CNDDB occurrence is approximately 3 miles from the project area.
Danaus plexippus Monarch butterfly	None	None	Feeds on milkweed plants in the Genus Asclepius and over-winters in large roosts in coastal central and southern California.	Unlikely. There are no milkweed plants within the project area to support this species. Additionally, there are no roosting habitats within the project area. The nearest CNDDB occurrence is 3 miles SW of the project area.
Speyeria zerene myrtleae Myrtle's silverspot butterfly	None	FE	Host plant is Viola adunca. Occurs in dunes, scrub, and grasslands along the coast.	Unlikely. Suitable habitat is present in the project area; however, the host plant was not present during the field reconnaissance. There are no CNDDB occurrences within the project area; the nearest CNDDB occurrence is approximately 2 miles from the project area.
Syncaris pacifica California freshwater shrimp	SE	FE	Endemic to quiet waters of freshwater streams in Marin, Sonoma, and Napa Counties. Habitat must be <1% gradient, <115 m elevation. Cannot tolerate saline or brackish waters.	Unlikely. There are no freshwater streams within the project site. Irrigation canals within the project area are generally influenced by infiltration of brackish water from Petaluma river. Freshwater sections of the canals were stagnant at the time of the reconnaissance survey. There are no CNDDB occurrences within 5 miles of the project area.
Talanites ubicki Ubick's gnaphosid spider	None	None	Known only from the type locality, Mount Burdell, Novato, Marin County. Serpentine endemic.	Unlikely. No suitable habitat exists within the project area. The nearest CNDDB occurrence is approximately 3 miles from the project area.
Tryonia imitator Mimic tryonia California brackishwater snail	None	None	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities.	Unlikely. Limited suitable habitat exists within the project area. The nearest CNDDB occurrence is approximately 1 mile from the project area, in habitats along the Petaluma River. Agricultural canals within the project area do not have surface water connections with the Petaluma River. Therefore, it is unlikely that this species would occur within the project area.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Amphibians				
Rana aurora draytonii | California red-legged frog	CSC/None	FT	Breeds in slow moving streams, ponds, and marshes with emergent riparian vegetation; forages in nearby uplands within about 200 feet.	Unlikely. There is no substantially deep aquatic habitat with dense riparian plants and no suitable upland habitat within the project area. The nearest CNDDB occurrence is approximately 2 miles from the project area.
Rana boylii Foothill yellow-legged frog	CSC/None	None	Breeds in shaded stream habitats with rocky, cobble substrate, usually below 6,000 feet in elevation. Absent or infrequent when introduced predators are present.	Unlikely. Suitable habitat does not exist within the project area. No CNDDB occurrences are found within 5 miles of the project area.
Reptiles				
Actinemys (=Emys) marmorata marmorata northwestern pond turtle	CSC/None	None	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Unlikely. Suitable habitat is present within the project area; however, very limited suitable egg-laying and basking habitat is present within the project area. The nearest CNDDB occurrence is more than 5 miles from the project area.
Fish				
Eucyclogobius newberryi Tidewater goby	None	FE	Relatively undisturbed lagoons, estuaries, backwater marshes, and streams adjacent to the Pacific Ocean. Commonly found in waters with low salinity levels with submerged or emergent vegetation.	Unlikely. Suitable habitat is not present within the project area and no CNDDB occurrences were found within 5 miles of the project area. Not likely to occur within Petaluma River.
Hypomesus transpacificus Delta smelt	ST	FT	Open surface waters in the Sacramento/San Joaquin Delta. Seasonally in Suisun Bay and Carquinez Strait. No permanent populations in San Pablo Bay. Found in Delta estuaries with dense aquatic vegetation and low occurrence of predators. May be affected by downstream sedimentation.	Unlikely. Suitable habitat is not present within the project area and no CNDDB occurrences were found within 5 miles of the project area. There is no surface water connection between the project area's agricultural canals and the Petaluma River.
Oncorhynchus kisutch Coho salmon – Central California Coast ESU	SE	FE	Northern California coastal streams where suitable spawning and rearing habitat occurs from Punta Gorda south to the San Lorenza River. Requires gravel substrate and large woody debris.	Unlikely. Suitable habitat is not present within the project area and no CNDDB occurrences were found within 5 miles of the project area. There is no surface water connection between the project area's agricultural canals and the Petaluma River.
Oncorhynchus mykiss irideus steelhead - Central California Coast ESU	None	FT	Spawns in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin.	Low. Suitable habitat is not present within the project area and no CNDDB occurrences were found within 5 miles of the project area. There is no surface water connectivity between the project area's agricultural canals and the Petaluma River; water is pumped from the canals into the Petaluma River. However, the project area is located within the Central California Coast steelhead ESU. Project implementation may result in potential indirect impacts to this species through water quality impacts.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Oncorhynchus tshawytscha Chinook salmon, Sacramento River winter-run	SE	FE	This ESU enters the Sacramento River December to May; spawning peaks May and June. Upstream movement occurs more quickly than in spring run population. Young move to rearing areas in and through the Sacramento River, Delta, and San Pablo and San Francisco Bays.	Unlikely. Suitable habitat is not present within the project area and no CNDDB occurrences were found within 5 miles of the project area. There is no surface water connection between the project area's agricultural canals and the Petaluma River.
Oncorhynchus tshawytscha Chinook salmon, Central Valley spring-run	ST	FT		Unlikely. Suitable habitat is not present within the project area and no CNDDB occurrences were found within 5 miles of the project area. There is no surface water connection between the project area's agricultural canals and the Petaluma River.
Pogonichthys macrolepidotus Sacramento splittail	CSC	None	Currently known only from the Delta, Suisun Bay and associated marshes. Prefers slow moving river sections and dead end sloughs. Requires flooded vegetation for spawning and juvenile foraging habitat. Spawning occurs over flooded vegetation in tidal freshwater and euryhaline habitats of estuarine marshes and sloughs, and slow-moving reaches of large rivers.	Unlikely. Limited suitable habitat exists within the project area in canals that support emergent vegetation. The canals do not receive surface water from the Petaluma River; therefore, this species is unlikely to occur within the project site.
Birds				
Agelaius tricolor Tricolored blackbird	CSC	None	Largely endemic to California, most numerous in the Central Valley and nearby vicinity. Typically requires open water, protected nesting substrate, and foraging grounds within vicinity of the nesting colony. Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water. Also nests in agricultural crops (e.g. silage), where colonies are threatened during harvest.	High. Suitable habitat for this species is present within the project area. Tricolor blackbirds were observed near freshwater emergent wetlands during field reconnaissance surveys of the project area. The nearest CNDDB occurrence is 1.5 miles SE of the project area.
Athene cunicularia burrowing owl	CSC/None	None	Forages in open plains, grasslands, and prairies; typically nests in abandoned small mammal burrows.	Unlikely. Suitable foraging habitat is present within the project area. However, the project area lacks mammal burrows and the species was not observed during the field reconnaissance. The nearest CNDDB occurrence is within 1 mile of the project area.
Charadrius alexandrinus nivosus Western snowy plover	CSC/None	FT	Flat sandy beaches, salt flats and sandy areas with minimal vegetation, nests in sandy depressions. May also nest on gravelly substrate. Has been known to nest near sewage ponds as well.	Unlikely. Suitable habitat is not present within the project area. No CNDDB occurrences were found within 5 miles of the project area.
Elanus leucurus White-tailed kite	CFP	None	Forages in open plains, grasslands, and prairies; typically nests in trees.	Unlikely. Suitable foraging habitat exists within the project area; however, there are no suitable nesting habitat within the project area. The nearest CNDDB occurrence is 3 miles SW of the project area.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Geothlypis trichas sinuosa Saltmarsh common yellowthroat	CSC/None	None	Prefers dense undergrowth in marshy areas, rivers, and swamps. Nests in low-lying vegetation or on the ground. Generally only in salt water habitats.	Unlikely. Marshy areas within the project area are not sufficiently dense to provide good habitat for this species. The nearest CNDDB occurrence is 1 mile from the project area.
Laterallus jamaicensis coturniculus California black rail	ST/CFP	None	Freshwater, brackish, or tidal salt marshes.	Low. Limited suitable habitat is present in the project area, and the nearest CNDDB occurrence is within 1 mile of the project area.
Melospiza melodia samuelis San Pablo song sparrow	CSC/None	None	Tidal brackish or salt marshes along San Pablo Bay. Breeds in dense riparian thickets, emergent wetlands, or dense thickets in moist areas. Builds nests in low, dense vegetation or on the ground.	Unlikely. Limited suitable foraging habitat is present in the project area, and the nearest CNDDB occurrence is within 1 mile of the project area. However, breeding habitat is not present due to a lack of dense riparian and wetland habitats within the project area.
Rallus longirostris obsoletus California clapper rail	SE/CFP	FE	Brackish and coastal salt marshes, nests along tidal sloughs.	Low. Limited suitable habitat is present in the project area, and the nearest CNDDB occurrence is within 2 mile of the project area. However, no suitable nesting habitat occurs within the project area.
Sternula(=Sterna) antillarum browni California least tern	SE/CFP	FE	Nests in colonies along California coast in marine and estuarine shores. Nests on ground usually on sandy or gravelly substrate. Sensitive to disturbance while nesting. Feeds on small fish in estuaries, lagoons, or bay mouths.	Unlikely. Suitable habitat is not present within the project area. No CNDDB occurrences were found within 5 miles of the project area.
Strix occidentalis caurina Northern spotted owl	None	FT	Old-growth, dense, multi-layered forests. In California, occurs from Marin Co. and north, with isolated populations in Santa Cruz and Santa Lucia mountains. Feeds on small mammals, small birds, bats, and large anthropods. Yearlong, nocturnal activity.	Unlikely. Suitable habitat is not found within the project area. No CNDDB occurrences were found within 5 miles of the project area.
Mammals				
Antrozous pallidus pallid bat	CSC/None	None	Occurs at low elevations. Uses caves, crevices, mines, buildings, some bridges, and hollow trees for day roosts, and more open spaces for nighttime roosts. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging.	Unlikely. Roosting habitat is not present within the project area. The nearest CNDDB occurrence is within 2 miles of the project area.
Corynorhinus townsendii Townsend's big-eared bat	CSC/None	None	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Unlikely. Roosting habitat is not present within the project area. The nearest CNDDB occurrences are within 2 miles of the project area.
Reithrodontomys raviventris salt-marsh harvest mouse	SE/CFP	FE	Generally inhabits salt marshes of the San Francisco Bay, San Pablo Bay, and Sacramento/San Joaquin Delta.	Unlikely. The project area lacks dense pickleweed, an essential habitat feature for this species. The nearest CNDDB occurrence is 1 mile from the project area.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Sorex ornatus sinuosus Suisan shrew	CSC	None	Tidally-influenced salt and brackish water marshes of San Pablo and Suisun Bays. Needs dense low-lying cover and an abundance of invertebrates. Nests in driftwood or other debris above mean high-tide and uses uplands during flooding.	Unlikely. The project area lacks dense cover for this species and nearest CNDDB occurrence is 3 miles SE of the project area, along San Pablo Bay. No occurrences were recorded along the Petaluma River salt marsh area.
Taxidea taxus American badger	CSC/None	None	Occurs in a wide variety of open forest, shrub, and grassland habitats that have friable soils for digging.	Unlikely. Suitable habitat is present within the project area; however, no signs of mammal activity were present during the reconnaissance surveys of the project area. Additionally, the project area is disturbed on a regular from agricultural activities. The nearest CNDDB occurrence is approximately 3 miles from the project area.
Plants				
Allium peninsulare var. franciscanum Franciscan onion	None/2.2	None	Occurs in valley and foothill grasslands on clay, often serpentinite soils between elevations of 100-300 meters. Blooms May-Jun.	Unlikely. Suitable habitat is not found within the project area. Elevation of the project area is unsuitable for this species. No CNDDB occurrences were found within 5 miles of the project area.
Amorpha californica var. napensis Napa false indigo	None/1B.2	None	Deciduous shrub occurring in openings of broadleafed upland forest, in chaparral, and in cismontane woodland. 150-2000 m elevation. Blooms Apr-Jul.	Unlikely. Suitable habitat is not present in project area. Elevation of the project area is unsuitable for this species. Species is known to occur approximately 2 miles from the project area.
Amsinckia lunaris Bent-flowered fiddleneck	None/1B.2	None	Annual herb occurring in coastal bluff scrub, cismontane woodland, and valley and foothill grasslands. Blooms Mar-Jun. 3-500 meters elevation.	Unlikely. Species is usually found in open woodland habitat, which is not present within the project area. Species was not encountered during the reconnaissance surveys. Elevation of the project area is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Arctostaphylos bakeri spp. Bakeri Baker's Manzanita	SR/1.B1	None	Evergreen shrub occurring in broadleafed upland forest, and on serpentinite substrate in chaparral. 75-300 m elevation. Blooms Feb-Apr.	Unlikely. Suitable habitat is not present in project area. Elevation of the project area is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Arctostaphylos canescens ssp. Sonomensis Sonoma canescent Manzanita	None/1B.2	None	Evergreen shrub occurring in chaparral and in lower montane coniferous forest, sometimes on serpentinite substrate. 180-1675 m elevation. Blooms Jan-Apr.	Unlikely. Suitable habitat is not present in project area. The elevation of the project area is unsuitable for this species. No CNDDB occurrences are recorded within 5 miles of the project area.
Arctostaphylos hookeri ssp. Montana Mt. Tamalpais Manzanita	None/1B.3	None	Serpentine slopes in chaparral and valley foothill grassland. 160-760 m. Blooms Feb-April.	Unlikely. Suitable habitat is not present in project area. The elevation of the project area is unsuitable for this species. The nearest CNDDB occurrence is approximately 2 miles from the project area.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Arctostaphylos virgata Marin manzanita	None/1B.2	None	Broadleafed upland forest, closed-cone coniferous forest, chaparral, north coast coniferous forest. Only known from about 20 sites in Marin County. On sandstone or granitic soil. 60-700 m. Blooms Jan-Mar.	Unlikely. Suitable habitat is not present in project area. The elevation of the project area is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Astragalus tener var. tener Alkali milk-vetch	None/1B.2	None	Generally found in playas, valley and foothill grasslands with adobe clay soils, and vernal pools. Generally found in alkaline soils. Blooms Mar-Jun. 1-60 m.	Unlikely. Limited suitable habitat is present in project area; however, the soil type is not suitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Blenosperma bakeri Sonoma sunshine	SE/1B.1	FE	Annual herb occurring in mesic areas of valley and foothill grassland or in vernal pools. 10-110 m elevation. Blooms Mar-May.	Unlikely. Limited suitable habitat is present in project area. Elevation of the project area is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Brodiaea californica var. leptandra Narrow-anthered California brodiaea	None/1B.2	None	Bulbiferous herb occurring in broadleafed upland forest, chaparral, and lower montane coniferous forest. 110-945 m elevation. Blooms May-Jul.	Unlikely. Limited suitable habitat is present in project area. Elevation of the project area is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
California macrophylla Round-leaved filaree	None/2.1	None	Generally found in Valley grasslands and foothill woodlands, 0-3937 feet in elevation. Blooms Mar-May.	Low. Suitable habitat is found within the project area, but no CNDDB occurrences are known to occur within 5 miles of the project area.
Castilleja affinis ssp. Neglecta Tiburon paintbrush	ST/1B.2	FE	Perennial hemiparisitic herb occurring in valley and foothill grassland on serpentine substrate. 60-400 m elevation. Blooms Apr-Jun.	Unlikely. Elevation and soil type of the project area are unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Ceanothus sonomensis Sonoma ceanothus	None/1B.2	None	Evergreen shrub occurring on sandy, serpentinite, or volcanic substrate in chaparral. 215-800 m. Feb-Apr.	Unlikely. Elevation and soil type of the project area are unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Centromadia parryi spp. parryi Pappose tarplant	None/1B.2	None	Vernally mesic, often alkaline sites in coastal prairies, meadows and seeps, coastal salt marshes, and valley and foothill grasslands. 2-420m. Blooms May-Nov.	Unlikely. Limited suitable habitat is present within the project area. However, soil within the project area is slightly to extremely acidic and therefore would not likely support this species. A CNDDB occurrence is recorded approximately 4 miles from the project area.
Chorizanthe valida spineflower	SE/1B.1	FE	Annual herb occurring on sandy substrate in coastal prairie. 10-305 m elevation. Blooms Jun-Aug.	Unlikely. Suitable habitat is not present within the project area and no CNDDB occurrences are recorded within 5 miles of the project area.
Cirsium hydrophilum var. vaseyi Mt. Tamalpais thistle	None/1B.2	None	Serpentine seeps and streams in chaparral and woodlands. 265-620m. Blooms May-Aug.	Unlikely. Suitable habitat is not present within the project area and no CNDDB occurrences are recorded within 5 miles of the project area.
Cordylanthus maritimus ssp. palustris Point Reyes bird's-beak	None/1B.2	None	Usually in coastal salt marshes with Salicornia, Distichlis, Jaumea, Spartina, etc. 0-15m. Blooms June-Oct.	Medium. Limited suitable habitat present in project area. The nearest CNDDB occurrence is approximately 2 mile north of the project area.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Cordylanthus mollis ssp. mollis Soft bird's-beak	SR/1B.2	FE	Hemiparasitic, annual herb occurring in coastal salt marshes and swamps. Found at 0-3 meters elevation. Blooms Jul-Nov.	Medium. Limited suitable habitat present in project area. The nearest CNDDB occurrence is approximately 1 mile from the project area.
Delphinium bakeri Baker's larkspur	SE/1B.1	FE	Only site occurs on northwest facing slope, on decomposed shale. Historically known from grassy areas along fencelines. 90-205m. Blooms Mar-May.	Unlikely. Suitable habitat is not present within the project area and site elevation is not suitable for this species. No CNDDB occurrences are recorded within 5 miles of the project area.
Delphinium luteum Golden larkspur	SR/1B.1	FE	North-facing rocky slopes in chaparral, coastal prairie, and coastal scrub. 0-100m. Blooms Mar-May.	Unlikely. Suitable habitat is not present within the project area. There are no CNDDB occurrences within 5 miles of the project area.
Dirca occidentalis Western leatherwood	None/1B.2	None	Deciduous shrub occurring in broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and mesic riparian woodland. Blooms Jan-Apr. 50-395 meters elevation.	Unlikely. Suitable habitat is not present within the project area. Elevation of the site is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Dowingia pusilla Dwarf downingia	None/2.2	None	Prefers lake margins, vernal pools and wet places such as roadside ditches; sometimes playas and grasslands. Blooms Mar-May. Occurs at 1-445 m elevation.	Low. Limited suitable habitat exists within the project area. However, this species was not encountered within the project area during the field reconnaissance. The nearest CNDDB occurrence is approximately 4 miles from the project area.
Entosthodon kochii Koch's cord moss	None/1B.3	None	Moss growing on soil within cismontane woodlands. 500-1000m.	Unlikely. Suitable habitat is not present within the project area. Elevation of the site is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Eriogonum luteolum var. caninum Tiburon buckwheat	None/1B.2	None	Annual herb occurring on chaparral, in coastal prairie grassland, and on serpentinite substrate in valley and foothill grassland. 10-500 m elevation. Blooms Jun-Sep.	Unlikely. Limited suitable habitat is present within the project area. However, elevation of the site is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Erigeron biolettii Streamside daisy	None/3	None	Perennial herb occurring in broadleafed upland forest, cismontane woodland, and in rocky, mesic areas of North Coast coniferous forest. 30-1100 m. Blooms Jun-Sep.	Unlikely. Suitable habitat is not present within the project area. Elevation of the site is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Fritillaria lanceolata var. tristulis Marin checker lily	None/1B.1	None	Occurrences reported from canyons and riparian areas as well as rock outcrops; often on serpentine. 30-300m.	Unlikely. Suitable habitat is not present within the project area. Elevation of the site is unsuitable for this species. There are no CNDDB occurrences within 5 miles of the project area.
Fritillaria liliaceae Fragrant fritillary	None/1B.2	None	Bulbiferous herb occurring in cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland, often on serpentinite substrate. Blooms Feb-Apr. 3-410 meters elevation.	Unlikely. Limited suitable habitat is present within the project area, but the nearest CNDDB occurrence is approximately 4 miles from the project area. Soil within the site is not serpentinite, therefore further reducing the likelihood of supporting this species.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Grindelia hirsutula var. maritima San Francisco gumplant	None/1B.2	None	Sandy or serpentine slopes, sea bluffs in coastal scrub, coastal bluff scrub, and valley and foothill grasslands. 15-400m. Blooms Jun-Sept.	Unlikely. Limited suitable habitat is present within the project area, but the nearest CNDDB occurrence is approximately 4 miles from the project area. Soil within the site is not serpentinite or sandy, therefore further reducing the likelihood of supporting this species.
Hemizonia congesta spp. congesta Pale yellow hayfield tarplant	None/1B.2	None	Grassy valleys and hills, often in fallow fields. 25-200m. Blooms Apr-Nov.	Unlikely. Suitable habitat is present within the project area; however, elevation of the project area is unsuitable for this species. This species was not encountered during the field reconnaissance. No CNDDB occurrences are recorded within 5 miles of the project area.
Hesperolinon congestum Marin western flax	ST/1B.1	FT	In serpentine barrens and in serpentine grassland and chaparral. 30-365m. Blooms Apr-Jul.	Unlikely. Suitable habitat is not present within the project area. Elevation and soil type of the site are unsuitable for this species. The nearest CNDDB occurrence is 1 mile from the project area.
Horkelia tenuiloba Thin-lobed horkelia	None/1B.2	None	Sandy soils; in mesic openings of coastal scrub and chaparral. 45-500m. Blooms May-Jul.	Unlikely. Suitable habitat is not present within the project area. Elevation and soil type of the site are unsuitable for this species. There are no CNDDB occurrences of this species within 5 miles of the project area.
Lasthenia burkei Burke's goldfields	SE/1B.1	FE	Most often in vernal pools and swales. 15-580m. Blooms Apr-Jun.	Unlikely. Limited suitable habitat for exists within the project area. However, elevation of the project area is unsuitable for this species. There are no CNDDB occurrences of this species within 5 miles of the project area.
Lasthenia conjugens Contra Costa goldfields	None/1B.1	FE	Annual herb occurring in cismontane woodland, alkaline playas, valley and foothill grassland, and in mesic areas such as vernal pools. 0-470 m elevation. Blooms Mar-Jun.	Unlikely. There is no vernal pool or mesic areas within grassland habitat present in the project area; no CNDDB occurrences are recorded for this species within 5 miles of the project area.
Legenere limosa Legenere	None/1B.1	None	Occurs in vernal pool beds. 1-880 m elevation. Blooms Apr-Jun.	Unlikely. Suitable habitat is not present within the project area. There are no CNDDB occurrences of this species within 5 miles of the project area.
Leptosiphon jepsonii Jepson's leptosiphon	None/1B.2	None	Open to partially shaded grassy slopes. On volcanics or the periphery of serpentine substrates. 100-500m. Blooms Mar-May.	Unlikely. Suitable habitat is not present within the project area. Elevation and soil type of the site are unsuitable for this species. There are no CNDDB occurrences of this species within 5 miles of the project area.
Lessingia hololeuca Woolly-headed lessingia	None/3	None	Annual herb occurring in broadleafed upland forest, coastal scrub, lower montane coniferous forest, and in serpentinite valley and foothill grasslands. Blooms Jun-Oct. 15-305 meters elevation.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Lessingia micradenia var. micradenia Tamalpais lessingia	None/1B.2	None	Usually on serpentine, in serpentine grassland or serpentine chaparral. Often on roadsides. 100-305m. Blooms Jul-Oct.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Suitable soil type and elevation are not present within the project area.
Limnanthes vinculans Sebastopol meadowfoam	SE/1B.1	FE	Swales, wet meadows and marshy areas in valley oak savanna; on poorly drained soils of clays and sandy loam. 15-115m. Blooms Apr-May.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Lupinus sericatus Cobb Mountain lupine	None/1B.2	None	Occurs in broadleaf upland forest, chaparral, cismontane woodland, and coniferous forest from 275-1525 m elevation. Blooms Mar-Jun.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Micropus amphibolus Mt. Diablo cottonweed	None/3.2	None	Occurs in broadleaf upland forest, chaparral, cismontane woodland, and grasslands from 45- 825 m elevation. Blooms Mar-May	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Microseris paludosa Marsh microseris	None/1B.2	None	Closed-cone coniferous forests, cismontane woodlands, coastal scrub, and valley and foothill grasslands. 5-300m. Blooms Apr-Jul.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Navarretia leucocephala ssp. bakeri Baker's navarretia	None/1B.1	None	Annual herb, occurrs almost always in wetlands in cismontane woodland, lower montane coniferous forest, meadows and seeps, Valley and foothill grassland, and vernal pools. Blooms May-Jul. 15-1740 m elevation.	Unlikely. There is no suitable wetland habitat present within the project area, and the nearest CNDDB occurrence is approximately 3 miles from the project area. Elevation of the site is not suitable for this species.
Navarretia rosulata Marin County navarretia	None/1B.2	None	Dry, open rocky places; can occur on serpentine. 200-635m. Blooms May-Jul.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Plagiobothrys mollis var. vestitus Petaluma pop-corn flower	None/1A	None	- -	Unlikely. There is no suitable wetland habitat present within the project area, and there are no CNDDB occurrences within 5 miles of the project area.
Pleuropogon hooverianus North Coast semaphore grass	ST/1B.1	None	Wet grassy, usually shady areas, sometimes freshwater marsh; associated with forest environments. 10-1150m. Blooms Apr-Aug.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Polygonum marinense Marin knotweed	None/3.1	None	Occurs in salt or brackish marsh from 0-10 m elevation. Blooms May-Aug.	Medium. Limited suitable habitat is present within the project area and one CNDDB occurrence is located 1 mile from the project area.
Rhynchospora globularis var. globularis Round-headed beaked-rush	None/2.1	None	Freshwater marshes. 45-60m. Blooms Jul-Aug.	Unlikely. Limited suitable habitat is present within the project area; however, site elevation is unsuitable for this species. No CNDDB occurrences are recorded within 5 miles of the project area.

TABLE BIO-1
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	None/1B.2	None	Freshwater marshes near the coast. 5-75m. Blooms Apr-Sep.	Unlikely. Limited suitable habitat is present within the project area, but there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is unsuitable for this species.
Streptanthus batrachopus Tamalpais jewel-flower	None 1B.3	None	Talus serpentine outcrops. 410-650m. Blooms Apr-Jul.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Streptanthus glandulous ssp. pulchellus Mount Tamalpais bristly jewel-flower	None/1B.2	None	Sepentine slopes in chaparral and valley and foothill grasslands. 150-800m. Blooms May-Jul.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Trifolium amoenum Two-forked clover	None/1B.1	FE	Annual herb occurring in coastal bluff scrub and valley and foothill grassland, sometimes on serpentinite. 5-415 m elevation. Blooms Apr-Jun.	Unlikely. Limited suitable habitat is present within the project area; however, site elevation is unsuitable for this species. No CNDDB occurrences are recorded within 5 miles of the project area.
Trifolium depauperatum var. hydrophilum Saline clover	None/1B.2	None	Occurs in marshes and swamps, vernal pools, and mesic grasslands on alkaline soils from 0-300 m elevation. Blooms Apr-Jun.	Low. Limited suitable habitat is present within the project area. However, no CNDDB occurrences are recorded within 5 miles of the project area.
Viburnum ellipticum Oval-leaved viburnum	None/2.3	None	Deciduous shrub occurring in chaparral, cismontane woodlands, and lower montane coniferous forest from 215-1400 m elevation. Blooms May-Jun.	Unlikely. Suitable habitat is not present within the project area, and there are no CNDDB occurrences within 5 miles of the project area. Elevation of the site is not suitable for this species.
Sensitive Habitats				
Coastal Brackish Marsh				
Northern Coastal Salt Marsh				

California Native Plant Society (CNPS):
List 1A Plants believed extinct
List 1B Plants rare, threatened, or endangered in California and elsewhere
List 2 Plants rare, threatened, or endangered in California but more common elsewhere
List 3 Plants about which more information is needed
List 4 Plants of limited distribution
CNPS Code Extensions
.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Fairly endangered in California (20-80% occurrences threatened)
.3 Not very endangered in California (less than 20% of occurrences threatened or no current threats known)

FEDERAL
U.S. Fish and Wildlife Service:
BEPA Bald Eagle Protection Act
FE Listed as Endangered by the Federal Government
FT Listed as Threatened by the Federal Government
FPD Proposed for De-listing
FPE Proposed for Listing as Endangered
FPT Proposed for Listing as Threatened
FC Candidate for Federal listing

Appendix BIO-2

Survey Protocol for Special-Status Plants

ESA

Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities

State of California
CALIFORNIA NATURAL RESOURCES AGENCY
Department of Fish and Game
November 24, 2009[1]

INTRODUCTION AND PURPOSE

The conservation of special status native plants and their habitats, as well as natural communities, is integral to maintaining biological diversity. The purpose of these protocols is to facilitate a consistent and systematic approach to the survey and assessment of special status native plants and natural communities so that reliable information is produced and the potential of locating a special status plant species or natural community is maximized. They may also help those who prepare and review environmental documents determine when a botanical survey is needed, how field surveys may be conducted, what information to include in a survey report, and what qualifications to consider for surveyors. The protocols may help avoid delays caused when inadequate biological information is provided during the environmental review process; assist lead, trustee and responsible reviewing agencies to make an informed decision regarding the direct, indirect, and cumulative effects of a proposed development, activity, or action on special status native plants and natural communities; meet California Environmental Quality Act (CEQA)[2] requirements for adequate disclosure of potential impacts; and conserve public trust resources.

DEPARTMENT OF FISH AND GAME TRUSTEE AND RESPONSIBLE AGENCY MISSION

The mission of the Department of Fish and Game (DFG) is to manage California's diverse wildlife and native plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. DFG has jurisdiction over the conservation, protection, and management of wildlife, native plants, and habitat necessary to maintain biologically sustainable populations (Fish and Game Code §1802). DFG, as trustee agency under CEQA §15386, provides expertise in reviewing and commenting on environmental documents and makes protocols regarding potential negative impacts to those resources held in trust for the people of California.

Certain species are in danger of extinction because their habitats have been severely reduced in acreage, are threatened with destruction or adverse modification, or because of a combination of these and other factors. The California Endangered Species Act (CESA) provides additional protections for such species, including take prohibitions (Fish and Game Code §2050 *et seq.*). As a responsible agency, DFG has the authority to issue permits for the take of species listed under CESA if the take is incidental to an otherwise lawful activity; DFG has determined that the impacts of the take have been minimized and fully mitigated; and, the take would not jeopardize the continued existence of the species (Fish and Game Code §2081). Surveys are one of the preliminary steps to detect a listed or special status plant species or natural community that may be impacted significantly by a project.

DEFINITIONS

Botanical surveys provide information used to determine the potential environmental effects of proposed projects on all special status plants and natural communities as required by law (i.e., CEQA, CESA, and Federal Endangered Species Act (ESA)). Some key terms in this document appear in **bold font** for assistance in use of the document.

For the purposes of this document, **special status plants** include all plant species that meet one or more of the following criteria[3]:

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1 This document replaces the DFG document entitled "Guidelines for Assessing the Effects of Proposed Projects on Rare, Threatened and Endangered Plants and Natural Communities."

2 http://ceres.ca.gov/ceqa/

3 Adapted from the East Alameda County Conservation Strategy available at http://www.fws.gov/sacramento/EACCS/Documents/080228_Species_Evaluation_EACCS.pdf

- Listed or proposed for listing as threatened or endangered under ESA or candidates for possible future listing as threatened or endangered under the ESA (50 CFR §17.12).

- Listed[4] or candidates for listing by the State of California as threatened or endangered under CESA (Fish and Game Code §2050 *et seq.*). A species, subspecies, or variety of plant is **endangered** when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors (Fish and Game Code §2062). A plant is **threatened** when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures (Fish and Game Code §2067).

- Listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 *et seq*.). A plant is **rare** when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901).

- Meet the definition of rare or endangered under CEQA §15380(b) and (d). Species that may meet the definition of rare or endangered include the following:

  - Species considered by the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (Lists 1A, 1B and 2);

  - Species that may warrant consideration on the basis of local significance or recent biological information[5];

  - Some species included on the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List* (California Department of Fish and Game 2008)[6].

- Considered a **locally significant species,** that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region (CEQA §15125 (c)) or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines, Appendix G). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status species or their habitat. The most current version of the Department's *List of California Terrestrial Natural Communities*[7] indicates which natural communities are of special status given the current state of the California classification.

Most types of wetlands and riparian communities are considered special status natural communities due to their limited distribution in California. These natural communities often contain special status plants such as those described above. These protocols may be used in conjunction with protocols formulated by other agencies, for example, those developed by the U.S. Army Corps of Engineers to delineate jurisdictional wetlands[8] or by the U.S. Fish and Wildlife Service to survey for the presence of special status plants[9].

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4 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

5 In general, CNPS List 3 plants (plants about which more information is needed) and List 4 plants (plants of limited distribution) may not warrant consideration under CEQA §15380. These plants may be included on special status plant lists such as those developed by counties where they would be addressed under CEQA §15380. List 3 plants may be analyzed under CEQA §15380 if sufficient information is available to assess potential impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a List 4 plant are significant even if individual project impacts are not. List 3 and 4 plants are also included in the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List.* [Refer to the current online published list available at: http://www.dfg.ca.gov/biogeodata.] Data on Lists 3 and 4 plants should be submitted to CNDDB. Such data aids in determining or revising priority ranking.

6 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

7 http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/natcomlist.pdf. The rare natural communities are asterisked on this list.

8 http://www.wetlands.com/regs/tlpge02e.htm

9 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

BOTANICAL SURVEYS

Conduct botanical surveys prior to the commencement of any activities that may modify vegetation, such as clearing, mowing, or ground-breaking activities. It is appropriate to conduct a botanical field survey when:

- Natural (or naturalized) vegetation occurs on the site, and it is unknown if special status plant species or natural communities occur on the site, and the project has the potential for direct or indirect effects on vegetation; or
- Special status plants or natural communities have historically been identified on the project site; or
- Special status plants or natural communities occur on sites with similar physical and biological properties as the project site.

SURVEY OBJECTIVES

Conduct field surveys in a manner which maximizes the likelihood of locating special status plant species or special status natural communities that may be present. Surveys should be **floristic in nature**, meaning that every plant taxon that occurs on site is identified to the taxonomic level necessary to determine rarity and listing status. "Focused surveys" that are limited to habitats known to support special status species or are restricted to lists of likely potential species are not considered floristic in nature and are not adequate to identify all plant taxa on site to the level necessary to determine rarity and listing status. Include a list of plants and natural communities detected on the site for each botanical survey conducted. More than one field visit may be necessary to adequately capture the floristic diversity of a site. An indication of the prevalence (estimated total numbers, percent cover, density, etc.) of the species and communities on the site is also useful to assess the significance of a particular population.

SURVEY PREPARATION

Before field surveys are conducted, compile relevant botanical information in the general project area to provide a regional context for the investigators. Consult the CNDDB[10] and BIOS[11] for known occurrences of special status plants and natural communities in the project area prior to field surveys. Generally, identify vegetation and habitat types potentially occurring in the project area based on biological and physical properties of the site and surrounding ecoregion[12], unless a larger assessment area is appropriate. Then, develop a list of special status plants with the potential to occur within these vegetation types. This list can serve as a tool for the investigators and facilitate the use of reference sites; however, special status plants on site might not be limited to those on the list. Field surveys and subsequent reporting should be comprehensive and floristic in nature and not restricted to or focused only on this list. Include in the survey report the list of potential special status species and natural communities, and the list of references used to compile the background botanical information for the site.

SURVEY EXTENT

Surveys should be comprehensive over the entire site, including areas that will be directly or indirectly impacted by the project. Adjoining properties should also be surveyed where direct or indirect project effects, such as those from fuel modification or herbicide application, could potentially extend offsite. Pre-project surveys restricted to known CNDDB rare plant locations may not identify all special status plants and communities present and do not provide a sufficient level of information to determine potential impacts.

FIELD SURVEY METHOD

Conduct surveys using **systematic field techniques** in all habitats of the site to ensure thorough coverage of potential impact areas. The level of effort required per given area and habitat is dependent upon the vegetation and its overall diversity and structural complexity, which determines the distance at which plants can be identified. Conduct surveys by walking over the entire site to ensure thorough coverage, noting all plant taxa

[10] Available at http://www.dfg.ca.gov/biogeodata/cnddb

[11] http://www.bios.dfg.ca.gov/

[12] Ecological Subregions of California, available at http://www.fs.fed.us/r5/projects/ecoregions/toc.htm

observed. The level of effort should be sufficient to provide comprehensive reporting. For example, one person-hour per eight acres per survey date is needed for a comprehensive field survey in grassland with medium diversity and moderate terrain[13], with additional time allocated for species identification.

TIMING AND NUMBER OF VISITS

Conduct surveys in the field at the time of year when species are both evident and identifiable. Usually this is during flowering or fruiting. Space visits throughout the growing season to accurately determine what plants exist on site. Many times this may involve multiple visits to the same site (e.g. in early, mid, and late-season for flowering plants) to capture the floristic diversity at a level necessary to determine if special status plants are present[14]. The timing and number of visits are determined by geographic location, the natural communities present, and the weather patterns of the year(s) in which the surveys are conducted.

REFERENCE SITES

When special status plants are known to occur in the type(s) of habitat present in the project area, observe reference sites (nearby accessible occurrences of the plants) to determine whether those species are identifiable at the time of the survey and to obtain a visual image of the target species, associated habitat, and associated natural community.

USE OF EXISTING SURVEYS

For some sites, floristic inventories or special status plant surveys may already exist. Additional surveys may be necessary for the following reasons:

- Surveys are not current[15]; or
- Surveys were conducted in natural systems that commonly experience year to year fluctuations such as periods of drought or flooding (e.g. vernal pool habitats or riverine systems); or
- Surveys are not comprehensive in nature; or fire history, land use, physical conditions of the site, or climatic conditions have changed since the last survey was conducted[16]; or
- Surveys were conducted in natural systems where special status plants may not be observed if an annual above ground phase is not visible (e.g. flowers from a bulb); or
- Changes in vegetation or species distribution may have occurred since the last survey was conducted, due to habitat alteration, fluctuations in species abundance and/or seed bank dynamics.

NEGATIVE SURVEYS

Adverse conditions may prevent investigators from determining the presence of, or accurately identifying, some species in potential habitat of target species. Disease, drought, predation, or herbivory may preclude the presence or identification of target species in any given year. Discuss such conditions in the report.

The failure to locate a known special status plant occurrence during one field season does not constitute evidence that this plant occurrence no longer exists at this location, particularly if adverse conditions are present. For example, surveys over a number of years may be necessary if the species is an annual plant having a persistent, long-lived seed bank and is known not to germinate every year. Visits to the site in more

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13 Adapted from U.S. Fish and Wildlife Service kit fox survey guidelines available at www.fws.gov/sacramento/es/documents/kitfox_no_protocol.pdf

14 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/sacramento/es/protocol.htm

15 Habitats, such as grasslands or desert plant communities that have annual and short-lived perennial plants as major floristic components may require yearly surveys to accurately document baseline conditions for purposes of impact assessment. In forested areas, however, surveys at intervals of five years may adequately represent current conditions. For forested areas, refer to “Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations”, available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

16 U.S. Fish and Wildlife Service Survey Guidelines available at http://www.fws.gov/ventura/speciesinfo/protocols_guidelines/docs/botanicalinventories.pdf

than one year increase the likelihood of detection of a special status plant especially if conditions change. To further substantiate negative findings for a known occurrence, a visit to a nearby reference site may ensure that the timing of the survey was appropriate.

REPORTING AND DATA COLLECTION

Adequate information about special status plants and natural communities present in a project area will enable reviewing agencies and the public to effectively assess potential impacts to special status plants or natural communities[17] and will guide the development of minimization and mitigation measures. The next section describes necessary information to assess impacts. For comprehensive, systematic surveys where no special status species or natural communities were found, reporting and data collection responsibilities for investigators remain as described below, excluding specific occurrence information.

SPECIAL STATUS PLANT OR NATURAL COMMUNITY OBSERVATIONS

Record the following information for locations of each special status plant or natural community detected during a field survey of a project site.

- A detailed map (1:24,000 or larger) showing locations and boundaries of each special status species occurrence or natural community found as related to the proposed project. Mark occurrences and boundaries as accurately as possible. Locations documented by use of global positioning system (GPS) coordinates must include the datum[18] in which they were collected;
- The site-specific characteristics of occurrences, such as associated species, habitat and microhabitat, structure of vegetation, topographic features, soil type, texture, and soil parent material. If the species is associated with a wetland, provide a description of the direction of flow and integrity of surface or subsurface hydrology and adjacent off-site hydrological influences as appropriate;
- The number of individuals in each special status plant population as counted (if population is small) or estimated (if population is large);
- If applicable, information about the percentage of individuals in each life stage such as seedlings vs. reproductive individuals;
- The number of individuals of the species per unit area, identifying areas of relatively high, medium and low density of the species over the project site; and
- Digital images of the target species and representative habitats to support information and descriptions.

FIELD SURVEY FORMS

When a special status plant or natural community is located, complete and submit to the CNDDB a California Native Species (or Community) Field Survey Form[19] or equivalent written report, accompanied by a copy of the relevant portion of a 7.5 minute topographic map with the occurrence mapped. Present locations documented by use of GPS coordinates in map and digital form. Data submitted in digital form must include the datum[20] in which it was collected. If a potentially undescribed special status natural community is found on the site, document it with a Rapid Assessment or Relevé form[21] and submit it with the CNDDB form.

VOUCHER COLLECTION

Voucher specimens provide verifiable documentation of species presence and identification as well as a public record of conditions. This information is vital to all conservation efforts. Collection of voucher specimens should

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17 Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata. For Timber Harvest Plans (THPs) please refer to the “Guidelines for Conservation of Sensitive Plant Resources Within the Timber Harvest Review Process and During Timber Harvesting Operations”, available at https://r1.dfg.ca.gov/portal/Portals/12/THPBotanicalGuidelinesJuly2005.pdf

18 NAD83, NAD27 or WGS84

19 http://www.dfg.ca.gov/biogeodata

20 NAD83, NAD27 or WGS84

21 http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp

be conducted in a manner that is consistent with conservation ethics, and is in accordance with applicable state and federal permit requirements (e.g. incidental take permit, scientific collection permit). Voucher collections of special status species (or suspected special status species) should be made only when such actions would not jeopardize the continued existence of the population or species.

Deposit voucher specimens with an indexed regional herbarium[22] no later than 60 days after the collections have been made. Digital imagery can be used to supplement plant identification and document habitat. Record all relevant permittee names and permit numbers on specimen labels. A collecting permit is required prior to the collection of State-listed plant species[23].

BOTANICAL SURVEY REPORTS

Include reports of botanical field surveys containing the following information with project environmental documents:

- **Project and site description**
  - A description of the proposed project;
  - A detailed map of the project location and study area that identifies topographic and landscape features and includes a north arrow and bar scale; and,
  - A written description of the biological setting, including vegetation[24] and structure of the vegetation; geological and hydrological characteristics; and land use or management history.

- **Detailed description of survey methodology and results**
  - Dates of field surveys (indicating which areas were surveyed on which dates), name of field investigator(s), and total person-hours spent on field surveys;
  - A discussion of how the timing of the surveys affects the comprehensiveness of the survey;
  - A list of potential special status species or natural communities;
  - A description of the area surveyed relative to the project area;
  - References cited, persons contacted, and herbaria visited;
  - Description of reference site(s), if visited, and phenological development of special status plant(s);
  - A list of all taxa occurring on the project site. Identify plants to the taxonomic level necessary to determine whether or not they are a special status species;
  - Any use of existing surveys and a discussion of applicability to this project;
  - A discussion of the potential for a false negative survey;
  - Provide detailed data and maps for all special plants detected. Information specified above under the headings "Special Status Plant or Natural Community Observations," and "Field Survey Forms," should be provided for locations of each special status plant detected;
  - Copies of all California Native Species Field Survey Forms or Natural Community Field Survey Forms should be sent to the CNDDB and included in the environmental document as an Appendix. It is not necessary to submit entire environmental documents to the CNDDB; and,
  - The location of voucher specimens, if collected.

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[22] For a complete list of indexed herbaria, see: Holmgren, P., N. Holmgren and L. Barnett. 1990. Index Herbariorum, Part 1: Herbaria of the World. New York Botanic Garden, Bronx, New York. 693 pp. Or: http://www.nybg.org/bsci/ih/ih.html

[23] Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.

[24] A vegetation map that uses the National Vegetation Classification System (http://biology.usgs.gov/npsveg/nvcs.html), for example *A Manual of California Vegetation*, and highlights any special status natural communities. If another vegetation classification system is used, the report should reference the system, provide the reason for its use, and provide a crosswalk to the National Vegetation Classification System.

- **Assessment of potential impacts**
  - A discussion of the significance of special status plant populations in the project area considering nearby populations and total species distribution;
  - A discussion of the significance of special status natural communities in the project area considering nearby occurrences and natural community distribution;
  - A discussion of direct, indirect, and cumulative impacts to the plants and natural communities;
  - A discussion of threats, including those from invasive species, to the plants and natural communities;
  - A discussion of the degree of impact, if any, of the proposed project on unoccupied, potential habitat of the species;
  - A discussion of the immediacy of potential impacts; and,
  - Recommended measures to avoid, minimize, or mitigate impacts.

QUALIFICATIONS

Botanical consultants should possess the following qualifications:

- Knowledge of plant taxonomy and natural community ecology;
- Familiarity with the plants of the area, including special status species;
- Familiarity with natural communities of the area, including special status natural communities;
- Experience conducting floristic field surveys or experience with floristic surveys conducted under the direction of an experienced surveyor;
- Familiarity with the appropriate state and federal statutes related to plants and plant collecting; and,
- Experience with analyzing impacts of development on native plant species and natural communities.

SUGGESTED REFERENCES

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Appendix BIO-3

Regionally Occurring Special-Status Species, Site 40 Alternative

ESA

TABLE BIO-3
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Invertebrates				
Caecidotea tomalensis Tomales isopod	None	None	Inhabits localized fresh-water ponds or streams with still or near-still water in several bay area counties.	Unlikely. Very limited suitable habitat exists within the study area; however, due to high nutrient loads and disturbance from cattle grazing activities, this species is not likely to be found within the study area. There are no CNDDB occurrences within 5 miles of the study area.
Hydrochara rickseckeri Ricksecker's water scavenger beetle	None	None	Occurs in slow moving waters, adults and larvae are aquatic.	Unlikely. Very limited suitable habitat exists within the study area. The majority of water features within the study area support fast-moving water during the rainy season months or stagnant water during the dry season. There are no CNDDB occurrences within 5 miles of the study area.
Amphibians				
Rana boylii Foothill yellow-legged frog	CSC	None	Partly-shaded, shallow streams and riffles with a rocky substrate	Unlikely. Suitable habitat is not present in the study area. The nearest CNDDB occurrence is approximately 2.5 miles from the project site.
Rana draytonii California red-legged frog	CSC	FT	Lowlands and foothills in or near permanent sources of deep water with dense or shrubby emergent riparian vegetation.	Unlikely. Suitable habitat is not present on the project site. The reservoir on the parcel may support suitable habitat but it will not be impacted by the project. The nearest CNDDB occurrence is approximately 1mile from the project site.
Reptiles				
Actinemys (=Emys) marmorata Western pond turtle	CSC	None	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Unlikely. Suitable habitat is present within the project area; however, very limited suitable egg-laying and basking habitat is present within the study area. There are no CNDDB occurrences within 5 miles of the study area.
Actinemys (=Emys) marmorata marmorata northwestern pond turtle	CSC/None	None	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Medium. Suitable habitat is present within the project area; however, limited suitable egg-laying and basking habitat is present within the study area. There is one CNDDB occurrence within Site 40, but is located approximately 1 mile east of the study area.
Fish				
None				

TABLE BIO-3
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Birds				
Agelaius tricolor Tricolored blackbird	CSC	None	Largely endemic to California, most numerous in the Central Valley and nearby vicinity. Typically requires open water, protected nesting substrate, and foraging grounds within vicinity of the nesting colony. Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water. Also nests in agricultural crops (e.g. silage), where colonies are threatened during harvest.	Low. The study area lacks suitable nesting habitat for this species. However, this species may forage within the study area. The nearest CNDDB occurrence is more than 5 miles SE of the study area.
Ardea Herodias Great blue heron	None	None	Groves of tall trees, especially near shallow water foraging areas such as marshes, tide-flats, lakes, rivers/streams and wet meadows.	Low. The study area lacks suitable nesting habitat for this species. However, this species may forage in limited suitable wetlands within the study area. There are no CNDDB occurrences within 5 miles of the study area.
Elanus leucurus White-tailed kite	CFP	None	Forages in open plains, grasslands, and prairies; typically nests in trees.	Low. The study area lacks suitable nesting habitat for this species. However, this species may forage in open grasslands within the study area.There are no CNDDB occurrences of this species within 5 miles of the study area.
Geothlypis trichas sinuosa Saltmarsh common yellowthroat	CSC/None	None	Prefers dense undergrowth in marshy areas, rivers, and swamps. Nests in low-lying vegetation or on the ground. Generally only in salt water habitats.	Unlikely. The study area lacks suitable nesting habitat for this species. The nearest CNDDB occurrence is approximately 2.5 - 5 miles from the project area.
Laterallus jamaicensis coturniculus California black rail	ST/CFP	None	Freshwater, brackish, or tidal salt marshes.	Unlikely. Very limited freshwater wetland habitat is present in the study area and would not provide good nesting habitat. The nearest CNDDB occurrence is approximately 2 miles south of the study area.
Melospiza melodia samuelis San Pablo song sparrow	CSC/None	None	Tidal brackish or salt marshes along San Pablo Bay. Breeds in dense riparian thickets, emergent wetlands, or dense thickets in moist areas. Builds nests in low, dense vegetation or on the ground.	Unlikely. The study area lacks dense emergent wetlands that would provide good habitat for this species. The nearest CNDDB occurrence is approximately 5 miles east of the study area.
Mammals				
Antrozous pallidus pallid bat	CSC/None	None	Occurs at low elevations. Uses caves, crevices, mines, buildings, some bridges, and hollow trees for day roosts, and more open spaces for nighttime roosts. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging.	Low. There is no roosting habitat within the study area; however, nearby ranch buildings may provide roosting opportunities. The nearest CNDDB occurrences are approximately 2-3 miles NE of the study area.
Lasiurus cinereus Hoary bat	None	None	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Unlikely. The study area does not have suitable cover for roosting habitat. The study area is part of an open habitat which may provide suitable foraging grounds, but no CNDDB occurrences were found within 5 miles of the study area.

TABLE BIO-3
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Plants				
Allium peninsulare var. franciscanum Franciscan onion	None/1B.2	None	Occurs in valley and foothill grasslands on clay, often serpentinite soils between elevations of 100-300 meters. Blooms May-Jun.	Low. Suitable habitat is present within the study area. However, no CNDDB occurrences were found within 5 miles of the study area and high disturbance from grazing cows may render site unsuitable for this species. This species was not encountered during the field reconnaissance survey.
Alopecurus aequalis var. sonomensis Sonoma alopecurus	None/1B.1	FE	Freshwater marshes and swamps, riparian scrub. In wet areas, marshes, and riparian banks with other wetland species. 5-360m. Blooms May-July.	Low. Very limited suitable habitat is present within the study area. There are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the field reconnaissance survey.
Blenosperma bakeri Sonoma sunshine	SE/1B.1	FE	Annual herb occurring in mesic areas of valley and foothill grassland or in vernal pools. 10-110 m elevation. Blooms Mar-May.	Low. Limited suitable habitat is present in project area. However, due to high disturbance from grazing cows, this species is not likely to be found in the study area. The nearest CNDDB occurrences are approximately 3-5 miles from the study area. This species was not encountered during the reconnaissance survey.
California macrophylla Round-leaved filaree	None/2.1	None	Generally found in Valley grasslands and foothill woodlands, 0-3937 feet in elevation. Blooms Mar-May.	Low. Suitable habitat is found within the study area, but no CNDDB occurrences are known to occur within 5 miles of the study area.
Dowingia pusilla Dwarf downingia	None/2.2	None	Prefers lake margins, vernal pools and wet places such as roadside ditches; sometimes playas and grasslands. Blooms Mar-May. Occurs at 1-445 m elevation.	Low. Limited suitable habitat exists within the study area. However, this species was not encountered reconnaissance survey. The nearest CNDDB occurrence is approximately 5 miles from the study area.
Hemizonia congesta spp. *congesta* Pale yellow hayfield tarplant	None/1B.2	None	Grassy valleys and hills, often in fallow fields. 25-200m. Blooms Apr-Nov.	Low. Suitable habitat is present within the study area; however, his species was not encountered during the field reconnaissance and no CNDDB occurrences are recorded within 5 miles of the study area.
Micropus amphibolus Mt. Diablo cottonweed	None/3.2	None	Occurs in broadleaf upland forest, chaparral, cismontane woodland, and grasslands from 45- 825 m elevation. Blooms Mar-May	Low. Suitable habitat is present within the study area. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Microseris paludosa Marsh microseris	None/1B.2	None	Closed-cone coniferous forests, cismontane woodlands, coastal scrub, and valley and foothill grasslands. 5-300m. Blooms Apr-Jul.	Low. Suitable habitat is present within the study area. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Navarretia leucocephala ssp. bakeri Baker's navarretia	None/1B.1	None	Annual herb, occurrs almost always in wetlands in cismontane woodland, lower montane coniferous forest, meadows and seeps, Valley and foothill grassland, and vernal pools. Blooms May-Jul. 15-1740 m elevation.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.

TABLE BIO-3
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Listing Status (USFWS)	Habitat Association	Potential for Project to Impact
Plagiobothrys mollis var. vestitus Petaluma pop-corn flower	None/1A	None	Wet sites in grassland, possibly coastal marsh margins. 10-50m. Blooms Jun-Jul.	Unlikely. Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area. Additionally, high disturbance from grazing cattle may render habitat unsuitable for this species. This species was not encountered during the reconnaissance survey.
Trifolium depauperatum var. hydrophilum Saline clover	None/1B.2	None	Occurs in marshes and swamps, vernal pools, and mesic grasslands on alkaline soils from 0-300 m elevation. Blooms Apr-Jun.	Unlikely. Unlikely. The study area lacks suitable habitat for this species The nearest CNDDB occurrence is approximately 5 miles SE of the study area. This species was not encountered during the reconnaissance survey.

SOURCE: CNPS, 2009; CDFG, 2009; USFWS, 2009

STATUS CODES:

STATE
California Department of Fish and Game:
SE Listed as Endangered by the State of California
ST Listed as Threatened by the State of California
SR Listed as Rare by the State of California (plants only)
CSC California species of special concern
CFP California fully protected bird species

California Native Plant Society (CNPS):
List 1A Plants believed extinct
List 1B Plants rare, threatened, or endangered in California and elsewhere
List 2 Plants rare, threatened, or endangered in California but more common elsewhere
List 3 Plants about which more information is needed
List 4 Plants of limited distribution
CNPS Code Extensions
.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Fairly endangered in California (20-80% occurrences threatened)
.3 Not very endangered in California (less than 20% of occurrences threatened or no current threats known)

FEDERAL
U.S. Fish and Wildlife Service:
BEPA Bald Eagle Protection Act
FE Listed as Endangered by the Federal Government
FT Listed as Threatened by the Federal Government
FPD Proposed for De-listing
FPE Proposed for Listing as Endangered
FPT Proposed for Listing as Threatened
FC Candidate for Federal listing

Appendix BIO-4

Regionally Occurring Special-Status Species, Central Site Alternative

TABLE BIO-4
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Invertebrates				
Andrena blennospermatis Blennosperma vernal pool adrenid bee	None	None	Oligolectic on vernal pool flowers, especially Blennosperma. Bees nest in the uplands around vernal pools.	Unlikely. The study area lacks suitable habitat (i.e., vernal pools). The nearest CNDDB occurrence is approximately 5 miles north of the study area.
Caecidotea tomalensis Tomales isopod	None	None	Inhabits localized fresh-water ponds or streams with still or near-still water in several bay area counties.	Low. One freshwater pond exists within the study area; however, the pond contains bass, a potential predator to this species. Additionally, there are no CNDDB occurrences within 5 miles of the study area.
Calicina diminua Marin blind harvestman	None	None	Known only from Mount Burdell, Novato, Marin County. Serpentine endemic.	Unlikely. The study area lacks Serpentine soil and habitat.
Hydrochara rickseckeri Ricksecker's water scavenger beetle	None	None	Occurs in slow moving waters, adults and larvae are aquatic.	Unlikely. The study area lacks habitat with slow moving water. The freshwater pond within the study area contains bass, a potential predator to this species. There are no CNDDB occurrences within 5 miles of the study area.
Hydroporus leechi Leech's skyline diving beetle	None	None	Aquatic beetle.	Unlikely. The freshwater pond within the study area contains bass, a potential predator to this species. Additionally, there are no CNDDB occurrences within 5 miles of the study area.
Linderiella occidentalis California linderiella	None	None	Lifecycle restricted to vernal pools.	Unlikely. The study area lacks suitable habitat (i.e., vernal pools). There are no CNDDB occurrences within 5 miles of the study area.
Syncaris pacifica California freshwater shrimp	SE	FE	Endemic to quiet waters of freshwater streams in Marin, Sonoma, and Napa Counties. Habitat must be <1% gradient, <115 m elevation. Cannot tolerate saline or brackish waters.	Unlikely. The study area lacks freshwater streams. The nearest CNDDB occurrence is approximately 4 miles northwest of the study area.
Talanites ubicki Ubick's gnaphosid spider	None	None	Known only from the type locality, Mount Burdell, Movato, Marin County. Serpentine endemic.	Unlikely. The study area lacks Serpentine habitat. There are no CNDDB occurrences within 5 miles of the study area.
Tryonia imitator Mimic tryonia (California brackishwater snail)	None	None	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities.	Unlikely. The study area lacks suitable habitats such as lagoons, estuaries, and salt marshes. There are no CNDDB occurrences within 5 miles of the study area.
Vespericola marinensis Marin hesperian	None	None	Found in moist spots in coastal brushfield and chaparral vegetation in Marin County. Under leaves of cow-parship, around spring seeps, in leafmold along streams, in alder woods and mixed evergreen forest.	Unlikely. The study area lacks coastal brushfield and chaparral vegetation. The study area also lacks seeps and stream habitats. There are no CNDDB occurrences within 5 miles of the study area.

TABLE BIO-4
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Reptiles				
Actinemys (=Emys) marmorata Western pond turtle	CSC	None	Ponds, marshes, rivers, streams, and irrigation ditches with aquatic vegetation. Requires basking sites and suitable upland habitat for egg-laying. Nest sites most often characterized as having gentle slopes (<15%) with little vegetation or sandy banks.	Medium. Suitable habitat in the form of a freshwater pond is present within the study area; basking habitat is present in shallow rocky areas surrounding the pond, and egg-laying habitat is present in grassy areas adjacent to the. The nearest CNDDB occurrence is 1 mile southwest of the study area.
Amphibians				
Ambystoma californiense California tiger salamander, Sonoma Co. population	ST	FE	Annual grassland and grassy understory of valley-foothill hardwood habitats in central and northern California. Needs underground refuges and vernal pools or other seasonal water sources.	Low. Although annual grassland habitat under the eucalyptus grove may provide suitable upland habitat, the freshwater pond is probably not suitable breeding habitat due to the presence of bass, a potential predator for the species and its eggs. However, numerous CNDDB occurrences were recorded within 5 miles north and east of the study site.
Rana aurora draytonii California red-legged frog	CSC	FT	Breeds in slow moving streams, ponds, and marshes with emergent vegetation; forages in nearby uplands within about 200 feet.	Medium. The freshwater pond with sparse to moderate emergent plants within the area provides potential aquatic habitat. The nearest CNDDB occurrence is approximately 2 miles from the project area.
Rana boylii Foothill yellow-legged frog	CSC	None	Breeds in shaded stream habitats with rocky, cobble substrate, usually below 6,000 feet in elevation. Absent or infrequent when introduced predators are present.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Fish				
Lavinia symmetricus ssp. 2 Tomales roach	CSC	None	Tributaries to Tomales Bay.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Oncorhynchus kisutch Coho salmon – central CA coast	SE	FE	Requires gravel substrate and large woody debris.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Oncorhynchus mykiss irideus Steelhead – central CA coast ESU	None	FT	Spawns in California streams from the Russian River to Aptos Creek, and the drainages of San Francisco and San Pablo Bays eastward to the Napa River (inclusive), excluding the Sacramento-San Joaquin River Basin.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Oncorhynchus mykiss irideus Steelhead – Central Valley	None	FT	This ESU enters the Sacramento and San Joaquin Rivers and their tributaries from July to May; spawning from December to April. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Oncorhynchus tshawytscha California coastal Chinook salmon	None	FT	Unknown.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.

TABLE BIO-4
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Oncorhynchus tshawytscha Central Valley spring-run Chinook salmon	ST	FT	This ESU enters the Sacramento and San Joaquin Rivers and tributaries March to July; spawning from late August to early October. Young move to rearing areas in and through the Sacramento and San Joaquin Rivers, Delta, and San Pablo and San Francisco Bays.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Oncorhynchus tshawytscha Winter-run Chinook salmon, Sacramento River	SE	FE	This ESU enters the Sacramento River December to May; spawning peaks May and June. Upstream movement occurs more quickly than in spring run population. Young move to rearing areas in and through the Sacramento River, Delta, and San Pablo and San Francisco Bays.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Pogonichthys macrolepidotus Sacramento splittail	CSC	None	Currently known only from the Delta, Suisun Bay and associated marshes. Prefers slow moving river sections and dead end sloughs. Requires flooded vegetation for spawning and juvenile foraging habitat. Spawning occurs over flooded vegetation in tidal freshwater and euryhaline habitats of estuarine marshes and sloughs, and slow-moving reaches of large rivers.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Birds				
Agelaius tricolor Tricolored blackbird	CSC	None	Largely endemic to California, most numerous in the Central Valley and nearby vicinity. Typically requires open water, protected nesting substrate, and foraging grounds within vicinity of the nesting colony. Nests in dense thickets of cattails, tules, willow, blackberry, wild rose, and other tall herbs near fresh water. Also nests in agricultural crops (e.g. silage), where colonies are threatened during harvest.	Low. The study area provides open water and foraging habitat, but lacks suitable nesting habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Athene cunicularia Burrowing owl	CSC	None	Forages in open plains, grasslands, and prairies; typically nests in abandoned small mammal burrows.	Unlikely. The study area lacks mammal burrows. There are no CNDDB occurrences within 5 miles of the study area.
Coccyzus americanus occidentalis Western yellow-billed cuckoo	Candidate	FE	Nests in densely foliaged deciduous trees and shrubs especially willow, in broad riparian forest.	Unlikely. The study area lacks suitable nesting habitat. The nearest CNDDB occurrence is approximately 2 miles north of the study area.
Elanus leucurus White-tailed kite	None/CFP	None	Forages in open plains, grasslands, and prairies; typically nests in trees.	Medium. The study area supports a dense grove of eucalyptus trees, which may provide suitable nesting habitat for this species. Surrounding grasslands provide suitable foraging habitat. However, there are no CNDDB occurrences within 5 miles of the study area.
Geothlypis trichas sinuosa Saltmarsh common yellowthroat	CSC	None	Prefers dense undergrowth in marshy areas, rivers, and swamps. Nests in low-lying vegetation or on the ground. Generally only in salt water habitats.	Unlikely. The study area lacks suitable foraging and nesting habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.

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REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Laterallus jamaicensis coturniculus California black rail	ST/CFP	FT	Freshwater, brackish, or tidal salt marshes.	Unlikely. The study area lacks suitable foraging and nesting habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Melospiza melodia samuelis San Pablo song sparrow	CSC	None	Tidal brackish or salt marshes along San Pablo Bay. Breeds in dense riparian thickets, emergent wetlands, or dense thickets in moist areas. Builds nests in low, dense vegetation or on the ground.	Unlikely. The study area lacks suitable foraging and nesting habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Rallus longirostris obsoletus California clapper rail	SE/CFP	FE	Brackish and coastal salt marshes, nests along tidal sloughs.	Unlikely. The study area lacks suitable foraging and nesting habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Sternula antillarum browni California least tern	SE	FE	Coastal open beaches that lack vegetation. Colonial. Pacific coast from San Francisco to Baja California.	Unlikely. The study area lacks suitable foraging and nesting habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Strix occidentalis caurina Northern spotted owl	None	FT	Old-growth, dense, multi-layered forests. In California, occurs from Marin Co. and north, with isolated populations in Santa Cruz and Santa Lucia mountains. Feeds on small mammals, small birds, bats, and large anthropods. Yearlong, nocturnal activity.	Unlikely. The study area lacks suitable foraging and nesting habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Mammals				
Antrozous pallidus pallid bat	CSC	None	Occurs at low elevations. Uses caves, crevices, mines, buildings, some bridges, and hollow trees for day roosts, and more open spaces for nighttime roosts. Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging.	Low. There is no roosting habitat within the study area; however, nearby buildings may provide roosting opportunities. There are no CNDDB occurrences within 5 miles of the study area.
Corynorhinus townsendii Townsend's big-eared bat	None	None	Throughout California in a wide variety of habitats. Most common in mesic sites. Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Low. There is no roosting habitat within the study area; however, nearby buildings may provide roosting opportunities. There are no CNDDB occurrences within 5 miles of the study area.
Lasiurus cinereus Hoary bat	None	None	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths; requires water.	Medium. Eucalyptus trees within the study area may provide suitable roosting habitat. The study area is part of an open habitat which may provide suitable foraging grounds. However, no CNDDB occurrences are recorded within 5 miles of the study area.
Reithrodontomys raviventris Salt-marsh harvest mouse	SE/CFP	FE	Generally inhabits salt marshes of the San Francisco Bay, San Pablo Bay, and Sacramento/San Joaquin Delta.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.

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Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Taxidea taxus American badger	CSC	None	Occurs in a wide variety of open forest, shrub, and grassland habitats that have friable soils for digging.	Low. The soil substrate within the study area seems compact and rocky during site reconnaissance surveys. No mammal burrows were observed. The nearest CNDDB occurrence is 1.5 miles north west of the study area.
Plants				
Allium peninsulare var. franciscanum Franciscan onion	None/1B.2	None	Occurs in valley and foothill grasslands on clay, often serpentinite soils between elevations of 100-300 meters. Blooms May-Jun.	Unlikely. The study area lacks suitable substrate for this species. There are no CNDDB occurrences within 5 miles of the study area.
Alopecurus aequalis var. sonomensis Sonoma alopecurus	None/1B.1	FE	Freshwater marshes and swamps, riparian scrub. In wet areas, marshes, and riparian banks with other wetland species. 5-360m. Blooms May-July.	Low. Very limited suitable habitat is present within the study area on the margins of the freshwater pond. The nearest CNDDB occurrence is 3.5 miles north of the study area. This species was not encountered during the reconnaissance survey.
Amorpha californica var. napensis Napa false indigo	None/1B.2	None	Deciduous shrub occurring in openings of broadleafed upland forest, in chaparral, and in cismontane woodland. 150-2000 m elevation. Blooms Apr-Jul.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Amsinckia lunaris Bent-flowered fiddleneck	None/1B.2	None	Annual herb occurring in coastal bluff scrub, cismontane woodland, and valley and foothill grasslands. Blooms Mar-Jun. 3-500 meters elevation.	Low. Annual grassland habitat within the study area may provide suitable habitat. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Arctostaphylos canescens ssp. sonomensis Sonoma canescent Manzanita	None/1B.2	None	Evergreen shrub occurring in chaparral and in lower montane coniferous forest, sometimes on serpentinite substrate. 180-1675 m elevation. Blooms Jan-Apr.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Arctostaphylos densiflora Vine Hill Manzanita	SE/1B.1	None	Acid marine sand in chaparral. 50-100 m. Blooms Feb-Apr.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Arctostaphylos stanfordiana ssp. decumbens Ricon Ridge Manzanita	None/1B.1	None	Chaparral. Highly restricted endemic to red rhyolites in Sonoma County. 75-310m. Blooms Feb-Apr.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Astragalus claranus Clara Hunt's milk-vetch	ST/1B.1	FE	Annual herb occurring in open areas of chaparral, in cismontane woodland, and on serpentinite or volcanic, rocky, clay substrate in valley and foothill grassland. 75-275 m elevation. Blooms Mar-May.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Astragalus tener var. tener Alkali milk-vetch	None/1B.2	None	Generally found in playas, valley and foothill grasslands with adobe clay soils, and vernal pools. Generally found in alkaline soils. Blooms Mar-Jun. 1-60 meters elevation.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.

TABLE BIO-4
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Balsamorhiza macrolepis var. macrolepis Big-scale balsamroot	None/1B.2	None	Perennial herb occurring in chaparral, cismontane woodland, and in valley and foothill grassland, sometimes on serpentinite substrate. 90-1400 m elevation. Blooms Mar-Jun.	Low. Annual grassland may provide suitable habitat for this species. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Blenosperma bakeri Sonoma sunshine	SE/1B.1	FE	Annual herb occurring in mesic areas of valley and foothill grassland or in vernal pools. 10-110 m elevation. Blooms Mar-May.	Low. Limited suitable habitat is present in project area. However, the nearest CNDDB occurrences are approximately 3-5 miles from the study area. This species was not encountered during the reconnaissance survey.
Brodiaea californica var. leptandra Narrow-anthered California brodiaea	None/1B.2	None	Bulbiferous herb occurring in broadleafed upland forest, chaparral, and lower montane coniferous forest. 110-945 m elevation. Blooms May-Jul.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Calamagrostis crassiglumis Thurber's reed grass	None/2.1	None	Usually in marshy swales surrounded by grassland or coastal scrub. 10-45m elevation. Blooms May-Jul.	Low. The study area provides limited suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
California macrophylla Round-leaved filaree	None/1B.1	None	Generally found in Valley grasslands and foothill woodlands, 0-3937 feet in elevation. Blooms Mar-May.	Low. Suitable habitat is limited within the study area, but no CNDDB occurrences are known to occur within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Campanula californica Swamp harebeel	None/1B.2	None	Bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, freshwater marsh, north coast coniferous forests. Uncommon where it occurs. 1-405m. Blooms Jun-Oct.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Carex albida White sedge	SE/1B.1	FE	Freshwater marshes, bogs and fens, or meadows and seeps. 35-55m. Blooms May-Jul.	Low. Suitable habitat is limited within the study area, but no CNDDB occurrences are known to occur within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Castilleja uliginosa Pitkin Marsh Indian paintbrush	SE/1A	None	Last known remaining plant died in 1987; was known from overgrown freshwater marsh. 60m. Blooms Jun-Jul.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Ceanothus confusus Rincon Ridge ceanothus	None/1B.1	None	Evergreen shrub occurring in closed-cone coniferous forest, chaparral, and cismontane woodland on volcanic or serpentinite substrate. 75-1065 m. Blooms Feb-Apr.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Ceanothus divergens Calistoga ceanothus	None/1B.2	None	Evergreen shrub occurring in chaparral on serpentinite or volcanic, rocky substrate. 170-950 m. Blooms Feb-Mar.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Ceanothus foliosus var. *vineatus* Vine Hill ceanothus	None/1B.1	None	Sandy, acidic soil in chaparral. 45-85m. Blooms Mar-May.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.

TABLE BIO-4
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Ceanothus masonii Mason's ceanothus	SR/1B.2	None	Serpentine ridges or slopes in chaparral or transition zone. 180-460m. Blooms Mar-Apr.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Ceanothus purpureus Holly-leaved ceanothus	None/1B.2	None	Evergreen shrub occurring in chaparral and on volcanic, rocky substrate in cismontane woodland. 120-640 m. Blooms Feb-Jun.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Ceanothus sonomensis Sonoma ceanothus	None/1B.2	None	Evergreen shrub occurring on sandy, serpentinite, or volcanic substrate in chaparral. 215-800 m. Blooms Feb-Apr.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Centromadia parryi ssp. *parryi* Pappose tarplant	None/1B.2	None	Vernally mesic, often alkaline sites in coastal prairies, meadows and seeps, coastal salt marshes, and valley and foothill grasslands. 2-420m. Blooms May-Nov.	Low. Annual grasslands within the study area may provide suitable habitat for this species. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Chorizanthe valida Sonoma spineflower	SE/1B.1	FE	Annual herb occurring on sandy substrate in coastal prairie. 10-305 m elevation. Blooms Jun-Aug.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Cirsium andrewsii Franciscan thistle	None/1B.2	None	Serpentine seeps in coastal bluff scrub, broadleaved upland forests, and coastal scrub. 0-135m. Blooms Mar-Jul.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Clarkia imbricata Vine Hill clarkia	SE/1B.1	FE	Acidic, sandy soil in chaparral and valley and foothill grasslands. 50-75m. Blooms Jun-Aug.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Cordylanthus maritimus ssp. *palustris* Point-Reyes bird's-beak	None/1B.2	None	Usually in coastal salt marshes with Salicornia, Distichlis, Jaumea, Spartina, etc. 0-15m. Blooms Jun-Oct.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Cordylanthus mollis ssp. *mollis* Soft bird's-beak	SR/1B.2	FE	Hemiparasitic, annual herb occurring in coastal salt marshes and swamps. Found at 0-3 meters elevation. Blooms Jul-Nov.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Delphinium bakeri Baker's larkspur	SE/1B.1	FE	Only site occurs on northwest facing slope, on decomposed shale. Historically known from grassy areas along fencelines. 90-205m. Blooms Mar-May.	Unlikely. The study area lacks suitable substrate for this species. There are no CNDDB occurrences within 5 miles of the study area.
Delphinium luteum Golden larkspur	SR/1B.1	FE	North-facing rocky slopes in chaparral, coastal prairie, and coastal scrub. 0-100m. Blooms Mar-May.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Dowingia pusilla Dwarf downingia	None/2.2	None	Prefers lake margins, vernal pools and wet places such as roadside ditches; sometimes playas and grasslands. Blooms Mar-May. Occurs at 1-445 m elevation.	Low. Limited suitable habitat exists within the study area. However, this species was not encountered during the reconnaissance survey. The nearest CNDDB occurrence is approximately 4-5 miles north of the study area.

TABLE BIO-4
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Erigeron biolettii Streamside daisy	None/3	None	Perennial herb occurring in broadleafed upland forest, cismontane woodland, and in rocky, mesic areas of North Coast coniferous forest. 30-1100 m. Blooms Jun-Sep.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Eriogonum luteolum var. *caninum* Tiburon wheat	None/1B.2	None	Annual herb occurring on chaparral, in coastal prairie grassland, and on serpentinite substrate in valley and foothill grassland. 10-500 m elevation. Blooms Jun-Sep.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Fritillaria liliacea Fragrant fritillary	None/1B.2	None	Bulbiferous herb occurring in cismontane woodland, coastal prairie, coastal scrub, and valley and foothill grassland, often on serpentinite substrate. Blooms Feb-Apr. 3-410 meters elevation.	Low. The study area supports limited suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Gilia capitata ssp. *tomentosa* Wooly-headed gilia	None/1B.1	None	Annual herb occurring in rocky areas or on outcrops in coastal bluff scrub. Blooms May-Jul. 15-155 meters elevation.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Hemizonia congesta spp. *congesta* Pale yellow hayfield tarplant (seaside tarplant)	None/1B.2	None	Grassy valleys and hills, often in fallow fields. 25-200m. Blooms Apr-Nov.	Low. Suitable habitat is present within the study area; however, his species was not encountered during the field reconnaissance and no CNDDB occurrences are recorded within 5 miles of the study area.
Hesperolinon congestum *Marin western flax*	ST/1B.1	FT	In serpentine barrens and in serpentine grassland and chaparral. 30-365m. Blooms Apr-Jul.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Horkelia tenuiloba Thin-lobed horkelia	None/1B.2	None	Sandy soils; in mesic openings of coastal scrub and chaparral. 45-500m. Blooms May-Jul.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Lasthenia burkei Burke's goldfields	SE/1B.1	FE	Most often in vernal pools and swales. 15-580m. Blooms Apr-Jun.	Unlikely. The study area lacks suitable habitat for this species. The nearest CNDDB occurrence is approximately 5 miles north of the study area.
Lasthenia californica ssp. *bakeri* Baker's goldfields	None/1B.2	None	Closed-cone coniferous forest (openings), Coastal scrub, Meadows and seeps, Marshes and swamps. Blooms Apr-Oct at 60-520 m elevation.	Low. The study area provides limited suitable habitat for this species. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Lasthenia conjugens Contra Costa goldfields	None/1B.1	FE	Annual herb occurring in cismontane woodland, alkaline playas, valley and foothill grassland, and in mesic areas such as vernal pools. 0-470 m elevation. Blooms Mar-Jun.	Low. The study area provides limited suitable habitat for this species. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Layia septentrionalis Colusa layia	None/1B.2	None	Scattered colonies in fields and grassy slopes in sandy or serpentine soil. 145-1095m. Blooms April-May.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.

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Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Legenere limosa Legenere	None/1B.1	None	Occurs in vernal pool beds. 1-880 m elevation. Blooms Apr-Jun. 1-880 m elevation.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Leptosiphon jepsonii Jepson's leptosiphon	None/1B.2	None	Open to partially shaded grassy slopes. On volcanics or the periphery of serpentine substrates. 100-500m. Blooms Mar-May.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Lessingia hololeuca Wooly-headed lessingia	None/3	None	Annual herb occurring in broadleafed upland forest, coastal scrub, lower montane coniferous forest, and in serpentinite valley and foothill grasslands. Blooms Jun-Oct. 15-305 meters elevation.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Lilium pardalinum ssp. *pitkinense* Pitkin marsh lily	SE/1B.1	FE	Saturated, sandy soils with grasses and shrubs. Cismontane woodland, Meadows and seeps, Marshes and swamps. Elevation 35 -65m. Blooms Jun-Jul.	Unlikely. The study area lacks suitable habitat for this species. One CNDDB occurrence is recorded within the study area; however, the occurrence area is large and imprecise (accuracy is within 80 m).
Limnanthes vinculans Sebastopol meadowfoam	SE/1B.1	FE	Swales, wet meadows and marshy areas in valley oak savanna; on poorly drained soils of clays and sandy loam. 15-115m. Blooms Apr-May.	Unlikely. The study area lacks suitable habitat for this species. Numerous CNDDB occurrences occur within 5 miles of the study area.
Micropus amphibolus Mt. Diablo cottonweed	None/3.2	None	Occurs in broadleaf upland forest, chaparral, cismontane woodland, and grasslands from 45- 825 m elevation. Blooms Mar-May.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Microseris paludosa Marsh microseris	None/1B.2	None	Closed-cone coniferous forests, cismontane woodlands, coastal scrub, and valley and foothill grasslands. 5-300m. Blooms Apr-Jun (Jul).	Low. The study area provides limited suitable habitat for this species. However, the nearest CNDDB occurrence is 3 miles east of the study area. The species was not encountered during the reconnaissance survey.
Navarretia leucocephala ssp. bakeri Baker's navarretia	None/1B.1	None	Annual herb, occurrs almost always in wetlands in cismontane woodland, lower montane coniferous forest, meadows and seeps, Valley and foothill grassland, and vernal pools. Blooms May-Jul. 15-1740 m elevation.	Low. The study area provides limited suitable habitat for this species. However, the nearest CNDDB occurrence is 3 miles north of the study area.
Navarretia leucocephala ssp. plieantha Many-flowered navarretia	SE/1B.2	FE	Volcanic ash vernal pools. 30-950m.	Unlikely. The study area lacks suitable substrate and habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Penstemon newberryi var. *sonomensis* Sonoma beardtongue	None/1B.3	None	Occurs in rocky outcrops of chaparral from 700 – 1370 m elevation. Blooms Apr-Aug.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Plagiobothrys mollis var. vestitus Petaluma pop-corn flower	None/1A	None	Wet sites in grassland, possibly coastal marsh margins. 10-50m. Blooms Jun-Jul.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.

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Pleuropogon hooverianus North Coast semaphore grass	ST/1B.1	None	Wet grassy, usually shady areas, sometimes freshwater marsh; associated with forest environments. 10-1150m. Blooms Apr-Jun.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Polygonum marinense Marin knotweed	None/3.1	None	Occurs in salt or brackish marsh from 0-10m elevation. Blooms (Apr) May-Aug (Oct).	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Potentilla hickmanii Hickman's cinquefoil	SE/1B.1	FE	Freshwater marshes, seeps, and small streams in open or forested areas along the coast. 5-125m. Blooms Apr-Aug.	Low. The study area provides limited suitable habitat for this species at the margin of the freshwater pond. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Rhynchospora alba White beaked-rush	None/2.2	None	Freshwater marshes and sphagnum bogs. 60-2000m. Blooms Jul-Aug.	Low. The study area provides limited suitable habitat for this species at the margin of the freshwater pond. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Rhynchospora californica California beaked-rush	None/1B.1	None	Occurs in seeps, meadows, and freshwater-marsh habitats; yellow pine forest, freshwater wetlands, meadows, and seeps. Blooms May-Jul.	Low. The study area provides limited suitable habitat for this species at the margin of the freshwater pond. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Rhynchospora capitellata Brownish beaked-rush	None/2.2	None	Perennial herb occurring under wet conditions in coastal and salt-marsh habitats; coastal salt marsh, and upper and lower montane coniferous forests. Found at 455-2000 m. Blooms July-Aug.	Unlikely. The study area lacks suitable habitat for this species. There are no CNDDB occurrences within 5 miles of the study area.
Rhynchospora globularis var. *globularis* Round-headed beaked-rush	None/2.1	None	Freshwater marshes. 45-60m. Blooms Jul-Aug.	Low. The study area provides limited suitable habitat for this species at the margin of the freshwater pond. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Sidalcea calycosa ssp. *rhizomata* Point Reyes checkerbloom	None/1B.2	None	Freshwater marshes near the coast. 5-75m. Blooms Apr-Sep.	Low. The study area provides limited suitable habitat for this species at the margin of the freshwater pond. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Sidalcea oregano ssp. *valida* Kenwood Marsh checkerbloom	SE/1B.1	FE	Edges of freshwater marshes. 115-150m. Blooms Jun-Sep.	Low. The study area provides limited suitable habitat for this species at the margin of the freshwater pond. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.

TABLE BIO-4
REGIONALLY OCCURRING SPECIAL-STATUS SPECIES (COMPLETE LIST)

Scientific Name Common Name	State Status (CDFG/CNPS)	Federal Status (USFWS)	Habitat Association	Potential for Project to Impact
Trifolium amoenum Showy Rancheria clover	None/1B.1	FE	Annual herb occurring in coastal bluff scrub and valley and foothill grassland, sometimes on serpentinite. 5-415 m elevation. Blooms Apr-Jun.	Medium. Annual grasslands within the study area provide suitable habitat for this species. The nearest CNDDB occurrence is within 0.5 miles east of the study area. However, the species was not encountered during the reconnaissance survey.
Trifolium buckwestiorum Santa Cruz clover	None/1B.1	None	Moist grasslands. 105-610 m elevation. Blooms Apr-Oct	Low. Annual grasslands within the study area provide suitable habitat for this species. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Trifolium depauperatum var. hydrophilum Saline clover	None/1B.2	None	Occurs in marshes and swamps, vernal pools, and mesic grasslands on alkaline soils from 0-300 m elevation. Blooms Apr-Jun.	Unlikely. The study area lacks suitable habitat for this species There are no CNDDB occurrences within 5 miles of the study area.
Triphysaria floribunda San Francisco owl's-clover	None/1B.2	None	Coastal prairies and valley and foothill grasslands, on serpentine and non-serpentine substrates. 10-160m. Blooms Apr-Jun.	Low. Annual grasslands within the study area provide suitable habitat for this species. However, there are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Triquetrella californica Coastal triquetrella	None/1B.2	None	Moss growing on soil. 10-100m. Blooming period N/A.	Low. There are no CNDDB occurrences within 5 miles of the study area. This species was not encountered during the reconnaissance survey.
Viburnum ellipticum Oval-leaved viburnum	None/2.3	None	Deciduous shrub occurring in chaparral, cismontane woodlands, and lower montane coniferous forest from 215-1400 m elevation. Blooms May-Jun.	Unlikely. The study area lacks suitable habitat for this species There are no CNDDB occurrences within 5 miles of the study area.

SOURCE: CNPS, 2010; CDFG, 2010; USFWS, 2010

STATUS CODES:

STATE
California Department of Fish and Game:
SE Listed as Endangered by the State of California
ST Listed as Threatened by the State of California
SR Listed as Rare by the State of California (plants only)
CSC California species of special concern
CFP California fully protected bird species

California Native Plant Society (CNPS):
List 1A Plants believed extinct
List 1B Plants rare, threatened, or endangered in California and elsewhere
List 2 Plants rare, threatened, or endangered in California but more common elsewhere
List 3 Plants about which more information is needed
List 4 Plants of limited distribution
CNPS Code Extensions
.1 Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Fairly endangered in California (20-80% occurrences threatened)
.3 Not very endangered in California (less than 20% of occurrences threatened or no current threats known)

FEDERAL
U.S. Fish and Wildlife Service:
BEPA Bald Eagle Protection Act
FE Listed as Endangered by the Federal Government
FT Listed as Threatened by the Federal Government
FPD Proposed for De-listing
FPE Proposed for Listing as Endangered
FPT Proposed for Listing as Threatened
FC Candidate for Federal listing

Appendix CONSISTENCY

General Plan Consistency Analysis

SONOMA COUNTY
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue Santa Rosa, CA 95403 (707) 565-1900 FAX (707) 565-8343

GENERAL PLAN CONSISTENCY ANALYSIS

(References are to the Sonoma County General Plan as amended to date unless stated otherwise. General Plan policies relevant to this project are stated on the pages following this analysis.)

Date: April 18, 2011

Project Applicant: Sonoma County Waste Management Agency

Project File Number:

Project Location / APN: 500 Meacham Road, Cotati / APN 024-080-019.

Project Title: Sonoma County Compost Facility - Central Site Alternative

Project Description: The SCWMA is seeking to relocate the existing compost facility currently located on the 389 acre Central Disposal Site on APN 024-080-019 to an alternate 25 acre area on the northwest portion of the same parcel. The site is already owned by the County; the project would not entail or necessitate any land acquisition. The Central Disposal Site is located approximately 1.5 miles southwest of the City of Cotati, off of Mecham Road.

The proposed operation would have the capacity to process approximately 110,000 tons of incoming feedstock materials per year, similar to the existing operation. Examples of compost feedstock that have been utilized include: green materials (yard wastes), food materials, agricultural materials (chicken feathers, rice hulls and bedding material from poultry farms). Non-hazardous liquid wastes may also be accepted as a substitute for the water that is added for efficient composting.

Materials would be processed, mixed, and composted using an Aerated Static Pile (ASP) system which requires less mechanical turning than open windrow composting and composts material in place under closed covers which allow enhanced air circulation and filtration controls. Implementation of the project would require the construction of a 6.5 acre impervious pad, water detention pond, and a small administrative office.

Site preparation is likely to entail removal of a significant amount of hard rock to create a surface suitable for composting operations. Approximately 550,000 cubic yards would be removed, but about 400,000 would not be used in the project (i.e. the project uses 150,000 cu. yd. of the material).
Portion of the site has already been disturbed by past landfill grading but portion of the site is undisturbed and contains a grove of eucalyptus trees.

At maximum capacity, the composting facility may require up to 36 acre-feet (11.7 million gallons) of water per year. This water is currently provided by a well near the intersection of Mecham and Stony. It was drilled in 1996 and tested at a rate of 300 GPM but currently has a pump that is rated for 120 GPM at a depth of 302 ft. The well permit is wel96-0436.

Composted materials and mulch products would be marketed and distributed from the site. Current traffic levels for the compost operation at the Central Disposal Site are 352 trips per weekday and 484 trips per weekend.

Conclusion:

The proposed composting facility would serve several of the County's 2020 General Plan goals with respect to waste reduction and sustainability and would be consistent with the Plan's goals, objectives and policies as well as the County's Integrated Waste Management Plan (CoIWMP). If the county leases the site to the SCWMA and the SCWMA contracts with a private firm to operate the composting facility, a discretionary use permit approval will be required pursuant to Article 52 of Chapter 26 of the County Code (the Zoning Code) or its successor prior to commencement.

If the rock and earth material excavated and removed in the site preparation is hauled offsite for commercial use, the excavation could be considered commercial mining under the Surface Mining and Reclamation Act (SMARA) and County Code and require prior approval of a mining permit and reclamation plan. However, such additional permit requirements may be avoided if excavated materials are used on site, or conditions for other SMARA exemptions are complied with as set forth in Division 2, Chapter 9, Section 2714 of the Public Resources Code.

ANALYSIS

LAND USE ELEMENT: The Land Use Element provides the distribution, location and extent of uses of land establishes standards for each land use category and establishes policies to guide growth and the development and use of land.

> **Land Use GOAL LU-11:** Promote a sustainable future where residents can enjoy a high quality of life for the long term, including a clean and beautiful environment and a balance of employment, housing, infrastructure, and services.
>
> **Policy LU-11h:** Encourage development and land uses that pursue reduction and re-use of by products and waste, especially approaches that also employ waste as a resource, such as ecoindustrial development.*
>
> **Discussion:** A composting operation which promotes reuse of the organic wastes, converts them into a resource and reduces the waste stream would be consistent with the above policy as well as with GP Objective OSRC-14.3 which seeks to: "Reduce the generation of solid waste and increase solid waste reuse and recycling."

Land Use designation: The project site is designated Public/Quasi Public (PQP) land use category. This category provides sites that serve the community or public need and are owned or operated by government agencies, non profit entities, or public utilities.

Permitted Uses. Uses include schools, places of religious worship, parks, libraries, governmental administration centers, fire stations, cemeteries, airports, hospitals, sewage treatment plants, waste disposal sites, etc.

Discussion: The proposed project for a county-wide composting facility would be consistent with the purposes of the PQP land use. The existing composting operation was previously found to be consistent with the 1989 General Plan in 1992. Though a new updated general plan was adopted in 2008 (GP2020), the relocated compost operation would still be considered consistent with the PQP land use.

PUBLIC FACILITIES AND SERVICES ELEMENT: This element contains County policy regarding solid waste management services in Sonoma County. The background text in section 3.4 describes State requirements and local history for the CoIWMP adopted in 1993 and last amended in 2003. The CoIWMP is the principal planning document for solid waste management in the County, but landfills, transfer stations and other solid waste management facilities located in unincorporated areas are designated in the Land Use Element. Following are the Element policies pertinent to this project:

Objective PF-2.9: Use the CoIWMP and any subsequent amendments thereto, as the policy document for solid waste management in the County.

Discussion: The CoIWMP includes a composting component (Section 4.5.4 et. seq.) which discusses several programs and implementation goals. Section 4.5.6.2 calls for the yard debris composting operation to be relocated to a permanent location off the central land fill during the 2009 to 2018 time frame. The proposal to relocate the existing facility would be consistent with that CoIWMP task.

Policy PF-2a: Plan, design, and construct park and recreation, fire and emergency medical, public education, and solid waste services and public utilities in accordance with projected growth, except as provided in Policy LU-4d.

Policy LU-4d seeks to assure that physical services, infrastructure, public facilities and facility plans are designed to accommodate future planned growth. The Central Disposal Site alternative provides a slight expansion beyond the capacity of the current onsite compost operation. However, alternate composting options may eventually be necessary to divert currently landfilled organic material and/or accommodate the growth in yard wastes that would result from population increase. The GP2020 projected that the Countywide growth rate to 2020 would .88 percent per year.

Information submitted is not adequate to estimate how long this alternate site would be able to handle the anticipated organic materials waste stream. The proposed operation could still be considered consistent if it is sufficient to handle the projected population growth of GP2020 or as long as the facility and/or waste management plans have considered the projected growth and corresponding waste stream generation and developed means or options for meeting the demands. There is no requirement that a single site must handle all of the county's existing and future needs and there very well could be multiple sites and or programs (including waste stream reduction) which work together to address the public service needs.

Policy PF-2y: Minor public facilities, defined as those that are located in a public road right of way or are not the primary use of the subject property, are allowed in any land use category, provided they are compatible with neighborhood character and designed to have minimal impact on natural and scenic resources. Projects that are clearly significant in terms of cost, scope of environmental impacts, public controversy, or involve more than one parcel, shall not be considered minor.

Since the project is a large central facility that would serve the entire County, it cannot be considered a minor public facility.

WATER RESOURCES ELEMENT: The Element was added to the 2020 General Plan to help ensure that Sonoma County's water resources are sustained and protected, that water use does not exceed replenishment rates over time causing declines in availability and that degradation in surface water or groundwater resources does not result. Several policies which are pertinent to the proposed relocated composting operation and the Central site are:

Policy WR-1b: Design, construct, and maintain County buildings, roads, bridges, drainage and other facilities to minimize sediment and other pollutants in stormwater flows. Develop and implement "best management practices" for ongoing maintenance and operation.*

Policy WR-1g: Minimize deposition and discharge of sediment, debris, waste and other pollutants into surface runoff, drainage systems, surface water bodies, and groundwater.*

Policy WR-2d: Continue the existing program to require groundwater monitoring for new or expanded discretionary commercial and industrial uses using wells. Where justified by the monitoring program, establish additional monitoring requirements for other new wells.*

Discussion: Protection of water resources has been and will continue to be, an ongoing priority at the Central site. Since storm runoff and/or compost leachate could infiltrate into the ground and or be carried offsite by stormwater, it will be important to design and operate the operation to protect water resources to comply with the above policies. The proposed facility would be designed for zero discharge. Composting would be carried out on impervious pad and all stormwater and compost leachate would flow to detention ponds to be reincorporated into the piles or for other beneficial use. The Aerated Static Pile (ASP) method of composting used creates a physical barrier that would cover the piles, preventing rainfall saturation which could cause excess runoff or compost leachate. The project design and operation would incorporate Best Management Practices and is consistent with WR-1b. Monitoring of the groundwater well supplying the project in compliance PRMD Policy 8-3-1 would be required as a condition of approval of any use permit in order to comply with Policy WR-2d.

Policy WR-2e (formerly RC-3h): Require proof of groundwater with a sufficient yield and quality to support proposed uses in Class 3 and 4 water areas. … Test wells may be required in Class 3 areas. Deny discretionary applications in Class 3 and 4 areas unless a hydrogeologic report establishes that groundwater quality and quantity are adequate and will not be adversely impacted by the cumulative amount of development and uses allowed in the area, so that the proposed use will not cause or exacerbate an overdraft condition in a groundwater basin or subbasin…"

Discussion: The proposed site is in an area of marginal groundwater availability - Zone 3 which requires proof of groundwater with a sufficient yield and quality to support proposed uses prior to project approval. However the water well serving the site is in a groundwater recharge area – Zone 2 so the above policy would not apply. Furthermore, the relocated composting facility is expected to use over 2 million gallons less than the existing composting operation on site – only 11.7 million gallons versus 14 million gallons of water per year.

OPEN SPACE AND RESOURCE CONSERVATION ELEMENT: This element addresses open space for the preservation of natural resources for several different purposes. It seeks to preserve the natural and scenic resources which contribute to the general welfare and quality of life for the residents provides the guidelines for making necessary consistency findings

Objective OSRC-14.3: Reduce the generation of solid waste and increase solid waste reuse and recycling.

Discussion: A composting operation which promotes reuse of the organic wastes, converts them into a resource and reduces the waste stream would be consistent with the above policy.

Open space map designations: The Open Space map included as Figure OSEC-5h of the GP2020 indicates two designations on the site. It indicates that the landfill site is in the potential range of the tiger salamander and that it is also a planned park.

Discussion: The General Plan's CTS range designation is consistent with the Santa Rosa Plains Conservation Strategy map and the issue would have to be addressed during environmental review. Though it is in the CTS range closer examination may indicate that there is little or no CTS habitat because of its elevation and the fact that portions of the site are already disturbed. In any case the CTS impacts would have to be assessed in the environmental review and mitigations identified as necessary to avoid or minimize the impacts.

If the Central site is still intended to be utilized for park development after the closure of the landfill, any ongoing operations at the transfer station or other onsite ancillary activities like the composting operation could potentially, but not necessarily, conflict with recreational activities because of their traffic, noise, visibility, etc. While the development of a park on the site is not expected in the near future and is somewhat speculative at this point, the composting operation should be designed in such a way as to not interfere or impact any potential future recreational use of the land. If the site is not used for park development, the ongoing use of the public lands for a countywide composting facility may be an acceptable alternate use to be considered. If the County adopts a new outdoor recreation plan prior to the closure of the landfill, the park development priorities set forth in that plan may be considered a refinement of the GP2020's projected potential park sites.

Objective OSRC-13.1 of the Resource Conservation Element regarding mineral resource policies states:

> "Use the Aggregate Resources Management (ARM) Plan to establish priority areas for aggregate production and to establish detailed policies, procedures, and standards for mineral extraction."

Discussion: Section 7.4.1 of the ARM Plan indicates quarry operations are allowed with approval of a use permit and reclamation plan in the PQP General Plan designation and in PF zoning where such operations are compatible with allowed public uses. Under the proposed project, approximately 550,000 cubic yards would be removed, about 150,000 cu. yd. of the material would be used on site and about 400,000 cu. yd. would be exported offsite.

If the rock and earth material excavated and removed in the site preparation is hauled offsite for commercial use, the excavation could be considered commercial mining under the Surface Mining and Reclamation Act (SMARA) and County Code and require prior approval of a mining permit and reclamation plan. Such permit approvals were obtained for a prior rock removal project at the Central Disposal site carried out from 1996 to about 1999 (File 93-570). However, such additional permit requirements may be avoided if:

1) All excavated materials are used on site, or
2) Conditions for other SMARA exemptions are complied with as set forth in Division 2, Chapter 9, Section 2714 of the Public Resources Code.

One of the possible exemptions under Section 2714 is for excavation and grading carried out as a necessary part of a construction project undertaken to prepare a site and the construction project is consistent with and permitted by the Sonoma County General Plan and Zoning Ordinance, all required permits and approvals required for the construction have been obtained from public agencies, and the County or the lead agency has considered the onsite excavation and earthmoving activities and offsite transport in its approval of the construction permit and any associated environmental review conducted pursuant to CEQA. This exception applies whether or not surplus soil or rock materials are exported from the site. However, the export of surplus materials is exempted only if it occurs after construction work has commenced and it is being actively undertaken pursuant to approved permits and ceases upon the conclusion of construction activities. Another possibility that could be explored to exempt the project from SMARA regulation would be to request the State Board of Mining and Geology to find the rock removal exempt from SMARA pursuant to Section 2714 (f) of the Public Resources Code after finding that the requested excavation is infrequent and minor.

The offsite entities receiving the rock materials may also have to obtain permit clearances to be able to receive the rock and earth materials. No information was provided as to potential offsite receiving sites so permit requirements for these cannot be ascertained at this time but could possibly include grading/fill permits or use permits to authorize importation, processing and sale of construction aggregate.

The project proposal has insufficient information regarding the destination and intended uses for rock and earth materials hauled offsite. More details should be provided on that aspect. As such, the permit requirements for such activities cannot be ascertained at this time but could possibly include grading/fill permits or use permits to authorize importation, processing and sale of construction aggregate.

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SONOMA COUNTY

PERMIT AND RESOURCE MANAGEMENT DEPARTMENT

2550 Ventura Avenue Santa Rosa, CA 95403 (707) 565-1900 FAX (707) 565-8343

GENERAL PLAN CONSISTENCY ANALYSIS

(References are to the Sonoma County General Plan as amended to date unless stated otherwise.
General Plan policies relevant to this project are stated on the pages following this analysis.)

Date: April 25, 2011
Project Applicant: Sonoma County Waste Management Agency (SCWMA)
Project File Number: To be determined
Project Location / APN: 2535 Stage Gulch Road, Petaluma / APN: 068-040-015.
Project Title: Sonoma County Compost Facility - Site 40 / Teixeira Ranch.

Project Description: The SCWMA is tentatively considering purchase the above 390 acre site for the purpose of constructing and operating a new county-wide compost facility on approximately 48 acres in the western corner of the site to replace the existing compost facility at the Central Disposal Site. At full production, the proposed facility would have capacity to process a maximum of 200,000 tons of compostable materials each year which is expected to be sufficient capacity to handle the waste stream for the existing and projected population through the year 2031.

Compostable materials imported to the site would include: green material (yard waste), wood waste, food material, and agricultural materials. The agricultural wastes that may be utilized are expected to be similar to those used at the existing facility on Mecham road. Examples of compost feedstock that have been utilized include: green materials, chicken feathers, rice hulls and bedding material from poultry farms, and food materials. Non-hazardous liquid wastes may also be accepted as a substitute for the water that is added for efficient composting.

Materials would be processed and mixed and composted using either the current windrow turning system or an Aerated Static Pile (ASP) system which requires less mechanical turning and composts material in place under closed covers which allow enhance air circulation and filtration controls. Depending on the methodology the compost processing generally takes two to three months after which finished compost products would be sold from the premises. About 15% of the compost and mulch material is subsequently sold to agriculture operations (vineyards, etc.) with the remaining material sold for use by landscape companies, and other companies and or individuals.

Implementation of the project would require the construction of an impervious pad, water detention pond, and a small administrative office and septic system. The facility would also include areas for material sorting and processing, windrow composting, on-site access roads, buffer zones, a sales area for mulch and compost products, and storage areas. Site will be designed so that entire facility is on an impervious pad and will be self contained with respect to storm runoff such that all storm runoff will be retained on site within the 48 acres. Use for the remainder of the parcel is not anticipated or proposed and it is expected to remain as currently used irrigated rangeland grazing.

At maximum capacity, the composting facility may require up to 82.9 acre feet of water per year. Treated water from the Ellis Creek Water Recycling Facility approximately two miles to the west is already pumped to the site via an existing pipeline for irrigation purposes. If approved, agreements will be sought to continue to use the pipeline to deliver water to the composting operation. No modifications to the pipeline are necessary. Other water supply options including use of well water and the site's existing ponds will be studied in the water supply assessment included in the Environmental Impact Report.

Composted materials and mulch products would be marketed and distributed from the site. Current traffic levels for the compost operation at the at the land full site are 352 per weekday) and 484 per weekend. These traffic levels are expected to increase to 803 per weekday and 1116 per weekend by the year 2030.

Conclusion: As proposed, a large countywide composting facility on the site would serve several of the County's General Plan goals with respect to waste reduction and sustainability. However, it would be inconsistent with several General Plan policies regarding land use and agricultural resources. It would also be inconsistent with the current LEA zoning of the parcel and the County's Williamson Act requirements.

Though the proposed operation would use agricultural and food wastes in up to 10 percent of the feedstock and sale about 15 percent of the finished compost to agricultural operations, both amounts are considered minor and not enough to consider the operation an agricultural use or a subordinate agricultural support service. The size and intensity of the composting operation and the proposed retail of materials from the site would limit its ability to be permitted as a subordinate agricultural support service or another compatible use in the agricultural land use.

Inconsistency with the LEA - Land Extensive Agricultural land use designation could be avoided by applying for a General Plan Amendment to redesignate the portion of the land used for the composting facility in the PQP - Public/Quasi public land use category.

Inconsistency with the development code could be remedied by applying to rezone the portion of the property used for public purposes to the "PF" –Public facilities zoning district and applying for the necessary use permit and/or public project, completing the environmental review and public hearing processes, and gaining approval to authorize commencement.

Inconsistencies with the existing Williamson Act contract could be remedied by phasing out or canceling the contract. If the parcel is acquired by a public entity for a public purpose, and the Board of Supervisors can make mandatory findings under Government Code section 51292, the contract may be immediately canceled pursuant to Gov. Code Section 51295 thereby avoiding any conflict with the Williamson Act. Finding the proposal consistent with the Williamson Act would appear to be questionable as it would depend upon the Boards ability to make a number of findings as discussed below. It may also be possible to address the consistency issues by proposing an easement exchanges with lands currently not under contract.

ANALYSIS

The following General Plan Goals, Objectives and Policies are pertinent to the proposed project and were considered in reaching the above conclusions regarding consistency.

LAND USE ELEMENT: The Land Use Element provides the distribution, location and extent of uses of land establishes standards for each land use category and establishes policies to guide growth and the development and use of land.

GOAL LU-9: Protect lands currently in agricultural production and lands with soils and other characteristics that make them potentially suitable for agricultural use. Retain large parcel sizes and avoid incompatible non agricultural uses.*

Objective LU-9.1: Avoid conversion of lands currently used for agricultural production to non agricultural use.

Objective LU-9.4: Discourage uses in agricultural areas that are not compatible with long term agricultural production.

Policy LU-9d: Deny General Plan amendments that convert lands outside of designated Urban Service Areas with Class I, II, or III soils (USDA) to an ... commercial, industrial, or public/quasi public category unless all of the following criteria, in addition to the designation criteria for the applicable land use category, are met:

(1) The land use proposed for conversion is not in an agricultural production area and will not adversely affect agricultural operations,

(2) The supply of vacant or underutilized potential land for the requested use is insufficient to meet projected demand,

(3) No areas with other soil classes are available for non resource uses in the planning area, and

(4) An overriding public benefit will result from the proposed use.

Public uses such as parks and sewage treatment plants may be approved if an overriding public benefit exists.

Discussion: The 48 acre site is identified as either prime farmland or “farmland of state importance” or “prime" farmland in the Department of Conservation's farmland mapping. The 48 acre site has several soil types on it including Clear Lake Loam 2-5% slope, Diablo Clay Loam 0-30% slope and Haire Clay Loam 0-15% slope. It also has several areas of drainage gullies. About half the area has an agricultural capability unit rating II or III with the remaining half in capability unit IV. The onsite soils suitability for farming is also reflected by its Storie index rating. Out of a range of 0 to 100, approximately a third of the site has a Storie Index rating in the 40 to 50 point range with the remainder of the parcel’s soils ranked with a Storie Index rating less than 40.

Given that a portion of the site contains Class III soils, Policy LU9d applies. It requires denial unless all four findings can be made. Since the land is currently used for agricultural production it appears doubtful that finding number 1 can be made. However, if the use is considered a public use akin to a sewage treatment plant or park, it may be approved if an overriding public benefit exists.

GOAL LU-11: Promote a sustainable future where residents can enjoy a high quality of life for the long term, including a clean and beautiful environment and a balance of employment, housing, infrastructure, and services.

Policy LU-11h: Encourage development and land uses that pursue reduction and re-use of by products and waste, especially approaches that also employ waste as a resource, such as ecoindustrial development.

Discussion: A composting operation which promotes reuse of the organic wastes, converts them into a resource and reduces the waste stream would be consistent with the above policy.

LEA - Land Extensive Agriculture General Plan Land Use Designation: The project site and surrounding parcels are designated Land Extensive Agriculture. The standards for this designation that are pertinent to the project are as follows:

Purpose and Definition. This category shall enhance and protect lands capable of and generally used for animal husbandry and the production of food, fiber, and plant materials. Soil and climate conditions typically result in relatively low production per acre of land. The objective in land extensive agricultural areas shall be to establish and maintain densities and parcel sizes that are conducive to continued agricultural production.

Permitted Uses: In addition to agricultural production, agricultural support uses, this land use category allows consideration of Other Uses consistent with the Agricultural Resources Element as provided in the Development Code.

Discussion: Composting facilities are not specifically listed anywhere in the Ag Resources Element or the Development Code. At the time of this review the Development Code is in fact undergoing an amendment process to bring it into compliance with the 2020 General Plan. The Development Code must be consistent with the General Plan and it cannot allow uses or activities that are not allowed by the General Plan
The proposals consistency with the above LEA land use depends on whether it is:
1) considered an "agricultural support service", or
2) an Other Use consistent with the Agricultural Resources Element.

1) Agricultural support service: Both Policy AR-5d of the 2020 General Plan and Chapter 2 of the Development Code define Agricultural Support Services as:

Processing services, maintenance and repair of farm machinery and equipment, veterinary clinics, custom farming services, agricultural waste handling and disposal services and other similar services.

General Plan Policies AR-5e (stated in full below under the AR element) requires that agricultural support services support local agricultural production and that such uses be "subordinate" to on-site agricultural production and do not adversely affect agricultural production in the area. It also suggests five factors that should be included in any considerations of whether a use is subordinate or not.

There are arguments that can be made for and against considering the proposed compost facility a subordinate agricultural support. The 48 acre site would utilize only about 12 percent of the parcel area and it does include processing a small amount of agricultural waste, less than ten percent of the compost feedstock. It is also projected that about fifteen percent of the compost and mulch products are sold for agricultural purposes.

However, even though the proposed project would use only about 12 percent of the parcel area, leaving the balance of the 390 acre parcel in grazing, it is still expected to be the dominant use of the parcel. The countywide facility will require more construction, employees, and water, and will generate more daily traffic. It will require installation of an office, parking lot, electrical service, water storage and a 15 -16.5 acre impermeable surfaced area under the composting area. It would remove the 48 acres from range land production. As such the proposed county wide facility would not appear to be a subordinate agricultural support facility permitted by the existing LEA zoning.

In addition, the facility also may not qualify as an agricultural support service as it proposes to include over the counter sales of compost and mulch which is not allowed as a permitted agricultural support service activity in the LEA Zoning District.

2) Other use consistent with the Agricultural Resources Element

To get an idea of what other non-agricultural uses may be considered consistent, one can review the list of permitted uses in the LEA zoning district since these have previously been found consistent with the general plan. There are two permitted non-agricultural uses which the proposed composting facility may be similar to. These are:

> 2a) Fertilizer plants or yards which serve agricultural production in the local area and subject, at a minimum, to the criteria of General Plan Policies AR-5e and AR-5f, and
>
> 2b) Minor public service uses or facilities (transmission and distribution lines and telecommunication facilities excepted), including but not limited to reservoirs, storage tanks, pumping stations, transformer stations, fire and police stations and training centers, service yards and related parking lots which, at a minimum, meet the criteria of general plan Policy PF-2s and which are not otherwise exempt by state law.
>
> With respect to number 2a above, a compost facility may be, and has been considered akin to a fertilizer plant or yard and allowed in agricultural zones as a compatible use when animal manures were being composted or composting was for onsite use. That would not be the case under the proposed project as animal manures would not be used and the compost would be marketed for offsite uses.
>
> With respect to number 2b above, General Plan Policy, PF-2s has been changed to Policy PF-2y of the Public Facilities and Services Element as stated below. Though it would be a public facility, and would use only about 1/8th of the parcel, the proposed compost facility would not appear to qualify as a "minor" public facility because it would clearly be significant in terms of cost, scope of environmental impacts, public controversy. It would be a countywide facility and clearly the most intensive use on the land in terms of traffic, employees, buildings, etc. As such the proposed county wide facility would not appear to be a "minor public facility" compatible with the existing LEA land use.

If a determination is made that the composting facility is not consistent with the existing General

Plan land use designation of LEA, the proposed site could still be considered and found consistent with the General Plan if the request for a permit is accompanied with a General Plan amendment and zone change request to change the site to a "PQP"-Public/Quasi-Public land use category and the "PF" – Public Facilities zoning district and such amendments are approved concurrently.

"Public/Quasi-Public" (PQP) GP land use category: The pertinent standards of the Public/Quasi-Public land use category are as follows:

> **Purposes and Definition.** This category provides sites that serve the community or public need and are owned or operated by government agencies, non profit entities, or public utilities. However, public uses are also allowed in other land use categories. The Public Facilities and Services Element establishes policies for location of public uses in these other categories.
>
> **Permitted Uses**. Uses include schools, places of religious worship, parks, libraries, governmental administration centers, fire stations, cemeteries, airports, hospitals, sewage treatment plants, waste disposal sites, etc.
>
> **Permitted Development Intensities and Designation Criteria**. Designation of public/quasi public sites on the Land Use Plan shall be confined to the actual area of public/quasi-public use. Amendments to add this designation must meet all of the following:
>
> (1) Ownership or long term lease by a government agency, other non-profit entity or public utility,
> (2) Adequate road access,
> (3) Lands are not suitable for and will not adversely affect resource production activities, and
> (4) Any applicable Land Use Policies for the Planning Area.

Discussion: The designation criteria above would have to be met for County approval of a General Plan amendment to change the land use designation on the site to Public / Quasi-Public. It appears that the criteria 1 and 2 for amending the land use could be made.

With respect to criteria 3, the site is used for resource production and is classified as either "prime farmland" or "farmland of state importance" in the state farmland mapping. The compost facility would reduce the available rangeland on site by 48 acres and according to UC rangeland specialists, the 48 acres of irrigated pasture would be expected to support at least 48 -1000 pound cows, perhaps more if certain management practices are used.

Though there would be a loss of this resource production on the 48 acres, an argument could be made that the scale of this effect would not be dramatic or significant since the state farmland mapping indicates that there are approximately 412,000 acres of available grazing land in the county and the County Crop Report indicates that there is about 6,997 acres of irrigated pasture in the county. In addition, the loss of irrigated rangeland production could be offset by providing irrigation to other rangelands which currently are not irrigated. In addition, the project may result in other increases in agricultural production resulting from the application of compost and mulch products generated by the project. As such the project could be designed and mitigated in such a way that it is not expected to have significant net effect on resource production.

It appears that the proposal could comply with other land use policies identified. However if the site is not considered a compatible use under the Williamson act, it may be necessary to either phase-out, cancel or rescind the Williamson act contract on the subject 48 acres in order to comply with policy AR-3b below.

AGRICULTURAL RESOURCES ELEMENT: The Agricultural Resources Element policies pertinent to the project are:

Policy AR-3b: Lands subject to a Williamson Act contract are restricted from incompatible development under the County's rules for administration of Agricultural Preserves, as amended from time to time.

See discussion of Williamson Act compliance below

Policy AR-4a: The primary use of any parcel within the three agricultural land use categories shall be agricultural production and related processing, support services, and visitor serving uses.

Policy AR-5d: Define "agricultural support services" as processing services, maintenance and repair of farm machinery and equipment, veterinary clinics, custom farming services, agricultural waste handling and disposal services, and other similar related services.

Policy AR-5e: Only permit agricultural support services that support local agricultural production consistent with the specific requirements of each of the three agricultural land use categories. Insure that such uses are subordinate to on-site agricultural production and do not adversely affect agricultural production in the area. Consider the following factors in determining whether or not an agricultural support service is subordinate to on-site agricultural production:

(1) The portion of the site devoted to the service as opposed to production.
(2) The extent of structure needed for the service as opposed to production.
(3) The relative number of employees devoted to the support service use in comparison to that needed for agricultural production.
(4) The history of agricultural production on the site.
(5) The potential for the service facility to be converted to non agricultural uses due to its location and access.

Discussion: The compost operation would provide some support to agricultural operations as up to ten percent of the raw materials may include agricultural wastes and about fifteen percent of the finished product is sold to agricultural operations. However it is clear that the majority of the input and output of the composting operation is not agriculturally related. Only about 48 acres or 12 percent of the parcel would be required for the operation but it would be the more intense use of the property requiring more infrastructure, and employees and associated traffic. The proposed site is currently irrigated pasture used to graze cattle. The site is located on two arterial roads east of Petaluma. Its potential for conversion to other uses depends on what those other uses are.

Policy AR-5f: Use the following guidelines for approving zoning or permits for agricultural support services:

(1) The use will not require the extension of sewer or water,
(2) The use does not substantially detract from agricultural production on-site or in the area,
(3) The use does not create a concentration of commercial uses in the immediate area, and
(4) The use is compatible with and does not adversely impact surrounding residential neighborhoods.

Discussion: The use will not require the extension of sewer or water lines. The proposed project area would occupy about 12 percent of the parcel area and does not include any alternate land use activity on the remaining lands which are used for grazing. As such 88 percent of the parcel would be retain the existing agricultural production and based on an acreage criteria would not substantially detract from agricultural production on the remaining parcel areas. The project is not expected to create a concentration of commercial uses in the area. The project is surrounded by agricultural lands and is several miles from the nearest residential neighborhood. The project could have an impact on adjacent residences in terms of noise, odors and traffic but these could be avoided and minimized through proper design and mitigations.

PUBLIC FACILITIES AND SERVICES ELEMENT: This element contains County policy regarding solid waste management services in Sonoma County. The background text in section 3.4 describes State requirements and local history for the CoIWMP adopted in 1993 and last amended in 2003. The CoIWMP is the principal planning document for solid waste management in the County, but landfills, transfer stations and other solid waste management facilities located in unincorporated areas are designated in the Land Use Element. Following are the Element policies pertinent to this project:

Objective PF-2.9: Use the CoIWMP and any subsequent amendments thereto, as the policy document for solid waste management in the County.

Discussion: The CoIWMP includes a composting component (Section 4.5.4 et. seq.) which discusses several programs and implementation goals. Section 4.5.6.2 calls for the yard debris composting operation to be relocated to a permanent location off the Central Landfill during the 2009 to 2018 time frame. The proposal to relocate the existing facility to an alternate offsite location is consistent with the CoIWMP implementation goal to relocate the operation to alternate site off of the Central Disposal Site.

Policy PF-2a: Plan, design, and construct ... solid waste services ... in accordance with projected growth, except as provided in Policy LU-4d.

Policy PF-2y: Minor public facilities... that ... are not the primary use of the subject property, are allowed in any land use category, provided they are compatible with neighborhood character and designed to have minimal impact on natural and scenic resources. Projects that are clearly significant in terms of cost, scope of environmental impacts, public controversy, or involve more than one parcel, shall not be considered minor.

Policy PF-2z: Acquisition of land for all larger public facilities not addressed by Policy PF-2y, including parks, schools, wastewater treatment and water transmission facilities...is generally inconsistent with agricultural land use categories.

Discussion: Since the project is a large central facility that would serve the entire County and would clearly be significant in terms of cost, scope of environmental impacts, public controversy, it may not qualify as a minor public facility under Policy PF-2y. Though Policy PF-2z indicates that public acquisition of lands for larger public facilities is generally inconsistent with the agricultural land use categories, there may still be occasional; instances where such acquisitions may appropriate. The acquisition of the proposed agricultural lands could be considered consistent if a General Plan amendment is applied for to change the land use designation to Public / Quasi-Public.

WATER RESOURCES ELEMENT: The Element was added to the 2020 General Plan to help ensure that Sonoma County's water resources are sustained and protected, that water use does not exceed replenishment rates over time causing declines in availability and that degradation in surface water or groundwater resources does not result. Several policies which are pertinent to the proposed relocated composting operation and the Central site are:

Policy WR-1b: Design, construct, and maintain County buildings, roads, bridges, drainage and other facilities to minimize sediment and other pollutants in stormwater flows. Develop and implement "best management practices" for ongoing maintenance and operation.*

Policy WR-1g: Minimize deposition and discharge of sediment, debris, waste and other pollutants into surface runoff, drainage systems, surface water bodies, and groundwater.*

Discussion: Since runoff from composting operations could include high degrees of organic matter, sediment and other constituents which could infiltrate to groundwater and or affect the quality of surface waters, it will be important to design the operation to protect water resources. The proposed facility would be designed for zero discharge. Composting would be carried out on impervious pad and all stormwater and compost leachate would flow to detention ponds to be reincorporated into the piles or for other beneficial use. If the ASP method of composting is used, a physical barrier would cover the piles preventing rainfall saturation which could cause excess runoff or compost leachate.

It is beyond the scope of this consistency review to assess potential ground water and surface water impacts or appropriate designs, BMP's or mitigations. These would be vetted out during the SCWMA's environmental review process and the County's permitting process. The stormwater management plan should be reviewed during the permitting process to assure that the above policies are met.

Policy WR-2e (formerly RC-3h): Require proof of groundwater with a sufficient yield and quality to support proposed uses in Class 3 and 4 water areas. … Test wells may be required in Class 3 areas. Deny discretionary applications in Class 3 and 4 areas unless a hydrogeologic report establishes that groundwater quality and quantity are adequate and will not be adversely impacted by the cumulative amount of development and uses allowed in the area, so that the proposed use will not cause or exacerbate an overdraft condition in a groundwater basin or subbasin…"

Discussion: The site is in an area of marginal groundwater availability - Zone 3 which requires proof of groundwater with a sufficient yield and quality to support proposed uses prior to project approval. The composting operation proposes to use up to 82.9 acre feet of water per year and plans on utilizing an existing pipeline to the property to deliver treated water from the Ellis Creek Water Recycling Facility for use in the composting operation. For this reason the groundwater demands of the relocated compost operation may be less than the existing operation which relies on well water.

However, potable water will be necessary to serve the administrative office and employees and patrons. In addition, the project proposal includes assessment and possible use of other water supply options including use of well water and the site's existing ponds. These will be studied in the water supply assessment as part of the Environmental Impact Report preparation.
A detailed water budget should be prepared to estimate the projects groundwater needs. Proof of adequate groundwater availability will have to provided prior to project approval and it may include a geologic report assessing groundwater supplies and nearby wells and or onsite test wells. In addition to addressing quantity of groundwater available to meet the proposed projects needs, the report must also verify that the quality of the groundwater is sufficient to meet the project needs.

Policy WR-2d: Continue the existing program to require groundwater monitoring for new or expanded discretionary commercial and industrial uses using wells. Where justified by the monitoring program, establish additional monitoring requirements for other new wells.*

Discussion: Depending on groundwater use and volume, monitoring may be required to comply with the above policy. It also may be required if the environmental review determines it is necessary for mitigation monitoring.

OPEN SPACE AND RESOURCE CONSERVATION ELEMENT: This element addresses open space for the preservation of natural resources. It seeks to preserve the natural and scenic resources and designates certain areas with designations where protective policies apply and provides the guidelines for making necessary consistency findings.

Objective OSRC-14.3: Reduce the generation of solid waste and increase solid waste reuse and recycling.
Discussion: A composting operation which promotes reuse of the organic wastes, converts them into a resource and reduces the waste stream would be consistent with the above policy.

The Open Space maps (Figure ORSC-5h) indicate there has been a reported observance of a special status species on the subject parcel, specifically a Western pond turtle which is a California Species of concern. In addition Adobe Road and the Highway 116/ Stage Gulch Roads which front the project parcel are designated as Scenic corridors.

Discussion: Both these issues would have to be assessed in the environmental review process and design revisions or mitigations would be recommended as necessary to avoid or minimize any impacts. The proposed site is setback approximately one half mile from the scenic corridors.

DEVELOPMENT CODE COMPLIANCE: The current Development Code provisions for the LEA - Land Extensive Agriculture district are set forth in Section 26-06-020 and it lists the following uses that would be allowed subject to the approval of a discretionary use permit.

(f) Agricultural support services with more than one (1) employee or occupying more than one-half acre of land subject to, at a minimum, the criteria of General Plan Policies AR-5c and AR-5d. By reference to the criteria of Section 26-06-010(e) it also stipulates that

> support services may include incidental sales of products related to the support service use but shall not include additional walk-in, over-the-counter retail sales and that they must be subordinate to on-site agricultural production.

Discussion: Both Policy AR-5d of the 2020 General Plan and Chapter 2 of the Development Code define Agricultural Support Services as:

> Processing services, maintenance and repair of farm machinery and equipment, veterinary clinics, custom farming services, agricultural waste handling and disposal services and other similar services.

The zoning code reference to General Plan policies AR5c and AR-5d under “agricultural support services” refer to what are known as policies AR-5e and 5f of the 2020 General Pan. Policy AR-5e lists criteria to be considered when determining whether an agricultural support service to be considered subordinate to agricultural production. Policy AR-5f establishes guidelines for approving zoning or permits for agricultural support services. See analysis under discussion of Agricultural Resources Element consistency.

WILLIAMSON ACT COMPLIANCE: The existing 390 acre parcel has been in an Agricultural Preserve and Type-2 Williamson Act contract since 1975. Contracts entered into pursuant to the California Land Conservation Act of 1965 place additional restrictions on the parcel beyond those that would otherwise apply pursuant to the General Plan and Development Code. Even if a project complies with the other applicable General Plan policies for agriculture, it could still be incompatible with the stricter requirements imposed by the Williamson Act contract.

The General Plan supports the ongoing protection of agricultural lands through the Williamson Act. At the time of this determination, amendments to the County’s Williamson Act guidelines and contract provisions are being considered for adoption through a public hearing process. Since that public hearing process is still ongoing and changes have not yet been officially adopted, the following discussion must be considered preliminary and project applicants are advised to consider the implications of the guidelines and contract amendments ultimately adopted by the Board of Supervisors.

The applicability of the WA’s contract restrictions will also depend on how the parcel is acquired by a local government agency. Public acquisition of Williamson Act land is governed by Government Code Sections 51290 – 51295 and 51296.6. If a public entity purchases the parcel for a public improvement and findings can be made pursuant to Government Code Section 51292, the Williamson Act contract may be voided on the portion acquired pursuant to the Government Code Section 51295. Section 51292 indicates that no public agency or person shall locate a public improvement within an agricultural preserve unless the following findings are made:

> "(a) The location is not based primarily on a consideration of the lower cost of acquiring land in an agricultural preserve, and
>
> b) If the land is agricultural land covered under a contract pursuant to this chapter for any public improvement, that there is no other land within or outside the preserve on which it is reasonably feasible to locate the public improvement."

The contract shall be deemed null and void as to the land actually being condemned, or so acquired as of the date the action is filed. Upon the termination of the proceeding, the contract shall be null and void for all land actually taken or acquired for a public improvement or use. If only 48 acres of the 390 acre parcel is intended to be used for public purposes a subdivision and new contract may be required to retain the remainder of the land under the WA.

If the contract is not canceled, extensive findings must be made pursuant to the County's updated Williamson Act guidelines and Sections 51238.1 to 51238.3 of the Government Code. For Type II contracts (non-prime agricultural land), a minimum of 50% of the total contracted land must be continuously maintained and used for commercial production of an agricultural commodity. Where an agricultural commodity is produced, the preparation for market of agricultural commodities in their natural state, which are grown or raised on-site or in the local area may also be allowed along with facilities and structures utilized in the preparation and or storage of an agricultural commodity in their natural state.

The County recognizes that in addition to agricultural production, it may be appropriate to allow other uses of contracted land that are compatible with the agricultural operation on the property. This could include processing of agricultural commodities beyond the natural state and/or the sale and marketing of agricultural commodities or agricultural support services. In addition, the County's Williamson Act Rules list other allowable land use activities which may be considered compatible with agricultural production.

The new guidelines being considered also lists permitted compatible uses in a Type II agricultural preserve but would require that to be considered compatible they must either 1) collectively occupy no more than 15% of the contracted land, or five acres, whichever is less, or 2) nevertheless be found compatible after the Board makes certain findings. Since the subject 48 acre project site exceeds the five acre limit, it could only be considered compatible if the Board makes the following findings:

(a) the proposed compatible use is an agricultural use, open space use, or recreational use, as defined by the Williamson Act and these Rules It is not; or

(b) the Board of Supervisors makes all of the following findings:

1. The use is enumerated as a compatible use by these Rules; Composting facilities are not specifically listed as an allowed compatible use. However, uses supportive of agriculture such as the processing of agricultural commodities beyond the natural state, agricultural sales and marketing, and agricultural support services are listed as compatible uses. The ability to make this finding depends upon whether or not the Board finds the use which predominantly serves non agricultural interests fits into one of the above categories.

2. The land will continue to be devoted to agricultural use for a …Type II contract…; the remainder portion of the 390 acre parcel would be devoted to an agricultural use but not the 48 acre composting site.

3. The use complies with Government Code Sections 51238.1 through 51238.3;

Section 51238.1: Uses approved on contracted lands shall be consistent with all of the following principles of compatibility:

(1) The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or on other contracted lands in agricultural preserves. Project would compromise long-term productive capacity on the 48 acres as it would be devoted to long-term composting operation but it would not compromise production on the remaining parcel area or other adjacent lands.

(2) The use will not significantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or on other contracted lands in agricultural preserves. Uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands, including activities such as harvesting, processing, or shipping.

The project would eliminate 48 acres of irrigated pasture used for rangeland. It would not impair grazing uses on the remainder of the parcel or adjacent lands.

(3) The use will not result in the significant removal of adjacent contracted land from agricultural or open-space use. Project is not expected to cause any removal of adjacent lands from the Williamson Act Contracts.

Section 51238.2 relates to mining and does not apply.

Section 51238.3 Section 51238.3 (a) and (b) do not apply to this proposal since they pertain to land uses that were in place or applied for prior to June 7, 1994. However, subsection 51238.3 (c) applies and it indicates the requirements of Sections 51238.1 and 51238.2 do not apply to uses that are expressly specified as a “compatible use” within the contract prior to June 7, 1994 or at the time the contract was amended to include the uses, whichever is later. None of these scenarios apply.

4. The use will not result in the significant increase in the density of the temporary or permanent human population that could hinder or impair agricultural operations on the subject contracted parcel or parcels;
No increase in populations is anticipated as a result of the project proposal.

5. The use will not require and will not encourage the extension of urban services such as public sewer, water, or the upgrade of public roads to urban standards that could encourage premature conversion of agricultural land to non-agricultural uses;
No extension of public services is required or anticipated.

6. The use will not include a residential subdivision;
The proposal does not involve any residential subdivision

7. The use is consistent with the County General Plan and Zoning Code;

See previous discussion in this analysis.

8. The use will not significantly change the character, appearance, or operation of the agricultural use or open space use of the contracted land.

The compost operation will change the character of the 48 acre site from rolling rangeland to a more industrial composting yard. However it is about a half mile from the road and may be partially screened. It would not affect the existing grazing use on the remainder of the parcel.

Possible alternatives to provide Williamson Act consistency: If the Williamson Act contract is not canceled, and the use is not considered a compatible use under the contract, it may still be possible to achieve Williamson act consistency by considering an easement exchange on other non-contracted land, or converting to an open space easement.

Appendix LESA

California Agricultural Land Evaluation and Site Assessment Model (Site 40)

SONOMA COUNTY WASTE MANAGEMENT AGENCY COMPOST FACILITY

LESA Summary

California Agricultural Land Evaluation and Site Assessment Model (LESA)

Introduction

Land Evaluation and Site Assessment (LESA) is a term used to define an approach for rating the relative quality of land resources based upon specific measurable features. The formulation of a California Agricultural LESA Model is the result of Senate Bill 850 (Chapter 812 /1993), which charges the Resources Agency, in consultation with the Governor's Office of Planning and Research, with developing an amendment to Appendix G of the California Environmental Quality Act (CEQA) Guidelines concerning agricultural lands. Such an amendment is intended "to provide lead agencies with an optional methodology to ensure that significant effects on the environment of agricultural land conversions are quantitatively and consistently considered in the environmental review process" (Public Resources Code Section 21095).

The California Agricultural LESA Model is composed of six different factors. Two Land Evaluation factors are based upon measures of soil resource quality. Four Site Assessment factors provide measures of a given project's size, water resource availability, surrounding agricultural lands, and surrounding protected resource lands. For a given project, each of these factors is separately rated on a 100 point scale. The factors are then weighted relative to one another and combined, resulting in a single numeric score for a given project, with a maximum attainable score of 100 points. It is this project score that becomes the basis for making a determination of a project's potential significance, based upon a range of established scoring thresholds.

Defining the LESA System

The Land Evaluation and Site Assessment (LESA) system is a point-based approach that is generally used for rating the relative value of agricultural land resources. In basic terms, a given LESA model is created by defining and measuring two separate sets of factors. The first set, Land Evaluation, includes factors that measure the inherent soil based qualities of land as they relate to agricultural suitability. The second set, Site Assessment, includes factors that are intended to measure social, economic, and geographic attributes that also contribute to the overall value of agricultural land. While this dual rating approach is common to all LESA models, the individual land evaluation and site assessment factors that are ultimately utilized and measured can vary considerably, and can be selected to meet the local or regional needs and conditions for which a LESA model is being designed to address. In short, the LESA methodology lends itself well to adaptation and customization in individual states and localities.

Background on LESA Nationwide

In 1981, the federal Natural Resources Conservation Service (NRCS), known then as the Soil Conservation Service, released a new system that was designed to provide objective ratings of the agricultural suitability of land compared to demands for nonagricultural uses of lands. The system became known as Land Evaluation and Site Assessment, or LESA. Soon after it was designed, LESA was adopted as a procedural tool at the federal level for identifying and addressing the potential adverse effects of federal programs (e.g., funding of highway construction) on farmland protection. The Farmland Protection Policy Act of 1981 spells out requirements to ensure that federal programs, to the extent practical, are compatible with state, local, and private programs and policies to protect farmland, and calls for the use of LESA to aid in this analysis. Typically, staff of the NRCS is involved in performing LESA scoring analyses of individual projects that involve other agencies of the federal government.

Since its inception, the LESA approach has received substantial attention from state and local governments as well. Nationwide, over two hundred jurisdictions have developed local LESA methodologies. One of the attractive features of the LESA approach is that it is well suited to being modified to reflect regional and local conditions. Typical local applications of LESA include assisting in decision making concerning the sitting of projects, changes in zoning, and spheres of influence determinations. LESA is also increasingly being utilized for farmland protection programs, such as the identification of priority areas to concentrate conservation easement acquisition efforts.

Because of the inherent flexibility in LESA model design, there is a broad array of factors that a given LESA model can utilize. Some LESA models require the measurement of as many as twenty different factors. Over the past 15 years, the body of knowledge concerning LESA model development and application has begun to indicate that LESA models utilizing only several basic factors can capture much of the variability associated with the determination of the relative value of agricultural lands. In fact, LESA models with many factors are increasingly viewed as having redundancies, with different factors essentially measuring the same features, or being highly correlated with one another.

California Agricultural LESA Scoring Thresholds -

Making Determinations of Significance Under CEQA

A single LESA score is generated for a given project after all of the individual Land Evaluation and Site Assessment factors have been scored and weighted as detailed in Sections 2 and 3 of the LESA Manual. Just as with the scoring of individual factors that comprise the California Agricultural LESA Model, final project scoring is based on a scale of 100 points, with a given project being capable of deriving a maximum of 50 points from the Land Evaluation factors and 50 points from the Site Assessment factors.

Scoring thresholds are based upon both the total LESA score as well as the component LE and SA subscores. In this manner the scoring thresholds are dependent upon the attainment of a minimum score for the LE and SA subscores so that a single threshold is not the result of heavily skewed subscores (i.e., a site with a very high LE score, but a very low SA score, or vice versa). Table 1 presents the California Agricultural LESA scoring thresholds.

TABLE 1

CALIFORNIA LESA MODEL SCORING THRESHOLDS

Total LESA Score	Scoring Decision
0 to 39 Points	Not Considered Significant
40 to 59 Points	Considered Significant only if LE and SA subscores are each greater than or equal to 20 points
60 to 79 Points	Considered Significant unless either LE or SA subscore is less than 20 points
80 to 100 Points	Considered Significant

Sources: DOC Farmland Mapping & Monitoring Program, 2008. NRCS Soil Survey, 2009. Soil Survey Sonoma County California, 1972. Water Supply Assessment, Sonoma County Waste Management Agency, Site 40 Composting Facility, 2011.

Conclusion

The Site 40 Alternative would be located on approximately 57 acres of land containing the following FMMP categories: Prime Farmland (0.7 acres), Farmland of Statewide Importance (17.3 acres), Farmland of Local Importance (27.6 acres), and Grazing Land (11.4 acres). After conducting the Land Evaluation and Site Assessment Model (Appendix A. California Agricultural LESA Worksheets), it was determined that the Project would have a Land Evaluation (LE) subscore of 21.64 and a Site Assessment (SA) subscore of 46.50 (see Appendix A). The combined final LESA score is 68.14 which is considered significant unless either the LE or SA subscore is less than 20 points, neither of which are; thus, the Project's agricultural impact is considered significant under the California Agricultural LESA Model.

Appendix A
California Agricultural LESA Worksheets

NOTES

Calculation of the Land Evaluation (LE) Score

Part 1. Land Capability Classification (LCC) Score:

(1) Determine the total acreage of the project.
(2) Determine the soil types within the project area and enter them in **Column A** of the **Land Evaluation Worksheet** provided on page 2-A.
(3) Calculate the total acres of each soil type and enter the amounts in **Column B**.
(4) Divide the acres of each soil type (**Column B**) by the total acreage to determine the proportion of each soil type present. Enter the proportion of each soil type in **Column C**.
(5) Determine the LCC for each soil type from the applicable Soil Survey and enter it in **Column D**.
(6) From the LCC Scoring Table below, determine the point rating corresponding to the LCC for each soil type and enter it in **Column E**.

LCC Scoring Table

LCC Class	I	IIe	IIs,w	IIIe	IIIs,w	IVe	IVs,w	V	VI	VII	VIII
Points	100	90	80	70	60	50	40	30	20	10	0

(7) Multiply the proportion of each soil type (**Column C**) by the point score (**Column E**) and enter the resulting scores in **Column F**.
(8) Sum the LCC scores in **Column F**.
(9) Enter the LCC score in box <1> of the **Final LESA Score Sheet** on page 10-A.

Part 2. Storie Index Score:

(1) Determine the Storie Index rating for each soil type and enter it in **Column G**.
(2) Multiply the proportion of each soil type (**Column C**) by the Storie Index rating (**Column G**) and enter the scores in **Column H**.
(3) Sum the Storie Index scores in **Column H** to gain the Storie Index Score.
(4) Enter the Storie Index Score in box <2> of the **Final LESA Score Sheet** on page 10-A.

Land Evaluation Worksheet

Land Capability Classification (LCC) and Storie Index Scores

A Soil Map Unit	B Project Acres	C Proportion of Project Area	D LCC	E LCC Rating	F LCC Score	G Storie Index	H Storie Index Score
GuF	6.64	.119	VIII	0	0	<5	.595
DbE	6.85	.122	IVe	50	6.1	34	4.148
DbC	0.71	.013	IIIe	70	.91	44	.572
CeB	1.00	.018	IIIe	70	1.26	41	.738
DbD	22.95	.410	IIIe	70	28.7	41	16.81
HcD	17.81	.318	IVe	50	15.9	34	10.812
Totals	55.96	(Must Sum to 1.0)		***LCC Total Score***	52.87	***Storie Index Total Score***	33.68

Site Assessment Worksheet 1.

Project Size Score

	I LCC Class I - II	J LCC Class III	K LCC Class IV - VIII
			6.64
			6.85
		0.71	
		1.00	
		22.95	
			17.81
Total Acres	0	24.66	31.30
Project Size Scores	0	30	0
Highest Project Size Score		30	

NOTES

Calculation of the Site Assessment (SA) Score

Part 1. Project Size Score:.

(1) Using **Site Assessment Worksheet 1** provided on page 2-A, enter the acreage of each soil type from **Column B** in the **Column - I, J or K** - that corresponds to the LCC for that soil. (Note: While the Project Size Score is a component of the Site Assessment calculations, the score sheet is an extension of data collected in the Land Evaluation Worksheet, and is therefore displayed beside it).
(2) Sum **Column I** to determine the total amount of class **I** and **II** soils on the project site.
(3) Sum **Column J** to determine the total amount of class **III** soils on the project site.
(4) Sum **Column K** to determine the total amount of class **IV** and lower soils on the project site.
(5) Compare the total score for each LCC group in the Project Size Scoring Table below and determine which group receives the highest score.

Project Size Scoring Table

Class I or II		**Class III**		**Class IV or Lower**	
Acreage	Points	Acreage	Points	Acreage	Points
>80	100	>160	100	>320	100
60-79	90	120-159	90	240-319	80
40-59	80	80-119	80	160-239	60
20-39	50	60-79	70	100-159	40
10-19	30	40-59	60	40-99	20
10<	0	20-39	30	40<	0
		10-19	10		
		10<	0		

(6) Enter the **Project Size Score** (the highest score from the three LCC categories) in box <3> of the **Final LESA Score Sheet** on page 10-A.

NOTES

Part 2. Water Resource Availability Score:

(1) Determine the type(s) of irrigation present on the project site, including a determination of whether there is dryland agricultural activity as well.

(2) Divide the site into portions according to the type or types of irrigation or dryland cropping that is available in each portion. Enter this information in **Column B** of **Site Assessment Worksheet 2. - Water Resources Availability**.

(3) Determine the proportion of the total site represented for each portion identified, and enter this information in **Column C**.

(4) Using the Water Resources Availability Scoring Table, identify the option that is most applicable for each portion, based upon the feasibility of irrigation in drought and non-drought years, and whether physical or economic restrictions are likely to exist. Enter the applicable Water Resource Availability Score into **Column D**.

(5) Multiply the Water Resource Availability Score for each portion by the proportion of the project area it represents to determine the weighted score for each portion in **Column E**.

(6) Sum the scores for all portions to determine the project's total Water Resources Availability Score

(7) Enter the Water Resource Availability Score in box <4> of the **Final LESA Score Sheet** on page 10-A.

Site Assessment Worksheet 2. - Water Resources Availability

A	B	C	D	E
Project Portion	Water Source	Proportion of Project Area	Water Availability Score	Weighted Availability Score (C x D)
1	Recycled Water, Existing Reservoir, Groundwater,Detention Pond	1	80	80
2				
3				
4				
5				
6				
		(Must Sum to 1.0)	***Total Water Resource Score***	80

Water Resource Availability Scoring Table

Option	Non-Drought Years			Drought Years			WATER RESOURCE SCORE
	RESTRICTIONS			RESTRICTIONS			
	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	Irrigated Production Feasible?	Physical Restrictions ?	Economic Restrictions ?	
1	YES	NO	NO	YES	NO	NO	100
2	YES	NO	NO	YES	NO	YES	95
3	YES	NO	YES	YES	NO	YES	90
4	YES	NO	NO	YES	YES	NO	85
5	YES	NO	NO	YES	YES	YES	80
6	YES	YES	NO	YES	YES	NO	75
7	YES	YES	YES	YES	YES	YES	65
8	YES	NO	NO	NO	-- --	-- --	50
9	YES	NO	YES	NO	-- --	-- --	45
10	YES	YES	NO	NO	-- --	-- --	35
11	YES	YES	YES	NO	-- --	-- --	30
12	Irrigated production not feasible, but rainfall adequate for dryland production in both drought and non-drought years						25
13	Irrigated production not feasible, but rainfall adequate for dryland production in non-drought years (but not in drought years)						20
14	Neither irrigated nor dryland production feasible						0

NOTES

Part 3. Surrounding Agricultural Land Use Score:

(1) Calculate the project's Zone of Influence (ZOI) as follows:

(a) a rectangle is drawn around the project such that the rectangle is the smallest that can completely encompass the project area.

(b) a second rectangle is then drawn which extends one quarter mile on all sides beyond the first rectangle.

(c) The ZOI includes all parcels that are contained within or are intersected by the second rectangle, less the area of the project itself.

(2) Sum the area of all parcels to determine the total acreage of the ZOI.

(3) Determine which parcels are in agricultural use and sum the areas of these parcels

(4) Divide the area in agriculture found in step (3) by the total area of the ZOI found in step (2) to determine the percent of the ZOI that is in agricultural use.

(5) Determine the Surrounding Agricultural Land Score utilizing the Surrounding Agricultural Land Scoring Table below.

Surrounding Agricultural Land Scoring Table

Percent of ZOI in Agriculture	Surrounding Agricultural Land Score
90-100	100
80-89	90
75-79	80
70-74	70
65-69	60
60-64	50
55-59	40
50-54	30
45-49	20
40-44	10
<40	0

(5) Enter the Surrounding Agricultural Land Score in box <5> of the **Final LESA Score Sheet** on page 10-A.

Site Assessment Worksheet 3.
Surrounding Agricultural Land and Surrounding Protected Resource Land

A	B	C	D	E	F	G
Zone of Influence					Surrounding Agricultural Land Score (From Table)	Surrounding Protected Resource Land Score (From Table)
Total Acres	Acres in Agriculture	Acres of Protected Resource Land	Percent in Agriculture (A/B)	Percent Protected Resource Land (A/C)		
408.87	384.61	369.57	94%	90%	180	100

NOTES

Part 4. Protected Resource Lands Score:

The Protected Resource Lands scoring relies upon the same Zone of Influence information gathered in Part 3, and figures are entered in Site Assessment Worksheet 3, which combines the surrounding agricultural and protected lands calculations.

(1) Use the total area of the ZOI calculated in Part 3. for the Surrounding Agricultural Land Use score.

(2) Sum the area of those parcels within the ZOI that are protected resource lands, as defined in the California Agricultural LESA Guidelines.

(3) Divide the area that is determined to be protected in Step (2) by the total acreage of the ZOI to determine the percentage of the surrounding area that is under resource protection.

(4) Determine the Surrounding Protected Resource Land Score utilizing the Surrounding Protected Resource Land Scoring Table below.

Surrounding Protected Resource Land Scoring Table

Percent of ZOI Protected	Protected Resource Land Score
90-100	100
80-89	90
75-79	80
70-74	70
65-69	60
60-64	50
55-59	40
50-54	30
45-49	20
40-44	10
<40	0

(5) Enter the Protected Resource Land score in box <6> of the **Final LESA Score Sheet** on page 10-A.

NOTES

Final LESA Score Sheet

Calculation of the Final LESA Score:

(1) Multiply each factor score by the factor weight to determine the weighted score and enter in Weighted Factor Scores column.
(2) Sum the weighted factor scores for the LE factors to determine the total LE score for the project.
(3) Sum the weighted factor scores for the SA factors to determine the total SA score for the project.
(4) Sum the total LE and SA scores to determine the Final LESA Score for the project.

	Factor Scores	Factor Weight	Weighted Factor Scores
LE Factors			
Land Capability Classification	<1> 52.87	0.25	13.22
Storie Index	<2> 33.68	0.25	8.42
LE Subtotal		***0.50***	21.64
SA Factors			
Project Size	<3> 30	0.15	4.50
Water Resource Availability	<4> 80	0.15	12
Agricultural Land	<5> 100	0.15	15
Resource Land	<6> 100	0.05	15
SA Subtotal		***0.50***	46.50
		Final LESA Score	68.14

For further information on the scoring thresholds under the California Agricultural LESA Model, consult Section 4 of the Instruction Manual.

Appendix NOISE

Traffic Noise Analysis Calculations

Central Site Alternative Traffic Noise Level Estimates

ROAD SEGMENT #1: Stoney Point N of 116

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	816	85	694	10	82	5	41	55	88	55	88	55	88	15.0	4.5	0.0	65.6
Existing + Project	816	85	694	10	82	5	41	55	88	55	88	55	88	15.0	4.5	0.0	65.6
AM Cum	2,091	85	1,777	10	209	5	105	55	88	55	88	55	88	15.0	4.5	0.0	69.7
AM Cum + P	2,091	85	1,777	10	209	5	105	55	88	55	88	55	88	15.0	4.5	0.0	69.7

ROAD SEGMENT #2: Stony Point S of 116

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,198	85	1,018	10	120	5	60	55	88	55	88	55	88	15.0	4.5	0.0	67.3
Existing + Project	1,219	85	1,036	10	122	5	61	55	88	55	88	55	88	15.0	4.5	0.0	67.4
AM Cum	2,520	85	2,142	10	252	5	126	55	88	55	88	55	88	15.0	4.5	0.0	70.5
AM Cum + P	2,541	85	2,160	10	254	5	127	55	88	55	88	55	88	15.0	4.5	0.0	70.6

ROAD SEGMENT #3: SR 116 E of Stoney Point

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,211	85	1,029	10	121	5	61	55	88	55	88	55	88	15.0	4.5	0.0	67.4
Existing + Project	1,232	85	1,047	10	123	5	62	55	88	55	88	55	88	15.0	4.5	0.0	67.4
AM Cum	2,224	85	1,890	10	222	5	111	55	88	55	88	55	88	15.0	4.5	0.0	70.0
AM Cum + P	2,245	85	1,908	10	225	5	112	55	88	55	88	55	88	15.0	4.5	0.0	70.0

ROAD SEGMENT #4: SR 116 W of Stoney Point

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,485	85	1,262	10	149	5	74	55	88	55	88	55	88	15.0	4.5	0.0	68.2
Existing + Project	1,485	85	1,262	10	149	5	74	55	88	55	88	55	88	15.0	4.5	0.0	68.2
AM Cum	2,639	85	2,243	10	264	5	132	55	88	55	88	55	88	15.0	4.5	0.0	70.7
AM Cum + P	2,639	85	2,243	10	264	5	132	55	88	55	88	55	88	15.0	4.5	0.0	70.7

ROAD SEGMENT #9: Stoney Point N of Meacham

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	1,107	85	941	10	111	5	55	55	88	55	88	55	88	15.0	4.5	0.0	66.9
Exiosting + Project	1,128	85	959	10	113	5	56	55	88	55	88	55	88	15.0	4.5	0.0	67.0
AM Cum	2,184	85	1,856	10	218	5	109	55	88	55	88	55	88	15.0	4.5	0.0	69.9
AM Cum + P	2,205	85	1,874	10	221	5	110	55	88	55	88	55	88	15.0	4.5	0.0	69.9

ROAD SEGMENT #10: Stoney Point S of Meacham

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	816	85	694	10	82	5	41	55	88	55	88	55	88	15.0	4.5	0.0	65.8
Exiosting + Project	816	85	694	10	82	5	41	55	88	55	88	55	88	15.0	4.5	0.0	65.8
AM Cum	2,091	85	1,777	10	209	5	105	55	88	55	88	55	88	15.0	4.5	0.0	68.8
AM Cum + P	2,091	85	1,777	10	209	5	105	55	88	55	88	55	88	15.0	4.5	0.0	68.9

ROAD SEGMENT #12: Meacham W of Stoney Point

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	356	70	249	25	89	5	18	45	72	45	72	45	72	15.0	4.5	0.0	62.3
Exiosting + Project	382	70	267	25	96	5	19	45	72	45	72	45	72	15.0	4.5	0.0	62.6
AM Cum	644	70	451	25	161	5	32	45	72	45	72	45	72	15.0	4.5	0.0	64.9
AM Cum + P	670	70	469	25	168	5	34	45	72	45	72	45	72	15.0	4.5	0.0	65.1

ROAD SEGMENT #17: Meacham Rd N of Site Access

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	315	70	221	25	79	5	16	45	72	45	72	45	72	15.0	4.5	0.0	61.8
Exiosting + Project	341	70	239	25	85	5	17	45	72	45	72	45	72	15.0	4.5	0.0	62.1
AM Cum	414	70	290	25	104	5	21	45	72	45	72	45	72	15.0	4.5	0.0	63.0
AM Cum + P	440	70	308	25	110	5	22	45	72	45	72	45	72	15.0	4.5	0.0	63.2

ROAD SEGMENT #21: Meacham Rd N of Site Access	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Sat Existing	463	80	370	15	69	5	23	45	72	45	72	45	72	15.0	4.5	0.0	62.5
Sat + Project	530	80	424	15	80	5	27	45	72	45	72	45	72	15.0	4.5	0.0	63.1
Sat Cum	648	80	518	15	97	5	32	45	72	45	72	45	72	15.0	4.5	0.0	63.9
Sat Cum + Project	715	80	572	15	107	5	36	45	72	45	72	45	72	15.0	4.5	0.0	64.4
	TOTAL			VEHICLE TYPE %						VEHICLE SPEED				Distance	attenuation	Barrier	TNM Lookup

ROAD SEGMENT #18: Meacham Rd S of Site Access	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	258	80	206	15	39	5	13	45	72	45	72	45	72	15.0	4.5	0.0	60.0
Exiosting + Project	258	80	206	15	39	5	13	45	72	45	72	45	72	15.0	4.5	0.0	60.0
AM Cum	357	80	286	15	54	5	18	45	72	45	72	45	72	15.0	4.5	0.0	65.9
AM Cum + P	357	80	286	15	54	5	18	45	72	45	72	45	72	15.0	4.5	0.0	65.9

ROAD SEGMENT #20: Site Access W of Meacham Rd.	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	attenuation 3.0 or 4.5	Barrier height	TNM Lookup Result (dBA)
Existing	65	70	46	25	16	5	3	20	32	20	32	20	32	15.0	4.5	0.0	55.1
Exiosting + Project	91	70	64	25	23	5	5	20	32	20	32	20	32	15.0	4.5	0.0	57.0
AM Cum	65	70	46	25	16	5	3	20	32	20	32	20	32	15.0	4.5	0.0	55.1
AM Cum + P	91	70	64	25	23	5	5	20	32	20	32	20	32	15.0	4.5	0.0	57.0

Site 5A Traffic Noise Level Estimates

Model Version 5/14/2009

ROAD SEGMENT #1: Lakeview Hwy north of twinhouse road

Weekday

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Existing	1,039	90	935	3	31	7	73	65	104	65	104	65	104	30	4.5	0	67.2
2011	1,108	90	997	3	33	7	78	65	104	65	104	65	104	30	4.5	0	67.4
2011+P	1,108	90	997	3	33	7	78	65	104	65	104	65	104	30	4.5	0	67.5
2030	1,480	90	1,332	3	44	7	104	65	104	65	104	65	104	30	4.5	0	68.7
2030+P	1,559	90	1,403	3	47	7	109	65	104	65	104	65	104	30	4.5	0	68.9
	0							65	104	65	104	65	104	30	4.5	0	

ROAD SEGMENT #2: Lakeview Hwy south of twinhouse road

Weekday

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Existing	1,036	90	932	3	31	7	73	65	104	65	104	65	104	30	4.5	0	67.2
2011	1,071	90	964	3	32	7	75	65	104	65	104	65	104	30	4.5	0	67.3
2011+P	1,073	90	966	3	32	7	75	65	104	65	104	65	104	30	4.5	0	67.3
2030	1,476	90	1,328	3	44	7	103	65	104	65	104	65	104	30	4.5	0	68.7
2030+P	1,484	90	1,336	3	45	7	104	65	104	65	104	65	104	30	4.5	0	68.7
	0							65	104	65	104	65	104	30	4.5	0	

ROAD SEGMENT #3: Lakeview Hwy north of Twin House Ranch Road

Saturday

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Existing	786	91	715	3	24	6	47	65	104	65	104	65	104	30	4.5	0	65.7
2011	813	91	740	3	24	6	49	65	104	65	104	65	104	30	4.5	0	65.9
2011+P	901	91	820	3	27	6	54	65	104	65	104	65	104	30	4.5	0	66.3
2030	1,121	91	1,020	3	34	6	67	65	104	65	104	65	104	30	4.5	0	67.3
2030+P	1,323	91	1,204	3	40	6	79	65	104	65	104	65	104	30	4.5	0	68
								65	104	65	104	65	104	30	4.5	0	

ROAD SEGMENT #4:. Lakeview Hwy south of twinhouse road**Sat**

	TOTAL # VEHICLES	Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Existing	800	91	728	3	24	6	48	65	104	65	104	65	104	30	4.5	0	65.8
2011	827	91	753	3	25	6	50	65	104	65	104	65	104	30	4.5	0	66
2011+P	837	91	762	3	25	6	50	65	104	65	104	65	104	30	4.5	0	66
2030	1,141	91	1,038	3	34	6	68	65	104	65	104	65	104	30	4.5	0	67.3
2030+P	1,164	91	1,059	3	35	6	70	65	104	65	104	65	104	30	4.5	0	67.4
								65	104	65	104	65	104	30	4.5	0	

Site 40 Alternative Traffic Noise Level Estimates

Model Version 5/14/2009

ROAD SEGMENT #1: Stage Gulch Road North of Site 40 Entrance

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Weekday																	
Existing	165	92	152	5	8	3	5	55	88	55	88	55	88	30	4.5	0	56.2
2011	170	92	156	5	9	3	5	55	88	55	88	55	88	30	4.5	0	56.4
2011+P	202	92	186	5	10	3	6	55	88	55	88	55	88	30	4.5	0	57.1
2030	224	92	206	5	11	3	7	55	88	55	88	55	88	30	4.5	0	57.6
2030+P	302	92	278	5	15	3	9	55	88	55	88	55	88	30	4.5	0	58.9
	0	92		5		3		55	88	55	88	55	88	30	4.5	0	

ROAD SEGMENT #2: Stage Gulch Road South of Site 40 Entrance

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Weekday																	
Existing	165	92	152	5	8	3	5	55	88	55	88	55	88	30	4.5	0	56.2
2011	170	92	156	5	9	3	5	55	88	55	88	55	88	30	4.5	0	56.4
2011+P	168	92	155	5	8	3	5	55	88	55	88	55	88	30	4.5	0	56.3
2030	224	92	206	5	11	3	7	55	88	55	88	55	88	30	4.5	0	57.6
2030+P	225	92	207	5	11	3	7	55	88	55	88	55	88	30	4.5	0	57.6
	0	92		5		3		55	88	55	88	55	88	30	4.5	0	

ROAD SEGMENT #3: Stage Gulch Road North of Site 40 Entrance

	TOTAL # VEHICLES	VEHICLE TYPE % Auto %	Auto	Medium Truck %	MT	Heavy Truck %	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Saturday																	
Existing	249	95	237	3	7	2	5	55	88	55	88	55	88	30	4.5	0	57.5
2011	256	95	243	3	8	2	5	55	88	55	88	55	88	30	4.5	0	57.6
2011+P	346	95	329	3	10	2	7	55	88	55	88	55	88	30	4.5	0	58.9
2030	339	95	322	3	10	2	7	55	88	55	88	55	88	30	4.5	0	58.8
2030+P	549	95	522	3	16	2	11	55	88	55	88	55	88	30	4.5	0	60.9
		95		3		2		55	88	55	88	55	88	30	4.5	0	

ROAD SEGMENT #4:. Stage Gulch Road South of Site 40 Entrance

	TOTAL # VEHICLES	VEHICLE TYPE % Auto	Auto	Medium Truck	MT	Heavy Truck	HT	VEHICLE SPEED Auto	k/h	MT	k/h	HT	k/h	Distance (meters)	Attenuation 3.0 or 4.5	Barrier Height	TNM Lookup Result dBA
Existing	249	95	237	3	7	2	5	55	88	55	88	55	88	30	4.5	0	57.5
2011	256	95	243	3	8	2	5	55	88	55	88	55	88	30	4.5	0	57.6
2011+P	256	95	243	3	8	2	5	55	88	55	88	55	88	30	4.5	0	57.6
2030	339	95	322	3	10	2	7	55	88	55	88	55	88	30	4.5	0	58.8
2030+P	346	95	329	3	10	2	7	55	88	55	88	55	88	30	4.5	0	58.9
		95		3		2		55	88	55	88	55	88	30	4.5	0	

Appendix NOP

Notice of Preparation

NOTICE OF PREPARATION OF DRAFT ENVIRONMENTAL IMPACT REPORT AND NOTICE OF PUBLIC SCOPING MEETING

Project Title: Sonoma County Compost Facility

Project Applicant: Sonoma County Waste Management Agency

The Sonoma County Waste Management Agency (SCWMA) will be the lead agency under the California Environmental Protection Act (CEQA) and will prepare an Environmental Impact Report (EIR) for the proposed Sonoma County Compost Facility. The SCWMA is requesting information from Responsible and Trustee Agencies and other interested parties regarding the scope and content of the EIR. This is the first notice of the proposed project and first opportunity for the public and agencies to comment on the project. The public and agencies will also have at least 45 days to comment on the Draft EIR when it is published.

The vast majority of Sonoma County's organic discards are managed at the SCWMA composting facility at the Central Disposal Site at 500 Mecham Road in the unincorporated County. The current site, located on intermediate cover on the Central Disposal Site, has been considered temporary since its establishment in 1993. In order to provide access to the solid waste disposal capacity occupied by the current composting operation, to address regulatory agency concerns and possible County divestiture of the landfill, SCWMA intends to relocate composting operations to a permanent site. A countywide siting study was conducted to identify potential sites for composting and the SCWMA selected the proposed site for further analysis in the EIR. A conceptual design for the compost facility is being prepared for inclusion in the EIR.

The proposed project is a green waste (yard waste), vegetative food waste and wood waste composting facility located in the unincorporated Sonoma County. The project site consists of approximately 627.7 acres and is located approximately 6 miles southeast of the City of Petaluma, adjacent to the Petaluma River. The project site consists of one parcel (Assessor's Parcel Number 068-120-002), which has a General Plan Land Use Designation and Zoning of Land Extensive Agriculture. Overlay Zoning includes the Biotic Resource, Floodplain and Valley Oak Habitat Combining Districts. The project site is currently used for hay farming and grazing.

The proposed project would have operation on approximately 50 to 100 acres on the project site. It is likely that development would occur on the eastern portion of the property due to site access and drainage and flooding avoidance considerations. The proposed project would use an outdoor windrow composting system, which is the system currently used at the existing composting operations at the Central Landfill. The proposed project would include material sorting and processing, windrow composting, on-site access roads, buffer zones, a sales area for wood and compost, administrative offices and storage areas. Access to the site would be from Twin House Ranch Road via Lakeville Highway.

Areas of potential environmental effect include traffic, hydrology and water quality (flooding and stormwater), air quality and greenhouse gases, land use consistency (zoning, airport, agriculture, and Williamson Act), biological resources including wetlands, aesthetics, hazards (fire prevention), cultural resources, public services and infrastructure (water supply and wastewater demand), and noise. The EIR will focus on the significant effects of the project and indicate briefly its reasons for determining that other effects would not be significant or potentially significant.

Public and Agency Comment: If you are a Responsible Agency or Trustee Agency, we need to know the views of your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the proposed compost site.

Due to the time limits mandated by State Law, your response must be sent at the earliest possible date and not later than 30 days after the receipt of this notice. Please send all written comments faxed or postmarked no later than December 30, 2008, to Patrick Carter, Sonoma County Waste Management Agency, 2300 County Center Drive, Suite B100, Santa Rosa, CA 95403. Comments may also be faxed to (707) 565-3701, attention Patrick Carter.

Public Scoping Meeting: SCWMA will hold a public scoping meeting from 7:00 p.m. to 9:00 p.m. on Thursday December 11, 2008 in Petaluma at the Community Center in Lucchesi Park, located at 320 North McDowell Blvd. This meeting will allow an opportunity for the public to express views regarding the scope of the environmental issues to be addressed in the EIR. The comments will be considered by the SCWMA during the preparation of the EIR. No decision will be made at this meeting. The purpose is only intended to gather information on the potential environmental effects of the project.

Mollie Mangerich

November 26, 2008

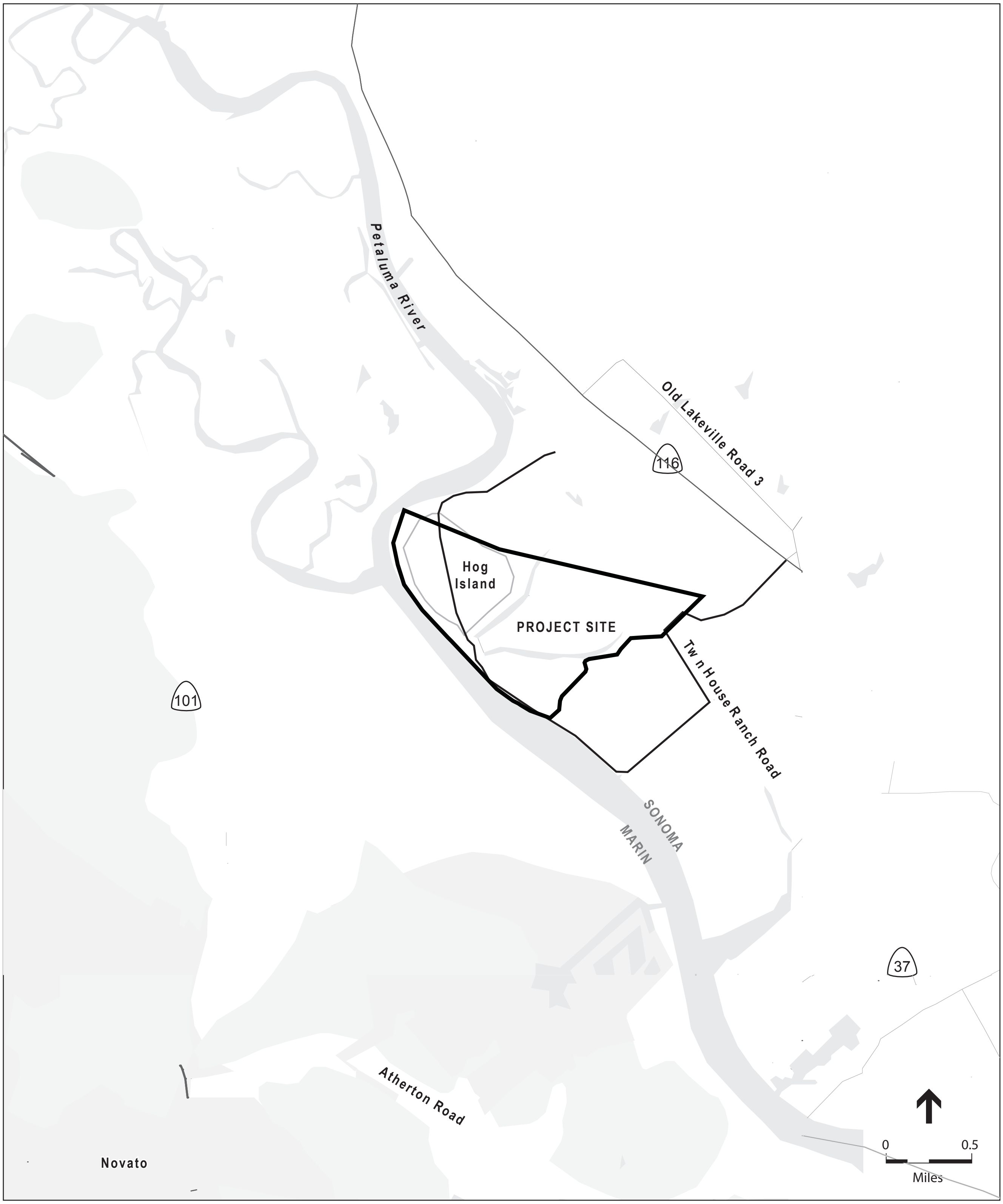
Mollie Mangerich, Executive Director

Sonoma County Waste Management Agency

Attachments : Regional Location Map; Site and Vicinity Map

SOURCE: DeLorme Street Atlas, 2000; and ESA, 2008

Sonoma County Compost Project . 207312
Exhibit A
Regional Map



SOURCE: DeLorme Street Atlas, 2000; and ESA, 2008

Sonoma County Compost Project . 207312

Exhibit B

Site and Vicinity Map

Appendix WSA

Water Supply Assessment

ESA

WATER SUPPLY ASSESSMENT

PREPARED FOR

SONOMA COUNTY WASTE MANAGEMENT AGENCY
SITE 40 COMPOSTING FACILITY

NOVEMBER 2011

Prepared by:

Tully & Young
Comprehensive Water Planning

TABLE OF CONTENTS

SECTION 1 – INTRODUCTION

The California Public Resources Code (PRC) §21151.9 requires that any proposed project comply with California Water Code (CWC) §10910, et seq. Compliance with PRC §21151.9 requires, where necessary, that a proposed project prepare a Water Supply Assessment (WSA) to ensure that long-term water supplies are sufficient to meet the proposed project's demands in normal, single dry and multiple dry years for a period of 20 years.

A WSA under CWC §10910, et seq. must be prepared if the proposed project meets the statutory definition of a "project." Among other things, CWC § 10912(a)(5) identifies a project as "a proposed industrial, manufacturing, or processing plant, or industrial park occupying more than 40 acres of land..." Moreover, in the recent *Center for Biological Diversity* case, the Fourth District Court of Appeal held that a project proponent must prepare a WSA where a project's processing facilities and lands associated with those facilities covers more than 40 acres even if water demands are less than the equivalent of a 500 unit residential development.[1]

As defined in more detail below, the Sonoma County Waste Management Agency's (SCWMA) Site 40 Composting Facility is located on 57 acres within a 390-acre site. The actual composting operations would occupy approximately 48 acres of the 57-acre portion of the property[2]. As such, the Composting Facility meets the definition of a "Project" and must prepare a Water Supply Assessment because it occupies more than 40 acres of land and meets the definition of a "project" under CWC §10912(a)(5).

The purpose of this document is to provide information to the SCWMA about water resources for its proposed Site 40 Composting Facility and to satisfy the requirements of CWC §10910, et seq. The document reviews estimated water demands for the project, water supplies at the site, the underlying water rights, and factors that could reduce those supplies or jeopardize those rights.

This WSA is organized as follows:

- Section 1: This section provides introductory text and a description of the Proposed Project
- Section 2: This section details the water demands of the Proposed Project
- Section 3: This section details the available water supplies and intended use of the supplies to meet described demands
- Section 4: This section details the methodology and results of the sufficiency analysis, and provides synthesis and concluding statements.

[1] *Center for Biological Diversity v. County of San Bernardino* 184 Cal.App.4th 1342 (2010).

[2] The SCWMA will purchase the entire 390 acre parcel, but maintain current agricultural activities on 333 acres. A 57 acre subarea of the parcel, including the existing dairy buildings and residence, will house the new composting facility. The remainder of the 57 acres not used for the actual composting operations will provide set-back and other necessary space to accommodate the needed operations.

1.1 PUBLIC WATER SYSTEM

CWC §10910, et seq. requires the responsible land use agency associated with the Project to identify the "public water system" that will serve the Project. The responsible land use agency for this Project is the Sonoma County Waste Management Agency (SCWMA). The identified "public water system" must prepare and approve the Water Supply Assessment. Specifically, CWC §10910(b) states:

> "The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project."
>
> If the County cannot identify a public water system that will serve the proposed project then the "county shall prepare the water assessment" required under the Water Code after consulting with any purveyor that provides domestic supplies to the area covered by the project, the local agency formation commission, and any public water system adjacent to the project site."

For the Proposed Project, there is no public water system identified to serve the Proposed Project site or any public water system adjacent to the project site. Accordingly, the SCWMA has prepared this Water Supply Assessment in order to satisfy the statutory requirements.

1. 2 PROJECT DESCRIPTION[3]

The SCWMA is proposing to construct a new compost facility in Sonoma County (County) that would replace the existing compost facility located at the Central Disposal Site. The proposed project would process up to 200,000 tons of compost feedstock per year on the 48-acre site. The project includes processing of green material[4] (yard waste), food material[5] and agricultural materials[6]. The following are examples of feedstocks received at the current facility, which may also be feedstocks for the project: green materials, chicken feathers and rice hulls (agricultural material), food materials, and bedding materials from a duck farm (to mix with other products). Non-hazardous liquid wastes may also be accepted to augment the water that is added for efficient composting[7]. The compost facility would use an open windrow system, aerated static piles, or a combination of both systems. For purposes of this Water Supply Assessment, an open windrow system will be assumed for all

[3] Text in this section is modified from ESA Corporation 2009, "SCWMA Compost Facility Draft EIR."

[4] "Green Material" means any plant material that is separated at the point of generation, contains no greater than 1% of physical contaminants by weight, and meets the requirements of section 17868.5. (CCR Title 14, Chapter 3.1, Article 1, Section 17852)

[5] "Food Material" means any material that was acquired for animal or human consumption that is separated from the municipal solid waste stream, and that does not meet the definition of "agricultural material." (CCR Title 14, Chapter 3.1, Article 1, Section 17852)

[6] "Agricultural Material" means material of plant or animal origin, which result from the production and processing of farm, ranch, agricultural, horticultural, aquacultural, silvicultural, floricultural, vermicultural, or viticultural products, including manures, orchard and vineyard prunings, and crop residues. (CCR Title 14, Chapter 3.1, Article 1, Section 17852)

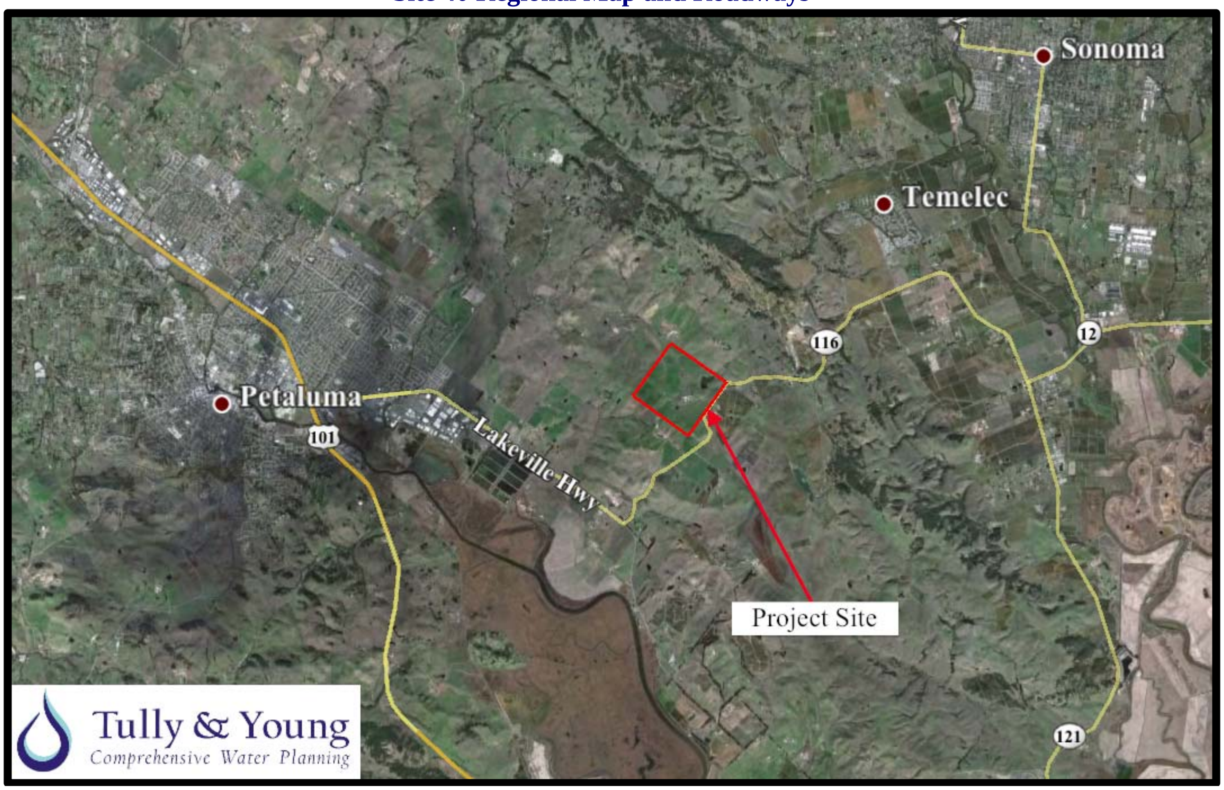
[7] The potential availability of non-hazardous liquid wastes is not considered a reliable source of water and is not detailed further in this WSA.

operations. This composting system has the highest potential water demand, resulting in a conservative overall estimate of water demands for the project.

Site 40 (Assessor's Parcel Number 068-040-015) includes 390 acres in unincorporated Sonoma County and is located approximately 2.5 miles east of the City of Petaluma at the intersection of Adobe Road and Stage Gulch Road (State Route 116) as shown in **Figure 1-1**. An aerial photograph of Site 40 and the immediate vicinity is shown in **Figure 1-2**. The operational footprint or composting area would occupy approximately 48 acres of a 57-acre portion in the western corner of Site 40, taking approximately 1/8 of the parcel area. Site 40 was the top ranked site in the siting study prepared for SCWMA.[8]

As shown in **Figure 1-2**, the site currently includes an dairy operation and irrigated and non-irrigated pasture grazing, as well as a rural domestic residence and associated out-buildings.

Figure 1-1
Site 40 Regional Map and Roadways



[8] HDR Engineering, Inc. Composting Facility Siting Study for Sonoma County, CA. June, 2008.

Figure 1-2
Aerial detail of Site 40

The majority of land uses surrounding Site 40 are agricultural in nature with areas of open space. A vineyard is located just east of Site 40. Single-family rural residences are scattered in the surrounding area and often present on sites with agricultural operations. Livestock operations such as dairy farming and grazing are located just north and south of Site 40. The closest residence to the Site 40 composting area is approximately 1,750 feet to the west. Other residences are approximately 1,835 feet to the east and 2,450 feet to the north. Urban development associated with the City of Petaluma is located approximately 2.5 miles west of Site 40. The Petaluma Municipal Airport is located approximately 3.25 miles west of Site 40.

1.3 Proposed Project Land Uses

The project location has historically been privately owned. The proposed project would result in the entire property being purchased by the SCWMA, with a portion of the property changing land use from historic operations to the proposed Composting Facility. The remaining areas of the parcel would continue the existing land uses described below.

Table 1-1 describes current and proposed land uses at Site 40.

1.3.1 Existing Land Uses

Existing land uses on the site include livestock grazing on irrigated and non-irrigated pasture and dairy operations.[9] Buildings include a single-family residence, dairy barns and outbuildings totaling ~68,000 square feet. Paddocks and associated working areas are also present on approximately 15 acres. The existing reservoir – located in the northeast corner of the property – has an area of approximately 10 acres.

1.3.2 Proposed Project Land Uses

The proposed project will have a footprint of approximately 57 acres in the western portion of the property. The operational area will cover approximately 45 acres and a detention pond of approximately 3 acres. Included in the primary operational footprint is landscaping of approximately 1 acre, site buildings on approximately 2 acres, and roads and additional project footprint approximately 4 acres. The remaining 9 acres of the 57-acre area (see Figure 2) will provide desired buffer from neighboring areas and will have no designated use.

The intended continuation of livestock grazing on irrigated and non-irrigated lands on the property are defined as separate from the proposed project, and thus do not fall under the purview of this WSA. Demand and supply estimates are described here for the proposed primary uses on the western portion of the site, namely the composting facility and associated uses described in this document. The proposed project does not change any uses on, nor propose to supply any additional water to, the eastern 7/8 of the property, and thus the water supply for those uses are not addressed as part of the proposed project in this WSA[10].

[9] Dairy operations ceased in 2006. The SCWMA would not restart the dairy.

[10] The water demand associated with continuation of irrigated agricultural operations (e.g. grazing lands) is included as part of the baseline water demands that would still exist with the introduction of the proposed project.

Table 1-1
Land uses for the Site 40
(Current land uses are estimated from aerial images and other sources - all values are approximate)

Category	Land use	Current Acres (by land-use)	Proposed Changes to Land Use, Acres	Future Acres (by land-use)
Agricultural	Irrigated and non-irrigated pasture	378	-57	321
Current buildings and working area	Dairy barns, paddocks, and working areas Residential housing and buildings	2	-	2
Composting Facility	Compost piles, process area, and new buildings	-	40	40
	Irrigated Landscaping	-	1	1
	Roads, sidewalks, operations area	-	4	4
	Detention pond	-	3	3
	Undesignated uses	-	9	9
Existing Reservoir		10	-	10
Proposed Project Total			57	
	Land use total	**390**	**-**	**390**

1.4 Proposed Project Water Supply and Demand Summary

As detailed later in this WSA, several primary water sources are identified that will serve the identified future land uses on the property:

- Existing licensed and permitted water rights on an unnamed on-site reservoir on an unnamed stream on the property that is tributary to Petaluma Creek;
- Recycled water from the City of Petaluma via an existing pipeline, and;
- A domestic groundwater well drilled on the hill above the current residence location.

Within the Proposed Project site, the following primary demands for water are identified:

- The compost processing area, which requires water to facilitate composting, to control dust, and to clean equipment;
- Buildings and employee facilities, which require potable water to meet the needs of on-site personnel;
- Landscaping for aesthetic and visual screening, which requires water to meet plant evapotranspiration needs, and;
- Fire suppression, which requires a stand-by quantity of water to assist with controlling and extinguishing fires.

SECTION 2 – WATER DEMAND ESTIMATE

This section describes water demand estimates for the Site 40 facility.[11] Water demands for the Proposed Project includes mostly non-potable water for compost pile maintenance, dust suppression, landscaping, equipment wash, and fire suppression, along with a small amount of potable water to meet employee needs at the facility.

Water supply is always linked to water quality. As in any project, for the purposes of the Site 40 WSA it is important to keep in mind the intended use for each element of the proposed project. Only a portion of the proposed use, namely the water used for supplying potable water for drinking, food preparation, showers, and other direct consumptive and contact uses by on-site workers and visitors, will be required to meet applicable water quality standards. As detailed later, potable water will be supplied by a modified well at the site of the existing domestic groundwater well[12].

The bulk of the water demand is for the outdoor composting facility and landscaping, supplied by non-potable water derived from a combination of recycled water and the onsite reservoir. A source for emergency fire suppression will be developed from the proposed 24 acre-foot storm water detention pond.

2.1 Demand Projection

As detailed in this section, water demands for the proposed project are based on estimates from similar uses in other settings as well as use of standard professional practices for estimating water needs. Very limited records exist to document the water demands of the current and historic land uses – an operating dairy – thus reasonable analyses are provided that characterize these uses for comparison to the demands from the proposed project.

2.1.1 Existing Demands

Both residential and agricultural demands for water currently exist on the site.

An estimate for residential water use assumes one single-family residence with four occupants and one rental residence with two occupants, and is estimated to be 0.75 acre-feet per year. This value is based on average residential indoor and landscape uses as published by the American Water Works Research Foundation.[13] This demand has historically and continues to be met by the existing groundwater well located on the property.

Existing agricultural demands on the property are associated with pasture irrigation and stock watering for the livestock grazing on the pastures. Up until 2006, an operating dairy added to the overall agricultural water demands, as described in Table 2-1.

[11] As discussed previously, the site is not within the service area of an existing water supplier. As such, the water demands are not reflected in an existing Urban Water Management Plan (as allowed under CWC § 10910(c) (1))

[12] The existing domestic well in use for domestic purposes is not constructed to meet the Sonoma County requirements for a public water supply. The existing well will be replaced with an appropriately completed well with the same capacity as the existing well, but used to serve the on-site public potable needs of the project.

[13] http://www.aquacraft.com/Publications/resident.htm

The agricultural demands vary by year, as driven by (1) the availability of recycled water to irrigate pasture, per the agreements with the City of Petaluma, and (2) the number of livestock in any given year.

As summarized in **Table 2-1**, the estimated annual agricultural use is based upon (1) the existing maximum capacity in the on-site reservoir as licensed by the State Water Resources Control Board (detailed further in Section 3), and (2) the maximum quantity of recycled water delivered by the City of Petaluma[14].

Table 2-1
Estimated Historical Demands

Category	Type of use	Estimated annual use	Water source
Residential	Single family residence (potable)	0.75 acre-feet	Well
Agricultural	Pasture Irrigation	408 acre-feet (average for '05 thru '09)	Recycled Water
	Stock watering and Dairy Operations	87 acre-feet (max. under water right)	Water rights
	Agricultural total	495 acre-feet	-
	Total Estimated Historic Use	496 acre-feet	-

2.1.2 Project Water Demand

Water demand estimates are based on the following assumptions about water use.

- There will be 48 on-site employees. This assumption, provided by SCWMA, is likely conservative for a facility of this size, and should thus result in a high bounding estimate for potable water use.
- The Open Windrow method will be used for composting, with associated water demands as detailed below. This method uses more water than the Aerated Static Pile (ASP) method, and will provide a high bounding estimate for water, should the Open Windrow method be selected.
- The project will utilize potable and non-potable water sources as appropriate. Specifically, groundwater resources will be used where potable water is required for staff, and recycled water will supply composting, landscaping, and other outdoor water needs, as it is available.
- Landscaping will be installed on the property edge for visual screening, as detailed below.

2.1.2.1 Non-Potable Water Demand

Demands for non-potable water are calculated as described in the sections below. **Table 2-2** summarizes non-potable water demands.

[14] The City of Petaluma has an agreement with existing landowners to provide recycled water for permitted use. The agreements do not specify a quantity. From 2005 through 2009, annual deliveries ranged from 304 acre-feet to 515 acre-feet, averaging 408 acre-feet.

Table 2-2
Summary of Estimated Non-Potable Water Demands

Estimated non-potable water demands			
	Landscaping	Compost piles	Miscellaneous outdoor
Unit demand factor	23.7 gal/sqft/yr	See detailed analysis	10
Unit	40,000 sq. ft.		% of other uses
Subtotal annual demands	3.3 acre-feet/yr	114 acre-feet/yr	11.7 acre-feet/year
Total annual non-potable demands		129 acre-feet/yr	

Compost facility water use

The SCWMA anticipates using either an Aerated Static Pile (ASP) method or an Open Windrow method of composting at the proposed regional compost facility. For purposes of this WSA, the Open Windrow method is assumed, since it has a higher water demand.

Annual non-potable water demand for all purposes in the composting facility is conservatively estimated as 129 acre feet per year, as described in Table 2-2. This quantity of water is anticipated to be necessary and will be applied to organic material to provide moisture for the biodegradation process.

The composting facility water quantity is based on an estimated 200,000 tons of raw organic material per year. The raw organic materials are ground, screened and moisture-conditioned prior to being placed in the Open Windrows. Estimates below are described in annual terms.

Based on experiences with similar composting facilities in the region[15], the materials will enter the facility with initial water content inadequate to facilitate the desired composting process. An initial watering will be added to the daily deliveries as they enter the process to attain ideal moisture for decomposition. During the roughly 60 day composting processes, some water is consumed as it evaporates to the atmosphere. To maintain the decomposition process and manage for the ideal moisture content at completion, an additional daily application of water to material in the Open Windrows is necessary. This daily quantity varies with the atmospheric conditions present each day (e.g., wind, fog, rain, sun, air temperature).

The initial watering and the daily watering combined equal about 37 million gallons per year. This equates to approximately 114 acre-feet per year for a plant processing 200,000 tons of raw material per year.

Table 2-3 illustrates the supporting calculations for non-potable water use for the composting process:

[15] Per communications with Mr. Tim Raibley of HDR (located in HDR's Folsom office)

Table 2-3
Estimated Non-Potable Water Demands for Compost Piles

Estimated open windrow compost water demands		
Initial moisture		
Annual compost tonnage	200,000	tons per year
Average arriving moisture content	38%	
Arriving organic content	124,000	tons per year
Solids reduction	25%	
ending soilds content	93,000	tons
ideal moisture content	55%	
total daily tonnage at ideal mositure content	275,556	tons per year
total water in system at initiation of compost	151,556	tons
water already in arriving feedstock	76,000	tons
Initial water to be added to reach ideal initial moisture	**75,556**	tons per year
Subtotal Initial Moisture	**20,202,020**	gal per year
Moisture loss during composting		
Assumed loss per day (%)	1.00%	
Assumed loss per day (tons)	2,756	tons
Days in composting	60	days
Total loss over time (%)	60%	
Total loss over time (tons)	165,333	
Ideal moisture content at screening	35%	
Ending solids content	93,000	tons
Total finished compost at 35% moisture	143,077	tons
Total water in finished compost	50,077	tons
Water in compost at start of composting process	151,556	
Makeup moisture needed in tons	**63,855**	tons water per year
Subtotal Makeup Water	**17,073,449**	gal per year
Total water demand	**139,410**	tons per year
Total Annual	**37,275,470**	gal per year
Total Annual	**114**	acre feet per year
Ratio of water per ton of feedstock	186	gal per ton
Ratio of water per ton of feedstock	0.7	ton water per ton feedstock

California Model Water Efficient Landscape Ordinance

This section briefly describes the Model Water Efficient Landscape Ordinance (MWELO), primarily to justify the landscaping assumptions described here as conservative.

MWELO (updated on September 10, 2009 in accordance with Gov. Code §§ 65591-65599), requires that a local agency adopt the provisions of the MWELO by January 1, 2010. The provisions of the MWELO are applicable to new construction and rehabilitated landscapes for public agency projects and private development projects with a landscape area greater than 2,500 square feet requiring a building or landscape permit, plan check or design review[16], among other project types. If SCWMA is deemed a "local agency" under the MWELO, it must require "project applicants" to prepare plans consistent with the requirements of MWELO for review and approval.[17] The ordnance may not substantially restrict the landscaping options available to SCWMA at Site 40, as MWELO-allowed water calculations are close to calculated landscaping demands (see next section).

The MWELO provision may affect landscaping by requiring the preparation of a Landscape Design Plan with a water budget that is 70% of reference evapotranspiration.[18] However, MWELO has an exception for "Special Landscape Areas (SLA)," which are defined as a landscape area dedicated solely to edible plants, areas irrigated with recycled water, water features using recycled water and areas dedicated to active play such as parks, sports fields, golf courses, and where turf provides a playing surface. Such SLAs can have a water demand of 100% of reference evapotranspiration in the maximum applied water calculation. As the planned water supply for Site 40 will rely on recycled water, irrigation water for plants used for a visual screen will have this latter upper limit under MWELO.

Landscaping Water Requirements

A visual barrier in the form of trees will screen the compost pile from the northeast and southeast sides of the compost facility. The trees will require approximately 3.3 acre-feet per year of non-potable water, comparable to that allowed under MWELO. This section describes the calculations to derive this estimate.

A 10-foot wide strip along the two borders of the project area, each of which is approximately 2,000 feet long, would amount to 40,000 square feet of landscaping. Estimated demands were calculated using U.S. Department of Energy Federal Energy Management Program Evapotranspiration Method[19]. For the Sacramento Climate Zone, assuming landscaping with high water requirements in an average density, open microclimate, the annual irrigation factor is 23.7 gal/sqft/yr. A high efficiency micro irrigation system has an efficiency factor of 85%.

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[16] CCR Tit. 23, Div. 2, Ch. 27, Sec. 490.1.

[17] "Local Agency" means a city or county, including a charter city or charter county, that is responsible for adopting and implementing the ordinance. The local agency is also responsible for the enforcement of this ordinance, including but not limited to, approval of a permit and plan check or design review of a project. California Code of Regulations (CCR) Tit. 23, Div. 2, Ch. 27, Sec. 491(ii).

[18] California Code of Regulations (CCR), Tit. 23, Div. 2, Ch. 27, Sec. 492.4.

[19] Federal Energy Management Program (2010). Guidelines for Estimating Unmetered Landscaping Water Use. Washington, D.C., U.S. Department of Energy. http://www1.eere.energy.gov/femp/pdfs/est_unmetered_landscape_wtr.pdf, Accessed September 21, 2010.

These assumptions feed into the water use calculations using the following equation:

$$\text{Annual Landscape Water Use (gallons per year)} = \frac{\text{Annual Irrigation Factor}\left(\frac{gal}{sqft - yr}\right) \times \text{Irrigation Area (sqft)}}{\text{Irrigation System Efficiency}}$$

Total landscaping irrigation requirements would thus be approximately

(23.7 gal/sqft/yr * 40,000 sqft) / 85% = 1,115,294 gallons/year ≈ 3.4 acre-feet/year.

MWELO calculations for an SLA using recycled water would allow for similar irrigation amounts. California Department of Water Resources uses a Maximum Applied Water Allowance (MAWA)[20] for planning purposes under MWELO.

DWR CIMIS Zone 5 average annual evapotranspiration (ETo) is estimated as 43.9 inches/year. For an area that is completely classified as SLA, the Department of Water Resources formula for calculating the MAWA simplifies to:

MAWA = (ETo) (0.62) [SLA]

= (43.9)(0.62)(40,000) = 1,088,720 gallons/year ≈ 3.3 acre-feet/year

Note that this maximum allowed irrigation using recycled water is in the same range, but is greater than the estimated irrigation needs as calculated above. Thus, we use an estimate of 3.3 acre-feet/year for irrigation demands, as permissible for this site under MWELO, with the proviso that highly efficient irrigation system will be installed and well managed for the site in accordance with MWELO guidelines.

Fire Suppression

Fire suppression for large scale composting facilities are primarily handled manually with heavy equipment on site for standard pile turning and maintenance, and thus a large water source specifically for this purpose is not required by either State code or best practices.[21]

While the final determination of fire safety requirements would be made by local fire authorities with jurisdiction over the site, a simple calculation suggests that sufficient water would be available on site in the eventuality of a compost fire.

Assuming compost piles in accordance with the 2006 International Fire Code section 1908.3, they would have a maximum footprint of 150 ft. by 250 feet. This may be considered equivalent in area to a 37,500 sq foot building. According to the same Fire Code, a Type 5 building with similar area would require a 5,250 gallon per minute flow for a four hour duration for adequate fire suppression.

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[20] CA DWR (2010), Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use (For the Consistent Implementation of the Water Conservation Act of 2009), California Department of Water Resources Division of Statewide Integrated Water Management Water Use and Efficiency Branch. October 1, 2010. http://www.water.ca.gov/wateruseefficiency/sb7/docs/methodologies-urban-per-capita-water-use-10042010.pdf, Accessed December 29, 2010.

[21] Emily Bacchini and Paul Miller, ESA Inc., September 23, 2010.

With 1250 gallon per minute pumps on a typical fire engine, such flow could be produced with five engines in response to a large fire in one of the piles.

Over the course of such an effort, 1,260,000 gallons, or approximately 5 acre-feet of water would be required. This amount of water could be easily stored in the storm water detention pond as a fire protection contingency or available as an emergency supply from the existing on-site reservoir (though only in the event water was not available in the storm water detention pond).

Thus, while the local fire authorities would determine eventual fire suppression water availability requirements, the storm water detention pond can be expected to provide a reasonable source for emergency fire suppression water supply and thus this demand is not included as part of the annual water demands for which sufficient water is evaluated (pursuant to §10910 et. seq.).

Potential Instream flow requirements

State Water Resources Control Board Permit 21217 (issued in June 2008) requires release of water to the stream below the on-site reservoir of 0.33 cfs at the point of diversion from December 15 to March 31, and the total stream flow for the rest of the year.

This requirement is treated in this document as a possible constraint on water availability to the reservoir, rather than as water demand. This constraint is only triggered if the on-site reservoir is expanded per the recently issued Permit 21217.

Miscellaneous

In addition to the defined demands described above, this WSA assumes that the facility would require water for miscellaneous uses associated with project operations. Such uses would include washing equipment, miscellaneous cleaning, and other incidental facilities operations. We estimate such uses to increase the detailed demands by an additional 10 percent.

2.1.2.2 Potable Water Demand

The facility will house an on-site building for management and operations of the composting facility. At the time of preparing this WSA, the SCWMA intends to use the existing residential dwelling unit already existing on the building for primary management and office functions.

The Federal Energy Management Program provides indices for water use at commercial facilities.[22] They estimate office use at 15 (range 8-20) gallons per employee per day. For a staff of 48, this would suggest a conservative typical water use of around 263,000 gallons per year or 0.8 acre-feet per year (conservatively assuming 365 day/year operation at full staff of this number). This value represents indoor use, which would be met by potable water available from the existing groundwater well. **Table 2-4** details the demand estimate for potable water.

[22] Federal Energy Management Program, U.S. Department of Energy. "Federal Water Use Indices." http://www1.eere.energy.gov/femp/program/waterefficiency_useindices.html, accessed September 21, 2010.

Table 2-4
Estimated potable water demands

Element	Quantity	Units
Personnel	48	persons
Daily water use per person	15	gallons/person/day
Daily water use	720	gallons/day
Annual water use	262,800	gallons/year
Annual water use	0.8	acre-feet/year

2.1.3 Other Uses

Temporary water demands during construction of the site will be less than those projected for compost operations, and are not detailed in the WSA analysis. Construction may require water supply for purposes including equipment maintenance and operation, generating materials such as cement, site preparation, and other associated activities such as dust control. Recycled or reservoir water available for daily composting operations will more than suffice for a standard construction job of this kind. Grazing operations will be suspended during the construction period if deemed necessary to free up additional water.

2.2 Summary of Project and Water System Demand

Estimates for Sonoma County Waste Management Agency Composting Facility Site 40 future water demands were calculated based on standard methods and based on expectations from similar project experience, as described above.

The water demands for the proposed facility would fall into four broad categories: 1) non-potable water for composting operations, primarily to manage moisture during the composting process; 2) non-potable water for landscaping and dust control; 3) potable water for indoor use; and 4) non-potable water for other miscellaneous uses.

As summarized in **Table 2-5**, the estimated potable and non-potable water demand is 130 acre-feet per year, and is dominated by non-potable demands for the composting operations. This estimate takes into account conservative assumptions, thus the actual demand may be less.

Table 2-5
Summary of Project Demands

Category	Quantity
Total annual potable demands	0.8 acre-feet/yr
Total annual non-potable demands	129 acre-feet/yr
Total annual demands	**130 acre-feet/yr**

SECTION 3 – WATER SUPPLY

As previously discussed, the Proposed Project is not located within the service area of an existing water purveyor. Therefore, this WSA must identify the water sources available to the SCWMA at the Site 40 location. Several options for water to supply the Proposed Project exist. These sources include:

- Recycled water provided by the City of Petaluma
- Groundwater underlying the property
- Existing water rights licenses, along with a new water right permit, associated with the existing on-site reservoir
- Water retained in the Proposed Project's on-site stormwater detention pond

Although, all of these sources are available to meet the Proposed Project's demands, the SCWMA has determined that primary supplies will be from recycled water and groundwater. The stormwater pond may also be available to provide a primary source of supply for fire suppression.

SCWMA has further determined that the existing water rights licenses will continue to be available for historic uses for stockwatering and irrigation on the portion of the property remaining as irrigated and non-irrigated pasture land.

Each of these sources is described in detail in the following subsection.

3.1 Recycled Water

The primary non-potable water source for the Proposed Project will be recycled water from the City of Petaluma (City), delivered through an existing pipeline that serves the property.

Permitted under Order Number 88-036, issued in 1988 by the San Francisco Bay Regional Water Quality Control Board, the City of Petaluma began to implement plans to delivery secondary treated wastewater to the Site 40 property and other local parcels. The recycled water is provided for growing fodder, fiber or seed crops. **Table 3-1** represents recycled water deliveries to the Site 40 property over the last several years (2010 data is incomplete).

Table 3-1
Historical Deliveries of Recycled Water to Site 40 Property (acre-feet)

	2005	2006	2007	2008	2009	2010
May		29	95	106		50
June	72	106	71	68	83	68
July	88	124	61	82	84	
August	98	157	45	88	70	
September	87	100	121		67	
October	54		42			
November			45			
Total	**399**	**516**	**480**	**344**	**304**	**118**

Recycled water is currently treated to secondary standards, and has been used for several years on the property for agricultural purposes (see **Table 3-1**). Upgrades to the City's treatment facility are planned to expand production of both secondary and tertiary treated supplies. As detailed in the City's recent 2010 Urban Water Management Plan (UWMP), the City anticipates continued delivery of the secondary treated wastewater to the existing property and other irrigation users along the existing distribution system at quantities equal to and potentially exceeding historic and current quantities.[23]

Currently, recycled water is provided to the Site 40 property under a periodically updated agreement between the City and the current landowner. As noted in the City's 2010 UWMP, the City anticipates renegotiating this and other landowner agreements in 2013 for continued delivery of secondary recycled water[24]. As represented in the City's 2010 UWMP, the total deliveries in 2010 to the irrigation customers, including the Site 40 property, was over 1,500 acre-feet. Projections for future demand are estimated to be nearly 2,000 acre-feet annually.[25] This representation by the City indicates the availability of this water supply for the Site 40 property for at least until 2035.

3.2 EXISTING WATER RIGHTS AND RESERVOIR

Topography at Site 40 is hilly, and grades from approximately 420 feet mean sea level (msl) at a peak near the southern corner of the site, to approximately 180 feet msl in the vicinity of Adobe Road, near the northeastern side of the site (see **Figure 1-2**). Water features at Site 40 include an ephemeral, unnamed stream that runs southeast to northwest in the vicinity of Adobe Road, as well as several smaller, unnamed drainages that feed into that stream from various points on site. The stream is impounded near the eastern corner of Site 40, near the intersection of Adobe Road and Stage Gulch Road. This small reservoir (Pinheiro Reservoir) is filled by natural streamflow along the unnamed stream, emanating from the areas to the south and east of the site.

The Pinheiro Reservoir presently has a capacity of 87 acre-feet, which is defined in two water rights licenses detailed below. A water rights application to expand the reservoir was recently permitted by the State Water Resources Control Board (SWRCB). As previously noted, surface water rights from the unnamed stream on the property will not be used to meet the demands of the Proposed Project, and thus are not considered as part of the Proposed Project water supply for the purposes of this WSA.

Surface water will continue to be stored in the reservoir on the property and used for non-potable applications as allowed under the licenses and permit on the areas of the property not involved in the Proposed Project. The State Water Resources Control Board could be petitioned for modifications of the purpose of use for each of these water rights, as described below, but water supply for the project is not contingent on any such changes.

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[23] The City has published a public draft of its 2010 UWMP and is scheduled to adopt the document in June of 2011. See Appendix ZZ for an excerpt from the UWMP regarding planned continued deliveries of secondary treated water to the Site 40 and other existing recipients of recycled water. As identified in the excerpt, the projected volumes of recycled water use is anticipated to increase, where the projected volumes are only for the existing customers under contract (which includes the Site 40 property)(see Table 4-8, p. 26 of the April 2011 Public Review Draft http://cityofpetaluma.net/wrcd/pdf/uwmp_public_review_draft.pdf)

[24] City of Petaluma 2010 UWMP, April 2011 Public Draft, page 25, Section 4.3.4.

[25] Id. page 24, Table 4-5.

- License 7228 for 42 acre-feet per year from the unnamed stream on the property; provides for a water right to divert 42 acre-feet per year to the on-site reservoir from about Oct 1 to about March 30; The current permitted purpose of use is for stock watering.
- License 8283 for 45 acre-feet per year from an unnamed stream on the property; provides for a water right to divert 45 acre-feet per year to the on-site reservoir from about Oct 1 to about May 1; The current permitted purpose of use is for industrial (dairy) and stock watering.
- Permit 21217 for increased storage in Pinhero Reservoir permits an increase in the storage in the existing reservoir from 87 acre-feet to 164 acre-feet, to be collected from December 15 to March 31. The reservoir currently has a capacity of 87 acre-feet, and construction of the expanded physical infrastructure would need to be completed by December 18, 2018. Construction of the expanded infrastructure would also subject the existing licenses to further restrictions on the allowed period of diversion.

All of these water sources developed through different circumstances and, as such, are subject to unique conditions and limitations.

3.2.1 Notable Conditions of Water Right Permit 21217

The majority of the stored water allowed under the new permit is assigned a purpose of use of vineyard frost protection, with a small amount (5 acre-feet) for irrigation. The use of water for frost protection in this permit is not only location-specific within the Site 40 parcel, but it is also contingent of development of vineyards on the property, or on a petition to SWRCB for a change of purpose of use.

Environmental provisions in this permit include the development of a 50-foot setback around the reservoir and preparation of a riparian enhancement plan for the intermittent and ephemeral streams at the place of use. Best practices as outlined in the permit need to be followed for maintenance and monitoring of these areas, but these provisions have no bearing on the water right (e.g., there are no environmental flow requirements in the permits and licenses described here beyond those described in the section “Instream Flow Requirements” above).

SWRCB could be petitioned for change in place and type of use if other uses were to be made for this water on other areas of the project site, or if the water were to be used should an interruption or cessation in recycled water supplies ever occur. However, these are alternatives to the proposed source of supply, which would be recycled water from the City.

3.3 Stormwater Detention Basin

Construction of the composting facility would require a storm water detention pond with a capacity of 24 acre-feet. Water retained in the pond could be put to use in two ways.

During spring months, when the need for retention space in the pond diminishes, storm water could be stored, potentially fully utilizing the storage capacity of the pond, for use during the non-precipitation months to help meet dust control and as a source for potential fire suppression. As discussed above, a conservative estimate of 5 acre-feet of water for fire suppression would likely suffice, and could be pumped from the pond in the event of a fire.

Detained storm water would also be reapplied to the compost areas as needed, although this source would not be relied on as a primary source for the purpose, since the pond would have to maintain retention space during winter and early spring months.

3.4 Surface Water Reliability

As described above, two primary surface water sources are available on-site for the Proposed Project: (1) recycled water from the City of Petaluma, and (2) existing and permitted water rights. The SCWMA has determined that recycled water will be used to serve the water demands of the Proposed Project.

The long-term reliability of these surface water supplies needs to be understood for purposes of assessing the sufficiency of supplies pursuant to Water Code §10910 et. seq.

3.4.1 Reliability of Recycled Water

When comparing the identified demand of the Proposed Project with the historically available recycled water supplied to the property, there has historically been available supplies that greatly surpass the needs of the proposed project. With the anticipated continuation of irrigation on portions of the property not affected by the Proposed Project and noting that the Proposed Project will offset some of the lands currently irrigated (see Table 1-1), the historic demand for irrigation will decrease. Furthermore, as the Proposed Project will be the primary focus of the entire property, the demands of the composing facility will take priority over any irrigation of surrounding pasture.

When these considerations are evaluated in combination with the future anticipated recycled water demands represented in the City's 2010 UWMP, it is apparent that the City anticipates equal or greater deliveries of secondary treated recycled water to the historically served properties – including the Site 40 property.[26] Notably, the City anticipates an increase in the delivery of secondary treated wastewater to current recycled water uses.[27]

3.4.2 Reliability of Recycled Water in Bi-Annual agreements

Historically, recycled water has been provided to the Site 40 property for pasture irrigation through an agreement held between the landowner and the City. This agreement is designed to expire periodically. Traditionally, the agreement has been reinstated after each expiration date for another defined period of time. As documented in the City's 2010 UWMP, the City anticipates renegotiating these many of the existing landowner contracts in 2013. For purposes of this WSA, and based on historical continuation, the SCWMA assumes the agreement to deliver secondary treated recycled water to the Site 40 property will continue until at least 2035, consistent with the City's representation in the 2010 UWMP.

3.4.3 Reliability of Existing Water Rights

Although not relied upon as a source of water for the Proposed Project, understanding the reliability of the existing licensed and permitted water rights is important should SCWMA ever choose to

[26] City of Petaluma 2010 UWMP, April 2011 Public Draft, pages 22 through 26. **Appendix B**.

[27] Id., page 24, Table 4-5 and page 25, Table 4-7.

pursue a change in the purpose of use of these rights as an alternative to the recycled water defined in the City's 2010 UWMP.

A water availability analysis[28] was conducted in 2003 for Application 30978 to increase the size of Pinheiro Reservoir and the amount of the allowable annual diversion. This analysis used a rainfall-runoff method to estimate average unimpaired flows at a number of points in the watershed of the unnamed creek that flows through the property.

To analyze dry year water supply reliability, the analysis done by Wagner and Bonsignore to estimate impacts of different precipitation regimes on streamflow was used. By using the rainfall-runoff parameters developed in their report, which combine an empirical runoff coefficient, the average annual precipitation, and the watershed area, average estimated annual runoff was generated. Using the historical precipitation records for Petaluma,[29] the runoff at the Pinheiro Reservoir outlet from December 15 to March 31 was estimated. Assuming a historical average monthly rainfall distribution, the 10th and 25th percentile was selected from the set of available full-year precipitation records from 1949-2002, and generated estimated Dec 15-March 31 rainfall for dry years in the 10th and 25th percentile of the historical record. Using the rainfall-runoff equation, the unimpaired runoff under each percentile was determined. The results suggest that average year December 15 to March 31 runoff at the reservoir outlet would be 333 acre-feet. 10th percentile runoff would be approximately 212 acre-feet, and 25th percentile runoff would be 240 acre-feet.

The dry year values here are greater than the total recorded water rights (as documented in the Wagner and Bonsignore report). However, the instream flow requirement during the period of the water right is

0.33 cfs * 1.98 ACRE-FEET/day/cfs * 106 days = 69 acre-feet.

This suggests that during dry years the stream would not be able to fully supply all of the water rights if they were all drawn on during the December 15 to March 31 window.

[28] Wagner & Bonsignore Consulting Civil Engineers, Water Availability Analysis for Application 30978 of Frank J. Teixeira, September 26, 2003.

[29] Wagner & Bonsignore Consulting Civil Engineers, Water Availability Analysis for Application 30978 of Frank J. Teixeira, September 26, 2003. **Appendix C**.

3.5 GROUNDWATER CHARACTERIZATION[30] [31]

3.5.1 Subbasin Characteristics[32]

Site 40 lies within the San Francisco Bay Hydrologic Region, in the Petaluma Valley basin (2-1). The groundwater basin covers 46,100 acres, and is categorized as a Type C basin. Type C basins are poorly characterized, with "low level of knowledge of any of the budget components for the area."[33]

Typical well yields for the Petaluma basin are relatively low, often <50 gpm with a maximum reported as 100 gpm, consistent with pump tests.

Per DWR, "In general, groundwater quality throughout most of the region is suitable for most urban and agricultural uses with only local impairments."[34] Petaluma has areas with high Total Dissolved Solids and chloride concentrations, but 85% of wells surveyed in the region meet state primary drinking water MCLs.

3.5.2 Description of Existing Wells

Potable water has been supplied on the property from two separate wells. The first, drilled in 1996 (hereafter, "Well 1"), is on the western quarter of the property near the reservoir, and the second, drilled in 2001 (hereafter, "Well 2"), is on the southern quarter on a hill above the dairy (see **Appendix D** for copies of the well completion reports and Sonoma County well permits).

Well 2 would be the anticipated source for the potable water demands defined in Section 2.

3.5.3 Historical Groundwater Use

Well 1 is permitted by the County of Sonoma for domestic use at the time of drilling, while Well 2 is permitted for domestic and irrigation use. Well 1 was completed to a depth of 255 feet, with the top 50 feet containing a cement seal. Well 2, built on a hill above the residence, was completed to a depth of 500 feet, but only sealed in the top 25 feet.

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[30] California Water Code §10910, subdivision (f) provides that: If a water supply for a proposed project includes groundwater, the following information shall be included in the water assessment: (3) A detailed description and analysis of the amount and location of groundwater pumped…for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records; and (4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped…from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

[31] California Water Code §10910, subdivisions (f)(1) and (f)(2) provides that: If a water supply for a proposed project includes groundwater, the following information shall be included in the water assessment: (1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.; (2) A description of any groundwater basin or basins from which the proposed project will be supplied. . . . For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description…of the efforts in the basin or basins to eliminate the long-term overdraft condition.

[32] The groundwater information in this subsection is derived from the California Department of Water Resources (DWR) Bulletin 118 Update 2003, October 2003.

[33] Id. p, 106.

[34] Id. p. 132.

Well 2 was drilled in 2001 to move the domestic well away from a potential location that might receive percolated recycled water being applied to nearby pastures.[35] With the cessation of dairy operations in 2006, Well 2 is the only source of water used for domestic purposes, including the main residence, a rental residence, the barns and numerous water troughs throughout the ranch.[36]

3.5.4 Groundwater Level Trends

Pump tests conducted at the time of drilling yielded 5 gpm (Well 1) and 16 gpm (Well 2). However, the drawdown of water levels was significant over these short tests. Estimates for potential well suitability for project purposes are based instead on historical use from the wells, as described below.

As stated by the current landowner, Well 2 alone has provided a continued dependable source of water for all domestic needs of the main residence and a rental residence.[37]

3.5.5 Groundwater Quality

In early 2008, water samples were collected from Well 2 and analyzed for general water quality and potability. The analytical results indicated no presence for either Coliform or E. Coli bacteria. The analysis for minerals was within the accepted standards for drinking water wells in the State of California.[38]

3.5.6 Well suitability

Well 2 was sealed with Bentonite to a depth of 25 feet. Such sealing meets the County's permit requirements for use as a single-family domestic well or for irrigation purposes. For use as a "domestic, public" source, the well would need to be re-sealed to a depth of 50 feet.

3.6 REGULATORY APPROVALS AND PERMITS

Pursuant to Water Code §10910(d)(2)(C)-(D), SCWMA shall identify for its proposed water supply: (1) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply; and (2) any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

The order from the San Francisco Bay Region of the California Regional Water Quality Control Board may need to be modified to ensure the entire footprint of the Proposed Project is able to receive recycled water. Order 88-036 included an attachment that indicated "the location and size of the areas to be irrigated." The attachment shows uniquely shaped shaded areas that do not fully cover the entire Site 40 property. Clarification of the areas allowed to receive recycled water may be necessary.

Furthermore, the SCWMA will need to obtain a new well permit to use Well 2 to meet potable needs of the Proposed Project.

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[35] Personal communication with Mr. Allan Tose (real estate agent for the property) in September 2010.

[36] Letter from Ms. Kara Lee Teixeira to Mr. Patrick Carter dated January 27, 2011. **Appendix E**.

[37] Id.

[38] January 30, 2008 letter to Ms. Kara Lee Teixeira and Ms. Mary Francis Escobar from EBA Engineering (EBA project number 07-1473). **Appendix F**.

3.7 SUPPLY SUMMARY

The primary water supplies for the Proposed Project are summarized in **Table 3-2**.

Table 3-2
Summary of Proposed Project Water Supplies

Category	Source	Supply amount	Point of delivery	Place of use	Quality	Supply reliability
Project	Recycled water from Petaluma	Up to 129 acre-feet/yr (historic ave. is 400 acre-fee/yr)	Along western property boundary	N/A	Title 22 recycled water standards	High, per City's 2010 UWMP
Project	Well 2	16 gpm (as tested)	Southern quarter of property, on hill over dairy	N/A	Potable	High, per testimonial

SECTION 4 – SUPPLY SUFFICIENCY ANALYSIS

Section 4 provides analysis of the sufficiency of the designated water supply for the Proposed Project water demands.[39]

4.1 Supply and Demand Integration

As demonstrated in Table 4-1, the identified surface and groundwater supplies are determined to be adequate to meet the water supply needs of the Proposed Project under all hydrologic year-type conditions.

While a traditional surface water supply may be subject to limitations during dry hydrologic conditions, the recycled water supplies obtained from the City of Petaluma are not subject to shortages and will be consistently available in all years. Furthermore, the historic use of groundwater for domestic purposes on the Site 40 property indicated the stability of the groundwater over varied climatic and hydrologic conditions. With similar demands for potable water from the Proposed Project offsetting the historic domestic uses, the available of groundwater is also not anticipated to experience shortage conditions.

4.2 Conclusion of Sufficiency

Per the requirements of CWC §10910(c)(4), the water supplies available to meet the Proposed Project demands are determined to be sufficient for at least the next twenty years, based upon the following primary conclusions:

- The Proposed Project anticipates an annual demand of 130 acre-feet per year, which includes 129 acre-feet of non-potable demands and one acre-foot of potable demand. The non-potable demands include a conservatively high estimate of water to enable composting functions, as well as estimated water necessary to irrigate trees used as a visual screen, to control dust, and to maintain equipment.
- The City of Petaluma will continue to provide adequate supplies of secondary-treated recycled water to the Site 40 property, as reflected in the City's 2010 Urban Water Management Plan (April 2011 Public Draft).
- The existing domestic well will continue to be used to meet potable demands generated by the Proposed Project that are similar in quantity and use pattern to those of the historic and existing domestic uses of the primary and rental residences and associated stock-water troughs.

[39] CWC § 10910 (c)(4) provides that "If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses." Furthermore, if a groundwater will be used to supply a project, CWC §10910 (f)(5) requires: "An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project."

Table 3-2
Summary of Proposed Project Water Supplies

Year	Projected Baseline Water Demand (ac-ft/year)	Surface Water			Groundwater (ac-ft/year)	Projected Surplus/ (Shortfall) (ac-ft/year)
		Hydrologic Year Type		Available Water Supply (ac-ft/year)		
2016	130	Normal		129	1	0
	130	Single Dry		129		0
		Multiple Dry	Year 1	129		0
			Year 2	129		0
			Year 3	129		0
2021	130	Normal		129	1	0
	130	Single Dry		129		0
		Multiple Dry	Year 1	129		0
			Year 2	129		0
			Year 3	129		0
2026	130	Normal		129	1	0
	130	Single Dry		129		0
		Multiple Dry	Year 1	129		0
			Year 2	129		0
			Year 3	129		0
2031	130	Normal		129	1	0
	130	Single Dry		129		0
		Multiple Dry	Year 1	129		0
			Year 2	129		0
			Year 3	129		0

Note: The Proposed Project is anticipated to reach the full demand estimate by 2016, reflecting the anticipated transition and expansion of existing composting activities elsewhere in the County to the Site 40 Property.

APPENDICES

Appendix A – Water Rights

Appendix B – Excerpt from Petaluma UWMP

Appendix C – Water Availability Analysis and Amendment

Appendix D – Well Completion Reports

Appendix E – January 27, 2011 Testimony of Water Availability

Appendix F – Report from EBA Engineering

Appendix A – Water Rights

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor ♦ Sacramento, California 95814 ♦ 916.341.5300
P.O. Box 2000 ♦ Sacramento, California 95812-2000
Fax: 916.341.5400 ♦ www.waterrights.ca.gov

Linda S. Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

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In Reply Refer to:BC:30978

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By__________ Date________
By__________ Date________

Estate of Frank Teixeira
c/o Paula Whealen
444 North Third Street, Suite 325
Sacramento, CA 95811-0238

Dear Ms. Whealen:

PERMIT 21217 (APPLICATION 30978), [UNNAMED STREAM], IN SONOMA COUNTY

Your WATER RIGHT PERMIT is enclosed. Please note that, with respect to other water rights attaching to this source, the priority of your right is identified by the filing date of your application. Therefore, in times of water shortage, those diverters with water rights senior to yours can take their water first. Additional limitations on your diversion and use of water are specified by the terms of this permit. Please read the terms and conditions of your permit carefully so that you are familiar with your responsibilities as an appropriator of water.

The State Water Resources Control Board (State Water Board) requires that you submit annual reports showing the progress you have made in the construction of your project and the use of water made under this permit that will qualify for licensing purposes. We will mail the forms to you when the reports are due.

Annual permit fees are required. The California Board of Equalization will mail you a Notice of Determination (billing) on behalf of the State Water Board when the fee is due. Please pay the fee promptly. Nonpayment of the fee may result in revocation of your permit.

You must comply with all of the conditions in your permit. The State Water Board will not issue a license for any water diverted and used for any purpose or at any place not authorized in the permit. Nor will the State Water Board credit you for any development or use that occurs after the date specified in the permit unless you request and receive an extension of time to use the water. An extension of time to continue development of a project requires public noticing and reevaluation of then-current environmental considerations, and is becoming considerably more difficult to obtain.

After the project has been completed, an inspection will be made to determine the amount of water that has been placed to beneficial use within the terms of the permit. A license will then be issued confirming a right to that amount of water. Please keep sufficient records of your diversion and use of water to facilitate this process.

Please inform us of any changes in address or ownership. The State Water Board will mail all notices, including fee notices, to the most recent address supplied. The regulations require a water right holder to immediately file a statement informing the State Water Board of any change in ownership of the application, permit, or license. The statement shall refer to the number of the water right, and identify the name and address of the new owner. This is

STATE OF CALIFORNIA
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

RECEIVED & READ
OF 2 PAGES
By________________Date________
By________________Date________

In the Matter of Application 30978
Estate of Frank Teixeira

ORDER APPROVING ISSUANCE OF PERMIT

SOURCE: Unnamed Stream tributary to the Petaluma River

COUNTY: Sonoma County

WHEREAS:

1. Frank Teixeira (Applicant) filed Application 30978 with the State Water Resources Control Board (State Water Board) on October 14, 1999.

2. The Division issued a public notice of Application 30978 on September 15, 2000. No protests were received on the basis of injury to prior rights. Protests were received from the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) on the bases of injury to the environment.

3. The State Water Board has determined that there is unappropriated water available to serve Application 30978. Applicant's consultant prepared and submitted a water availability analysis on October 3, 2003, documenting the availability of water. On October 22, 2003, the Division of Water Rights (Division) accepted Applicant's water availability analysis. Additional hydrologic analysis was submitted on August 3, 2004 supporting Division's evaluation of water availability.

4. The water will be diverted and used without injury to any lawful user of water. Based on the water availability analysis, water is available to serve this application without injury to prior rights.

5. Water will be diverted and used without unreasonable effect upon fish, wildlife, or other instream beneficial uses. Based on an August 2003 site visit and the water availability analysis, NMFS concluded that the project would not pose a threat to steelhead, and they withdrew their protest on March 15, 2004. The USFWS protest was dismissed pursuant to Water Code Section 1335 for failure to respond to a request for information.

   In 2002, NMFS and California Department of Fish and Game (DFG) developed *Draft Guidelines for Maintaining Instream Flows to Protect Fisheries Resources Downstream of Water Diversions in Mid-California Coastal Streams* (Draft Guidelines), dated June 17, 2002. The Draft Guidelines are recommended for use by permitting agencies (including the State Water Board), planning agencies and water resources development interests when evaluating proposals to divert and use water from northern California coastal streams. The Draft Guidelines apply to projects located in the geographic area of

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STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT 21217

RECEIVED & READ
OF 10 PAGES
By________ Date________
By________ Date________

Application 30978 of **Estate of Frank Teixeira**
1035 Stage Gulch Road
Petaluma, CA 94954

filed on **October 14, 1999**, has been approved by the State Water Resources Control Board (State Water Board) SUBJECT TO PRIOR RIGHTS and to the limitations and conditions of this permit.

Permittee is hereby authorized to divert and use water as follows:

1. Source of water

Source:	Tributary to:
Unnamed Stream	**Petaluma River**
	San Pablo Bay

within the County of **Sonoma**

2. Location of point of diversion

By California Coordinate System of 1983 in Zone 2	40-acre subdivision of public land survey or projection thereof	Section (Projected)	Township	Range	Base and Meridian
North 1,848,592 feet East 6,408,856 feet	**SW¼ of NW¼**	33	5N	6W	MD

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor ♦ Sacramento, California 95814 ♦ 916.341.5300
P.O. Box 2000 ♦ Sacramento, California 95812-2000
FAX: 916.341.5400 ♦ www.waterrights.ca.gov

Linda S. Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

In Reply Refer
to: EIO: A030978

JUL 2 2 2008

Estate of Frank Teixeira
c/o Paula Whealen
Wgner & Bonsignore
444 North Third Street, Suite 325
Sacramento, CA 95811-0238

RECEIVED & READ
OF 1 PAGES
By________ Date________
By________ Date________

Dear Ms. Whealen:

PERMIT 21217 (APPLICATION 30978) OF ESTATE OF FRANK J. TEIXEIRA TO APPROPRIATE WATER FROM AN UNNAMED STREAM TRIBUTARY TO THE PETALUMA RIVER THENCE SAN PABLO BAY IN SONOMA COUNTY

This letter is a follow-up to our July 17, 2008, conversation regarding your concern with use of the word "Licensee" in several of the terms contained in Permit 21217 (A030978). The word "Licensee" was added to certain permit terms so that when or if Permit 21217 gets licensed, the existing terms could be transferred to a license without modification. This will also help insure that terms developed as part of the California Environmental Quality Act process or to protect public trust resources will be carried through to license when appropriate. The intent of using the words "Permittee/Licensee" was not to encumber the Permittee's existing license with new terms. The bypass term (term 14), however, is intended to apply to all bases of right, including licensed rights.. Use of the word licensee does not change the affect of Term 14 since the term specifically states that it applies to all bases of right.

Application of the bypass term to the existing licenses would need to occur prior to construction (i.e., enlargement of the reservoir) or diversion or use of water under Permit 21217. In other words, application of the bypass flow requirement to the existing licenses becomes invoked when diversion is commenced under Permit 21217. This interpretation is consistent with Term 15, which requires submittal and Division approval of a bypass compliance plan prior to the start of construction or diversion or use of water under the permit. It is important to point out that withdrawal of water from the exiting reservoir for a purpose of use, or on a place of use, other than those specified in the existing licenses, may require diversion to occur under Permit 21217.

Please feel free to contact me at (916) 341-5384 or by email at eioppenheimer@waterboards.ca.gov if you have any questions regarding this matter.

Sincerely,

Eric Oppenheimer, Chief
Russian River Permitting Unit

CVC Teixeira

Report of Water Analysis

Date Sampled: 09/11/2008 Lab No: 08-388

Date Reported: 09/25/2008

No.	Description	Na meq/l	Ca meq/l	Mg meq/l	HCO3 meq/l	Cl meq/l	EC dS/m	pH	Cu ppm	Fe ppm	Mn ppm	Zn ppm	P ppm	K ppm	NO3 ppm	SO4 ppm	B ppm	TDS ppm	Adj. SAR	Lang. Index
1	POND	1.3	1.25	1.23	2.8	0.76	0.33	8		0.11	0.26		1.15	5.2		15	0.09	289	1.21	-0.4
2	CITY	7.04	2	1.97	5.75	3.55	1.07	7.9		0.07	0.08		7.33	23.8	51	52	0.49	838	5.75	0.1

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OF 1 PAGES
By________________Date__________
By________________Date__________

All comments are based upon the results of the laboratory analysis. The lab results, although believed to be reliable, cannot be guaranteed by CVC.

Coastal Viticultural Consultants, Inc. / Phone: 707-965-3700 / Fax: 707-965-3737 / Phone: 925-462-6206

State Water Resources Control Board

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Linda S. Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

JUN 2 7 2008

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WAGNER & BONSIGNORE

In Reply Refer
to:BC:30978

Estate of Frank Teixeira
c/o Paula Whealen
444 North Third Street, Suite 325
Sacramento, CA 95811-0238

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In the Matter of Application 30978
Estate of Frank Teixeira

ORDER APPROVING ISSUANCE OF PERMIT

SOURCE: Unnamed Stream tributary to the Petaluma River

COUNTY: Sonoma County

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3. The State Water Board has determined that there is unappropriated water available to serve Application 30978. Applicant's consultant prepared and submitted a water availability analysis on October 3, 2003, documenting the availability of water. On October 22, 2003, the Division of Water Rights (Division) accepted Applicant's water availability analysis. Additional hydrologic analysis was submitted on August 3, 2004 supporting Division's evaluation of water availability.

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Sonoma, Napa, Mendocino, and Marin Counties, and portions of Humboldt County. The Draft Guidelines recommend that terms and conditions be included in new water right permits for small diversions to protect fishery resources in the absence of site-specific biologic and hydrologic assessments. Approval of Application 30978 is consistent with the recommendations in the Draft Guidelines.

6. Pursuant to the provisions of the California Environmental Quality Act, the State Water Board, acting as lead agency, adopted a Mitigated Negative Declaration (MND) pursuant to the California Code of Regulations, Title 14, section 15074. The Initial Study and MND were circulated on March 21, 2008. The MND determined that the proposed project will have a less than significant effect on the environment and will not result in significant cumulative impacts based on the reasons specified in the Initial Study. The potential adverse impacts of the project were found to be less than significant with the inclusion mitigation measures specified as permit terms. The Division will file a Notice of Determination in accordance with the California Code of Regulations, title 14, section 15075 after issuance of this order.

7. All protests to approval of the application have been resolved by inclusion of permit conditions or cancellation pursuant to Water Code section 1335, subdivision (d).

8. Applicant requests to store 164 acre-feet of water in an existing reservoir for stockwatering of up to 1,000 head of dairy cows, and irrigation and frost protection of approximately 300 acres. The existing reservoir, Pinheiro Reservoir- Division of Safety of Dams # 3429, under Licenses 7228 and 8283 (Applications 18476 and 21284, respectively) has a capacity of 87 acre-feet. Applicant proposes to increase the capacity of the reservoir to 164 acre-feet by reinforcing the existing flashboards and adding new ones. The proposed water use is beneficial.

NOW, THEREFORE, IT IS ORDERED THAT A PERMIT IS ISSUED FOR APPLICATION 30978, subject to the conditions of the attached permit.

STATE WATER RESOURCES CONTROL BOARD

Victoria A. Whitney

Victoria A. Whitney, Chief
Division of Water Rights

Dated: JUN 27 2008

STATE OF CALIFORNIA
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
STATE WATER RESOURCES CONTROL BOARD

DIVISION OF WATER RIGHTS

PERMIT FOR DIVERSION AND USE OF WATER

PERMIT 21217

Application 30978 of **Estate of Frank Teixeira**
1035 Stage Gulch Road
Petaluma, CA 94954

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Permittee is hereby authorized to divert and use water as follows:

1. Source of water

Source:	Tributary to:
Unnamed Stream	**Petaluma River**
	San Pablo Bay

within the County of **Sonoma**

2. Location of point of diversion

By California Coordinate System of 1983 in Zone 2	40-acre subdivision of public land survey or projection thereof	Section (Projected)	Township	Range	Base and Meridian
North 1,848,592 feet **East 6,408,856 feet**	SW¼ of NW¼	33	5N	6W	MD

3. Purpose of use	4. Place of use	Section (Projected)	Township	Range	Base and Meridian	Acres
Irrigation	Within SE¼ of SE¼	28	5N	6W	MD	5
Frost Protection	Within SE¼ of NW¼	32	5N	6W	MD	5
	Within NE¼ of NE¼	32	5N	6W	MD	30
	Within NW¼ of NE¼	32	5N	6W	MD	14
	Within SW¼ of NE¼	32	5N	6W	MD	36
	Within SE¼ of NE¼	32	5N	6W	MD	30
	Within NE¼ of SE¼	32	5N	6W	MD	35
	Within NW¼ of SE¼	32	5N	6W	MD	20
	Within SE¼ of SE¼	32	5N	6W	MD	8
	Within NE¼ of NW¼	33	5N	6W	MD	4
	Within NW¼ of NW¼	33	5N	6W	MD	30
	Within SW¼ of NW¼	33	5N	6W	MD	20
	Within SE¼ of NW¼	33	5N	6W	MD	15
	Within NE¼ of SW¼	33	5N	6W	MD	3
	Within NW¼ of SW¼	33	5N	6W	MD	35
	Within SW¼ of SW¼	33	5N	6W	MD	10
Stockwatering	Within SW¼ of NW¼	33	5N	6W	MD	
	Within SE¼ of NW¼	33	5N	6W	MD	

The place of use is shown on map on file with the State Water Board.

5. The water appropriated shall be limited to the quantity that can be beneficially used and shall not exceed 164 acre-feet per annum to be collected from December 15 of each year to March 31 of the succeeding year.

(0000005C)

6. This permit does not authorize collection of water to storage outside of the specified season to offset evaporation and seepage losses or for any other purpose.

(0000005I)

7. The total quantity of water collected to storage under this permit and Licenses 7228 (A018476) and 8283 (A021284) shall not exceed 164 acre-feet per year.

(0000005L)

8. The capacity of the reservoir covered under this permit shall not exceed 164 acre-feet.
(0000005N)

9. Construction work and complete application of the water to the authorized use shall be prosecuted with reasonable diligence and completed by December 31, 2018.
(0000009)

10. The State Water Board reserves jurisdiction to impose conditions to conform this permit to the State Water Board's policy on use of water for frost protection. Action by the State Water Board will be taken only after notice to interested parties and opportunity for hearing.
(0000020)

11. Permittee shall install and maintain an outlet pipe of adequate capacity in the dam as near as practicable to the bottom of the natural stream channel, or provide other means satisfactory to the State Water Resources Control Board, in order that water entering the reservoir that is not authorized for appropriation under this permit can be released. Before storing water in the reservoir, Permittee shall furnish to the Division of Water Rights evidence, substantiating that the outlet pipe, or alternative facility, has been installed in the dam. Evidence shall include photographs showing completed works or certification by a registered Civil or Agricultural Engineer.
(0050043B)

12. Before storing water under this permit, Permittee shall install a staff gage in the reservoir, satisfactory to the Chief of the Division of Water Rights, for the purpose of determining water levels in the reservoir. The Permittee/Licensee must maintain the staff gage in operating condition as long as water is being diverted or used under this permit.

Permittee/Licensee shall record the staff gage readings on the last day of each month. Permittee/Licensee shall record the maximum and minimum water level surface elevations and the dates that these water levels occur, each water-year between October 1, and September 30. Permittee/Licensee shall maintain a record of all staff gage readings and shall submit these records with all required Reports of Permittee, Reports of Licensee or whenever requested by the staff of the Division of Water Rights.
(0070500)

13. Prior to diversion or use of water under this permit, Permittee shall install an in-line flow meter satisfactory to the Chief of the Division of Water Rights that measures the instantaneous rate and the cumulative amount of water withdrawn from the reservoir at the POD. The in-line flow meter must be maintained in operating condition as long as water is being diverted or used under this permit. Permittee/Licensee shall maintain a record of the end-of-the-month meter readings and the days of actual diversion, and shall submit these records with all required Reports of Permittee, Reports of Licensee, or whenever requested by the staff of the Division of Water Rights.
(0100900)

14. For the protection of fish and wildlife, under all bases of right, Permittee/Licensee shall during the period from December 15 of each year through March 31 of each succeeding year bypass a minimum of 0.33 cubic feet per second (cfs) at the POD. Under all bases of right the Permittee/Licensee shall bypass the total streamflow from April 1 through December 14 of each year. The total streamflow at the POD shall be bypassed whenever it is less than 0.33 cfs.
(0140060)

15. Prior to the start of construction or diversion or use of water under this permit, the Permittee shall submit a Compliance Plan for approval by the Chief of the Division of Water Rights that will

demonstrate compliance with the flow bypass terms specified in this permit. The Compliance Plan shall include the following:

a) A description of the physical facilities (i.e., outlet pipes, siphons, pipelines, bypass ditches, splitter boxes etc.) that will be constructed or have been constructed at the project site and will be used to bypass flow.
b) A description of the gages and monitoring devices that will be installed or have been installed to measure stream flow and/or reservoir storage capacity, including any necessary calibration.
c) A time schedule for the installation and rating of these facilities.
d) A description of the frequency of data collection and the methods for recording bypass flows and storage levels.
e) An operation and maintenance plan that will be used to maintain all facilities in good condition.
f) A description of the events that will trigger recalibration of the monitoring devices, and the process that will be used to recalibrate.

The Permittee/Licensee shall be responsible for all costs associated with developing the Compliance Plan, and installing and maintaining all flow bypass and monitoring facilities described in the Compliance Plan.

Permittee/Licensee shall maintain all measurements and other monitoring required by this condition. Permittee shall provide measuring and monitoring records to the Chief of the Division of Water Rights within 15 days upon request by the State Water Board, the Division Chief, or other authorized designees of the State Water Board.

Diversion of water prior to approval of the Compliance Plan and the installation of facilities specified in the Compliance Plan is not authorized.

(0490500)

16. Based on the information contained in the Division's files, riparian water has not been used on the place of use. Diversion of water is not authorized under this permit if in the future the Permittee/Licensee diverts water under riparian right. With the Chief of the Division's approval, Permittee/Licensee may use water under basis of riparian right on the authorized place of use, provided that Permittee/Licensee submits reliable evidence to the Chief of the Division quantifying the amount of water that Permittee/Licensee likely would have used under the basis of riparian right absent the appropriation authorized by this permit. The Chief of the Division is hereby authorized to approve or reject any proposal by Permittee/Licensee to use water under the basis of riparian right on the place of use authorized by this permit.

(0560300B)

17. Prior to the start of construction or diversion or use of water under this permit, Permittee shall file a notice of vineyard planting or replanting with the Sonoma County Agricultural Commissioner. The notice shall conform to applicable provisions of the Sonoma County Vineyard Erosion and Sediment Control Ordinance (Ord. No. 5216 §§ 2, 2000). The notice shall include: 1) maps, plans, drawings, calculations, photographs, and other information as may be necessary or required by the Agricultural Commissioner to verify that the vineyard planting qualifies as a Level II or III authorized vineyard planting, or that the vineyard replanting qualifies as a Level II authorized vineyard replanting; and 2) an erosion and sediment control plan, certified pursuant to Section 30-74 of the Sonoma County Vineyard Erosion and Sediment Control Ordinance, for the vineyard planting or replanting. Prior to the start of construction or diversion or use of water under this permit, Permittee

shall submit evidence to the Chief of the Division of Water Rights verifying that the Sonoma County agricultural commissioner has authorized the vineyard planting or replanting to proceed.

(0490300A)

18. Prior to licensing of this permit, Permittee shall submit evidence to the Chief of the Division of Water Rights verifying that the project was constructed in compliance with the requirements of the certified erosion and sediment control plan and the Sonoma County Vineyard Erosion and Sediment Control Ordinance.

(0490300B)

19. Prior to construction or diversion or use of water under this permit, Permittee shall obtain any required grading permits from Sonoma County.

(0120300)

20. Permittee shall submit a detailed Dust Control and Mitigation Plan for review and approval by the San Francisco Bay Air Quality Management District. Prior to the start of construction or diversion or use of water under this permit, Permittee shall submit evidence to the Chief of the Division of Water Rights showing that San Francisco Bay Air Quality Management District has approved the Permittee's Dust Control and Mitigation Plan.

(0450300A)

21. Permitee shall prevent any debris, soil, silt, cement that has not set, oil, or other such foreign substance from entering into or being placed where it may be washed by rainfall runoff into the waters of the State.

(0000208)

22. Construction activities within 100 feet of any drainage shall only occur between May 15 and October 31 to minimize the potential for rainfall events to mobilize and transport sediment to aquatic resources.

(0400500)

23. In order to prevent degradation of the quality of water during and after construction of the project, prior to commencement of construction, Permittee shall file a report pursuant to Water Code section 13260 and shall comply with all waste discharge requirements imposed by the California Regional Water Quality Control Board, San Francisco Bay Region, or by the State Water Resources Control Board.

(0450300B)

24. For the protection of habitat of the western pond turtle (*Clemmys marmorata*) and to allow for the continued growth of riparian vegetation, the Permittee/Licensee shall:

a) Maintain a 50-feet-wide setback around the reservoir as shown on Setback Map No. SB-01 dated February 25, 2008 on file with the Division of Water Rights. No new ground-disturbing activities shall occur within the setback area, with the exception of livestock access and occasional equipment access necessary for continued operation of the reservoir. Equipment access within the setback area shall be limited to only activities necessary for the ongoing operation of the reservoir and shall incorporate best management practices to minimize disturbance to water, soils, and vegetation. Natural vegetation shall be preserved and protected within the setback area. Planting of native riparian vegetation within the setback area is allowed.

b) Obtain approval of the United States Fish and Wildlife Service, Sacramento Endangered Species Office, and the California Department of Fish and Game prior to any future reservoir dredging operations. Permittee/Licensee shall submit to the Chief of the Division of Water Rights evidence of agencies approval prior to any future reservoir dredging operations.

c) Refrain from disturbing emergent (wetland) vegetation in the reservoir during dredging operation

(0600500A)

26. For the protection of riparian habitat and mitigation of disturbed riparian habitat, Permittee shall establish a setback as shown on Setback Map No. SB-01 dated February 25, 2008 on file with the Division of Water Rights. The setback shall be at least 50 feet wide along the unnamed intermittent stream within the Place of Use as measured from the top of the bank on both sides of the stream and at least 25 feet wide along the ephemeral streams within the Place of Use as measured from the top of the bank on both sides of the streams. No ground-disturbing activities shall occur within the setback area, including, but not limited to, grading, herbicide spraying, roads, fencing, and use or construction of storage areas, with the exception of livestock access and occasional equipment access reasonably necessary for continued operation of the vineyard and management of the setback area. Equipment access through the setback shall be limited to previously disturbed areas of the setback when possible and is only allowed when other means of access are not available. Equipment access through the setback area shall incorporate best management practices to minimize disturbance to water, soils, and vegetation. Planting of native riparian vegetation within the setback area is allowed. These requirements shall remain in effect as long as water is being diverted under this permit.

(0600500B)

27. For the protection of riparian habitat and mitigation of disturbed riparian habitat, Permittee shall implement a riparian enhancement plan. Prior to beginning construction or diversion or use of water under this permit, Permittee shall submit a riparian enhancement plan for review and approval of the Chief of the Division of Water Rights. The riparian enhancement plan shall specify: (1) the location of area to be planted; (2) the number and species of plants to be planted; (3) planting methods; (4) success criteria and monitoring methods; and (5) a description of the actions that will be taken if success criteria are not met. The riparian enhancement plan shall require at least five years of monitoring of the vigor and abundance of riparian plantings. The riparian enhancement area specified in the plan shall encompass at least 500 linear feet and 50,000 square feet of the setback identified on Setback Map No. SB-01 dated February 25, 2008 on file with the Division of Water Rights. Prior to beginning construction or diversion or use of water under this permit, the 50,000 square feet enhancement area shall be fenced to exclude livestock access. The riparian enhancement plan shall be implemented within two years of approval of the plan.

(0490500A)

28. Permittee shall not conduct construction activities within 50 feet of drainages from October 16 of each year to April 30 of the succeeding year to reduce the likelihood of the presence of western pond turtles in construction areas. If a western pond turtle is encountered during construction, Permittee shall cease construction and ground-disturbing activities in areas within 250 feet of the location where the western pond turtle is present and shall contact the California Department of Fish and Game. Prior to restarting construction activities, Permittee shall submit to the Chief of the Division of Water Rights evidence of DFG approval to continue construction.

(0490500B)

29. Prior to beginning construction or diversion or use of water under this permit, Permittee shall submit a western pond turtle habitat enhancement plan for review and approval of the Chief of the Division of Water Rights. The enhancement plan shall include the actions necessary to provide

sufficient underwater refugia and basking habitat (e.g., submerged logs, downed trees and large rocks) for western pond turtles. Permittee shall develop the enhancement plan in consultation with California Department of Fish and Game. The approved western pond turtle enhancement plan shall be implemented within one year of enlargement of the reservoir.

(0490500C)

30. In accordance with the requirements of Water Code section 1393, Permittee shall clear the area covered by the proposed reservoir enlargement of all structures, trees, and other vegetation which would interfere with the use of the reservoir for water storage and recreational purposes.

(0120050B)

31. If tree removal activities are to occur between February 1 and September 30, a biologist, whose qualifications are acceptable to Division of Water Rights staff shall conduct a pre-construction survey for the purpose of identifying nesting bird species prior to tree removal. The pre-construction survey shall include all potential nesting habitat within 500 feet of proposed tree removal activities. The survey shall be conducted no more than 14 days prior to the beginning of tree removal activities. If an active raptor or migratory bird nest is found during the pre-construction survey, the Permittee shall notify the California Department of Fish and Game. If an active raptor nest is found during the pre-construction survey, a 500-feet no-disturbance buffer shall be established and maintained around the nest until all young have fledged. If an active nest of any other migratory or non-migratory bird is found, a 250-feet wide buffer shall be established around the nest until all young have fledged.

(0000210)

32. Prior to the start of construction, or diversion or use of water under this permit, Permittee shall obtain the appropriate permit from the U.S. Army Corps of Engineers (USACE) and file a copy with Division of Water Rights. If a permit from the USACE is not necessary for this permitted project, the Permittee shall provide to the Division of Water Rights a letter from the USACE affirming that a permit is not needed.

(0520300)

33. If the project requires a permit from the USACE, Permittee shall obtain Clean Water Act section 401 Water Quality Certification from the State Water Resources Control Board prior to the start of construction, or diversion or use of water under this permit.

(0300300)

34. Should any buried archeological materials be uncovered during project activities, such activities shall cease within 100 feet of the find. Prehistoric archeological indicators can include, but not necessarily be limited to: stone tools and flaking debris; bedrock outcrops and boulders with mortar cups; ground stone implements (grinding slabs, mortars and pestles); and locally darkened midden soils containing artifactual material such as bone and shell fragments, stone tools, or fire-cracked rock. Historic period site indicators can include: fragments of glass, ceramic, and metal objects; milled and split lumber; structure and feature remains such as building foundations, privy pits, wells and dumps; and old trails. The Chief of the Division of Water Rights shall be notified of the discovery, and a professional archeologist shall be retained by the Permittee to evaluate the find and recommend appropriate mitigation measures. Proposed mitigation measures shall be submitted to the Chief of the Division of Water Rights for approval. Project-related activities shall not resume within 100 feet of the find until all approved mitigation measures have been completed to the satisfaction of the Chief of the Division of Water Rights.

(0000215)

35. If human remains are encountered, then the Applicant shall comply with Section 15064.5 (e) (1) of the CEQA Guidelines and the Public Resources Code Section 7050.5. All project-related ground disturbance within 100 feet of the find shall be halted until the county coroner has been notified. If

the coroner determines that the remains are Native American, the coroner will notify the Native American Heritage Commission to identify the most-likely descendants of the deceased Native Americans. Project-related ground disturbance in the vicinity of the find shall not resume until the process detailed under Section 15064.5 (e) has been completed and evidence of completion has been submitted to the Chief of the Division of Water Rights.

(0380500)

36. Prior to and during any ground disturbing activities, the Permittee/Licensee shall comply with the requirements of the Treatment Plan titled *Final Treatment Plan for Application 30978,* dated June 12, 2008, on file with Application 30978 at the Division of Water Rights. This includes all activities associated with any features of the proposed project (e.g., water diversion works, storage reservoirs, and distribution facilities, related to conversion of the place of use to vineyard).

(0380300)

37. Permittee/Licensee shall report any non-compliance with the terms of the permit to the Chief of the Division of Water Rights within three days of identification of the violation.

(9990999)

ALL PERMITS ISSUED BY THE STATE WATER RESOURCES CONTROL BOARD ARE SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:

A. The amount authorized for appropriation may be reduced in the license if investigation warrants.

(0000006)

B. Progress reports shall be submitted promptly by Permittee when requested by the State Water Resources Control Board (State Water Board) until a license is issued.

(0000010)

C. Permittee shall allow representatives of the State Water Board and other parties, as may be authorized from time to time by said State Water Board, reasonable access to project works to determine compliance with the terms of this permit.

(0000011)

D. Pursuant to California Water Code sections 100 and 275, and the common law public trust doctrine, all rights and privileges under this permit and under any license issued pursuant thereto, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of State Water Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the State Water Board may be exercised by imposing specific requirements over and above those contained in this permit with a view to eliminating waste of water and to meeting the reasonable water requirements of Permittee without unreasonable draft on the source. Permittee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this permit and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the State Water Board determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the State Water Board also may be exercised by imposing further limitations on the diversion and use of water by the Permittee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the State Water Board determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

(0000012)

E. The quantity of water diverted under this permit and under any license issued pursuant thereto is subject to modification by the State Water Board if, after notice to the Permittee and an opportunity for hearing, the State Water Board finds that such modification is necessary to meet water quality objectives in water quality control plans which have been or hereafter may be established or modified pursuant to Division 7 of the Water Code. No action will be taken pursuant to this paragraph unless the State Water Board finds that (1) adequate waste discharge requirements have been prescribed and are in effect with respect to all waste discharges which have any substantial effect upon water quality in the area involved, and (2) the water quality objectives cannot be achieved solely through the control of waste discharges.

(0000013)

F. This permit does not authorize any act that results in the taking of a threatened, endangered, or candidate species or any act that is now prohibited, or becomes prohibited in the future, under either the California Endangered Species Act (Fish & Game Code, §§ 2050 - 2097) or the federal Endangered Species Act (16 U.S.C.A. §§ 1531 - 1544). If a "take" will result from any act authorized under this water right, the Permittee shall obtain authorization for an incidental take prior to construction or operation of the project. Permittee shall be responsible for meeting all requirements of the applicable Endangered Species Act for the project authorized under this permit.

(0000014)

G. Permittee shall maintain records of the amount of water diverted and used to enable the State Water Board to determine the amount of water that has been applied to beneficial use pursuant to Water Code Section 1605.

(0000015)

H. No work shall commence and no water shall be diverted, stored or used under this permit until a copy of a lake or streambed alteration agreement between the State Department of Fish and Game (DFG) and the Permittee is filed with the Division of Water Rights. Compliance with the terms and conditions of the agreement is the responsibility of the Permittee. If a stream or lake agreement is not necessary for this permitted project, the Permittee shall provide the Division of Water Rights a copy of a waiver signed by the DFG.

(0000063)

This permit is issued and Permittee takes it subject to the following provisions of the Water Code:

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every Permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefore shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the

Section 1390. A permit shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code), but no longer.

Section 1391. Every permit shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a permit is issued takes it subject to the conditions therein expressed.

Section 1392. Every Permittee, if he accepts a permit, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefore shall at any time be assigned to or claimed for any permit granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any Permittee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any permittee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

STATE WATER RESOURCES CONTROL BOARD

Victoria A. Whitney

Victoria A. Whitney, Chief
Division of Water Rights

Dated: JUN 2 7 2008

State Water Resources Control Board

Division of Water Rights
1001 I Street, 14th Floor • Sacramento, California 95814 • 916.341.5300
P.O. Box 2000 • Sacramento, California 95812-2000
FAX: 916.341.5400 • www.waterrights.ca.gov

Linda S. Adams
Secretary for Environmental Protection

Arnold Schwarzenegger
Governor

In Reply Refer
to: EIO: A030978

JUL 22 2008

Estate of Frank Teixeira
c/o Paula Whealen
Wgner & Bonsignore
444 North Third Street, Suite 325
Sacramento, CA 95811-0238

Dear Ms. Whealen:

PERMIT 21217 (APPLICATION 30978) OF ESTATE OF FRANK J. TEIXEIRA TO APPROPRIATE WATER FROM AN UNNAMED STREAM TRIBUTARY TO THE PETALUMA RIVER THENCE SAN PABLO BAY IN SONOMA COUNTY

This letter is a follow-up to our July 17, 2008, conversation regarding your concern with use of the word "Licensee" in several of the terms contained in Permit 21217 (A030978). The word "Licensee" was added to certain permit terms so that when or if Permit 21217 gets licensed, the existing terms could be transferred to a license without modification. This will also help insure that terms developed as part of the California Environmental Quality Act process or to protect public trust resources will be carried through to license when appropriate. The intent of using the words "Permittee/Licensee" was not to encumber the Permittee's existing license with new terms. The bypass term (term 14), however, is intended to apply to all bases of right, including licensed rights.. Use of the word licensee does not change the affect of Term 14 since the term specifically states that it applies to all bases of right.

Application of the bypass term to the existing licenses would need to occur prior to construction (i.e., enlargement of the reservoir) or diversion or use of water under Permit 21217. In other words, application of the bypass flow requirement to the existing licenses becomes invoked when diversion is commenced under Permit 21217. This interpretation is consistent with Term 15, which requires submittal and Division approval of a bypass compliance plan prior to the start of construction or diversion or use of water under the permit. It is important to point out that withdrawal of water from the exiting reservoir for a purpose of use, or on a place of use, other than those specified in the existing licenses, may require diversion to occur under Permit 21217.

Please feel free to contact me at (916) 341-5384 or by email at eioppenheimer@waterboards.ca.gov if you have any questions regarding this matter.

Sincerely,

Eric Oppenheimer, Chief
Russian River Permitting Unit

CVC Teixeira

Report of Water Analysis

Date Sampled: 09/11/2008

Lab No: 08-388

Date Reported: 09/25/2008

No.	Description	Na meq/l	Ca meq/l	Mg meq/l	HCO3 meq/l	Cl meq/l	EC dS/m	pH	Cu ppm	Fe ppm	Mn ppm	Zn ppm	P ppm	K ppm	NO3 ppm	SO4 ppm	B ppm	TDS ppm	Adj. SAR	Lang. Index
1	POND	1.3	1.25	1.23	2.8	0.76	0.33	8		0.11	0.26		1.15	5.2		15	0.09	289	1.21	-0.4
2	CITY	7.04	2	1.97	5.75	3.55	1.07	7.9		0.07	0.08		7.33	23.8	51	52	0.49	838	5.75	0.1

All comments are based upon the results of the laboratory analysis. The lab results, although believed to be reliable, cannot be guaranteed by CVC.

Coastal Viticultural Consultants, Inc. / Phone: 707-965-3700 / Fax: 707-965-3737 / Phone: 925-462-6206

STATE OF CALIFORNIA
THE RESOURCES AGENCY
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER RIGHTS

License for Diversion and Use of Water

Notice of Change (Over)

APPLICATION 21284 PERMIT 14446 LICENSE 8283

THIS IS TO CERTIFY, *That* FRANK PINHEIRO AND MARY PINHEIRO
7533 REDWOOD HIGHWAY, NOVATO, CALIFORNIA 94947

HAVE *made proof as of* APRIL 7, 1967 *(the date of inspection) to the satisfaction of the State Water Resources Control Board of a right to the use of the water of* AN UNNAMED STREAM IN SONOMA COUNTY

tributary to PETALUMA CREEK THENCE SAN FRANCISCO BAY

for the purpose of STOCKWATERING AND INDUSTRIAL USES
under Permit 14446 *of the Board and that the right to the use of this water has been perfected in accordance with the laws of California, the Regulations of the Board and the permit terms; that the priority of this right dates from* MAY 14, 1963, *and that the amount of water to which this right is entitled and hereby confirmed is limited to the amount actually beneficially used for the stated purposes and shall not exceed* FORTY-FIVE (45) ACRE-FEET PER ANNUM TO BE COLLECTED FROM ABOUT OCTOBER 1 OF EACH YEAR TO ABOUT MAY 1 OF THE SUCCEEDING YEAR.

LICENSEE'S RIGHT HEREUNDER EXTENDS ONLY TO WATER NECESSARY TO KEEP THE RESERVOIR FULL BY REPLACING WATER BENEFICIALLY USED OR LOST BY EVAPORATION AND SEEPAGE, AND TO REFILL IF EMPTIED FOR NECESSARY MAINTENANCE OR REPAIR.

THE POINT OF DIVERSION OF SUCH WATER IS LOCATED:

NORTH 1,020 FEET AND EAST 840 FEET FROM W1/4 CORNER OF PROJECTED SECTION 33, T5N, R6W, MDB&M, BEING WITHIN SW1/4 OF NW1/4 OF SAID SECTION 33.

A DESCRIPTION OF LANDS OR THE PLACE WHERE
SUCH WATER IS PUT TO BENEFICIAL USE IS AS FOLLOWS:

INDUSTRIAL (DAIRY) WITHIN SW1/4 OF NW1/4 OF PROJECTED SECTION 33, T5N, R6W, MDB&M.
STOCKWATERING WITHIN NW1/4 OF NW1/4, NE1/4 OF NW1/4, SW1/4 OF NW1/4 AND SE1/4 OF NW1/4 OF PROJECTED SECTION 33, T5N, R6W, MDB&M.

LICENSEE SHALL MAINTAIN AN OUTLET PIPE OF ADEQUATE CAPACITY IN HIS DAM AS NEAR AS PRACTICABLE TO THE BOTTOM OF THE NATURAL STREAM CHANNEL, OR PROVIDE OTHER MEANS SATISFACTORY TO THE STATE WATER RESOURCES CONTROL BOARD, IN ORDER THAT WATER ENTERING THE RESERVOIR OR COLLECTED IN THE RESERVOIR DURING AND AFTER THE CURRENT STORAGE SEASON MAY BE RELEASED INTO THE DOWNSTREAM CHANNEL TO THE EXTENT NECESSARY TO SATISFY THE DOWNSTREAM PRIOR RIGHTS AND/OR TO THE EXTENT THAT APPROPRIATION OF SAID WATER IS NOT AUTHORIZED UNDER THIS RIGHT.

6-8-73 Records chg'd to show Mary Francis Pinheiro, Gloria anne Pinheiro & Rose Marie Pinheiro Teixeira as owners

Licensee shall allow representatives of the Board and other parties, as may be authorized from time to time by the Board, reasonable access to project works to determine compliance with the terms of this license.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: JAN 23 1968

STATE WATER RESOURCES CONTROL BOARD

K. L. Woodward

Chief, Division of Water Rights

JAN 9 '68 A.A.C.

STATE OF CALIFORNIA—STATE WATER RIGHTS BOARD

License for Diversion and Use of Water

APPLICATION 18476 **PERMIT** 11903 **LICENSE** 7228

THIS IS TO CERTIFY, *That* Frank Pinheiro and Mary Pinheiro
7533 Redwood Highway
Novato, California

Notice of Change (Over)

have made proof as of April 23, 1963, *(the date of inspection) to the satisfaction of the State Water Rights Board of a right to the use of the water of* an unnamed stream in Sonoma County

tributary to Petaluma Creek

for the purpose of stockwatering use *under Permit* 11903 *of the State Water Rights Board and that said right to the use of said water has been perfected in accordance with the laws of California, the Rules and Regulations of the State Water Rights Board and the terms of the said permit; that the priority of the right herein confirmed dates from* January 14, 1959, *and that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to the amount actually beneficially used for said purposes and shall not exceed* forty-two (42) acre-feet per annum to be collected from about October 1 of each year to about March 30 of the succeeding year.

The point of diversion of such water is *located* :

North one thousand twenty (1020) feet and east eight hundred forty (840) feet from $W\frac{1}{4}$ corner of projected Section 33, T5N, R6W, MDB&M, being within $SW\frac{1}{4}$ of $NW\frac{1}{4}$ of said Section 33.

A description of the lands or the place where such water is put to beneficial use is as follows:

Within $NE\frac{1}{4}$ of $NW\frac{1}{4}$, $NW\frac{1}{4}$ of $NW\frac{1}{4}$, $SE\frac{1}{4}$ of $NW\frac{1}{4}$, and $SW\frac{1}{4}$ of $NW\frac{1}{4}$ of projected Section 33, T5N, R6W, MDB&M.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the State Water Rights Board in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the State Water Rights Board.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

FORM 64

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the board.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property cannot agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Dated: MAR 30 1965

L. K. Hill
L. K. Hill
Executive Officer

6-8-73 Records chgd to show Mary Francis Pinheiro, Gloria Anne Pinheiro & Rose Marie Pinheiro Teixeira as owners

LICENSE 7228
STATE OF CALIFORNIA
STATE WATER RIGHTS BOARD

LICENSE TO APPROPRIATE WATER

ISSUED TO Frank and Mary Pinheiro.

DATED MAR 30 1965

47680 8-61 3M SPO

DEC 18 '64 M.K.L.

2

Appendix B – Excerpt from Petaluma UWMP

Table 4-2. Past Groundwater Usage (DWR Table 18)

Basin Name		Volume of Groundwater Pumped, acre-feet				
	Metered or Un-metered	2006	2007	2008	2009	2010
Petaluma Valley 2-1	metered	0	277	498	1,073	1,007
As a percent of total water supply	--	0	3%	5%	12%	13%

Note: Total water supply for 2006-2010 provided in Table 3-5.

Table 4-3. Projected Groundwater Usage (DWR Table 19)

	Projected Groundwater Usage, acre-feet per year				
Basin Name	2015	2020	2025	2030	2035
Petaluma Valley 2-1	0	0	0	0	0

4.3 Recycled Water

The City owns and operates its own wastewater collection and treatment system. The Utility recently constructed a new Water Recycling Facility (WRF) that can treat wastewater to Title 22 recycled water standards. The new WRF is located south of town, adjacent to the existing oxidation ponds on Lakeville Highway. The WRF is regulated in the National Pollution Discharge Elimination System (NPDES) permit, promulgated by the San Francisco Bay Region of the California Regional Water Quality Control Board (RWQCB). The NPDES permit allows for discharge of secondary effluent into the Petaluma River adjacent to the WRF from October 21 through April 30 of each year.

4.3.1 System Description

The WRF produces both secondary and tertiary effluent to meet the Water Recycling Criteria contained in the California Code of Regulation, Title 22. The City's General Plan 2025 Update included a recycled water planning appendix (GP Recycle Water Appendix). The GP Recycled Water Appendix recommends two recycled water systems; secondary and tertiary. The purpose of the recycled water program is two-fold, it provides potable water offset and it allows for effluent reuse during the non-river discharge restriction period.

The new 6.7 MGD ADWF WRF produces two levels of recycled water: Title 22 disinfected secondary-23 effluent for restricted reuse, and Title 22 disinfected tertiary effluent for unrestricted reuse. WRF preliminary treatment includes screening and grit removal, secondary treatment through oxidation ditches, and secondary clarification. After clarification, the flow is split between the secondary and tertiary recycled water treatment facilities. Disinfected secondary-23 facilities consist of oxidation ponds, treatment and polishing wetland cells, sodium hypochlorite disinfection, and recycled water pumping. During the non-river discharge season (May 1st to October 20th), a combination of secondary effluent and pond effluent will be disinfected to Title 22 disinfected Secondary-23 standards using the existing disinfection facilities. Tertiary treatment facilities include chemical addition and flocculation, filtration, and UV disinfection. The current capacity of the tertiary system is 5.3 mgd.

Currently, only the secondary distribution system is fully operational. It serves agricultural and industrial customers mostly located near the WRF. The tertiary distribution system will serve customers for various tertiary effluent uses acceptable per the Title 22 unrestricted use definitions such as parks, golf courses, schools, and business parks, as well as industrial sites. Although the WRF is producing tertiary effluent, the tertiary distribution system is not fully constructed and currently uses secondary effluent to supply two golf courses connected to the distribution system. The WRF also uses recycled water for process water.

4.3.2 Wastewater and Projected Recycled Water Supply

Table 4-4 lists the projected wastewater collected and the volume of recycled water produced. The volume of influent treated to recycled water standards is assumed equal to potential demand listed in Table 4-7. Up until 2009 when the new WRF went online, a portion of the influent flow during wet weather events was bypassed around the influent structure of the previous wastewater treatment plant located at Hopper street and sent to the oxidation ponds for treatment. This results in some years having an effluent volume higher than influent volume. Table 4-5 lists the past and projected volume of wastewater disposal. Projected values reflect the current NPDES discharge schedule.

Table 4-4. Wastewater Collection and Treatment (DWR Table 21)

	Annual Volume, acre-feet per year						
	2005 (actual)	**2010 (actual)**	**2015**	**2020**	**2025**	**2030**	**2035**
Wastewater Collected in Service Area	7,264	6,287	6,670	7,050	7,430	7,820	8,200
Volume Treated to at least Secondary 23 Recycle Water Standard	7,316	6,192	3,319	3,319	3,319	3,319	3,319

Note: In 2005, some influent flow was bypassed to oxidation ponds and not included in influent value. Volume treated to secondary or tertiary recycled water standards based on projected recycled water demands in Table 4-7.

Table 4-5. Projected Wastewater Disposal (DWR Table 22)

		Annual Volume, acre-feet per year					
Disposal Method	**Treatment Level**	**2010 (actual)**	**2015**	**2020**	**2025**	**2030**	**2035**
River discharge	Disinfected Secondary-23	4,646	3,351	3,731	4,111	4,501	4,881
Secondary - 23 Reuse System	Disinfected Secondary-23	1,546	1,982	1,982	1,982	1,982	1,982
Tertiary Reuse System	Tertiary	0	1,337	1,337	1,337	1,337	1,337
Total:		6.192	6,670	7,050	7,430	7,820	8,200

Note: Recycled water disposal volumes based on projected recycled water demands in Table 4-7.

4.3.3 Recycled Water Projected Use

The 2005 UWMP projected recycled water use based on the assumption that a portion of the tertiary distribution system would be installed by 2010. Due to the economic recession, decreased water demands, and other factors, the City has not constructed any additional recycled water distribution infrastructure since the 2005 UWMP. Table 4-6 compares the 2010 projected recycled water use from the 2005 UWMP to actual use.

Table 4-6. 2005 to 2010 Recycled Water Use Comparison (DWR Table 24)

User Type	2005 UWMP Projection for 2010, AF	2010 Actual Use, AF
Agriculture	1,505	1,190
Landscape	941	356
Wildlife Habitat	0	0
Wetlands	0	0
Industrial	0	121
Landscape irrigation at WRF	123	10
Total:	2,569	1,677

Note: The 2005 UWMP included all WRF use as Landscape, though most is used for process water, as shown for 2010.

The City's GP Recycled Water Appendix evaluated potential recycled water application sites and identified landscape irrigation locations within the City, and agricultural applications south and east of the City boundaries. The Appendix limited its identification of agriculture reuse demands to the estimation of available supply, considering seasonal storage requirements and in-City tertiary demands. Total potential demands, un-constrained by infrastructure or tertiary demand needs, are assumed to be higher. WR&C will investigate additional demands and uses for its secondary recycled water supply and will be updating its existing contracts with the secondary recycled water users in 2013, or before.

Table 4-7 lists the current identified most probable recycled water uses through 2035. Values in Table 4-7 assume the Water Utility completes the tertiary system for Area A (as described in the GP Recycled Water Appendix), and continues to serve its existing agricultural customers. Values could be higher if the Water Utility implements the later phases of its tertiary system or if more agricultural or other demands are identified. The values in Table 4-7 indicate this future unknown potential with a "+". The feasibility for potential projects is subject to WR&C's overall water supplies and demands, in addition to future NPDES discharge requirements. The Utility will continue to track and monitor these issues and develop a suite of supply, demand, and discharge options. Potential uses may include elements other than agriculture and landscape, as shown in Table 4-7. The Landscape category includes golf courses and commercial customer irrigation. Depending on costs, regulatory issues, agriculture economy, industrial customers, and other factors, recycled water options may be feasible and selected for implementation.

Table 4-7. Potential Future Recycled Water Uses (DWR Table 23)

User Type[e	2015	2020	2025	2030	2035
Agricultural	1,982+	1,982+	1,982+	1,982+	1,982+
Landscape	1,216+	1,216+	1,216+	1,216+	1,216+
Wildlife Habitat	0+	0+	0+	0+	0+
Wetlands	0+	0+	0+	0+	0+
Industrial	121+	121+	121+	121+	121+
Groundwater Recharge	0+	0+	0+	0+	0+
Seawater Barrier	0+	0+	0+	0+	0+
Geothermal/Energy	0	0	0	0	0
Indirect Potable Reuse	0+	0+	0+	0+	0+
Total:	3,319+	3,319+	3,319+	3,319+	3,319+

Note: Industrial includes process needs at the WRF.
Table only includes potable offset and current agricultural recycled water uses, does not include additional agricultural or other secondary effluent uses.

4.3.4 Methods to Encourage Recycled Water Use

The City's existing secondary recycled water customers received supply according to the terms and conditions of each respective contract. In the past, the City has provided financial incentives to its recycled water customers. The City will review contract and incentive terms in the future to support the integrated water resources strategy. Table 4-8 lists the current secondary recycled water contract amounts that are subject to the financial incentives for use. Many of these contracts will be renegotiated in 2013. Table 4-8 assumes volumes of existing identified users will not change. However, it is likely recycled water uses and incentives will change in the future to reflect the future supply, demand, and discharge issues. Additional incentives could be provided in the case of industry location efforts, private water supply impacts, wetland or habitat creation, or others. Additional recycled water use as a result of new incentives is unknown at this time and will be addressed as the Water Utility's water resources strategy addresses expansion of the recycled water program.

Table 4-8. Methods to Encourage Recycled Water Use (DWR Table 25)

	Projected Recycled Water Use, acre-feet per year					
Action	**2010 (actual use)**	**2015**	**2020**	**2025**	**2030**	**2035**
Financial Incentive	1,546	2,600	2,600	2,600	2,600	2,600

Note: projected volumes are only for the existing customers under contract.

4.4 Other Supply Opportunities

Currently there are no programs or projects for water transfers or exchanges of water to create additional supply for Petaluma. Until the WSTSP is constructed, there may be opportunities to wheel water through Petaluma's infrastructure, but no programs have been identified. WR&C continues to monitor future potential issues and will identify additional opportunities that may benefit Petaluma and the region's water needs.

WR&C has not identified any current desalination opportunities. However, the City is the reporting agency for the California Statewide Groundwater Elevation Monitoring program for the groundwater basin. The reporting area covers wells near the San Pablo Bay and surface water bodies that are likely under tidal influence. WR&C will work with property owners to monitor groundwater quality within the watershed and will gain a better understanding of desalination opportunities in the future.

4.5 Future Water Supply Projects

WR&C continues to investigate local supply options to supplement its supply from SCWA. The current strategy includes implementing a combination of demand management measures and recycled water projects to meet any near-term supply reductions from SCWA. WR&C will continue to investigate groundwater opportunities to further understand long-term yields and costs for a potential groundwater supply beyond emergency or peak use.

Table 4-9 lists the future potable offset tertiary recycled water supply projects. The City's GP Recycled Water Appendix identifies areas throughout the City for tertiary recycled water service. The actual date for putting these areas on line is dependent upon future SCWA supplies. Other than Area A (as listed in the GP Recycled Water Appendix), WR&C is not including start dates for these projects but will monitor supply needs and implement as necessary. WR&C planning efforts also include future potential agricultural needs for secondary recycled water. These projects are not included in Table 4-9, but may be included at a later date depending on future supply and demand issues.

Appendix C – Water Availability Analysis and Amendment

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

Nicholas F. Bonsignore, P.E.
Robert C. Wagner, P.E.
Paula J. Whealen
John V. Goin
David M. Houston
Monique Robbins, P.E.
Ryan E. Stolfus

MEMORANDUM

TO: Chief, Division of Water Rights, State Water Resources Control Board

FROM: Nicholas F. Bonsignore, P.E., Wagner & Bonsignore, Consulting Civil Engineers

DATE: September 26, 2003

SUBJECT: **WATER AVAILABILITY ANALYSIS FOR APPLICATION 30978 OF FRANK J. TEIXEIRA**

1.0 INTRODUCTION

The purpose of this report is to summarize the results of the water availability analysis conducted for the subject application located within the watershed of an unnamed stream tributary to the Petaluma River in Sonoma County. The objectives of the analysis are as follows:

- To determine whether water is available for appropriation in accordance with California Water Code section 1275 (d); and
- To determine the impact of the application/project on streamflow in order to evaluate impacts to fishery resources as required by the California Environmental Quality Act (CEQA), the California Endangered Species Act (CESA), and the federal Endangered Species Act (ESA).

This analysis was prepared in general conformance with the procedure discussed at the State Water Resources Control Board's (SWRCB) workshop of May 1, 2002, entitled Methods to Estimate Streamflow and Water Availability.

2.0 PROJECT DESCRIPTION

The project is located in Sonoma County approximately 0.4 miles west of the intersection of State Highway 116 and Adobe Road (see Attachments A-1 through A-4). In combination with the Applicant's vested rights under Licenses 7228 and 8283 (Applications 18476 and 21284, respectively), Application 30978 seeks to divert and store up to 164 acre-feet of water (total under all three rights) from an unnamed stream in an existing on-stream reservoir called the Pinheiro Reservoir. Water is proposed to be diverted during the season of October 1 to May 31, and will be used for irrigation of up to 300 acres of vineyard.

The five Points of Interest (POI) for this project were identified in the SWRCB's letter of June 13, 2003. POI #1 is located immediately above the mouth of the Petaluma River at San Pablo Bay. Based on discussions with Dr. William Hearn of NOAA Fisheries and Linda Hanson of the Department of Fish & Game at a site visit on August 25, 2003, it was agreed that it was not necessary to evaluate water availability at POD #1, because it is within the tidal zone. POI #2 is located on the unnamed stream immediately above the confluence with the Petaluma River (see Attachment A-1). POIs #3 and #4 are on the unnamed stream immediately below confluences with other unnamed streams at locations upstream of POI #2 (refer to Attachments A-2 and A-3). Lastly, POI #5 is located immediately below the Pinheiro Dam (see Attachment A-4). There are senior water rights on tributaries of the unnamed stream upstream and downstream of the subject application as identified in Attachment D.

The Cumulative Flow Impairment Index (CFII) was computed using a rainfall-runoff method, as set forth by the SWRCB at the workshop of May 1, 2002. Because there are no USGS gaging stations reasonably close to the project, we determined that the SWRCB's alternative method of estimating unimpaired flows based on adjusting historical USGS gage data was not appropriate for this analysis.

3.0 ANNUAL UNIMPAIRED FLOW

Annual unimpaired flow is the total volume of water, on average, that would flow past a particular point of interest on an annual basis if no diversions (impairments) were taking place in the watershed above that point. Flow is measured in units of acre-feet per year.

Rainfall-runoff methods use rainfall data and land use characteristics to calculate runoff for a particular watershed area. When the rate of rainfall exceeds the rate of infiltration of water into the ground, excess water (runoff) is available to supply surface waters. The Rational Method is typically used by engineers and hydrologists to estimate peak flood flows and design hydraulic structures. The SWRCB's rainfall-runoff method for estimating average annual runoff is conceptually similar to the Rational Method. The equation is as follows:

$$Q = CIA$$

Where: Q = Estimated average annual runoff (acre-feet per annum);
C = Runoff coefficient;
I = Average annual precipitation (feet per annum); and
A = Tributary watershed area (acres)

In the Rational Method, the runoff coefficient C represents the percentage of precipitation that will run off the ground surface during a storm event. The California Department of Transportation (Caltrans) Highway Design Manual provides tables showing various values for C depending on soil type, relief, vegetation and surface storage (see Attachment C).[1] In the Caltrans method, C is used to compute *peak* flows for relatively small watersheds (about 0.5 square miles). Accordingly, use of the Caltrans C factor for estimating annual seasonal runoff may result in an overestimation of such flows. For this project, C was estimated to be 0.47 based on the parameters provided in Attachment C, and computed as follows:

C Factor Calculations:	
Relief (Hilly, average slopes 10-30%)	0.24
Soil Infiltration (Normal, moderately well drained)	0.08
Vegetal Cover (Good)	0.06
Surface Storage (Low)	0.09
Total	**0.47**

The estimated mean annual precipitation (I) for each of the watersheds above POIs 2 through 5 is based on a weighted average of mean annual rainfall isoheytals taken from Plate No. B-3 in the Sonoma County Water Agency's Flood Control Design Criteria manual (see Attachment E). The isoheytals are shown on Attachment A. The drainage areas (A) above POIs 2 through 5 are based on an analysis of the USGS quadrangles for Glen Ellen and Petaluma River, and are also shown on Attachments A-1 though A-4. The estimated mean annual precipitation and drainage areas for the POI watersheds are summarized below:

[1] California Department of Transportation. *Highway Design Manual*, July 1, 1995. http://www.dot.ca.gov/hq/oppd/hdm/hdmtoc.htm

POI	MAP (I) (in)	Drainage Area (A) (ac)
2	34.2	5,627
3	34.8	5,203
4	35.1	2,116
5	35.3	547

The estimated average annual unimpaired flows at the POIs were computed as follows:

POI 2 Q = 0.47 x (34.2 in./12 in. per ft.) x 5,627 ac. = 7,537 acre-feet
POI 3 Q = 0.47 x (34.8 in./12 in. per ft.) x 5,203 ac. = 7,092 acre-feet
POI 4 Q = 0.47 x (35.1 in./12 in. per ft.) x 2,116 ac. = 2,909 acre-feet
POI 5 Q = 0.47 x (35.3 in./12 in. per ft.) x 547 ac. = 756 acre-feet

4.0 SEASONAL UNIMPAIRED FLOW DURING THE PROJECT'S DIVERSION SEASON

Based on the SWRCB method, seasonal unimpaired flow is the total volume of water, on average, that would flow past a selected point of interest between December 15 and March 31 if no diversions (impairments) were taking place in the watershed above that point. Flow is measured in units of acre-feet.

Seasonal unimpaired flow was computed by adjusting the estimated annual unimpaired flow based on the seasonal occurrence of precipitation. The historical record of precipitation data for the Petaluma Fire Station 3 (Petaluma) station was used as a reference. The Petaluma station is located about 5.5 miles west of the project area. The annual average precipitation for the period of record (1949 – 2002) is 24.97 inches, see Attachment B. For the season of December 15 through March 31, the average precipitation is 15.55 inches, which is about 62.3 percent of the annual average precipitation. Accordingly, the estimated annual average unimpaired flows for each POI computed in Section 3.0, were adjusted by a factor of 0.623 to compute estimated average seasonal unimpaired flow for the period of December 15 to March 31, as follows:

POI 2 Q = 7,537 acre-feet x 62.3% = 4,696 acre-feet
POI 3 Q = 7,092 acre-feet x 62.3% = 4,418 acre-feet
POI 4 Q = 2,909 acre-feet x 62.3% = 1,812 acre-feet
POI 5 Q = 756 acre-feet x 62.3% = 471 acre-feet

5.0 CUMULATIVE FLOW IMPAIRMENT INDEX

The Cumulative Flow Impairment Index (CFII) is used to evaluate the cumulative flow impairment demand of all existing and pending projects in a watershed of interest, relative to the estimated average seasonal unimpaired flow. The CFII is a percentage obtained by dividing the *Demand* in acre-feet by the *Supply* in acre-feet at a specified point of interest (POI), and for a specified time period.

Based on the SWRCB methodology, *Demand* is the "face value" entitlement of all existing and pending water rights, under all bases of right, during the period of October 1 to March 31. Demand includes existing and pending water right applications for post-1914 appropriators, Statements of Water Diversion and Use for riparian and pre-1914 appropriators, small domestic use registrations, stockpond registrations, and any other known authorized diversions. Based on the SWRCB's Water Rights Information Management System (WRIMS) database and review of certain water right files, water rights of record for the watersheds above POI 2 through 5 are as shown on Attachment D. The total entitlement of recorded water rights above each POI is summarized below:

POI	Entitlement (af)
2	272
3	272
4	209
5	203

It should be noted that the purposes of use for many of the diversions of record are non-consumptive, or nearly non-consumptive, such as stockwatering, fire protection, and fish and wildlife protection/enhancement. Accordingly, the use of the face values of these entitlements for computing CFIIs is conservative.

Supply is the estimated seasonal average unimpaired flow above the POI in acre-feet, as computed in the preceding Section 4.0, summarized below:

POI	*Q* (cfs)
2	4,696
3	4,418
4	1,812
5	471

Based on the foregoing The CFII values were computed as follows:

POI 2 CFII = (272 ÷ 4,696) x 100% = 5.8%
POI 3 CFII = (272 ÷ 4,418) x 100% = 6.2%
POI 4 CFII = (209 ÷ 1,812) x 100% = 11.5%
POI 5 CFII = (203 ÷ 471) x 100% = 43.1%

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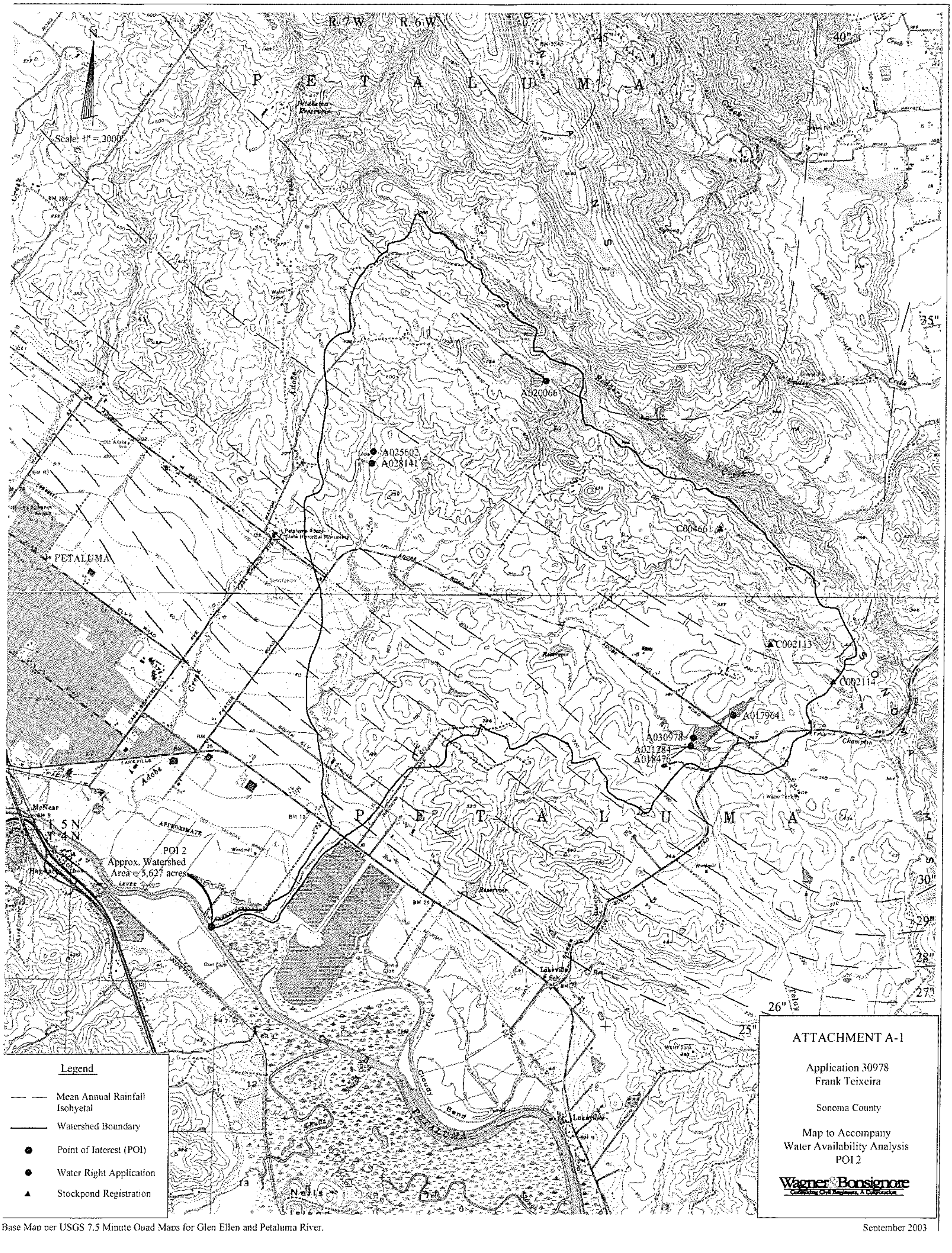
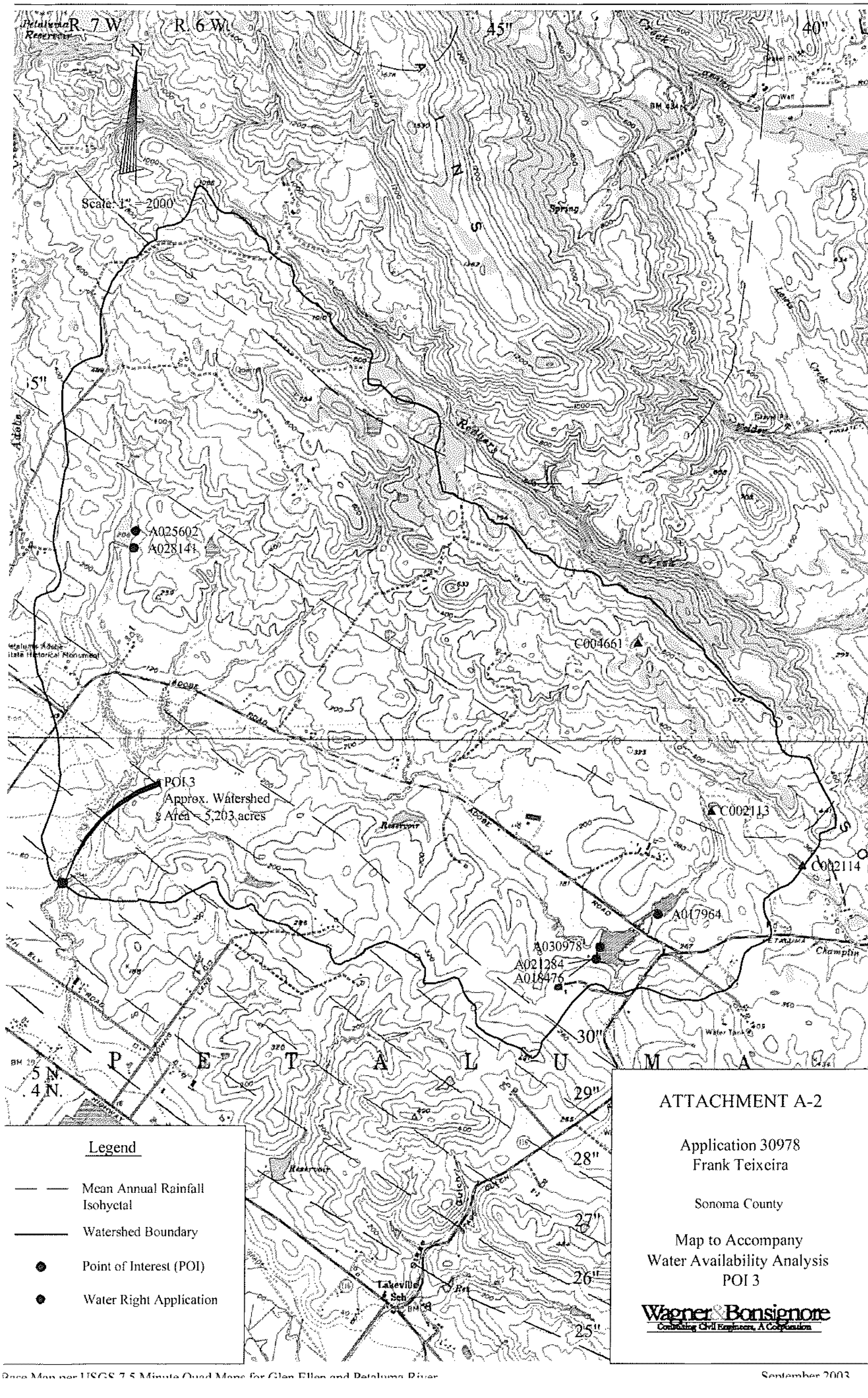


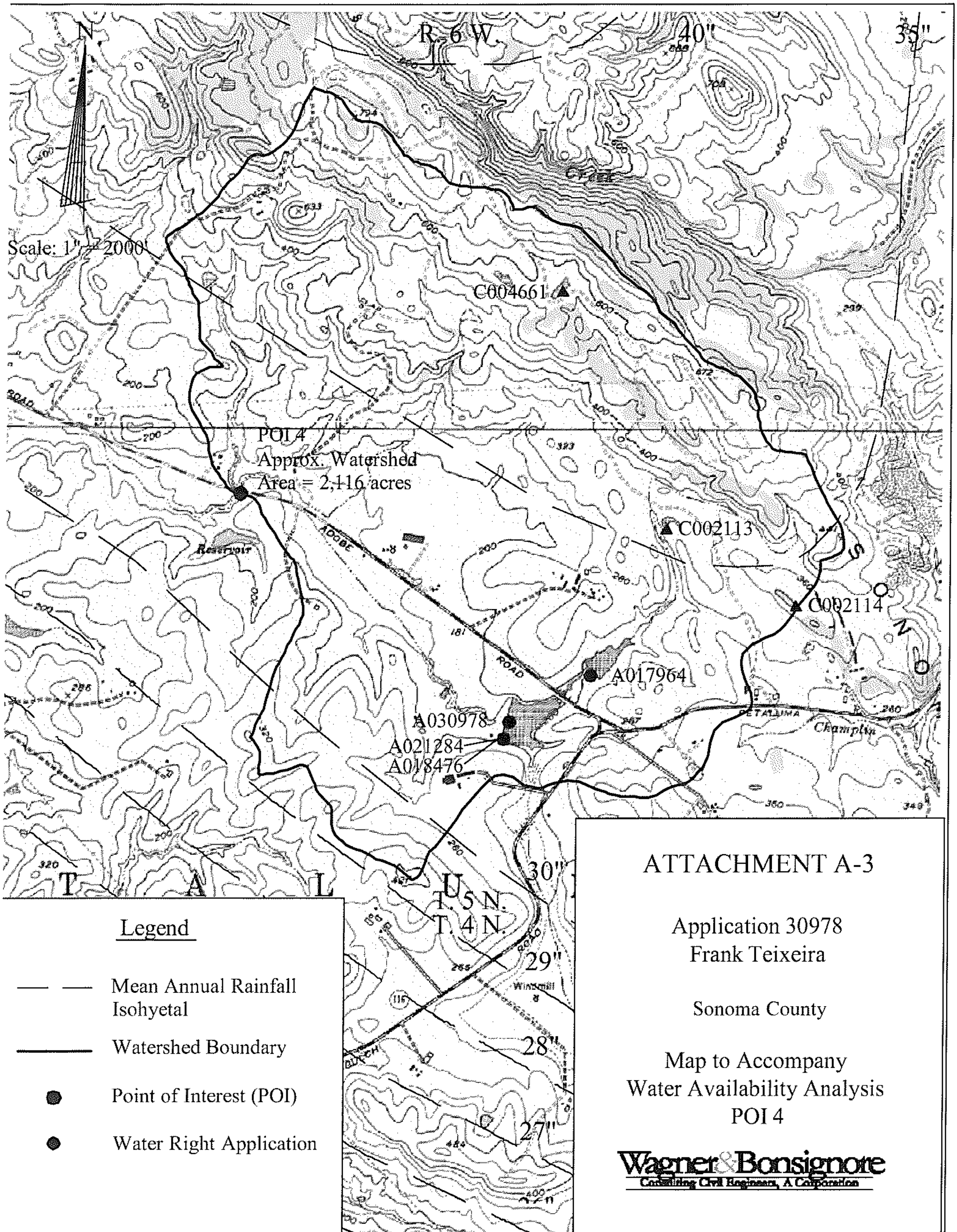
Base Map per USGS 7.5 Minute Quad Maps for Glen Ellen and Petaluma River.

September 2003



Base Map per USGS 7.5 Minute Quad Maps for Glen Ellen and Petaluma River

September 2003



ATTACHMENT A-3

Application 30978
Frank Teixeira

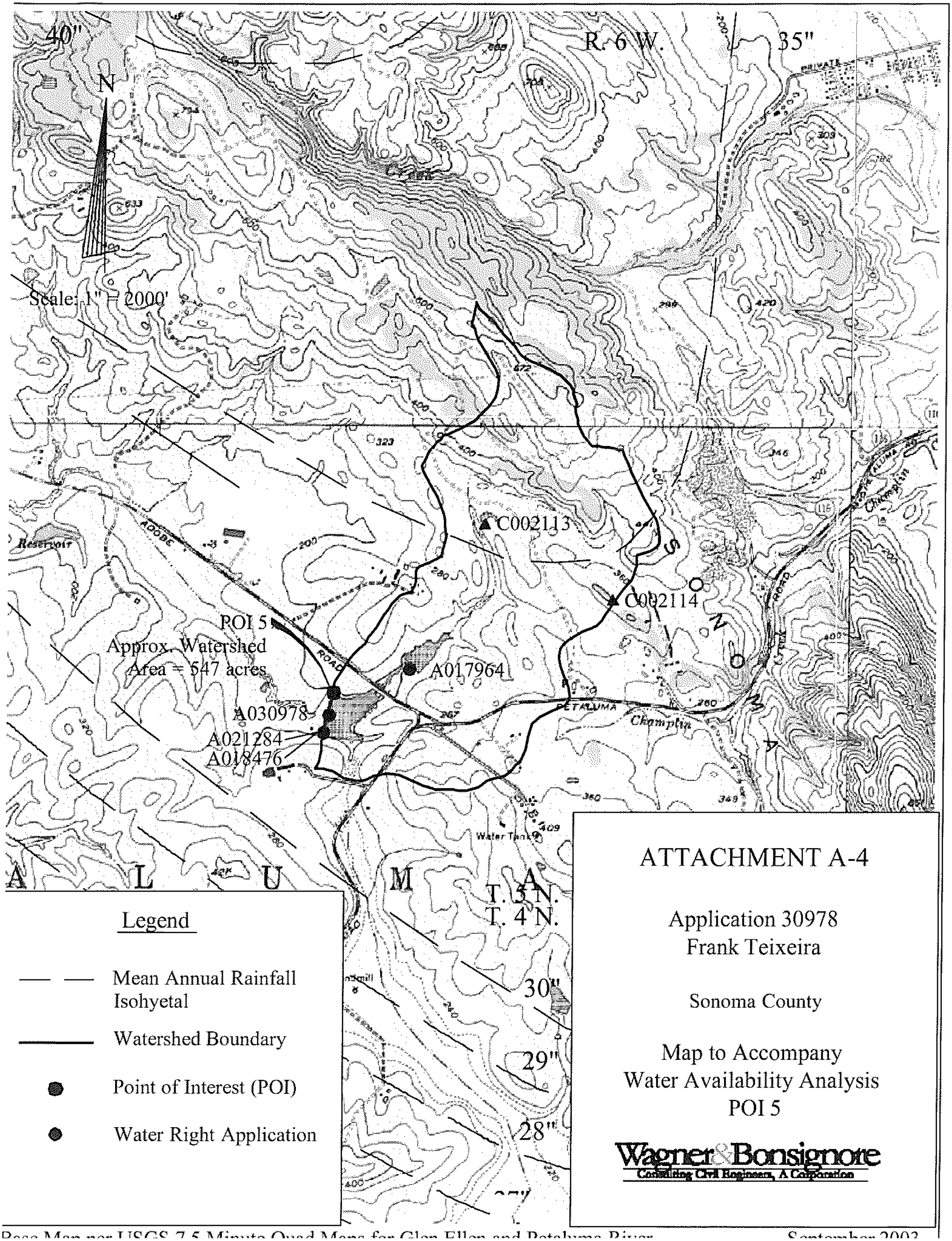
Sonoma County

Map to Accompany
Water Availability Analysis
POI 4

Wagner & Bonsignore
Consulting Civil Engineers, A Corporation

Base Map per USGS 7.5 Minute Quad Maps for Glen Ellen and Petaluma River

September 2003



Legend

Mean Annual Rainfall Isohyetal

Watershed Boundary

Point of Interest (POI)

Water Right Application

ATTACHMENT A-4

Application 30978
Frank Teixeira

Sonoma County

Map to Accompany
Water Availability Analysis
POI 5

Wagner & Bonsignore
Consulting Civil Engineers, A Corporation

Base Map per USGS 7.5 Minute Quad Maps for Glen Ellen and Petaluma River

September 2003

ATTACHMENT B

Precipitation at Petaluma Fire Station 3, California, for Complete Water Years 1949-1969, 1971-1982, 1984-1989, 1993-1998 and 2002*

Water Year	Precipitation (inches)	Water Year	Precipitation (inches)
1949	17.59	1976	12.06
1950	20.60	1977	9.70
1951	26.43	1978	34.94
1952	30.31	1979	21.67
1953	25.17	1980	31.11
1954	20.19	1981	16.15
1955	18.45	1982	38.02
1956	35.63	1983	Incomplete
1957	17.82	1984	24.02
1958	37.38	1985	19.42
1959	16.94	1986	38.31
1960	15.92	1987	15.15
1961	18.91	1988	19.55
1962	21.78	1989	17.68
1963	28.90	1990	Incomplete
1964	15.92	1991	Incomplete
1965	25.01	1992	Incomplete
1966	19.40	1993	29.78
1967	36.71	1994	16.69
1968	21.58	1995	44.59
1969	30.21	1996	31.41
1970	Incomplete	1997	26.26
1971	23.36	1998	49.4
1972	14.67	1999	Incomplete
1973	37.22	2000	Incomplete
1974	30.72	2001	Incomplete
1975	22.14	2002	23.80
		Average	24.97

Monthly Average Precipitation (inches)

Oct	1.30
Nov	3.44
Dec	4.62
Jan	5.76
Feb	4.22
Mar	3.04
Apr	1.56
May	0.51
Jun	0.15
Jul	0.04
Aug	0.08
Sep	0.27
Total	24.97
Dec 15 - Mar 31	15.55

*Note: Precipitation Data from Northern California Climate Summaries, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caangw+nca.
Water year and monthly data excludes all of incomplete water years.

ATTACHMENT D

POI's 2 & 3 Diverters of Record, Seasonal Diversions October 1 Through March 31[1]

Diverter	Application	License/ Permit	Direct Diversion Rate (cfs)	Direct Diversion Season	No. of Days of Diversion	Direct Diversion Amount[2] (af)	Storage Season	Face Value Storage Amount (af)	Total Seasonal Amount (af)	Purpose
Joseph Sequeira	A017964	L007254	0	-	0	0	Oct 15 to Apr 15	29	29	Stock
Gloria Anne. Pinheiro, et al	A018476	L007228	0	-	0	0	Oct 1 to Mar 1	42	42	Stock
Peter Pfendler	A020066	L010065	0	-	0	0	Oct 1 to Apr 1	30	30	Dom, Irr, Rec, Stock
Rose Marie. Teixeira, et al	A021284	L008283	0	-	0	0	Oct 1 to May 1	45	45	Ind, Stock
Thomas Gambonini	A025602	L011892	0	-	0	0	Nov 1 to Apr 1	18	18	Fire, Stock, Wild
Thomas Gambonini	A028141	L011893	0	-	0	0	Nov 1 to Apr 1	15	15	Fire, Stock, Wild
Triangle G Ranch	C002113		0	-	0	0	Nov 1 to May 1	3.8	3.8	Stock
Triangle G Ranch	C002114		0	-	0	0	Nov 1 to May 1	6.3	6.3	Stock
Triangle G Ranch	C004661		0	-	0	0	Nov 1 to May 1	6.3	6.3	Stock
Subtotal						**0**		**195**	**195**	
Frank J. Teixeira[3]	A030978		0	-	0	0	Oct 1 to May 1	77	77	Irr, Frost, Stock
Total Diverters of Record						**0**		**272**	**272**	

Notes:

[1] Information obtained from WRIMS database and from review of selected permits and licenses on file at the SWRCB.

[2] The seasonal amount of water taken by direct diversion is computed as the diversion rate continuous during the number of diversion days within the period of October 1 through March 31, unless specifically stated otherwise in the permit or license.

[3] The total amount of water sought by Application 30978, together with water diverted under Licenses 7228 (A018476) and 8283 (A021284), will not exceed 164 af. The 77 af shown above for A030978 is the net additional amount of water diverted if water is diverted under Licenses 7228 and 8283 to the full amount allowed.

ATTACHMENT D

POI 4 Diverters of Record, Seasonal Diversions October 1 Through March 31 [1]

Diverter	Application	License/ Permit	Direct Diversion Rate (cfs)	Direct Diversion Season	No. of Days of Diversion	Direct Diversion Amount[2] (af)	Storage Season	Face Value Storage Amount (af)	Total Seasonal Amount (af)	Purpose
Joseph Sequeira	A017964	L007254	0	-	0	0	Oct 15 to Apr 15	29	29	Stock
Gloria Anne. Pinheiro, et al	A018476	L007228	0	-	0	0	Oct 1 to Mar 1	42	42	Stock
Rose Marie. Teixeira, et al	A021284	L008283	0	-	0	0	Oct 1 to May 1	45	45	Ind, Stock
Triangle G Ranch	C002113		0	-	0	0	Nov 1 to May 1	3.8	3.8	Stock
Triangle G Ranch	C002114		0	-	0	0	Nov 1 to May 1	6.3	6.3	Stock
Triangle G Ranch	C004661		0	-	0	0	Nov 1 to May 1	6.3	6.3	Stock
Subtotal						**0**		**132**	**132**	
Frank J. Teixeira[3]	A030978		0	-	0	0	Oct 1 to May 1	77	77	Irr, Frost, Stock
Total Diverters of Record						**0**		**209**	**209**	

Notes:

[1] Information obtained from WRIMS database and from review of selected permits and licenses on file at the SWRCB.

[2] The seasonal amount of water taken by direct diversion is computed as the diversion rate continuous during the number of diversion days within the period of October 1 through March 31, unless specifically stated otherwise in the permit or license.

[3] The total amount of water sought by Application 30978, together with water diverted under Licenses 7228 (A018476) and 8283 (A021284), will not exceed 164 af. The 77 af shown above for A030978 is the net additional amount of water diverted if water is diverted under Licenses 7228 and 8283 to the full amount allowed.

ATTACHMENT D

POI 5 Diverters of Record, Seasonal Diversions October 1 Through March 31[1]

Diverter	Application	License/ Permit	Direct Diversion Rate (cfs)	Direct Diversion Season	No. of Days of Diversion	Direct Diversion Amount[2] (af)	Storage Season	Face Value Storage Amount (af)	Total Seasonal Amount (af)	Purpose
Joseph Sequeira	A017964	L007254	0	-	0	0	Oct 15 to Apr 15	29	29	Stock
Gloria Anne. Pinheiro, et al	A018476	L007228	0	-	0	0	Oct 1 to Mar 1	42	42	Stock
Rose Marie. Teixeira, et al	A021284	L008283	0	-	0	0	Oct 1 to May 1	45	45	Ind, Stock
Triangle G Ranch	C002113		0	-	0	0	Nov 1 to May 1	3.8	3.8	Stock
Triangle G Ranch	C002114		0	-	0	0	Nov 1 to May 1	6.3	6.3	Stock
Subtotal						**0**		**126**	**126**	
Frank J. Teixeira[3]	A030978		0	-	0	0	Oct 1 to May 1	77	77	Irr, Frost, Stock
Total Diverters of Record						**0**		**203**	**203**	

Notes:

[1] Information obtained from WRIMS database and from review of selected permits and licenses on file at the SWRCB.

[2] The seasonal amount of water taken by direct diversion is computed as the diversion rate continuous during the number of diversion days within the period of October 1 through March 31, unless specifically stated otherwise in the permit or license.

[3] The total amount of water sought by Application 30978, together with water diverted under Licenses 7228 (A018476) and 8283 (A021284), will not exceed 164 af. The 77 af shown above for A030978 is the net additional amount of water diverted if water is diverted under Licenses 7228 and 8283 to the full amount allowed.

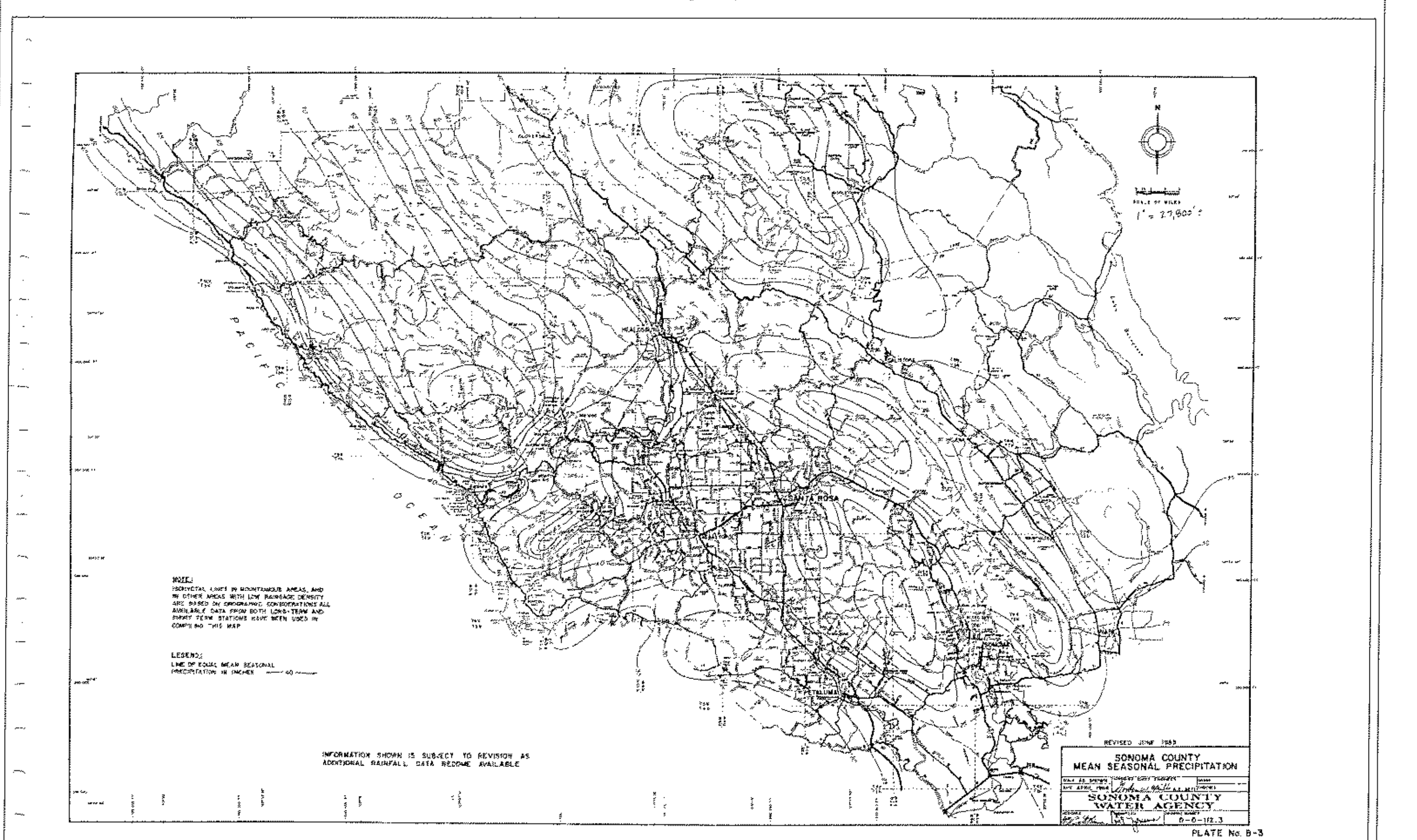
ATTACHMENT C
Caltrans Runoff Coefficient for Undeveloped Areas

	Watershed Types			
	Extreme	High	Normal	Low
Relief	0.28 – 0.35 Steep, rugged terrain with average slopes above 30%	0.20 – 0.28 Hilly, with average slopes of 10 to 30%	0.14 – 0.20 Rolling with average slope of 5 to 10%	0.08 – 0.14 Relatively flat land, with average slope of 0 to 5%
Soil Saturation	0.12 – 0.16 No effective soil cover; either rock or thin soil mantle of negligible infiltration capacity	0.08 – 0.12 Slow to take up water; clay or loam soil of low infiltration capacity; imperfectly or poorly drained	0.06 – 0.08 Normal; well-drained, high or medium-textured soils, sandy loams, silt and silty loams.	0.04 – 0.06 High; deep sand or other soil that takes up water readily, very high level drained soils.
Vegetal Cover	0.12 – 0.16 No effective plant cover, bare, or very sparse cover	0.08 – 0.12 Poor to fair; clean cultivation crops, or poor natural cover, less than 20% of drainage area over good cover	0.06 – 0.08 Fair to good; about 50% of area in good grassland or woodland, not more than 50% of area in cultivated crops	0.04 – 0.06 Good to excellent; about 90% of drainage area in good grassland, woodland or equivalent cover
Surface Storage	0.10 – 0.12 Negligible surface depression few and shallow; drainage ways steep and small, no marshes	0.08 – 0.10 Low; very well defined system of drainage ways; no ponds or marshes	0.06 – 0.08 Normal; considerable surface depression storage, lakes and pond marshes	0.04 – 0.06 High; surface storage high; drainage system not sharply defined, large floodplain storage or large number of pond marshes

Example 1: The watershed above project site consisting of:	Solutions:	
1) Hilly terrain with average slope of 15%,	Relief =	0.25
2) Well-drained gravelly loams,	Soil infiltration =	0.11
3) Planted with grapes, and	Vegetal Cover =	0.07
4) Low, well-defined	Surface storage =	0.09
Find the runoff coefficient, C, for the above watershed.		--------------
	C =	0.52

Reference Source: California Department of Transportation, *Highway Design Manual*, July 1, 1995, pp. 810-816.

ATTACHMENT E



MEMORANDUM

TO: Mr. Steve Herrera, State Water Resources Control Board, Division of Water Rights

FROM: Nicholas F. Bonsignore, P.E., Wagner & Bonsignore Consulting Civil Engineers nb

DATE: July 27, 2004

RE: **AMENDMENT TO WATER AVAILABILITY ANALYSIS FOR WATER RIGHT APPLICATION 30978 OF FRANK TEIXEIRA RE: FEBRUARY MEDIAN BYPASS**

This is response to the email message from Isabel Baer of May 14, 2004, requesting a calculation of the February median flow for Application 30798. This memorandum serves as a follow-up to the Water Availability Analysis for this project that we submitted by memo dated September 26, 2003, and which the SWRCB accepted as sufficient on October 22, 2003.

We computed the February median flow at Point of Interest 5 (POI 5) by adjusting the February median for the USGS Gaging Station #11459000 (Petaluma River at Petaluma, CA) for differences in drainage area and mean annual precipitation (MAP), using the following formula:

$Q_2 = Q_1 \times (A_2/A_1) \times (I_2/I_1)$

Where: Q_2 = Flow at point of interest;
Q_1 = Flow at nearby gage;
A_2 = Watershed area above point of interest;
A_1 = Watershed area above nearby gage;
I_2 = Mean annual precipitation for watershed above point of interest;
I_1 = Mean annual precipitation for watershed above nearby gage;

The drainage area for the USGS gage Petaluma River gage and POI 5 are shown in Attachments A and B, respectively. Watershed boundaries were delineated on electronic versions of USGS 7.5-minute quad maps, and watershed areas were determined using AutoCAD. Lines of equal mean annual precipitation shown on the maps are based on isohyetals taken from Plate No. B-3 in the Sonoma County Water Agency's Flood Control Design Criteria manual (see Attachment C). The weighted MAP was computed using AutoCAD and Excel spreadsheet calculations.

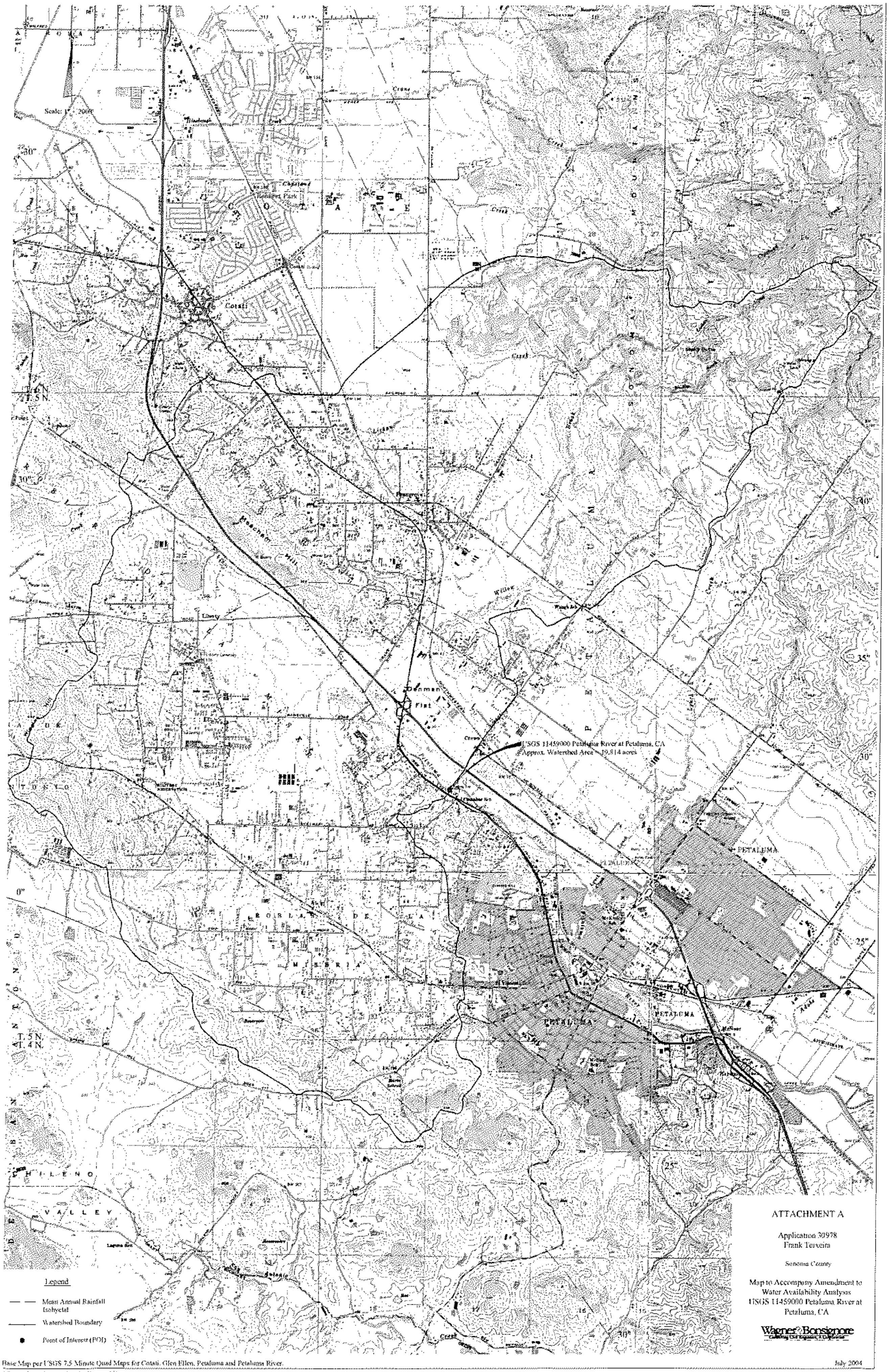
The average daily flow in February, measured at the USGS gage, is shown in Attachment E. The calculated February median flow for the gage period of record (1949 to 1963) is

10 cfs. Mean annual precipitation during this period as measured at the Petaluma Fire Station 3 (23.47 inches) is very close to the long term mean annual precipitation of 24.97 inches (1949 to 2002, see Attachment D), suggesting that the February median flow at the Petaluma River gage during the period of record approximates the long-term February median flow. Adjusting the gage February median flow value using the above formula, the February median flow at POI 5 is estimated as follows:

POI	Drainage Area (ac)	Weighted MAP (inches)	February Median Flow (cfs)
Gage	19,814	28.9	10
5	547	35.3	0.33

The February median flow at POI 5 is computed to be about 0.33 cfs. Note that to the extent diversions were being made from within the watershed above the Petaluma River gage during the period of record, the computed February median flow at the gage would be underestimated, resulting in a conservative estimate of the February median flow for POI 5.

TEIXX016.doc



ATTACHMENT A

Application 30978
Frank Teixeira

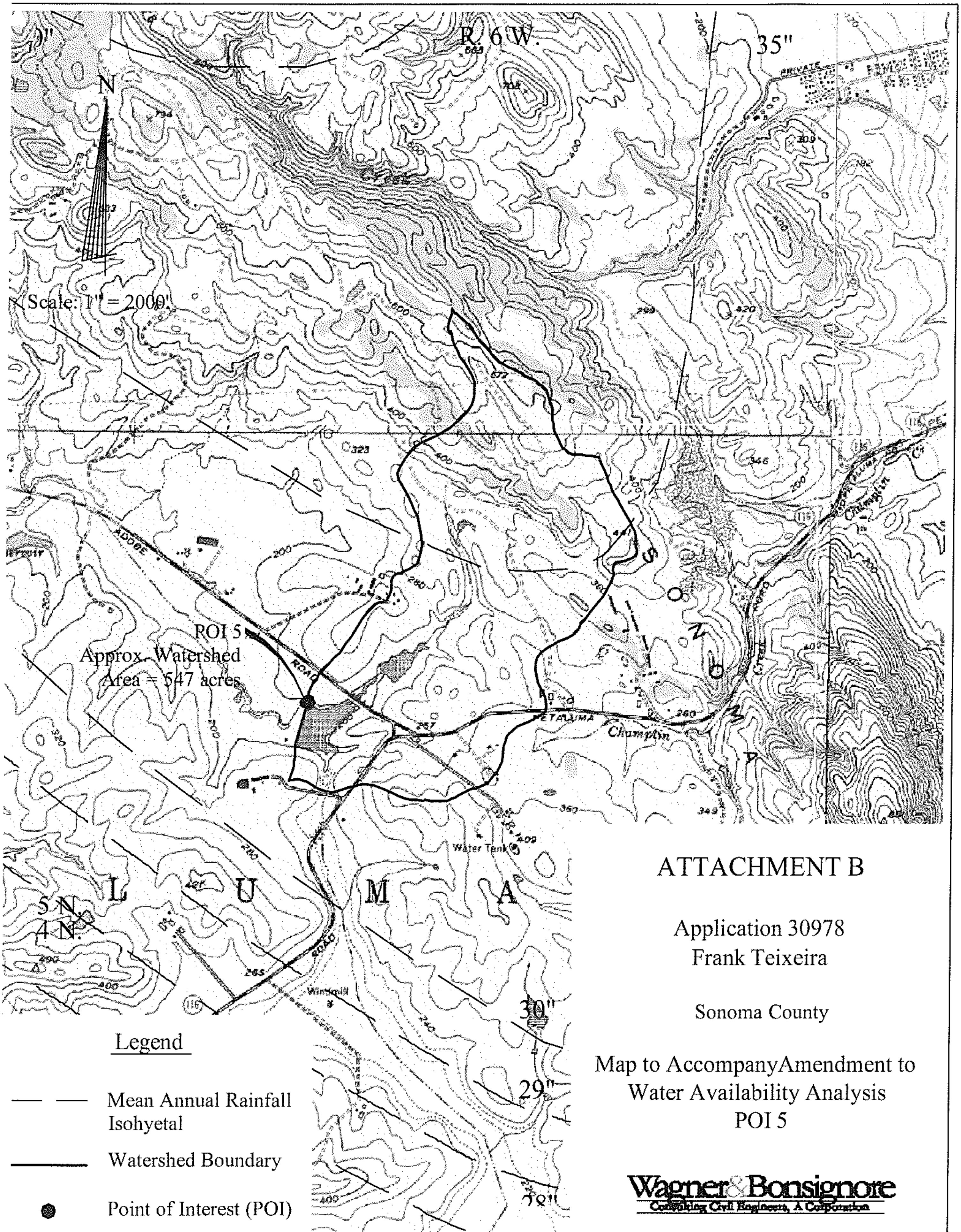
Sonoma County

Map to Accompany Amendment to Water Availability Analysis USGS 11459000 Petaluma River at Petaluma, CA

Wagner & Bonsignore

July 2004

Base Map per USGS 7.5 Minute Quad Maps for Cotati, Glen Ellen, Petaluma and Petaluma River.



ATTACHMENT B

Application 30978
Frank Teixeira

Sonoma County

Map to AccompanyAmendment to
Water Availability Analysis
POI 5

Wagner & Bonsignore
Consulting Civil Engineers, A Corporation

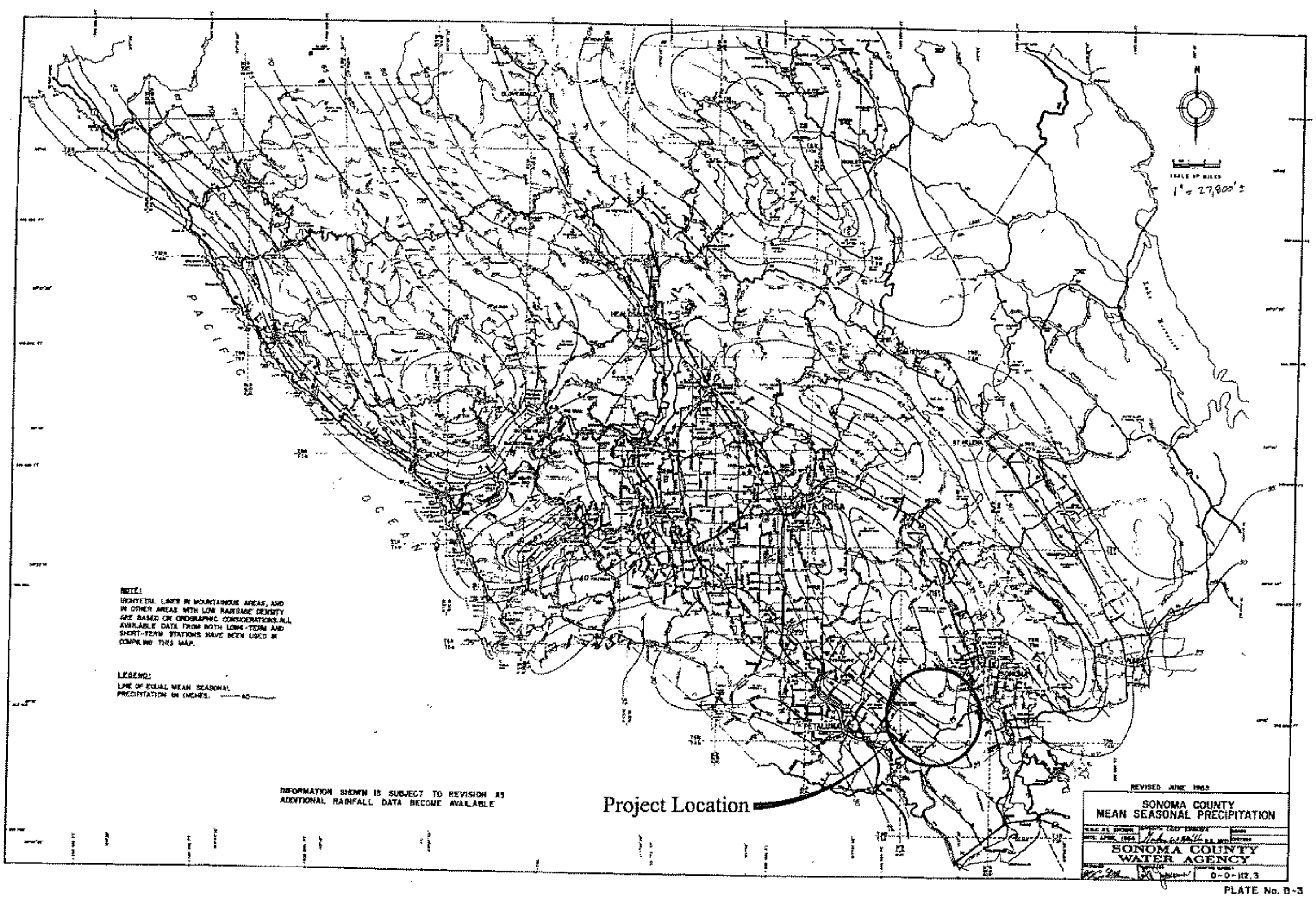
Legend

- Mean Annual Rainfall Isohyetal
- Watershed Boundary
- Point of Interest (POI)

Base Map per USGS 7.5 Minute Quad Maps for Glen Ellen and Petaluma River

June 2004

ATTACHMENT C



July 2004

ATTACHMENT D

Precipitation at Petaluma Fire Station 3, California, for Complete Water Years 1949-1969, 1971-1982, 1984-1989, 1993-1998 and 2002*

Water Year	Precipitation (inches)
1949	17.59
1950	20.60
1951	26.43
1952	30.31
1953	25.17
1954	20.19
1955	18.45
1956	35.63
1957	17.82
1958	37.38
1959	16.94
1960	15.92
1961	18.91
1962	21.78
1963	28.90
1964	15.92
1965	25.01
1966	19.40
1967	36.71
1968	21.58
1969	30.21
1970	Incomplete
1971	23.36
1972	14.67
1973	37.22
1974	30.72
1975	22.14

Water Year	Precipitation (inches)
1976	12.06
1977	9.70
1978	34.94
1979	21.67
1980	31.11
1981	16.15
1982	38.02
1983	Incomplete
1984	24.02
1985	19.42
1986	38.31
1987	15.15
1988	19.55
1989	17.68
1990	Incomplete
1991	Incomplete
1992	Incomplete
1993	29.78
1994	16.69
1995	44.59
1996	31.41
1997	26.26
1998	49.4
1999	Incomplete
2000	Incomplete
2001	Incomplete
2002	23.80
Average	24.97
1949-1963 Average	23.47

Monthly Average Precipitation (inches)

Month	Precipitation
Oct	1.30
Nov	3.44
Dec	4.62
Jan	5.76
Feb	4.22
Mar	3.04
Apr	1.56
May	0.51
Jun	0.15
Jul	0.04
Aug	0.08
Sep	0.27
Total	24.97
Dec 15 - Mar 31	15.55

*Note: Precipitation Data from Northern California Climate Summaries, http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?caangw+nca.
Water year and monthly data excludes all of incomplete water years.

ATTACHMENT E
USGS 11459000 PETALUMA RIVER AT PETALUMA, CA
Daily February Flow 1949-1963
(all amounts in cfs)

Day	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
1	0.3	8.1	8.7	259.0	5.3	2.1	22.0	25.0	0.0	42.0	1.8	24.0	64.0	0.1	490.0
2	0.3	6.6	7.8	191.0	5.0	1.0	13.0	20.0	0.0	404.0	1.5	17.0	105.0	0.1	91.0
3	0.5	15.0	7.8	56.0	4.6	0.4	9.2	17.0	0.0	395.0	1.3	6.8	46.0	0.1	49.0
4	1.5	1,040.0	223.0	35.0	4.4	0.3	7.3	15.0	0.0	532.0	1.2	8.9	20.0	0.1	32.0
5	5.5	314.0	562.0	26.0	4.5	0.2	6.3	14.0	0.0	341.0	1.2	105.0	12.0	0.1	22.0
6	15.0	357.0	642.0	20.0	4.9	0.2	5.8	12.0	0.0	82.0	1.2	21.0	9.7	0.2	17.0
7	34.0	47.0	33.0	16.0	4.4	0.1	5.2	9.7	0.1	567.0	1.3	127.0	7.4	12.0	15.0
8	6.8	28.0	24.0	13.0	4.0	0.1	4.8	8.4	1.2	208.0	1.3	604.0	5.6	7.9	25.0
9	3.3	22.0	19.0	10.0	3.2	0.1	4.8	6.1	1.8	196.0	1.5	123.0	150.0	185.0	100.0
10	2.5	34.0	28.0	8.9	2.7	0.1	4.5	5.8	0.6	379.0	12.0	92.0	50.0	47.0	163.0
11	22.0	24.0	112.0	126.0	2.6	0.1	4.1	6.1	0.2	98.0	32.0	30.0	235.0	17.0	52.0
12	7.0	14.0	77.0	74.0	2.6	19.0	3.8	5.8	0.2	732.0	14.0	17.0	53.0	63.0	236.0
13	3.0	11.0	26.0	24.0	2.5	136.0	3.5	5.6	0.1	137.0	6.5	13.0	28.0	799.0	383.0
14	1.7	9.8	19.0	16.0	2.4	190.0	3.3	4.7	0.1	55.0	4.8	8.2	23.0	585.0	56.0
15	1.7	8.4	15.0	14.0	2.3	42.0	3.2	3.8	0.1	57.0	31.0	5.4	50.0	754.0	28.0
16	1.8	11.0	12.0	63.0	2.1	25.0	3.3	2.8	0.1	69.0	768.0	4.3	28.0	197.0	29.0
17	1.9	11.0	10.0	48.0	2.1	211.0	3.8	2.6	0.1	40.0	496.0	3.6	14.0	77.0	36.0
18	2.2	8.1	10.0	24.0	2.1	139.0	3.6	2.8	0.1	337.0	250.0	4.0	9.4	313.0	17.0
19	2.5	6.4	8.0	47.0	1.9	32.0	2.4	153.0	0.0	940.0	102.0	4.5	6.3	204.0	13.0
20	2.4	5.4	7.8	134.0	1.9	22.0	2.0	741.0	0.0	181.0	204.0	2.9	5.1	52.0	11.0
21	2.4	4.3	11.0	48.0	1.9	17.0	1.7	196.0	10.0	55.0	79.0	2.3	4.2	28.0	8.4
22	2.1	3.6	13.0	27.0	1.9	14.0	1.7	768.0	12.0	38.0	52.0	2.2	3.6	17.0	6.6
23	5.2	3.3	12.0	66.0	1.8	12.0	1.7	459.0	56.0	30.0	46.0	1.9	2.9	13.0	5.3
24	10.0	3.2	7.8	32.0	1.7	10.0	1.7	62.0	64.0	662.0	26.0	1.7	2.3	10.0	4.2
25	9.2	2.9	6.4	20.0	1.5	9.2	1.7	101.0	42.0	786.0	18.0	1.5	2.2	7.9	4.0
26	6.7	2.9	5.8	16.0	1.5	7.8	3.6	60.0	60.0	139.0	14.0	1.5	2.1	6.2	3.4
27	8.8	2.6	6.2	14.0	1.6	6.6	57.0	34.0	48.0	44.0	11.0	1.4	1.7	4.2	2.8
28	5.8	2.4	17.0	11.0	1.7	5.8	21.0	29.0	23.0	29.0	8.2	1.2	1.5	4.6	2.2
29				8.7				42.0				1.2			

February Median at the Maacama Creek Gage =10

February Median at POI 5 = 0.331

Appendix D – Well Completion Reports

WELL COMPLETION REPORT - STATE OF CALIFORNIA

Page 1 of 1 No# 749557

Owner's Well No. 1

Permit Date: 09/21/01 Permit # WEL01-0551

Date Work Began 10/1/01 Ended 10/4/01

Permit Agency Dept of Permits & Resource Management

State Well No./Station No.

APN/TRS/Other

GEOLOGIC LOG

ORIENTATION: Vertical

DRILLING METHOD: Rotary

FLUID: Mud

Ft	to Ft	DESCRIPTION
0	4	Top soil
4	44	Brown clay
44	48	Sandy brown clay
48	60	Brown clay with rock
60	62	Cemented gravel
62	84	Borwn clay with rock
84	114	Cemented gravel
114	130	Blue clay with jointed clay
130	134	Cemented gravel
134	140	Blue clay with gravel
140	164	Cemented gravel
164	194	Blue clay with gravel
194	254	Cemented gravel
254	264	Blue clay with gravel
264	268	Cemented gravel
268	274	Blue clay with gravel
274	324	Blue clay
324	348	Cemented gravel with clay
348	394	Cemented gravel
394	424	Cemented gravel with blue clay
425	435	Cemented gravel with clay
435	444	Blue clay with some gravel
444	464	Cemented gravel with blue clay
464	484	Cemented gravel
484	504	Blue clay

TOTAL DEPTH OF BORING (FT): 504

TOTAL DEPTH OF COMPLETED WELL (FT): 500

WELL OWNER

Name: Stage Gulch Ranch

Mailing Address: 1035 State Gulch Road
Petaluma, CA 94952

WELL LOCATION

Address: 1035 Stage Gulch Road

City: Petaluma

County: Sonoma

APN Book 068 - 040 - 015

Latitude Longitude

LOCATION SKETCH

ACTIVITY

XX New Well

Modification/Repair

Deepen

Other (Specify)

DESTROY (Describe) Procedures and Materials Under "Geologic Log")

PLANNED USES:

Monitoring

Test well

Cathodic Protection

Heat Exchange

Direct Push

Injection

Vapor Extraction

Sparging

Remediation

Other (specify)

PLANNED USES

Water Supply

Domestic Public

XX Irrigation Industrial

WATER LEVEL & YIELD OF COMPLETED WELL

Depth to First Water (ft.) BELOW SURFACE

Depth of Static Water Level (Ft) 50

Estimate Yield (GPM)* 16

Date Measured: 10/04/01

Test Length/Test type: 2 hr / Air lift

Total drawdown (ft) 490

*May not be representative of a well's long-term yield

Depth from surface Ft	to Ft	Bore-hole diameter Inches	Type Blank	Type Screen	Material Grade	Diameter	Gauge	Slot Size	Depth From Surface Ft	to Ft	Annular Material Seal Material
0	60	8 3/4	XX		PVC	5	200		0	25	Bentonite
60	500			XX				0.032	25	504	1/4 x 1/8

ATTACHMENTS

No Geologic Log

No Well Construct Diagram

No Geophysical Log(s)

No Soil/Water Chemical Analyses

No Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief

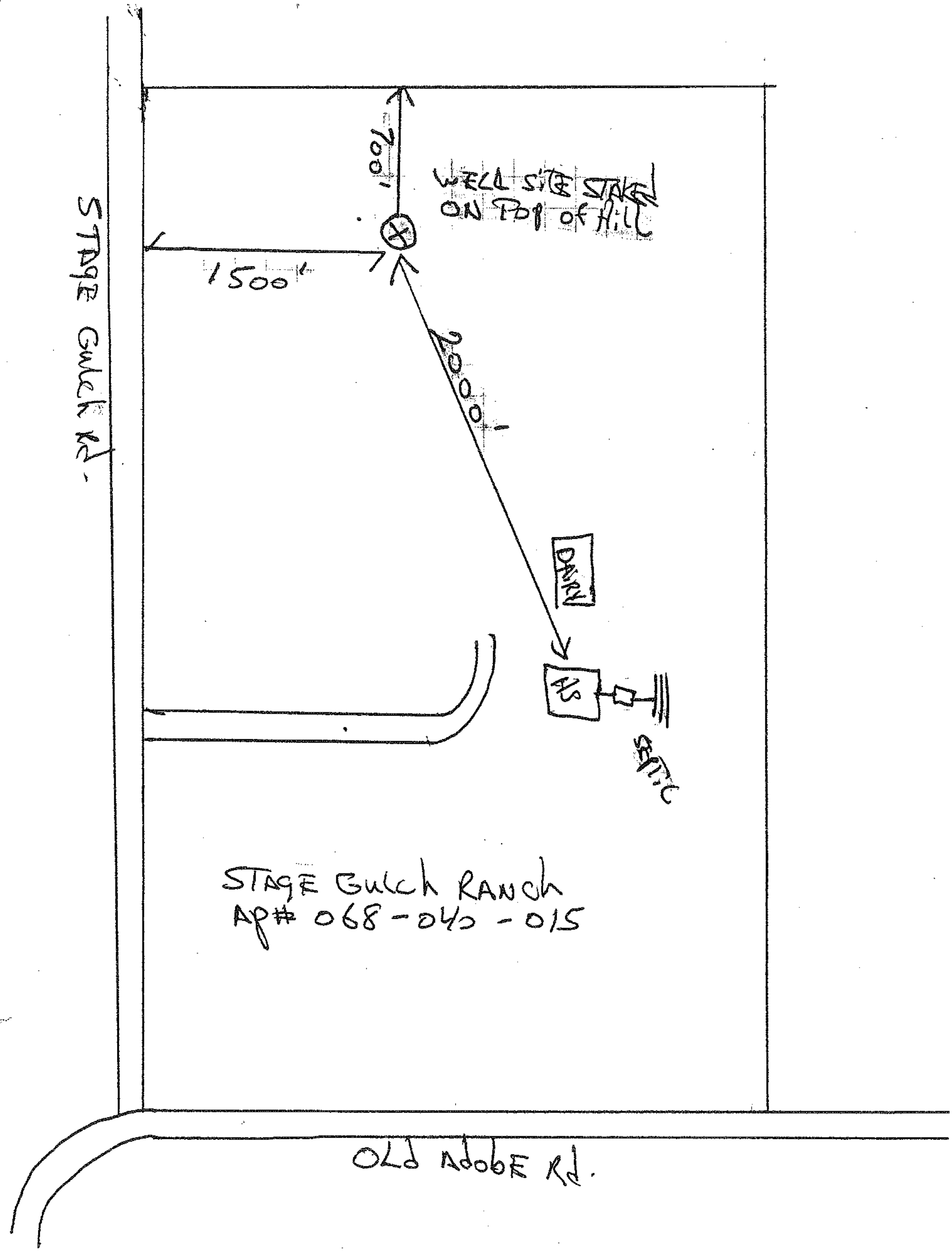
NAME: LES PETERSEN DRILLING AND PUMP, INC

ADDRESS 5434 OLD REDWOOD HWY, SANTA ROSA, CA 95403

SIGNED: Ray Petersen/ Ray Petersen LP 10/04/01 26108

Well Driller/Authorized Representative (Lupe) Date C-57 License

DWR Driller Owner Local



Stage Gulch Rd.
700'
WELL SITE STAKED ON TOP OF HILL
1500'
2000'
DAIRY
A/S
SEPTIC
STAGE GULCH RANCH
AP# 068-040-015
OLD ADOBE Rd.

COUNTY OF SONOMA
PERMIT & RESOURCE MANAGEMENT DEPARTMENT
WELL & SEPTIC SECTION
2550 VENTURA AVENUE
SANTA ROSA, 95403
(707) 565-1900

APPLICATION FOR PERMIT WATER WELL

WELL ADDRESS ~~1035~~ 2535 Stage Gulch Rd

CITY Petaluma ZIP 94952

PROPERTY OWNER Stage Gulch Ranch

ADDRESS same as well site

DRILLING CONTRACTOR Les Petersen Drilling & Pump, Inc.

ADDRESS 5434 Old Redwood Hwy, SR 95403

APPLICATION No. WEL01-0551

ASSESSOR'S PARCEL No. 068-040-015

PHONE No. 707-762-0397

CONTRACTOR LICENSE No. 261084

PHONE No. 707-545-0246

TYPE OF WORK: Class I Permit [X] Class II Permit [ ] New Well [X] Reconstruct [ ] Observation [ ] Test well, Test hole [ ] Destruct [ ] Other: ______

PROPOSED USE: Domestic, Single Family [XX] Domestic, Public [ ] Irrigation [XX] Industrial [ ] Other: ______

CONSTRUCTION PROPOSED:

Casing: Diameter: 5 Gauge: 200 Material: PVC Conductor: Yes [ ] No [XX] Single [XX] Double [ ] Gravel Pack: Yes [XX] No [ ]

Annular Space: Size: 2 Depth of Seal: 20 Concrete: ______ Grout: XX Neat Cement: ______ Puddled Clay: ______

Method of Disinfection: chlorination Method of Sealing Access Opening: cap Type of Joint: certa lock

Well located within an existing public water system boundary: Yes [ ] No [ ] Name: ______

I hereby agree to comply with all laws and regulations of the County of Sonoma and State of California pertaining to water well construction. I will telephone (707) 565-1694 to notify the Environmental Health Specialist when I am commencing this work. I will furnish the Permit and Resource Management Department and the owner a copy of the State Water Well Driller's Report within 60 days in order to obtain final approval on this well. I acknowledge that the application will become a permit only after site approval and payment of fee. I understand that this permit is not transferrable and expires one year from date of issuance.

Linda Paul 9-14-01
Signature of Well Driller Date

CONSTRUCTION PROPOSED:

[XX] A currently effective certificate of Worker's Compensation Insurance is on file with the Sonoma County PRMD.

[ ] I certify that in the performance of the work for which this permit is issued I shall not employ any person in any manner so as to become subject to the Worker's Compensation laws of California.

Insurance Carrier ______ Policy# ______

Linda Paul 9-14-01
Signature of Applicant Date

FOR OFFICE USE ONLY - ENVIRONMENTAL HEALTH SERVICE

Site approved by: Gwendolyn R Baert Date: 9-21-01 Water Scarce Area: Yes [ ] No [X] ZONE III

Sealed to depth of ______

Finaled by: ______ Date: ______ Seal Observed: Yes [ ] No [ ]

Indicate below the exact location of well with respect to the following items: property lines, water bodies or water courses, drainange pattern, roads, existing wells, sewer main and laterals and private sewage disposal systems or other sources of contamination or pollution. INCLUDE DIMENSIONS. The validity of this permit depends upon the accuracy of the information provided by the applicant.

SEE ATTACHED

10/2/01 - inspection @ 4:00 setup

N

4529A0000#09/17/01 SUBTTL 353.00

File with DWR

Page 1 of 1

Owner's Well No. 1

Date Work Began 9/23/96, Ended 9/25/96

Local Permit Agency DEPARTMENT OF PERMITS AND RESOURSE MGM.

Permit No. 96-0388 Permit Date 9/11/96

WELL COMPLETION REPORT

Refer to Instruction Pamphlet

No. 561493

STATE WELL NO./STATION NO.

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) XX VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color, etc.*
0	5	TOP SOIL
5	10	BROWN CLAY AND ROCK
10	20	GRAVEL
20	30	BLUE CLAY
30	35	BROWN CLAY
35	50	BLUE CLAY
50	55	BROWN CLAY W/ROCK
55	60	BLUE CLAY/SOME GRAVEL
60	70	BLUE CLAY & ROCK
70	105	GRAVEL
105	135	BLUE CLAY/SOFT ROCK
135	142	HARD SANDSTONE
142	145	BLUE CLAY WITH ROCK
145	155	SANDSTONE
155	190	BLUE CLAY
190	195	SANDSTONE W/ CLAY
195	205	BLUE CLAY/ROCK
205	210	GRAVEL W/CLAY
210	215	BLUE CLAY AND REDWOOD
215	225	HARD BLACK ROCK
225	235	MIXED ROCK AND GRAVEL
235	255	BLUE CLAY/SANDY

TOTAL DEPTH OF BORING 255 (Feet)

TOTAL DEPTH OF COMPLETED WELL 256 (Feet)

WELL OWNER

Name FRANK TEXEIRA

Mailing Address 1035 STAGE GULCH ROAD

PETALUMA, CA.

CITY STATE ZIP

WELL LOCATION

Address SAME

City

County SONOMA

APN Book 068 Page 040 Parcel 015

or Township ___ Range ___ Section ___

or Latitude ___ DEG. MIN. SEC. NORTH Longitude ___ DEG. MIN. SEC. WEST

LOCATION SKETCH

NORTH

WEST EAST

SOUTH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

XX NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

PLANNED USE(S) (✓)

___ MONITORING

WATER SUPPLY

XX Domestic

___ Public

___ Irrigation

___ Industrial

___ "TEST WELL"

___ CATHODIC PROTECTION

___ OTHER (Specify)

DRILLING METHOD ROTARY MUD FLUID

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL ___ (Ft.) & DATE MEASURED ___

ESTIMATED YIELD* 5 (GPM) & TEST TYPE AIR LIFT

TEST LENGTH 4 (Hrs.) TOTAL DRAWDOWN 250 (Ft.)

* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	BLANK	SCREEN	CON-DUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
0	55	9 7/8	X				F480	5"	200#	
55	135	"		XX			"	"		.032
135	195	"	X				"	"		
195	255	"		XX			"	"	"	.032

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	50	XX			
50	255				1/4 X 1/8

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME LES PETERSEN DRILLING & PUMP, INC.
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

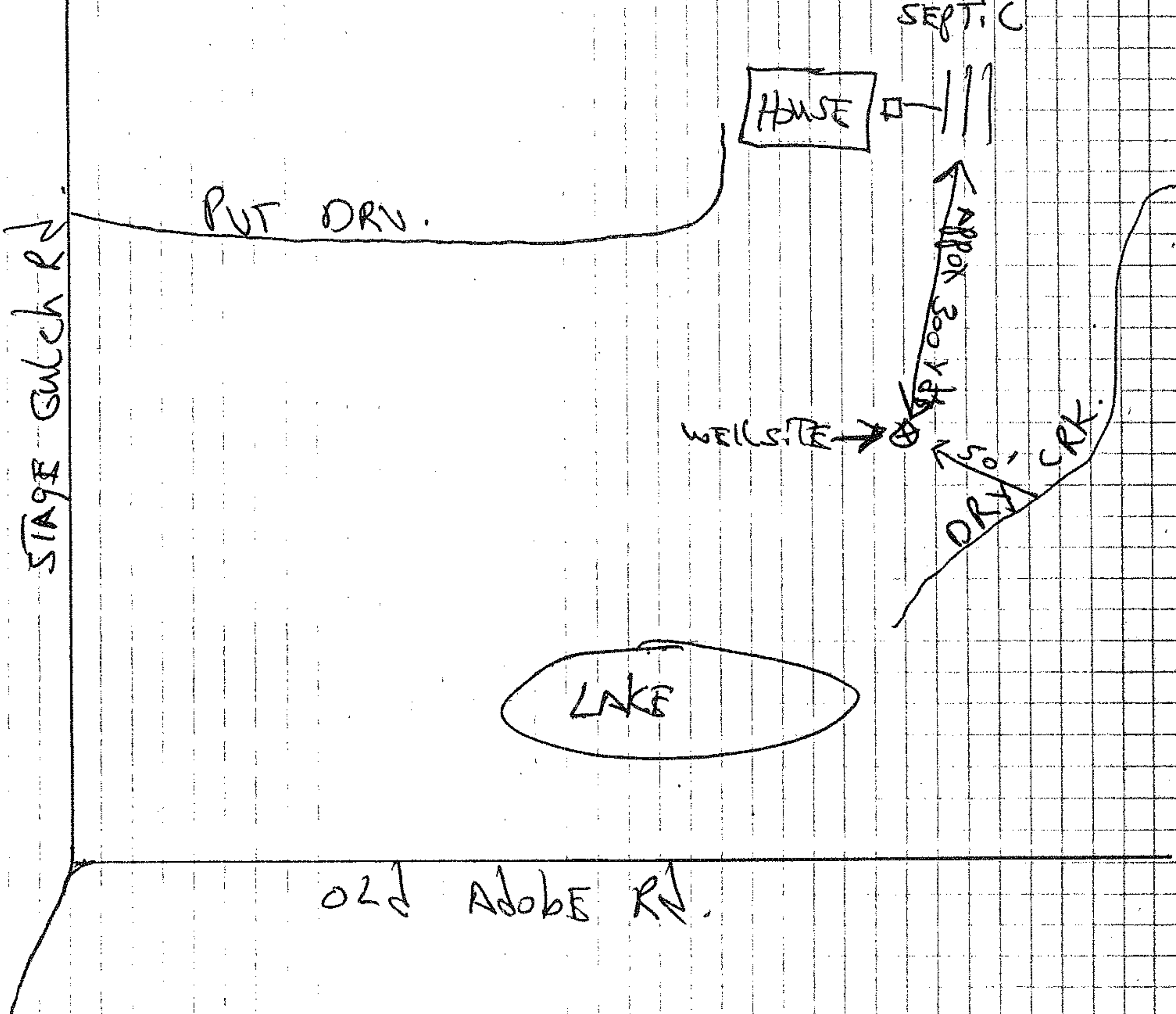
5434 OLD REDWOOD HIGHWAY SANTA ROSA, CA. 95403
ADDRESS CITY STATE ZIP

Signed LUPE VASQUEZ 9/30/96 261084
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

DWR 188 REV. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

LANDS OF
FRANK TEIXEIRA
STAGE GULCH RANCH
1035 STAGE GULCH Rd.
PETALUMA
AP# 068-040-015



COUNTY OF SONOMA
PERMIT AND RESOURCE MANAGEMENT DEPARTMENT
WELL & SEPTIC SECTION
2550 Ventura Avenue
Santa Rosa, CA 95403
(707) 527-1900

APPLICATION FOR PERMIT
WATER WELL

WELL ADDRESS 1035 STAGE GULCH ROAD

CITY PETALUMA, CA. ZIP ____ APPLICATION NO. Wel 96-0388

PROPERTY OWNER FRANK TEIXEIRA A.P. NO. 068-040-015

ADDRESS SAME PHONE NO. 762-0397

DRILLING CONTRACTOR ~~LES PETERSEN DRILLING & PUMP, INC~~ CONTRACTOR LICENSE NO. ~~261084~~

ADDRESS ~~5434 OLD REDWOOD HIGHWAY SANTA ROSA, CA~~ PHONE NO. ~~545-0246~~

TYPE OF WORK Class I Permit XX Class II Permit ☐ New Well XX Reconstruct ☐ Observation ☐ Test well, Test hole ☐ Destruct ☐ Other: ____

PROPOSED USE Domestic, Single Family X Domestic, Public ☐ Irrigation ☐ Industrial ☐ Other: ____

Receipt Information
017171 09/12/96A01
\# 0960388
SIERRA $301.00
TTL $301.00
CHECK $301.00
CHNG $0.00

CONSTRUCTION PROPOSED:

Casing: Diameter: 5" Gauge: 200 Material: PVC Conductor: yes ☐ no X Single XX Double ☐ Gravel Pack: yes XX no ☐

Annular Space: Size: 20 Depth of Seal: 20 Concrete: ____ Grout: XX Neat Cement: ____ Puddled Clay: ____

Method of Disinfection: CHLORINATE Method of Sealing Access Opening: CAP Type of Joint: SOLVENT WELD

Well located within an existing public water system boundary: ☐ Yes ☐ No Name: ____

I hereby agree to comply with all laws and regulations of the County of Sonoma and State of California pertaining to water well construction. I will telephone (707) 525-6500 to notify the sanitarian when I am commencing this work. I will furnish the Public Health Officer and the owner a legible copy of the State Water Well Driller's Report within 30 days in order to obtain final approval on this well. I acknowledge that the application will become a permit only after site approval and payment of fee. I understand that this permit is not transferable and expires one year from date of issuance.

Aloha McCarter 9/6/1996
(SIGNATURE OF WELL DRILLER)

WORKMEN'S COMPENSATION CERTIFICATE

☑ A currently effective certificate of Workmen's Comp. insurance coverage is on file with this office.

☐ I certify that in the performance of the work for which this permit is issued I shall not employ any person in any manner so as to become subject to the workmen's compensation laws of California.

Insurance Carrier ____ Policy # ____

Aloha McCarter 9/6/1996
(SIGNATURE OF APPLICANT)

FOR OFFICE USE ONLY — ENVIRONMENTAL HEALTH SERVICE

Site approval by: [signature] Date 10/13/1996 Water Scarce Area: ☐ yes ☑ no
Sealed to depth of ____
Finaled by: ____ Date: __/__/19__ Seal Observed: ☐ yes ☐ no

Indicate below the exact location of well with respect to the following items: property lines, water bodies or water courses, drainage pattern, roads, existing wells, sewer main and laterals and private sewage disposal systems or other sources of contamination or pollution. INCLUDE DIMENSIONS. The validity of this permit depends upon the accuracy of the information provided by the applicant. **SONOMA COUNTY CODE, CHAPTER 25B, requires submittal of well log within thirty (30) days of completion of type of work indicated on this permit.**

SEE ATTACHED

Appendix E – January 27, 2011 Testimony of Water Availability

1-27-2011

Attn: Mr. Patrick Carter
Sonoma County Solid Waste Management
2300 County Center Drive STE 100
Santa Rosa, CA 95404

Dear Mr. Carter,

The one well located at the top of the hill, which was drilled by Les Petersen Well Drilling, has been the only source of water for the ranch since the operation of the dairy ceased in 2006. This well has provided water for the main house, a rental, the barns and numerous water troughs throughout the ranch. It has been a continued dependable source of water. The only interruptions that have occurred were due to broken pipes and repairs due to the stock watering system.

Sincerely,

Kara Lee Teixeira

Kara Lee Teixeira

Appendix F – Report from EBA Engineering

EBA ENGINEERING
CIVIL & ENVIRONMENTAL ENGINEERS

January 30, 2008

Ms. KaraLee Teixeira & Ms. Mary Francis Escobar
c/o Mr. Arthur LaFranchi
Law Office of Arthur LaFranchi
420 Aviation Boulevard #202
Santa Rosa, California 95403-1039

SUBJECT: SUPPLEMENTAL SITE INFORMATION
PHASE II ENVIRONMENTAL ASSESSMENT
TEIXEIRA PROPERTY
1035 STAGE GULCH ROAD
PETALUMA, CALIFORNIA
EBA PROJECT NO. 07-1473

Dear Ms. Teixeira and Ms. Escobar:

The following presents our findings and results from the completion of supplemental site investigation activities at the Teixeira property located in Petaluma, California (Figure 1, Appendix A). The additional investigation was performed following completion of the Phase I Environmental Site Assessment as a means to better assess the environmental condition of the property. The following presents our results and findings.

SCOPE OF WORK

The scope of work performed at the site included the following:

- Sample domestic water supply well at the property to determine general water quality and potibility;
- Perform surficial soil sampling in the immediate vicinity of two aboveground fuel storage tanks to determine if impacts to the site have occurred as result of using the tanks;
- Perform surficial soil sampling on the west side of the equipment shed where contained waste oil and discarded batteries were stored;
- Perform a limited geophysical survey of the site to determine if underground fuel storage tanks are present at the property.

METHODOLOGY

The following sets forth the sampling and testing methodology that was used in the collection and handling of samples during the investigation of the project site property.

Domestic Well Sampling

The domestic water supply well at the project site property is located on the southern portion of the property. The well system consists of a constructed well with PVC casing and submersible pump. There is a large water storage tank located directly adjacent to the well in which pumped water is stored prior to use for domestic consumption.

A sample was collected from the well on January 18, 2008. Prior to sampling the well was allowed to run for approximately 15 minutes into the holding tank and a sample was collected in laboratory supplied containers. The samples were then labeled, capped and stored in refrigerated conditions pending transport to Alpha Analytical Laboratories in Ukiah, California for chemical analysis. The analysis included the following constituents:

- Hardness
- pH
- Electrical Conductivity
- Total Dissolved Solids
- Sodium
- Iron
- Manganese
- Arsenic
- Nitrates

Samples for the analysis Total Coliform and Escherichia Coliform (E. Coli) bacteria were submitted to Brelje and Race Laboratories in Santa Rosa, California for chemical analysis.

Soil Sampling - Aboveground Fuel Tanks

Soil sampling was performed in and around the two aboveground fuel tanks located to the north of the milking barn. As documented in the Phase I Environmental Site Assessment, a slight petroleum odor was observed during the site inspection in the area of the tanks. Soil samples were therefore obtained from beneath the dispenser end of each tank at a depth of approximately six inches below the ground surface. The soil samples were collected in two-inch diameter by six-inch long steel tubes that were then capped, labeled and stored under refrigerated conditions pending transport to Alpha Analytical Laboratories.

The analysis for the samples included the following:

- Total Petroleum Hydrocarbons as Gasoline (TPH-g)
- Total Petroleum Hydrocarbons as Diesel (TPH-d)
- Volatile Organic Compounds including benzene, toluene, ethylbenzene and xylenes
- Fuel Oxygenates including Methyl tert-Butyl Ether, Ethyl tert-Butyl Ether, Diisoprpyl Ether, Tert Amyl Methyl Ether and Tert Butly Alcohol

Soil Sampling – Equipment Shed

Soil sampling was performed on the west side of the equipment shed where containerized waste products such as waste oil and discarded batteries were stored. The presence of these items was documented in the Phase I Environmental Site Assessment. Soil samples were therefore obtained from the area around the stored materials at a depth of approximately six inches below the ground surface. The soil samples were collected in two inch diameter by six inch long steel tubes that were then capped, labeled and stored under refrigerated conditions pending transport to Alpha Analytical Laboratories.

The analysis for the samples included the following:

- Oil and Grease
- Volatile Organic Compounds
- Metals including cadmium, chromium, lead, nickel and zinc

Geophysical Survey

EBA Engineering contracted with Norcal Geophysical Consultants of Petaluma, California to conduct a limited geophysical survey in the area generally bound by the main dwelling, west to the milking barn and south to the equipment shed. The purpose of the geophysical survey was to investigate for possible buried objects and debris, and other subsurface anomalies. The geophysical survey used several methods of investigation including the use of a magnetometer and conductivity meter on a 10-foot grid over accessible portions of the site to define localized magnetic and conductivity variations that may be present due to buried debris, tanks and miscellaneous subsurface structures. Based on these results, ground penetrating radar and a metal detector was systematically used in localized areas to further define the nature and extent of buried features. The field survey included the establishment of a horizontal control grid.

FINDINGS

The analytical results for the domestic water well indicate no presence for either Coliform or E. Coli bacteria. The analysis for minerals appears to be within accepted standards for drinking water wells in the State of California as defined by Title 22 of the California Code of Regulations. Copies of the certified analytical reports for the well are attached.

The analytical results from the soil sampling in the area of the aboveground fuel storage tanks indicate the presence of gasoline and diesel in shallow soil. Shallow soil samples collected from the dispenser end in the vicinity of the north and south tanks indicate diesel at levels up to 2,700 milligrams per kilogram (mg/kg) and 8,000 mg/kg, respectively. Low levels of gasoline were also detected in the soil samples however the results are flagged by the analytical laboratory as being atypical for gasoline and are likely an overlap from the diesel product. No volatile organic compounds or fuel oxygenates were detected in either soil sample. The levels of diesel detected in both samples exceed published Environmental Screening Levels (ESL's) as established by the San Francisco Bay Regional Water Quality Control Board for shallow soils at residential properties where groundwater is a source of drinking water. The full extent of the impacts to soil is at this time undefined. A copy of the certified analytical report is attached.

The testing of soil on the west side of the equipment shed indicates the presence of Total Oil and Grease at a concentration of 3,100 mg/kg as well as concentrations of lead at 480 mg/kg and zinc at 520 mg/kg. The concentrations of both Oil and Grease and lead exceed ESL's in soil for residential use. The concentrations of the remaining metals appear to be at expected background levels for the area. No volatile organic compounds were detected in the soil samples collected from this area. A copy of the certified analytical results is enclosed.

A full report of findings for the geophysical survey is currently being prepared by Norcal Geophysical. We are including a copy of the field survey map showing the vertical magnetic gradient contour grid for the areas of the project site explored during this work scope. The results indicate no significant magnetic anomalies in the area of study. The study did indicate a localized magnetic anomaly in the central portion of the area of study however this anomaly appears to be limited in depth and extent and does not have the features of a buried fuel tank. A full report is being prepared by Norcal that will include the findings from the field survey and include complete descriptions of the methods used, results, and interpretation regarding the locations of possible subsurface features. The report will also include a site map showing pertinent site features and magnetic and conductivity contour maps. The full report will be forwarded to you upon receipt.

RECOMMENDATIONS

Based on the detection of petroleum hydrocarbons in the area of the fuel storage tanks, we recommend further definition of the area. This will allow for assessment of remedies that will likely entail removal and off-site disposal of the impacted soil.

Similarly, based on the detection of elevated levels of Oil and Grease and lead in the area of the equipment shed, we would recommend additional assessment of this area and removal and off-site disposal of the impacted soil.

LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological practice at the place and time this investigation was performed. This warranty is in lieu of all other warranties, either expressed or implied. This investigation was conducted solely for the purpose of evaluating environmental conditions of the soil with respect to environmental conditions previously identified at the project site. No soil engineering or geotechnical references are implied or should be inferred. Evaluation of the geologic conditions at the project site for the purpose of this investigation is made from a limited number of observation points. Subsurface conditions may vary away from the data points available.

Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of investigation. This report has been prepared solely for the Client and any reliance on this report by third parties shall be at such party's sole risk.

CLOSING

We trust this provides the information you require at this time. If you have any questions or comments, please call (707) 544-0784.

Sincerely,
EBA ENGINEERING

David Noren, Manager
Environmental Services

Dale Solheim, P.E.
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
DALE S. SOLHEIM
No. 30888
Exp 3/31/08
CIVIL
STATE OF CALIFORNIA

2/1/08

Enclosure: Appendix A- Figures
Appendix B - Analytical Reports
Appendix B – Geophysical Field Map