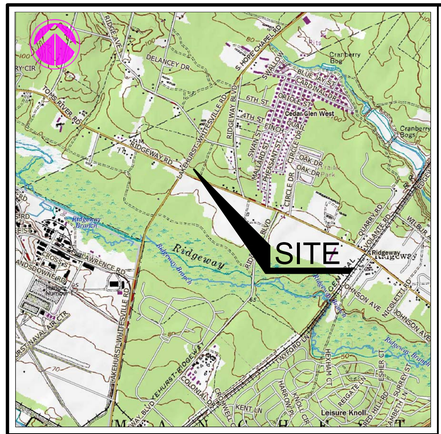
PRELIMINARY & FINAL - MAJOR SITE PLANS

FOR

BLOCK 65 - LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY



QUAD MAP

SCALE: 1" = 2000'

KEY MAP

1"=2000'

PROPERTY OWNERS LIST

SUPPLIED BY THE TOWNSHIP OF MANCHESTER ON APRIL 25, 2023

BLOCK & LOT	NAME	ADDRESS	CITY, STATE, ZIP
	NAVAL AIR ENGINEERING STATION - COMMANDING OFFICER	CODE CNI 01L	LAKEHURST NJ 08733
	COMCAST	830 RT 37 WEST	TOMS RIVER NJ 08755
	VERIZON ENG DEPT	PO BOX 152206	IRVING TX 75015
	GPU	400 LINCOLN ST	PHILLIPSBURG NJ 08865
	MANCHESTER TWP CLERKS OFFICE	1 COLONIAL DR	MANCHESTER NJ 08759
	NJ DEP	CN 401	TRENTON NJ 08625
	NJ DOT	RT 79 & DANIELS WAY	FREEHOLD NJ 07728
	NJ NATURAL GAS CO	PO BOX 1464	WALL NJ 07719
	OCEAN COUNTY MUA	PO BOX P	BAYVILLE NJ 08721
	OCEAN COUNTY ROAD DEPT	119 HOOPER AVE	TOMS RIVER NJ 08753
B 64 – L 3.01	KIARI & EMBERLE PEARSON	3808 RIDGE AVE	MANCHESTER NJ 08759
B 64 – L 6	PATRICIA GIORDANO	3134 HWY 547	MANCHESTER NJ 08759
B 64 – L 7	ROBERT J III & R J JR BLANK	224 EDGEMERE DR	TOMS RIVER NJ 08755
B 65 – L 1	RUSSELL DECKER & JOYCE H BLACKWELL	3163 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 2	JAMES & FAITH JOHNS	3153 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 4	CYNTHIA S SEARS	3143 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 5	KARL E & VICTORIA KOVACOFSKY	3133 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 6	CHARLES & MICHELE KOVACS	3099 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 7.01	ORIETT S WTDV MARCUS	3083 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 7.02	JOHN L JR & ERIKA M PROVEAUX	3087 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 9	GERARD R HEALY	3738 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 10	FRANK BARTH	3776 RIDGEWAY AVE	MANCHESTER NJ 08759
B 65 – L 11	PARKWOOD SQUARE LP	305 MAIN ST	LAKEWOOD NJ 08701
B 65 – L 12	PARKWOOD SQAURE LP	305 MAIN ST	LAKEWOOD NJ 08701
B 65 – L 13	PARKWOOD SQUARE LP	305 MAIN ST	LAKEWOOD NJ 08701
B 65 – L 14	PARKWOOD SQUARE LP & PARKWOOD CTR B	305 MAIN ST	LAKEWOOD NJ 08701
B 65 – L 15	CARLOS & MONICA ARTEAGA	3123 RIDGEWAY AVE	MANCHESTER NJ 08759
B 66 – L 2	LAKEWOOD INVESTMENTS LLC	305 MAIN ST	LAKEWOOD NJ 08701
B 67.01 – L 1.01	MANCHESTER TWP	1 COLONIAL DR	MANCHESTER NJ 08759
B 67.06 – L 5	JAMES WALL	390 TOMS RIVER RD	JACKSON NJ 08527
B 67.07 – L 10	HARTMUT & JOANN HUEBSCHER	3857 RIDGE AVE	MANCHESTER NJ 08759
B 69 – L 4	TARANTINO PROPERTIES LLC	3875 RIDGEWAY AVE	MANCHESTER NJ 08759
B 71 – L 1.01	OCEAN COUNTY	101 HOOPER AVE	TOMS RIVER NJ 08753
B 71 – L 1.02	OCEAN COUNTY	101 HOOPER AVE	TOMS RIVER NJ 08753
B 71 – L 6.01	OCEAN COUNTY	101 HOOPER AVE	TOMS RIVER NJ 08753

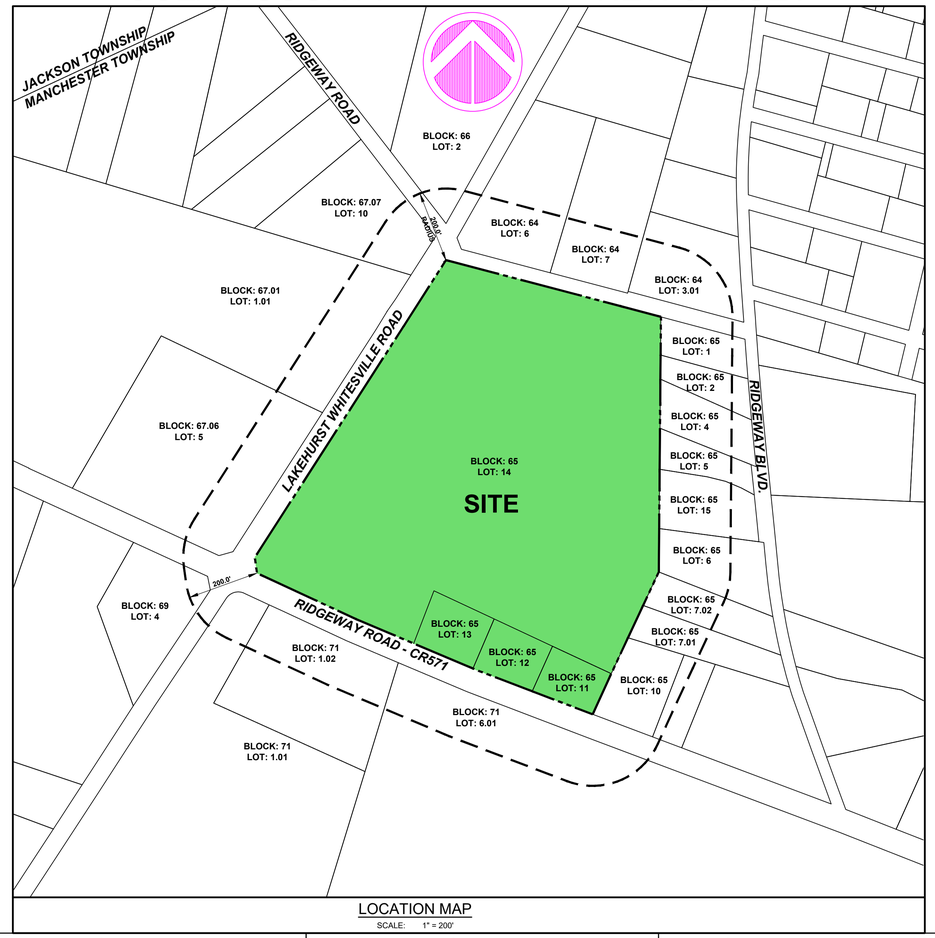
APPROVED BY:

THE MANCHESTER TOWNSHIP PLANNING BOARD

BOARD CHAIRMAN DATE

BOARD SECRETARY DATE

BOARD ENGINEER DATE



LOCATION MAP

SCALE: 1" = 200'

GENERAL NOTES

1. PROPERTY IS KNOWN AS BLOCK 65 - LOTS 11, 12, 13 & 14 AS SHOWN ON THE MANCHESTER TOWNSHIP TAX MAP SHEET 4.
2. OUTBOUND & TOPOGRAPHIC INFORMATION TAKEN FROM A MAP ENTITLED "BOUNDARY & TOPOGRAPHIC SURVEY FOR TAX BLOCK 65 - TAX LOTS 11, 12, 13 & 14 TOWNSHIP OF MANCHESTER, OCEAN COUNTY, NEW JERSEY," AS PREPARED BY PROFESSIONAL DESIGN SERVICES, LLC, DATED NOVEMBER 29, 2021.
3. THE PROPERTY IS CURRENTLY LOCATED WITHIN THE PB ZONE AND CONTAINS APPROXIMATELY 20.86 ACRES.
4. IT IS ASSUMED THAT THERE ARE NO FRESHWATER WETLANDS LOCATED ON OR WITHIN 300 FEET OF THE PROPERTY.
5. TOWNHOUSE DEVELOPMENTS ARE A CONDITIONAL USE IN THE PB-1 ZONE PURSUANT TO 245-74 AS SET FORTH IN ORDINANCE 17-025.
6. IT IS PROPOSED TO CONSTRUCT 167 TOWN HOUSE UNITS.
7. WATER SERVICE WILL BE PROVIDED BY PUBLIC WATER.
8. SEWAGE SERVICE WILL BE PROVIDED PRIVATE SEPTIC SYSTEM.
9. ALL UTILITIES (ELECTRIC, TELEPHONE, ETC.) TO BE PROVIDED UNDERGROUND. THE CONTRACTOR MUST VERIFY LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
10. THE SIGHT TRIANGLE EASEMENTS ARE SUBJECT TO RESTRICTIONS CONTAINED WITHIN THE OCEAN COUNTY LAND USE REGULATIONS.
11. SOLID WASTE IS TO BE PICKED UP BY A PRIVATE GARBAGE HAULER. THE REFUSE AREA SHALL CONTAIN AN AREA FOR THE COLLECTION OF RECYCLABLE MATERIALS.
12. MAINTENANCE OF THE STORMWATER SYSTEM SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER AND SUBJECT TO INSPECTION BY THE TOWNSHIP OF MANCHESTER.
13. ALL TRAFFIC CONTROL SIGNAGE INCLUDING PAVEMENT MARKINGS WILL BE PROVIDED IN ACCORDANCE WITH THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".
14. ALL DISTURBED AREAS WILL BE VEGETATIVELY STABILIZED IN ACCORDANCE WITH THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLAN UPON COMPLETION OF THE GRADING ACTIVITIES.
15. EXISTING CONDITIONS AND DIMENSIONS TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL UTILITIES PRIOR TO CONSTRUCTION.
16. ALL CONSTRUCTION TO BE IN CONFORMANCE WITH APPLICABLE CODES, ORDINANCES AND MANUFACTURER'S REQUIREMENTS.
17. TRAFFIC DIRECTION ARROWS, FIRE LANE MARKINGS, ETC. SHALL BE IN CONFORMANCE WITH MANCHESTER TOWNSHIP FIRE PREVENTION BUREAU AND TOWNSHIP ENGINEERING DEPARTMENT REQUIREMENTS.
18. THE OWNER OR HIS/HER REPRESENTATIVE, IS TO DESIGNATE AN INDIVIDUAL RESPONSIBLE FOR CONSTRUCTION SITE SAFETY DURING THE COURSE OF SITE IMPROVEMENTS PURSUANT TO NJAC 5:23-2.21(e) OF THE NJ UNIFORM CONSTRUCTION CODE AND CFR 1926.32(f) (OSHA COMPETENT PERSON). PROFESSIONAL DESIGN SERVICES, LLC ASSUMES NO RESPONSIBILITY FOR CONSTRUCTION SITE SAFETY.
19. ALL HANDICAPPED PARKING SPACES SHALL BE CONSTRUCTED TO MEET ADA REQUIREMENTS.
20. NO PHASING OF SITE IMPROVEMENTS IS PROPOSED.
21. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW ALL OF THE DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THE PROJECT WORK SCOPE PRIOR TO THE INITIATION OF CONSTRUCTION. SHOULD THE CONTRACTOR FIND A CONFLICT WITH THE DOCUMENTS RELATIVE TO THE SPECIFICATION OR THE RELATIVE CODES, IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE PROJECT ENGINEER OF RECORD IN WRITING PRIOR TO THE START OF CONSTRUCTION. FAILURE BY THE CONTRACTOR TO NOTIFY THE PROJECT ENGINEER SHALL CONSTITUTE ACCEPTANCE OF FULL RESPONSIBILITY BY THE CONTRACTOR TO COMPLETE THE SCOPE OF WORK AS DEFINED BY THE DRAWINGS AND IN FULL COMPLIANCE WITH LOCAL REGULATIONS AND CODES.
22. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF SITE PLAN DOCUMENTS AND ARCHITECTURAL DESIGN FOR EXACT BUILDING UTILITY CONNECTION LOCATIONS, GREASE TRAP REQUIREMENTS/ DETAILS, DOOR ACCESS AND EXTERIOR GRADING. THE UTILITY SERVICE SIZES ARE TO BE DETERMINED BY THE ARCHITECT. THE CONTRACTOR SHALL COORDINATE INSTALLATION OF UTILITIES/SERVICES WITH THE INDIVIDUAL COMPANIES, TO AVOID CONFLICTS AND ENSURE PROPER DEPTHS ARE ACHIEVED. THE JURISDICTION UTILITY REQUIREMENTS SHALL ALSO BE MET, AS WELL AS COORDINATING THE UTILITY TIE-INS/CONNECTIONS PRIOR TO CONNECTING TO THE EXISTING UTILITY/SERVICE. WHERE CONFLICT EXISTS WITH THESE SITE PLANS, ENGINEER IS TO BE NOTIFIED PRIOR TO CONSTRUCTION TO RESOLVE SAME.
23. ALL FILL, COMPACTION AND BACKFILL MATERIALS REQUIRED FOR UTILITY INSTALLATION SHALL BE AS PER THE RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL REPORT AND SHALL BE COORDINATED WITH THE APPLICABLE UTILITY COMPANY SPECIFICATIONS.
24. THE CONTRACTOR SHALL COMPLY TO THE FULLEST EXTENT WITH THE LATEST OSHA STANDARDS AND REGULATIONS, OR ANY OTHER AGENCY HAVING JURISDICTION FOR EXCAVATION AND TRENCHING PROCEDURES. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING "MEANS AND METHODS" REQUIRED TO MEET THE INTENT AND PERFORMANCE CRITERIA OF OSHA, AS WELL AS ANY OTHER ENTITY THAT HAS JURISDICTION FOR EXCAVATION AND/OR TRENCHING PROCEDURES.
25. PAVEMENT SHALL BE SAW CUT IN STRAIGHT LINES TO THE FULL DEPTH OF THE EXISTING PAVEMENT. ALL DEBRIS FROM REMOVAL OPERATIONS SHALL BE REMOVED FROM THE SITE AT THE TIME OF EXCAVATION . STOCKPILING OF DEBRIS WILL NOT BE PERMITTED.
26. IN CASE OF DISCREPANCIES BETWEEN PLANS OR RELATIVE TO OTHER PLANS, THE SITE PLAN WILL TAKE PRECEDENCE. IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY CONFLICTS.
27. CONTRACTOR SHALL BE REQUIRED TO SECURE ALL NECESSARY PERMITS AND APPROVALS FOR ALL OFF-SITE MATERIAL SOURCES AND DISPOSAL FACILITIES. CONTRACTOR SHALL SUPPLY A COPY OF APPROVALS TO ENGINEER AND OWNER PRIOR TO INITIATING WORK.
28. THE DEVELOPER IS REQUIRED TO OBTAIN A PERMIT FROM THE OCEAN COUNTY ENGINEERING DEPARTMENT PRIOR TO THE START OF CONSTRUCTION OF ANY IMPROVEMENTS WITHIN THE RIGHT-OF-WAY OF LAKEHURST-WHITESVILLE ROAD (CR547) OR RIDGEWAY ROAD (CR571).
29. THE DEVELOPER SHALL OBTAIN A LETTER OF FINAL ACCEPTANCE FROM THE OCEAN COUNTY ENGINEER FOR THE ROAD IMPROVEMENTS ALONG LAKEHURST-WHITESVILLE ROAD (CR547) OR RIDGEWAY ROAD (CR571) PRIOR TO THE RELEASE OF ANY BOND OR FINANCIAL SURETY POSTED WITH THE MUNICIPALITY FOR THE COMPLETION OF SAID IMPROVEMENTS.
30. THERE IS NO NATURAL OR MAN-MADE WATERCOURSE TRAVERSING THE SITE.

SHEET INDEX		SHEET INDEX		SUPPLEMENTAL DRAWINGS	
No.	DESCRIPTION	No.	DESCRIPTION	TOTAL SHEETS	DESCRIPTION
1	COVER SHEET	17	CONSTRUCTION DETAILS - STORMWATER DETAILS		
2	NOTES	18	CONSTRUCTION DETAILS - UTILITY DETAILS	1	BOUNDARY SURVEY
3	SITE PLAN OVERALL	19	PRE-DEVELOPED DRAINAGE AREA MAP		
4	SITE PLAN "A"	20	POST DEVELOPED DRAINAGE AREA MAP		
5	SITE PLAN "B"	21	STORMWATER MAINTENANCE PLAN		
6	OVERALL GRADING & STORM DRAINAGE PLAN				
7	GRADING & STORM DRAINAGE PLAN "A"				
8	GRADING & STORM DRAINAGE PLAN "B"				
9	OVERALL UTILITY PLAN				
10	ROAD PROFILES				
11	ROAD PROFILES				
12	LANDSCAPE PLAN "A"				
13	LANDSCAPE PLAN "B"				
14	LANDSCAPE DETAILS				
15	LIGHTING PLAN				
16	CONSTRUCTION DETAILS - SITE DETAILS				

MANCHESTER LAND USE ZONE

R-3 RURAL RESIDENTIAL
R-20 SINGLE FAMILY RESIDENTIAL (MEDIUM DENSITY)

LAND USE

(C) COMMERCIAL
(I) INDUSTRIAL
(R) RESIDENTIAL
(V) VACANT

OWNER / APPLICANT

BELLEVUE ESTATES, LLC
305 MAIN STREET
LAKEWOOD, NJ 08701

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732.363.0160 FAX 732.363.0173
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

COVER SHEET

FOR

BLOCK 65

LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
AS SHOWN	APRIL 25, 2022	18123	1 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

File: W:\PROJECTS\18123\18123_s01_Cover Key Layout_s01_Cover Jun 01, 2023 - 2:37pm

ZONE REQUIREMNTS § 245-74**Townhouse developments.**	**PROVIDED**
A. Permitted. subject to the conditions specified below:	
(1) Minimum lot size: 10 acres.	20 acres
(2) The maximum density for townhouses is eight units per gross acre.	7.05 /acre
(3) Minimum setback distance:	
(a) Minimum front yard: 75 feet from a collector road or arterial road as identified in the Master Plan;	75 ft.
(b) Minimum side yard setback: 50 feet;	N/A
(c) Minimum rear yard setback: 30 feet.	30 ft.
(4) Minimum width of any townhouse shall be 20 feet.	22 ft.
(5) Minimum floor area per unit: 600 square feet.	1,760 sq. ft.
(6) Maximum building height: same as underlying zone.	Less than 40 ft.
(7) Maximum number of stories: same as underlying zone.	2 ½ stories
(8) Maximum number of units per structure: eight.	8
(9) Maximum number of eight-unit structures shall not be more than 20% of all residential structures included in the townhouse development.	16.0%
(10) Minimum distance between buildings shall be as follows:	
(a) For townhouse dwellings oriented essentially at 90° to each other, the minimum distance between same shall be 30 feet or one times the maximum height of the building, whichever is greater.	30 ft.
(b) For townhouse dwellings oriented essentially end-to-end to each other, the minimum distance between same shall be 30 feet minimum or 1.5 times the maximum height of the buildings, whichever is greater.	30 ft.
(c) For townhouse dwellings oriented essentially with parallel axis facing each other, the minimum distance between same shall be 50 feet or 2.5 times the maximum height of the buildings, whichever is greater.	50 ft.
(11) No portion of any dwelling unit shall be lower than the outside finished grade. No depressed siting shall be permitted.	Complies
B. Recreation requirement.	
(1)A playground area or areas shall be provided at the rate of 500 square feet per four dwelling units. A swimming pool of 1,500 square feet minimum size shall be provided, outdoor play equipment shall be installed in each outdoor playground in sufficient amount and variety to service the occupants of the project. At least one tennis court shall be provided for every 50 acres. No certificate of occupancy shall be issued until recreation areas are completed.	Complies
(2) All areas of a townhouse development not used for the construction of buildings, roads, accessways, parking areas or sidewalks shall be fully landscaped or grassed.	Complies
C. Off-street parking requirements.	
(1) There shall be two parking spaces for every dwelling unit.	3 / unit
(2) Garage facilities or off-street parking areas shall be provided on the lot sufficient to provide storage or parking for a number of vehicles equal to not less than twice the number of dwelling units, and shall be developed and maintained in accordance with the following:	
(a) Garages and parking area shall be used for automobile parking only with no sale of automobiles, dead storage of automobiles, repair work, dismantling or servicing of any kind.	Complies
(b) Parking areas shall be paved and curbed and provided with an adequate system of stormwater drainage.	Complies
(c) No garages or off-street parking areas shall be located neared than five feet from any adjoining property line.	
(d) No garages or off-street parking areas shall be located between the main building or buildings and the street line on which the building(s) fronts.	Complies
(e) Where the rear or side yard of a lot abuts on a street, no garage or off-street parking area shall be located nearer than 25 feet from such street line.	Complies
(f) No parking area may be place closer to a building than 12 feet. No parking shall be permitted on any access road within the townhouse development.	Complies
(g) All garage walls facing any street shall be screened from street view by dense evergreen planting or hedge planting at least six feet in height, maintained in good condition.	Complies
(h) All off-street parking shall be efficiently screened along all side and rear lot lines, by a six-foot-high wood or wire fence landscaped with dense evergreen planting, or a dense evergreen shrub or hedge screening at least six feet in height maintained in good condition.	Complies
D. Utility requirements.	
(1) Utilities for all townhouse developments. The applicant for the site plan approval shall arrange with the serving utility for the underground installation of the utilities distribution supply lines and service connections in accordance with the provisions of the applicable standard terms and conditions incorporated as part of its tariff on file with the State of New Jersey Board of Public Utility Commissioners.	Complies
(2) All townhouse projects shall be served by public sewer in accordance with the requirements of the Manchester Township Division of Utilities. [Amended 6-9-2008 by Ord. No. 08-020]	Complies
E. Landscaping and buffer requirements. All areas of a townhouse development not used for the construction of buildings, roads, accessways, parking areas or sidewalks shall be fully landscaped, and/or grassed. Where a townhouse development boundary line abuts a lot in a residential zone, no existing trees, shrubbery or other planting within the area of 20 feet inside the boundary line of the townhouse development abutting a residential lot shall be cut, uprooted, destroyed, or taken away. If no adequate trees, shrubs or planting exists in the twenty-foot area in the natural state of the premises before development, the area shall be provided with an adequate approved planting plan to provide a belt of screening within the twenty-foot area.	
F. Interior roads and driveway location.	
(1)All roads and other accessways within the townhouse development shall be private roads constructed, paved and curbed to right-of-way width of not less than 26 feet. All such construction, paving and curbing shall be completed in accordance with the subdivision regulations of Manchester Township.	Complies
(2) Driveways for ingress and egress for the project shall not be located within 200 feet of an existing intersection or create any hazardous conditions. Acceleration and deceleration lanes shall be installed where a traffic hazard exists or where substantial traffic congestion shall be created.	Complies
G. Accessory uses. Accessory uses usually incidental to the above uses, as specified below:	
(1) Noncommercial garage for exclusive use of site residents only.	N/A
(2) Noncommercial swimming pools for exclusive use of site residents only.	Complies
H. Association required. Any applicant requesting a townhouse project approval shall provide for the creation of an association. Such documents creating the association shall specifically provide for the association to have responsibility for maintenance for all common areas and shall provide for assurances that the Township shall in no way be held responsible for and shall be held harmless for the cost of maintenance of the common elements.	Complies
I. Affordable housing requirement. The applicant shall provide for a twenty-percent inclusionary component or such other requirement that is in effect in accordance with a court-approved housing plan or a housing plan approved by the New Jersey Council on Affordable Housing (COAH) at the time of final site plan approval. The type, construction and distribution of affordable housing units shall conform to the regulations in effect by COAH, by the Department of Community Affairs or such other state agency designated as the regulatory agency for affordable housing and affordable housing construction in New Jersey at the time of the issuance of the first building permit for the development.	28 Affordable Housing Units required, 28 Units Provided
J. Pinelands development credits. In the PB-1, POR-LI and PRC-1 Zoning Districts, Pinelands development credits shall be purchased and redeemed for 30% of all units, excluding up to 20% of the total project units that are made affordable for low- and moderate-income households in accordance with applicable state law. Units made affordable for low- and moderate-income households that account for more than 20% of the total project units shall purchase and redeem Pinelands development credits for 30% of all such units.	8.5 PDCs are required

ZONE REQUIREMNTS § 245-68 **Garden Apartments**	**PROVIDED**
A. Permitted. subject to the conditions specified below:	
(1) Minimum lot size: 10 acres.	20 acres
(2) The maximum density for garden apartments is six units per gross acre.	1.4 /acre
(3) Minimum setback distance: 75 feet from a collector road or arterial road as identified in the Master Plan;	80 ft.
(4) A swimming pool of 1,000 square feet minimum size shall be provided for all developments of 90 units or more.	N/A
(5) Minimum width of any garden apartment shall be 20 feet.	20 ft.
(6) Minimum floor area per unit: 600 square feet.	>600 sq. ft.
(7) Maximum floor area per unit: 1,200 square feet.	<1,200 sq. ft.
(8) Maximum building height: same as underlying zone.	Less than 40 ft.
(9) Maximum number of stories: same as underlying zone.	2 ½ stories
(10) Minimum number of units per structure: eight.	20 units
(11) Maximum number of units per structure: 24.	20 units
(12) Reserved	
(13) Minimum distance between buildings shall be as follows:	
(a) For garden apartment dwellings oriented essentially at 90° to each other, the minimum distance between same shall be 30 feet or one times the maximum height of the building, whichever is greater.	30 ft.
(b) For garden apartment dwellings oriented essentially end-to-end to each other, the minimum distance between same shall be 30 feet minimum or 1.5 times the maximum height of the buildings, whichever is greater.	30 ft.
(c) For garden apartment dwellings oriented essentially with parallel axis facing each other, the minimum distance between same shall be 50 feet or 2.5 times the maximum height of the buildings, whichever is greater.	50 ft.
(d) No portion of any dwelling unit shall be lower than the outside finished grade. No depressed siting shall be permitted.	Complies
B. Recreation requirement.	
(1)A playground area or areas shall be provided at the rate of 500 square feet per four dwelling units. A swimming pool of 1,500 square feet minimum size shall be provided, outdoor play equipment shall be installed in each outdoor playground in sufficient amount and variety to service the occupants of the project. At least one tennis court shall be provided for every 50 acres. No certificate of occupancy shall be issued until recreation areas are completed.	Complies
(2) All areas of a garden apartment development not used for the construction of buildings, roads, accessways, parking areas or sidewalks shall be fully landscaped or grassed.	Complies
C. Off-street parking requirements.	
(1) There shall be two parking spaces for every dwelling unit.	3 / unit
(2) Garage facilities or off-street parking areas shall be provided on the lot sufficient to provide storage or parking for a number of vehicles equal to not less than twice the number of dwelling units, and shall be developed and maintained in accordance with the following:	Complies
(a) Garages and parking area shall be used for automobile parking only with no sale of automobiles, dead storage of automobiles, repair work, dismantling or servicing of any kind.	Complies
(b) Parking areas shall be paved and curbed and provided with an adequate system of stormwater drainage. **(c)** No garages or off-street parking areas shall be located neared than five feet from any adjoining property line.	Complies
(d) No garages or off-street parking areas shall be located between the main building or buildings and the street line on which the building(s) fronts.	Complies
(e) Where the rear or side yard of a lot abuts on a street, no garage or off-street parking area shall be located nearer than 25 feet from such street line.	Complies
(f) No parking area may be place closer to a building than 12 feet. No parking shall be permitted on any access road within the garden apartment development.	Complies
(g) All garage walls facing any street shall be screened from street view by dense evergreen planting or hedge planting at least six feet in height, maintained in good condition.	Complies
(h) All off-street parking shall be efficiently screened along all side and rear lot lines, by a six-foot-high wood or wire fence landscaped with dense evergreen planting, or a dense evergreen shrub or hedge screening at least six feet in height maintained in good condition.	Complies
D. Utility requirements.	
(1) Utilities for all garden apartment developments. The applicant for the site plan approval shall arrange with the serving utility for the underground installation of the utilities distribution supply lines and service connections in accordance with the provisions of the applicable standard terms and conditions incorporated as part of its tariff on file with the State of New Jersey Board of Public Utility Commissioners.	Complies
(2) All garden apartment projects shall be served by public sewer in accordance with the requirements of the Manchester Township Division of Utilities. [Amended 6-9-2008 by Ord. No. 08-020]	Complies
E. Landscaping and buffer requirements. All areas of a garden apartment development not used for the construction of buildings, roads, accessways, parking areas or sidewalks shall be fully landscaped, and/or grassed. Where a garden apartment development boundary line abuts a lot in a residential zone, no existing trees, shrubbery or other planting within the area of 20 feet inside the boundary line of the garden apartment development abutting a residential lot shall be cut, uprooted, destroyed, or taken away. If no adequate trees, shrubs or planting exists in the twenty-foot area in the natural state of the premises before development, the area shall be provided with an adequate approved planting plan to provide a belt of screening within the twenty-foot area.	Complies
F. Interior roads and driveway location.	
(1)All roads and other accessways within the garden apartment development shall be private roads constructed, paved and curbed to right-of-way width of not less than 26 feet. All such construction, paving and curbing shall be completed in accordance with the subdivision regulations of Manchester Township.	Complies
(2) Driveways for ingress and egress for the project shall not be located within 200 feet of an existing intersection or create any hazardous conditions. Acceleration and deceleration lanes shall be installed where a traffic hazard exists or where substantial traffic congestion shall be created.	Complies
G. Accessory uses. Accessory uses usually incidental to the above uses, as specified below:	
(1) Noncommercial garage for exclusive use of site residents only.	N/A
(2) Noncommercial swimming pools for exclusive use of site residents only.	Complies
H. Pinelands development credits. In the PB-1, POR-LI and PRC-1 Zoning Districts, Pinelands development credits shall be purchased and redeemed for 30% of all units, excluding up to 20% of the total project units that are made affordable for low- and moderate-income households in accordance with applicable state law. Units made affordable for low- and moderate-income households that account for more than 20% of the total project units shall purchase and redeem Pinelands development credits for 30% of all such units.	None required for apartment units since all are affordable units

NO.	DATE	DESCRIPTION	BY

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

NOTES

FOR

BLOCK 65

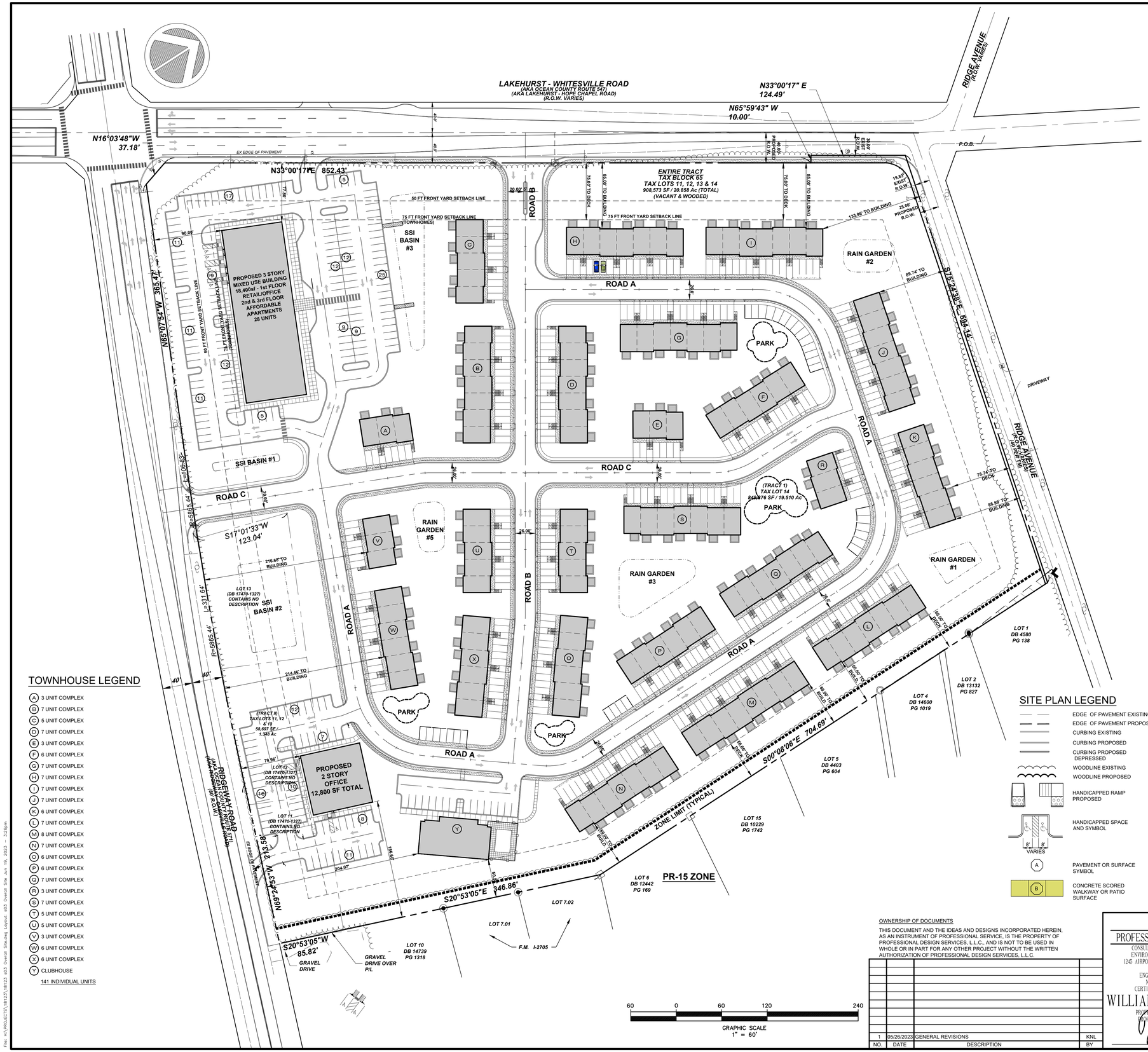
LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE: NTS	DATE: MAY 26, 2023	JOB NUMBER: 18123	SHEET 2 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

File: W:\PROJECTS\18123\18123 - 401 Notes.dwg Layout: 401 Notes Jun 01, 2023 - 2:39pm



TOWNHOUSE LEGEND

- (A) 3 UNIT COMPLEX
- (B) 7 UNIT COMPLEX
- (C) 5 UNIT COMPLEX
- (D) 7 UNIT COMPLEX
- (E) 3 UNIT COMPLEX
- (F) 6 UNIT COMPLEX
- (G) 7 UNIT COMPLEX
- (H) 7 UNIT COMPLEX
- (I) 7 UNIT COMPLEX
- (J) 7 UNIT COMPLEX
- (K) 6 UNIT COMPLEX
- (L) 7 UNIT COMPLEX
- (M) 8 UNIT COMPLEX
- (N) 7 UNIT COMPLEX
- (O) 6 UNIT COMPLEX
- (P) 6 UNIT COMPLEX
- (Q) 7 UNIT COMPLEX
- (R) 3 UNIT COMPLEX
- (S) 7 UNIT COMPLEX
- (T) 5 UNIT COMPLEX
- (U) 5 UNIT COMPLEX
- (V) 3 UNIT COMPLEX
- (W) 6 UNIT COMPLEX
- (X) 6 UNIT COMPLEX
- (Y) CLUBHOUSE

141 INDIVIDUAL UNITS

SITE PLAN LEGEND

- EDGE OF PAVEMENT EXISTING
- EDGE OF PAVEMENT PROPOSED
- CURBING EXISTING
- CURBING PROPOSED
- CURBING PROPOSED DEPRESSED
- WOODLINE EXISTING
- WOODLINE PROPOSED
- HANDICAPPED RAMP PROPOSED
- HANDICAPPED SPACE AND SYMBOL (8' x 8' VARIES)
- (A) PAVEMENT OR SURFACE SYMBOL
- (B) CONCRETE SCORED WALKWAY OR PATIO SURFACE

PB-1 PINELANDS BUSINESS ZONE REQUIREMENTS

	REQUIRED	PROVIDED
MINIMUM LOT AREA	20,000 SF	908,573 SF
MINIMUM LOT FRONTAGE	125 FT	594 FT
MINIMUM LOT WIDTH	125 FT	610 FT
MINIMUM IMPROVABLE LOT AREA	13,500 FT	9,600 FT
PRINCIPAL BUILDING		
MINIMUM FRONT YARD SETBACK	50 FT	77.80 FT
MINIMUM REAR YARD SETBACK	25 FT	N/A
MINIMUM SIDE YARD SETBACK	20 FT	50.38 FT
ACCESSORY BUILDING		
MINIMUM REAR YARD SETBACK	10 FT	N/A
MINIMUM SIDE YARD SETBACK	10 FT	N/A
SITE MAXIMUM IMPROVEMENT RATIO	0.2	<0.2%
MAXIMUM BUILDING COVERAGE	20%	13.7%
MAXIMUM LOT COVERAGE	65%	36.8%
MAXIMUM BUILDING HEIGHT	35 FT	<35 FT
MAXIMUM FLOOR AREA	1,500 SF	36,800 FT

NOTE: FOR TOWNHOUSE DEVELOPMENT ZONE REQUIREMENTS, SEE NOTES SHEET 2.

PARKING REQUIREMENTS

	REQUIRED	PROVIDED
MIXED USE:		
RETAIL & OFFICE 1 SPACE PER 200 SF 18,400 SF	92 SPACES	98 SPACES
AFFORDABLE APARTMENTS 2 SPACES PER UNIT 28 UNITS	56 SPACES	56 SPACES
DWELLING UNIT 2 SPACES PER UNIT* 141 UNITS	282 SPACES	313 SPACES
*PER SECTION 245-74 C.(1)		
OFFICE 1 SPACE PER 200 SF 12,800 SF	64 SPACES	64 SPACES

PROJECT YIELD

TOTAL NUMBER OF MARKET UNITS = 141

TOTAL AFFORDABLE UNITS = 28

TOTAL DWELLING UNITS = 169

(1) 30% OF ALL MARKET SINGLE FAMILY LOTS MUCH PURCHASE PINELANDS QUARTER CREDITS PER ORDINANCE 22-17

COAH COMPLETION SCHEDULE

MINIMUM PERCENTAGE OF LOW AND MODERATE INCOME UNITS COMPLETED		MINIMUM PERCENTAGE OF MARKET HOUSING UNITS COMPLETED	
0%		25%	
10%	3	25% PLUS 1	36
50%	14	50%	71
75%	21	75%	106
100%	28	90%	127

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

OVERALL SITE PLAN

FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE: 1" = 60'	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 3 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

Plot: H:\PROJECTS\18123\18123_s03 Overall Site\dwg Layout_s03 Overall Site Jun 19, 2023 - 3:26pm

LAKEHURST - WHITESVILLE ROAD
(AKA OCEAN COUNTY ROUTE 547)
(AKA LAKEHURST - HOPE CHAPEL ROAD)
(R.O.W. VARIES)

N33°00'17" E
124.49'

N65°59'43" W
10.00'

P.O.B.

N16°03'48"W
37.18'

EX EDGE OF PAVEMENT

OCEAN CNTY
MON FND
STA= 106+74.15
OFFSET= 39.63'

PROP'D ROW
40.00'

EXIST ROW
40.00'

N33°00'17"E 852.43'

S33°00'17"E 852.43'

ENTIRE TRACT
TAX BLOCK 65
TAX LOTS 11, 12, 13 & 14
908,573 SF / 20.858 Ac (TOTAL)
(VACANT & WOODED)

R1-1

24" PAINTED
STOP BAR
(TYP)

75.00' TO BACK

89.00' TO BUILDING

89.00' TO CURB

19.65'
EXIST
R.O.W.

25.00'
PROPOSED
R.O.W.

50 FT FRONT YARD SETBACK LINE

75 FT FRONT YARD SETBACK LINE (TOWNHOMES)

ROAD B

R2.5'

R2.5'

20.00'

5'

20.00'

1+00

PROPOSED 3 STORY
MIXED USE BUILDING
18,400sf - 1st FLOOR
RETAIL/OFFICE
2nd & 3rd FLOOR
AFFORDABLE
APARTMENTS - 28 UNITS

80'

230'

90.00

HC RAMP
(TYP)

CONCRETE CURB (TYP)

50 FT FRONT YARD SETBACK LINE (TOWNHOMES)

75 FT FRONT YARD SETBACK LINE (TYP)

CONCRETE CURB (TYP)

8' WIDE CONC WALK

LOADING

12'

LOADING

14' WIDE CONC WALK

8' WIDE PAINTED CROSS WALK

5LF DEP CURB

5' WIDE GRASSCRETE (TYP)

5LF DEP CURB

CONCRETE CURB (TYP)

SSI
BASIN
#3

SSI BASIN #1

RAIN GARDEN
#2

PARK

ROAD A

ROAD C

ROAD C

PARK

RAIN

24.0'
18.0'
18.0'
24.0'
18.0'

31.85'
30.00'
41.35'

43.28'

30.21'

65.86'

48.07'

52.80'

71.88'

89.74' TO BUILDING

89.07' TO BUILDING

S75°24'38"E 594.14'

RIDGE AVENUE
(AKA COUNTY ROUTE 547)
(AKA LAKEHURST - HOPE CHAPEL ROAD)
(80' R.O.W.)

POSSIBL
OVERLAP E
ADJOINING
CONTAIN
BK. 4580,

N65°07'54"W 365.47'

EXIST 6.83'

SITE PLAN "A"

SCALE: 1"=40 FT

40 0 40 80 160

GRAPHIC SCALE
1"=40'

SITE PLAN LEGEND

- EDGE OF PAVEMENT EXISTING
- EDGE OF PAVEMENT PROPOSED
- CURBING EXISTING
- CURBING PROPOSED
- CURBING PROPOSED DEPRESSED
- WOODLINE EXISTING
- WOODLINE PROPOSED
- HANDICAPPED RAMP PROPOSED
- HANDICAPPED SPACE AND SYMBOL (8' 8' VARIES)
- PAVEMENT OR SURFACE SYMBOL (A)
- CONCRETE SCORED WALKWAY OR PATIO SURFACE (B)

75 FT FRONT YARD SETBACK LINE

12.00'
DECK
10.00'
2.0'
22.00'
22.00'
22.00'
12.00'
10.00'
TYPICAL TOWNHOUSE SLAB ON GRADE
TYPICAL TOWNHOUSE SLAB ON GRADE
TYPICAL TOWNHOUSE SLAB ON GRADE
36.00'
4 FT WIDE CONC WALK TYPICAL
4 FT WIDE CONC WALK FOR ROBO CANS
6 FT WIDE CONC WALK FOR ROBO CANS
9.00'
9.00'
9.00'
9.00'
20.0'
4.0'
4.0'
4.0'
4.0'
18.00'
1.50'
DEPRESSED CURB
1.50'
1.50'
36.00' DEPRESSED CURB
1.50'

TYPICAL 7 UNIT TOWNHOUSE PLAN DETAIL

SCALE: 1"=20 FT

20 0 20 40 80

GRAPHIC SCALE
1"=20'

OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C., AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0160 FAX 732 363 0072
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

SITE PLAN "A"

FOR

BLOCK 65
LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 40'	APRIL 25, 2022	18123	4 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

File: W:\PROJECTS\18123\18123_dc4 Site Plan A & B.dwg Layout: dc4 Site Plan A Jun 19, 2023 - 3:35pm

SITE PLAN LEGEND

- EDGE OF PAVEMENT EXISTING
- EDGE OF PAVEMENT PROPOSED
- CURBING EXISTING
- CURBING PROPOSED
- CURBING PROPOSED DEPRESSED
- WOODLINE EXISTING
- WOODLINE PROPOSED
- HANDICAPPED RAMP PROPOSED
- HANDICAPPED SPACE AND SYMBOL
- PAVEMENT OR SURFACE SYMBOL
- CONCRETE SCORED WALKWAY OR PATIO SURFACE

GRAPHIC SCALE
1"=40'

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

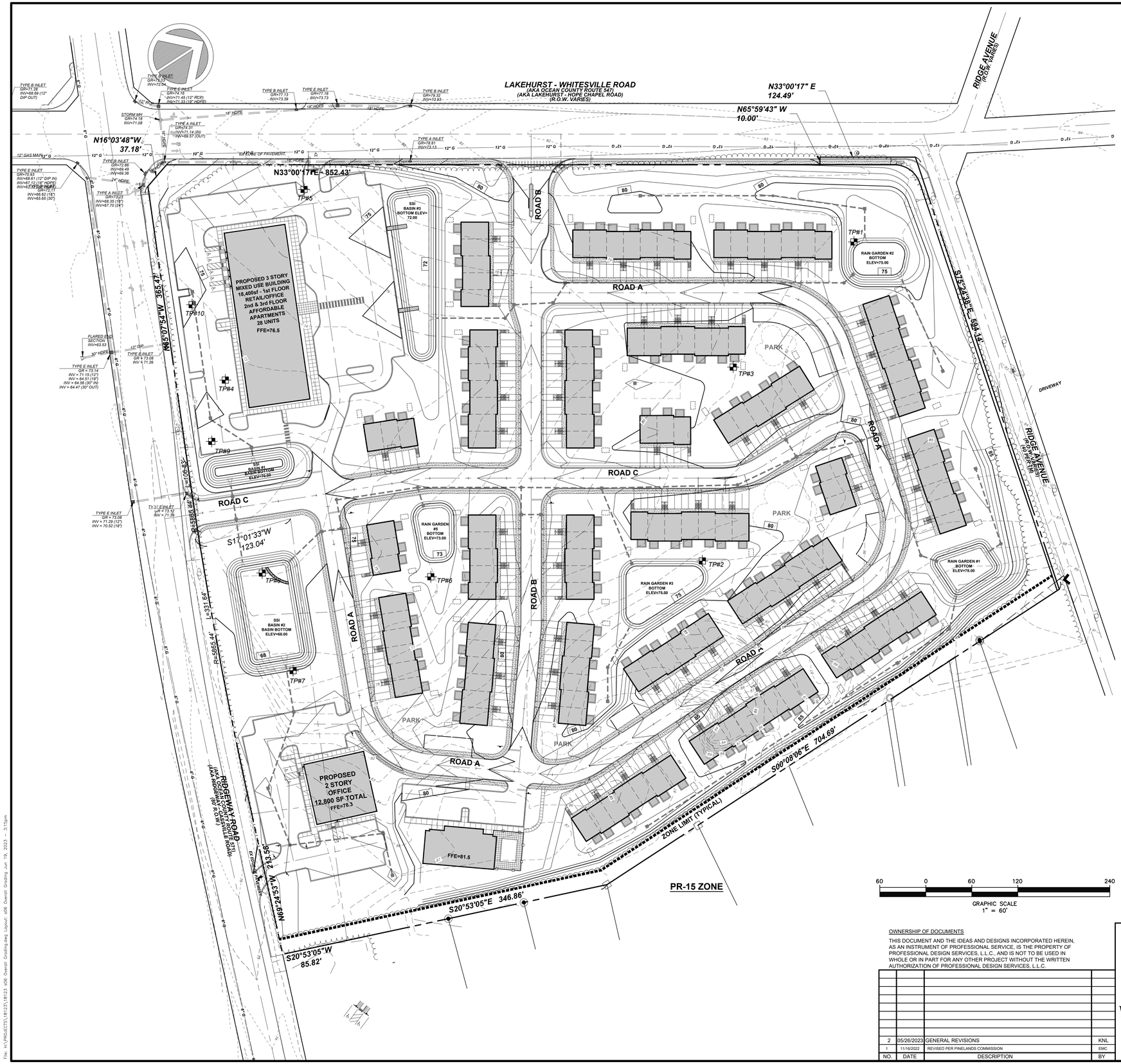
PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

SITE PLAN "B"

FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 60'	APRIL 25, 2022	18123	5 of 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	



TEST PIT LOGS

Test Pits			
TP # 1	Elevation = 81.4	TP - 6	Elevation = 76.1
0 - 4"	10 YR 4/4 Loamy Sand	0 - 4"	10 YR 4/4 Loamy Sand
4-30"	10 YR 6/8 Sandy Loam	4 - 28"	10 YR 6/8 Sandy Loam
30-64"	10 YR 7/6 Loamy Sand	28 - 54"	10 YR 8/4 Loamy Sand
64 - 84"	10 YR 8/2 Loamy Sand	54 - 84"	10 YR 8/1 Loamy Sand
84 - 96"	10 YR 8/6 Sandy Loam	84 - 90"	10 YR 8/6 Sandy Loam
96 - 110"	10 YR 8/6 Sandy Loam 6/8 faint mottles	90 - 99"	10 YR 8/1 Sandy Loam
110 -120"	10 YR 8/2 Sandy Loam 6/8 distinct mottles	99 - 106"	10 YR 8/2 Loamy Sand
		106 - 130"	10 YR 8/8 Sandy Loam 6/8 distinct mottles
	SHWT @ 96 ", Elevation 73.4	130 - 144"	10 YR 7/2 Loamy Sand
	Permeability @ 66 " = 2.5 inches per hour		
			SHWT @ 106 ", Elevation = 67.3
			Water encountered @ 140"
			Permeability 70" @ = 5.5 Inches per hour
TP # 2	Elevation = 83.2	TP - 7	Elevation = 76.3
0 - 3"	10 YR 4/4 Loamy Sand	0 - 6"	10 YR 4/4 Loamy Sand
3 - 34"	10 YR 6/8 Sandy Loam	6 - 28"	10 YR 6/8 Sandy Loam
34 - 56"	10 YR 6/8 Loamy Sand	28 - 64"	10 YR 7/8 Loamy Sand
56 - 73"	10 YR 8/6 Loamy Sand	64 - 88"	10 YR 8/6 Loamy Sand
73 - 85"	10 YR 6/8 Sandy Clay Loam	88 - 112"	10 YR 8/8 Sandy Loam
85 - 96"	7.5 YR 6/6 Sand	112 - 125"	10 YR 8/1 Sand
95 - 120"	5 YR 5/4 Loamy Sand 8/8 faint mottles @112"		
			SHWT @ >125", Elevation = <66.0
	SHWT @ 112", Elevation 73.9		Permeability @ 70" = 11.5 Inches per hour
	Permeability @ 60" = 7.5 Inches per hour		
TP # 3	Elevation = 81.0	TP - 8	Elevation = 74.0
0 - 4"	10 YR 4/4 Loamy Sand	0 - 4"	10 YR 4/4 Loamy Sand
4 - 26"	10 YR 6/8 Sandy Loam	4 - 32"	10 YR 6/8 Sandy Loam
26 - 72"	10 YR 6/8 Loamy Sand	32 - 59"	10 YR 7/8 Loamy Sand
72 - 96"	10 YR 7/8 Loamy Sand	59 - 94"	10 YR 8/1 Loamy Sand
96 - 108"	10 YR 7/8 Loamy Sand	94 - 110"	10 YR 8/8 Sandy Loam
108 - 120"	10 2.5 YR 4/4 Sand 5/8 distinct mottles	110 - 130"	10 YR 8/1 Sand 8/8 distinct mottles
	SHWT @ 108", Elevation = 72.0		SHWT @ 110", Elevation = 64.9
	Permeability @ 55" = 9.0 Inches per hour		Permeability @ 90" = 2.5 Inches per hour
TP # 4	Elevation = 73.5	TP # 9	Elevation = 72.8
0-4"	10 Yr 4/4 Loamy Sand	0 - 4"	10 YR 4/4 Loamy Sand
4 - 27"	10 YR 7/6 Sandy Loam	4 - 32"	10 YR 6/8 Sandy Loam
27 - 48"	10 YR 7/8 Loamy Sand	32 - 64"	10 YR 6/8 Loamy Sand
48 - 56	10 YR 7/8 Loamy Sand	64 - 96"	10 YR 7/8 Loamy Sand
56 - 67"	10 YR 7/8 Loamy Sand	96 - 106"	Gley 8/N Sandy Clay 8/8 distinct mottles
67 - 84"	10 YR 7/6 Loamy Sand	106 - 120"	10 YR 8/4 Loamy Sand
84 - 95"	10 YR 8/3 Loamy Sand 5/8 distinct mottles		
95 - 104"	10 YR 8/1 Loamy Sand 8/8 distinct mottles		SHWT @ 96", Elevation = 64.8
104 - 109"	Gley 8/N Sandy Clay 8/8 distinct mottles		Permeability @ 70" = 6.5 Inches per hour
109 - 112"	10 YR 8/4 Sandy Clay Loam 8/8 distinct mottles		
112 - 132"	10 YR 8/1 Loamy Sand 8/8 distinct mottles		
	SHWT @ 84", Elevation = 66.5		
	Permeability @ 60" = 15.5 Inches per hour		
TP # 5	Elevation = 77.0	TP # 10	Elevation = 73.0
0 - 4"	10 YR 4/4 Loamy Sand	0 - 4"	10 YR 4/4 Loamy Sand
4 - 23"	10 YR 6/8 Sandy Loam	4 - 19"	10 YR 6/8 Sandy Loam
23 - 60"	10 YR 7/6 Loamy Sand	19 - 57"	10 YR 6/8 Loamy Sand
60 - 71"	10 YR 8/4 Loamy Sand	57 - 94"	10 YR 8/8 Loamy Sand
71 - 99"	2.5 Y 8/1 Loamy Sand	94 - 102"	10 YR 8/8 Loam / Silt Loam 5/8 distinct mottles
99 - 109"	10 YR 8/1 Loamy Sand 6/8 distinct mottles	102 - 120"	10 YR 8/1 Sand 8/8 distinct mottles
109 - 130"	10 YR 8/4 Sand 5/8 distinct mottles		
	SHWT @ 99", Elevation = 68.7		SHWT @ 102", Elevation = 64.5
	Permeability @ 64" = 13.0 Inches per hour		Permeability @ 60" = 3.5 Inches per hour
			Test Pits performed by PDS February 5, 2022
			Permeability results per Tube Permeameter Tests

STORMWATER BASN NOTES:

1. THE PROJECT DOES NOT CONTAIN ANY HIGH POLLUTANT LOADING AREAS (HPLA) AND SEGREGATION OR PRETREATMENT OF RUNOFF IS NOT REQUIRED.
2. THE STORMWATER BASIN HAS BEEN DESIGNED TO MAINTAIN A MINIMUM SEPARATION OF AT LEAST TWO (2) FEET FROM THE BASIN BOTTOM TO THE SEASONAL HIGH WATER TABLE.
3. THE SOIL PERMEABILITY BELOW THE BASIN DOES NOT PERMEATE IN EXCESS OF 20 INCHES PER HOUR AND NO BIORETENTION SYSTEM IS REQUIRED.
4. A GROUNDWATER MOUNDING ANALYSIS INDICATES NO ADVERSE IMPACT TO ADJACENT WATERBODIES, WETLANDS, STRUCTURES OR SEPTICS.
5. THE BASIN FOREBAY SHALL SERVE AS A TEMPORARY SEDIMENT BASIN UNTIL THE DRAINAGE AREA HAS BEEN COMPLETELY STABILIZED. WHEN THE DRAINAGE SYSTEM HAS BEEN COMPLETELY STABILIZED, TWO (2) FEET OF THE BOTTOM WITHIN THE FOREBAY MUST BE EXCAVATED AND REPLACED WITH CLEAN SAND HAVING A PERMEABILITY OF 6 TO 20 INCHES PER HOUR.
6. CARE MUST BE TAKEN DURING CONSTRUCTION TO MINIMIZE COMPACTION OF THE BASIN BOTTOM. THE BASIN AREA MUST BE RENOVATED AND TILLED AFTER CONSTRUCTION IS COMPLETED AND THE DRAINAGE AREA IS STABILIZED. NO EARTHWORK MAY BE PERFORMED WHEN SOIL MOISTURE CONTENT IS ABOVE THE LOWER PLASTIC LIMIT.
7. ONCE THE BASIN IS COMPLETED AND THE DRAINAGE AREA IS STABILIZED, FIELD PERMEABILITY TESTS MUST BE PERFORMED AND SUBMITTED TO THE TOWNSHIP ENGINEER TO ASSURE COMPLIANCE WITH THE DESIGN PERMEABILITY.
8. AS-BUILT PLANS MUST BE PERFORMED OF THE COMPLETED BASIN AND SUBMITTED TO THE TOWNSHIP ENGINEER TO ASSURE COMPLIANCE WITH THE DESIGN.
9. THE BASIN MUST BE DEED RESTRICTED TO PERMANENTLY PROTECT IT FROM FUTURE DEVELOPMENT.

NO.	DATE	DESCRIPTION	BY
2	05/26/2023	GENERAL REVISIONS	KNL
1	11/16/2022	REVISED PER PINELANDS COMMISSION	EMC

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

OVERALL GRADING & STORM DRAINAGE PLAN

FOR

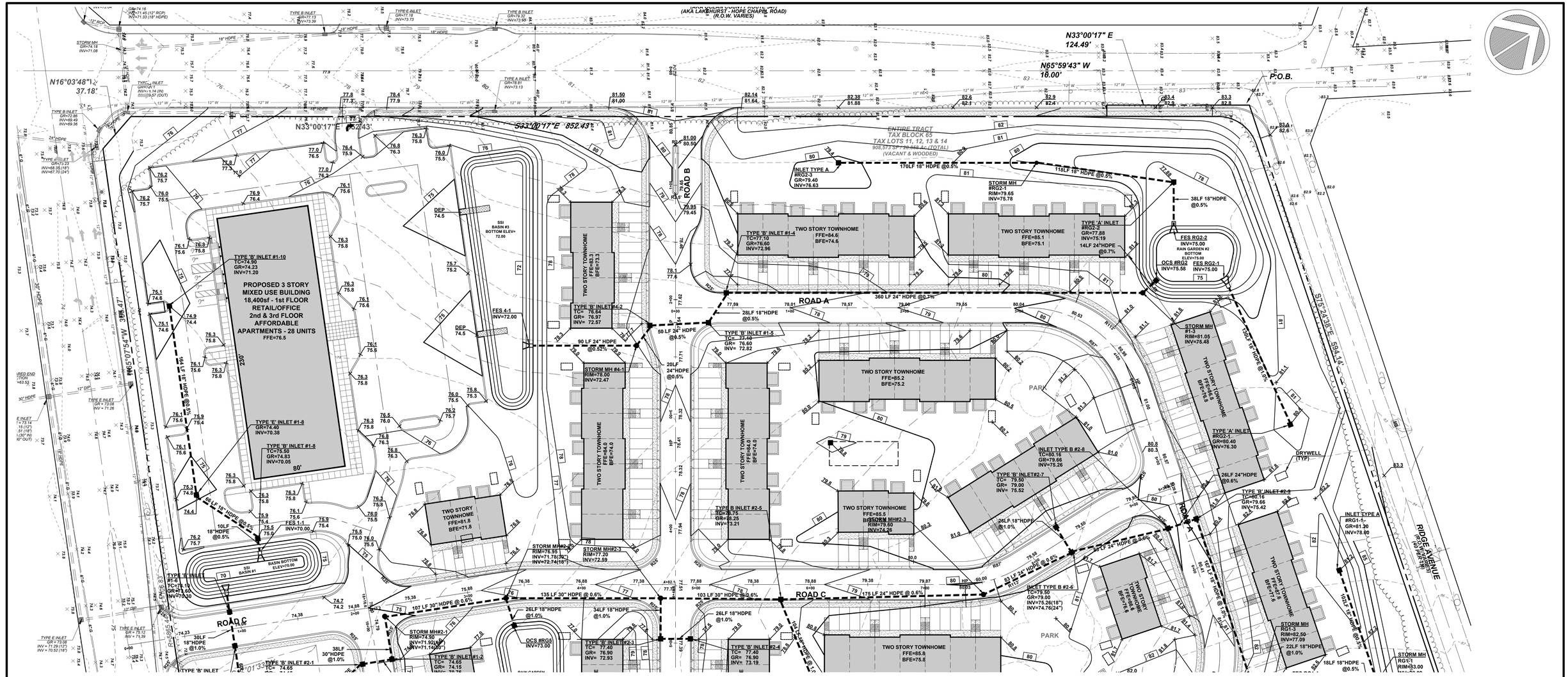
BLOCK 65

LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE: 1" = 60'	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 6 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	



OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C., AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY
2	05/26/2023	GENERAL REVISIONS	KNL
1	11/16/2022	REVISED PER PINELANDS COMMISSION	EMC

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732.363.0160 FAX 732.363.0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

GRADING & STORM DRAINAGE PLAN "A"

FOR

BLOCK 65

LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 40'	APRIL 25, 2022	18123	7
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	21

40 0 40 80 160

GRAPHIC SCALE
1"=40'

OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C., AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL
1	11/16/2022	REVISED PER PINELANDS COMMISSION	EMC

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5394

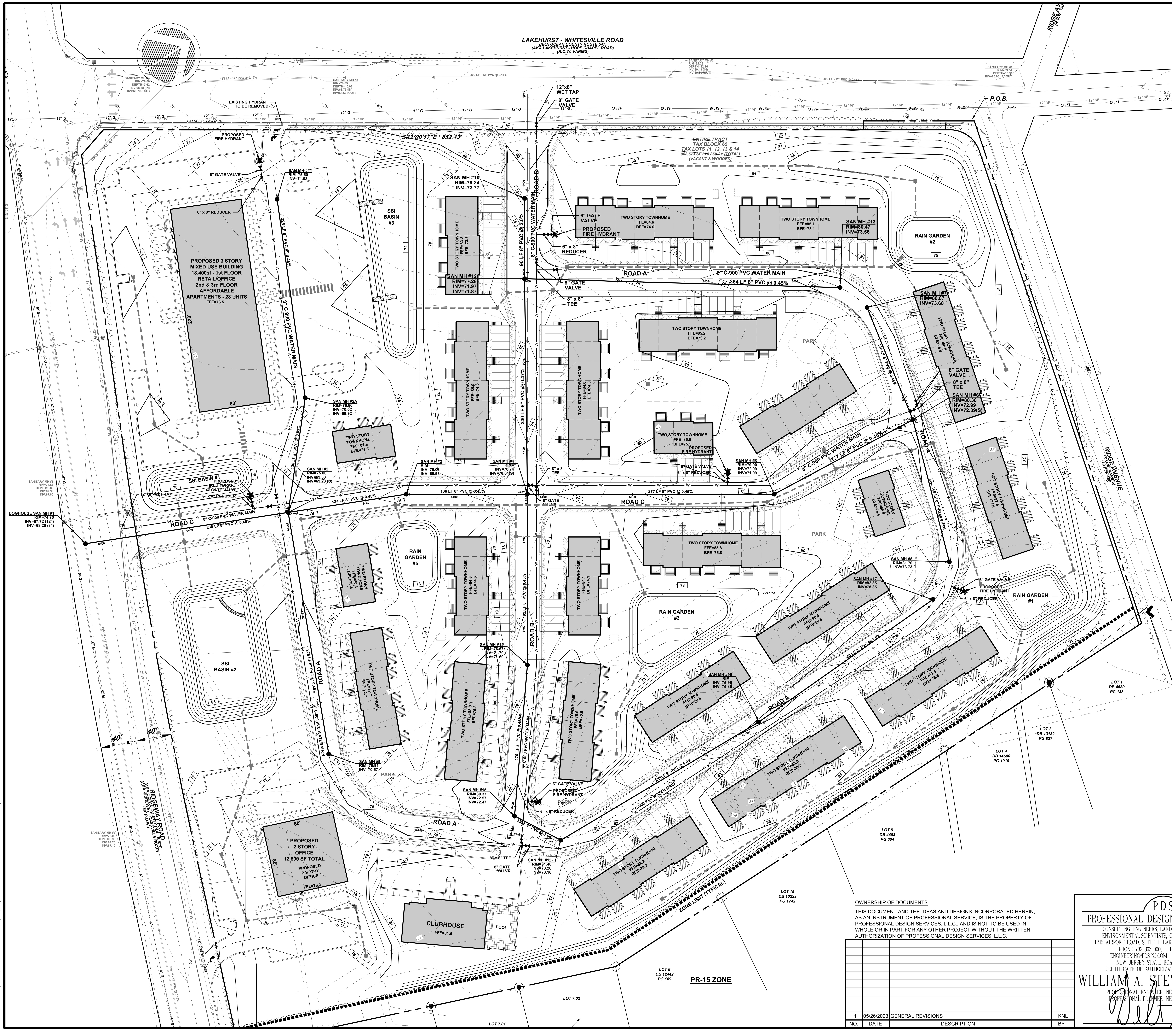
PRELIMINARY & FINAL MAJOR SITE PLAN

GRADING & STORM DRAINAGE PLAN "B"

FOR

BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE: 1" = 40'	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 8 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	



GENERAL UTILITY NOTES:

1. THRUST BLOCKS ARE TO BE PROVIDED AT ALL WATER MAINS, BENDS AND FITTINGS.
2. FIRE HYDRANTS MUST BE SUPPLIED BY A MINIMUM OF 6" WATER LINES.
3. ALL SANITARY LATERALS SHALL BE INSTALLED WITH A MINIMUM SLOPE OF ¼" PER FOOT.
4. AT THE SANITARY LATERAL WYE OR TEE, MATCH THE CROWN OF THE SEWER MAINS AND THE LATERALS.
5. PROVIDE TEN FOOT (10') MINIMUM HORIZONTAL SEPARATION BETWEEN SEWER MAINS AND WATER MAINS. IF SUCH LATERAL SEPARATION IS NOT POSSIBLE, THE PIPES SHALL BE IN SEPARATE TRENCHES WITH THE SEWER AT LEAST 18 INCHES BELOW THE BOTTOM OF THE WATER MAIN. WHERE SEPARATION IS NOT MAINTAINED BETWEEN THE WATER AND SEWER MAINS, INSTALL THE SEWER WITH DUCTILE IRON PIPE WITH WATER TIGHT JOINTS THAT ARE A DISTANCE OF AT LEAST 10 FEET ON EITHER SIDE OF THE WATER MAIN.
6. UTILITY CROSSING REQUIREMENTS:

   A. IF A SEWER MAIN CROSSES LESS THAN 6 INCHES ABOVE THE WATER MAIN, SUPPORT THE SEWER MAIN WITH A CONCRETE CRADLE.

   B. IF A WATER MAIN CROSSES LESS THAN 6 INCHES ABOVE THE SEWER MAIN, SUPPORT THE WATER MAIN WITH A CONCRETE CRADLE.

   C. IF OTHER PIPING OR UTILITIES CROSS LESS THAN 18 INCHES ABOVE THE SEWER, SUPPORT THE TOP PIPING OR UTILITIES WITH CONCRETE CRADLES.

   D. IF OTHER PIPING OR UTILITIES CROSS LESS THAN 6 INCHES AVOVE THE WATER, SUPPORT THE TOP PIPING OR UTILITIES WITH CONCRETE CRADLES.

   E. IF A WATER OR SEWER MAIN CROSSES LESS THAN 6 INCHESS AVOVE OTHER PIPING OR UTILITIES, SUPPORT THE WATER OR SEWER MAIN WITH A CONCRETE CRADLE.
7. PROVIDE 3'-0" MINIMUM COVER OVER PVC SEWER MAINS
   PROVIDE 3'-0" MINIMUM COVER OVER SEWER LATERALS.
8. ALL SANITARY SEWER SHALL BE P.V.C. CONFORMING TO ASTM D-3034; SDR-35 WITH PUSH ON JOINTS, UNLESS OTHERWISE NOTED.
9. ALL WATER MAINS SHALL BE CLASS 52, CEMENT LINED DUCTILE IRON PIPE, RATED AT 150 PSI MINIMUM. PIPE JOINTS SHALL BE OF PUSH-ON TYPE OR MECHANICAL JOINT TYPE.
10. PROVIDE 4'-0" MINIMUM COVER OVER WATER MAINS. COVER MAY BE LESSENED TO 3'-9" WITH APPROVAL E OF M.T.D.O.U. TO CROSS OVER OTHER UTILITIES. WATER MAINS TO CROSS OVER STORM DRAINAGE PIPES EXCEPT WHERE INDICATED IN THE PROFILES TO CROSS UNDER, OR APPROVED BY M.T.D.O.U. WHERE THE WATER MAIN MUST CROSS UNDER THE STORM DRAINAGE, A MINIMUM CLEARANCE OF 6" MUST BE MAINTAINED.
11. ALL WATER SERVICES AND PLUMBING SHALL CONFORM WITH THE PLUMBING SUBCODE NJAC 5:23-3.15.
12. ALL WATER VALVES SHALL BE RESILIENT WEDGE TYPE IN ACCORDANCE WITH THE AMERICAN WATER WORKS ASSOCIATION STANDARD SPECIFICATION C-509.
13. VALVES SHALL BE PLACED ON WATER DISTRIBUTION MAINS NOT MORE THAN 1,000 FEET APART.
14. ALL DEAD END WATER MAINS SHALL BE TERMINATED WITH A FIRE HYDRANT.
15. WATER MAIN FITTINGS TO BE USED WHEREVER JOINT DEFLECTION EXCEEDS MANUFACTURERS SPECIFICATIONS.
16. CONNECTIONS TO EXISTING WATER MAINS AND THE ADDITION OF VALVES TO EXISTING WATER MAINS SHALL BE MADE WITHOUT THE LOSS OF WATER SERVICE TO MANCHESTER TOWNSHIP WATER UTILITY (MTWA) CUSTOMERS. WHERE A SECTION OF EXISTING WATER MAIN CANNOT BE ISOLATED WITHOUT DISRUPTING WATER SERVICE TO MTWA CUSTOMERS, CONNECTIONS TO THE EXISTING WATER MAINS WILL BE MADE BY WET TAPPING THE ACTIVE MAINS AND VALVES ADDED TO THE EXISTING MAINS WILL BE ADDED BY INSERTION INTO THE ACTIVE MAINS.
17. WATER MAINS SHALL BE CONSTRUCTED 5 FEET FROM CURBS. 4 FOOT OFFSETS WILL BE PERMITTED WHERE CURBS BEND AT ROADWAYS.
18. THE PROPOSED GAS MAINS SHALL BE LOCATED ON THE OPPOSITE SIDE OF THE ROADWAY FROM THE WATER MAINS. THE GAS MAINS SHOULD BE PARALLEL TO AND WITHIN 4 FEET OF THE CURBS TO PROVIDE ADEQUATE CLEARANCE FOR FUTURE EXCAVATIONS TO THE SANITARY SEWER MAINS, WHICH GENERALLY FOLLOW THE CENTERLINES OF THE ROADS.
19. THE PUBLIC WATER SUPPLY SHALL NOT BE UTILIZED FOR LAWN AND LANDSCAPE IRRIGATION. ALL LAWN AND LANDSCAPE IRRIGATION MUST BE SUPPLIED BY EACH PROPERTY OWNER'S PRIVATE WELL.

GRAPHIC SCALE
1" = 50'

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

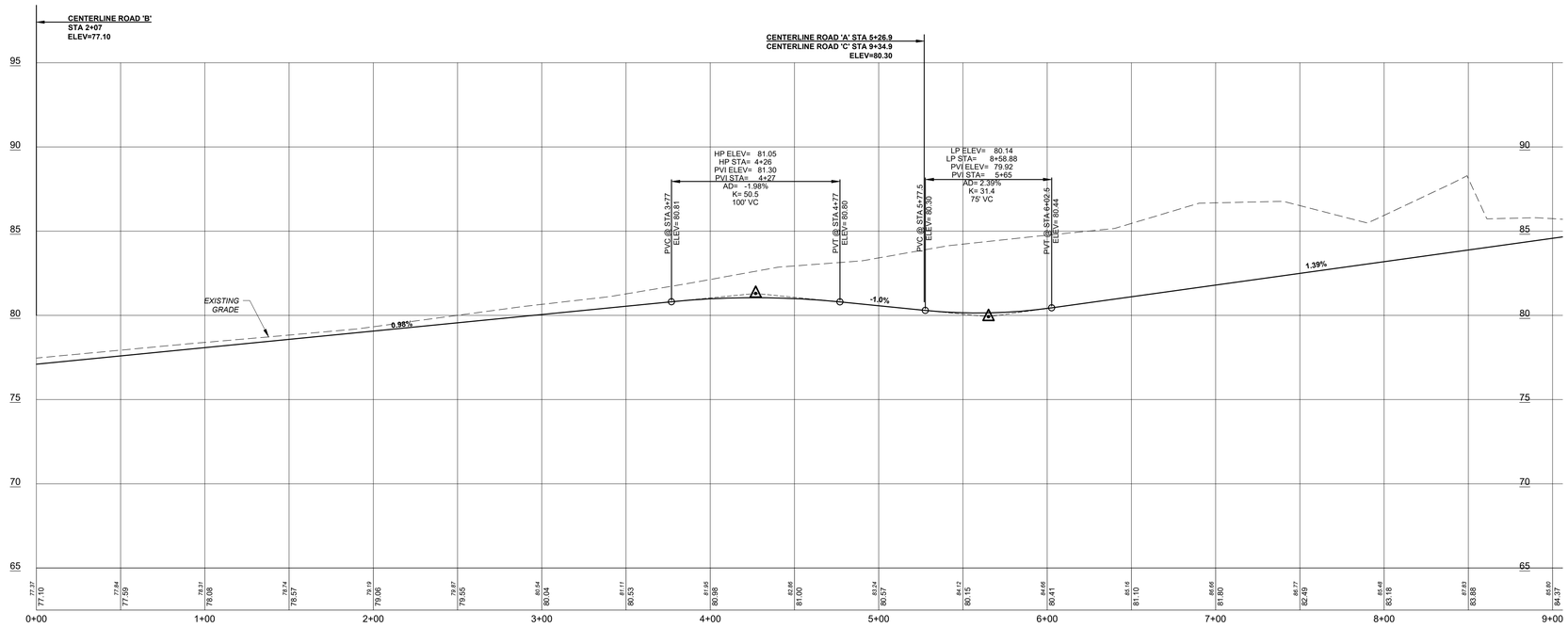
PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5394

PRELIMINARY & FINAL MAJOR SITE PLAN

OVERALL UTILITY PLAN

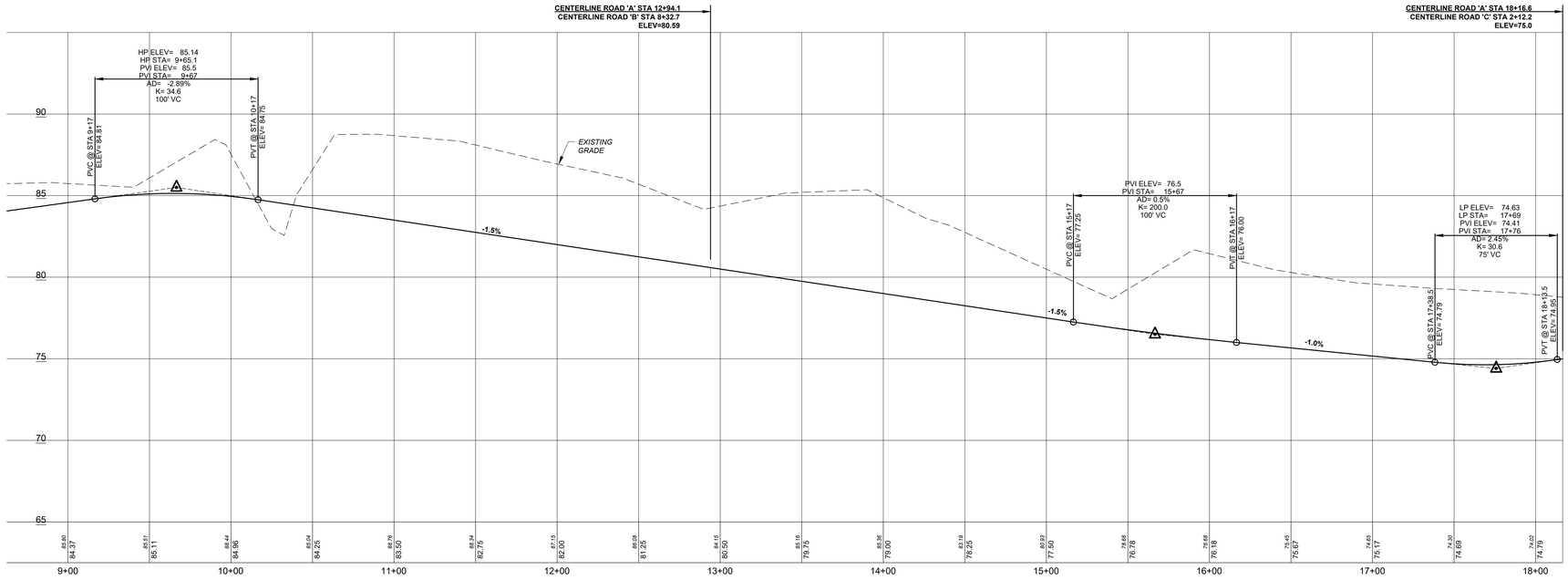
FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE: 1" = 50'	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 9 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	



ROAD 'A'

SCALE H: 1" = 40'
V: 1" = 4'



ROAD 'A'

SCALE H: 1" = 40'
V: 1" = 4'

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

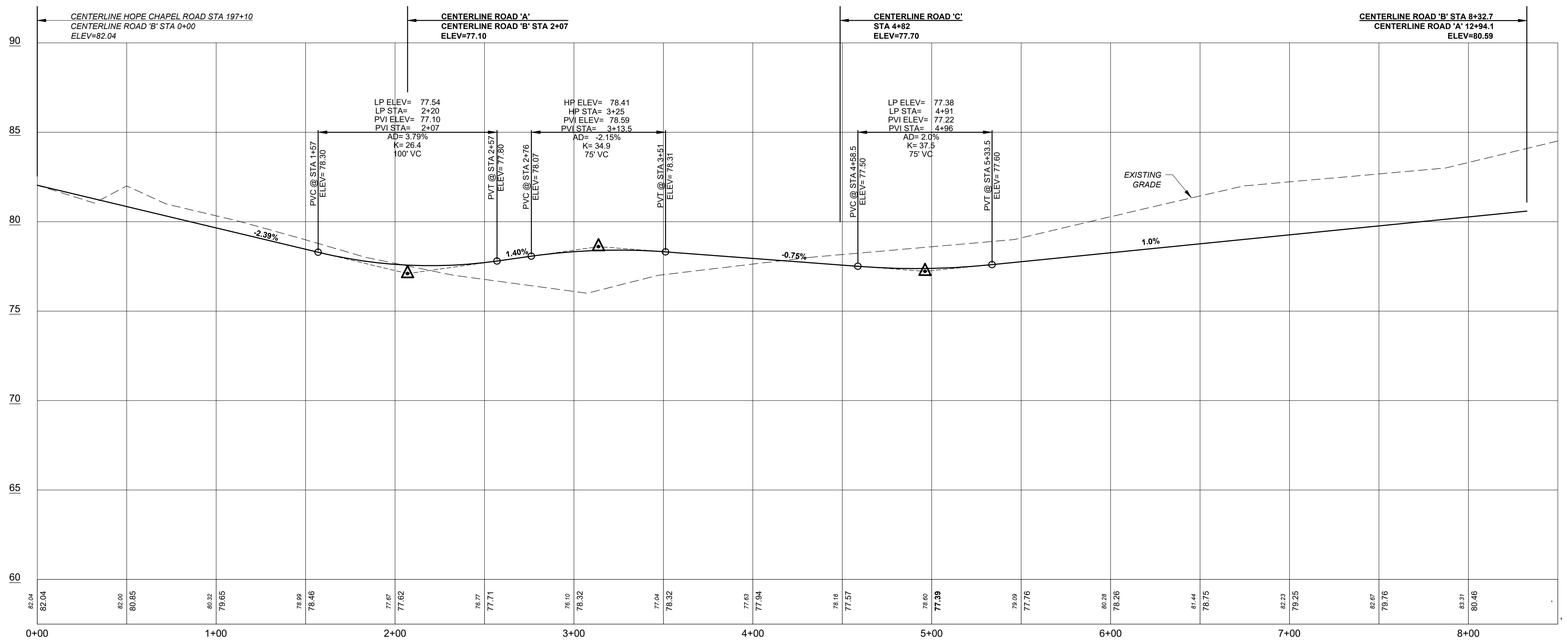
PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

ROAD PROFILES

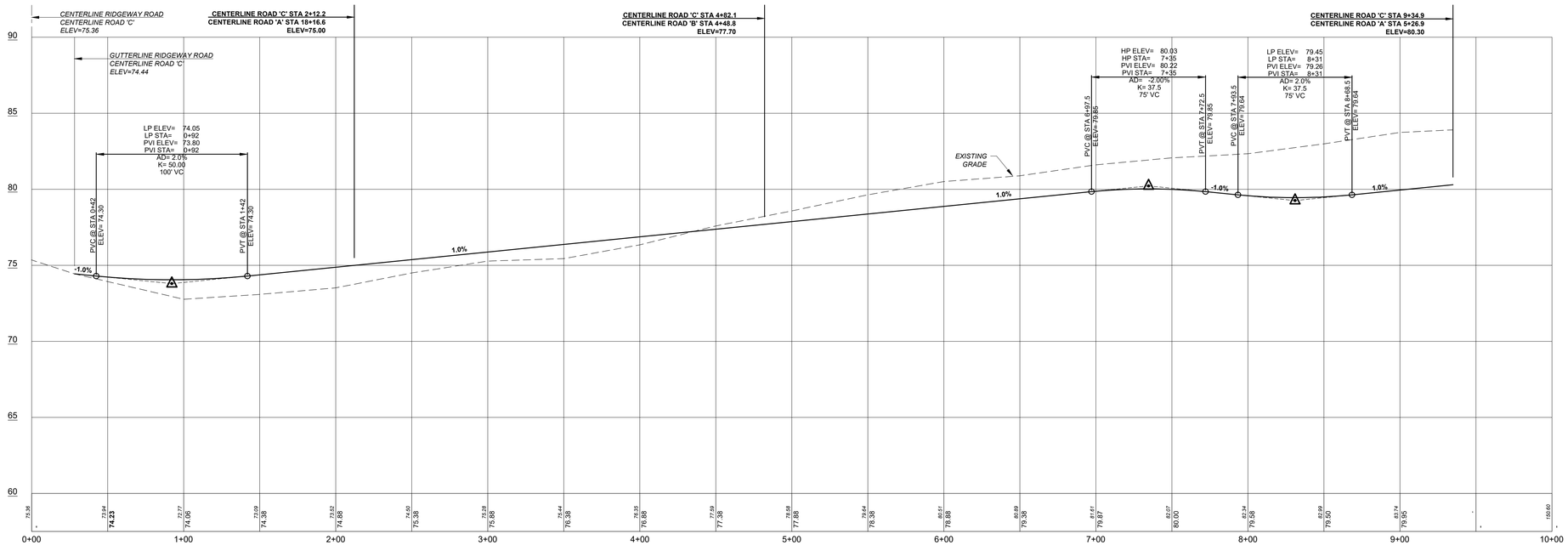
FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
AS SHOWN	APRIL 25, 2022	18123	10 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	



ROAD 'B'

SCALE H: 1" = 40'
V: 1" = 4'



ROAD 'C'

SCALE H: 1" = 40'
V: 1" = 4'

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732.363.0160 FAX 732.363.0023
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

ROAD PROFILES

FOR

BLOCK 65

LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
AS SHOWN	APRIL 25, 2022	18123	11 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

File: W:\PROJECTS\18123\18123_sht3 Road Profiles.dwg Layout: a11 Road Profile B C Jun 01, 2023 - 2:43pm

RAIN GARDEN BASIN NOTES:

1. RAIN GARDEN BASIN BOTTOM TO BE 6" K-5 SAND.
2. RAIN GARDEN BASIN SLOPE TO BE SEEDED WITH "RAIN GARDEN MIX" SEED AS MANUFACTURED BY PINELANDS NURSERY & SUPPLY, COLUMBUS, NJ OR APPROVED EQUAL. COVERAGE RATE: 11 LBS / ACRE.

GRAPHIC SCALE
1"=40'

LANDSCAPE SCHEDULE:

KEY	QTY	BOTANICAL NAME	COMMON NAME	INSTALLED HEIGHT	CALIPER	ROOT	COMMENTS	
Shade Trees								
AR	38	*Acer rubrum 'October Glory'*	October Glory Red Maple		3"-3 1/2"	B&B	Limbed up to 7 feet	
LS	25	*Liquidambar styraciflua*	Sweet Gum		2 1/2-3"	B&B	Limber up to 7 feet, Fall Dig Hazard - Spring Planting Only	
BN	22	*Betula nigra*	River Birch		2 1/2"-3"	B&B	Fall Dig Hazard-Spring Planting Only	
NS	10	*Nyssa sylvatica*	Black Gum		2 1/2"-3"	B&B	Fall Dig Hazard-Spring Planting Only	
QP	3	*Quercus phellas*	Willow Oak		2 1/2"-3"	B&B	Limber up to 7 feet, Fall Dig Hazard - Spring Planting Only	
QA	33	*Quercus alba*	White Oak		2 1/2"-3"	B&B	Fall Dig Hazard-Spring Planting Only	
QC	20	*Quercus coccinea*	Scarlet Oak		2 1/2"-3"	B&B	Fall Dig Hazard-Spring Planting Only	
Ornamental Trees								
AC	15	*Amelanchier canadensis*	Shadblow Sericeberry	6' - 8'		B&B		
CF	18	*Cornus florida*	Eastern Red Bud Flowering Dogwood	6' - 8'		B&B		
MV	4	*Magnolia Virginiana*	Sweetbay Magnolia		6'-8'	B&B		
Evergreen Trees								
IO	74	*Ilex opaca*	American Holly	5' - 6'		B&B	Use 4 "Jersey Knight" as Pollinator	
JV	21	*Juniperus virginiana*	Eastern Red Cedar	5' - 6'				
PE	24	*Pinus echinata*	Shortleaf Pine	6' - 8'				
Shrubs								
CA	96	*Clethra alnifolia*	Ruby Spice Summersweet	24" - 30"		#5 CONT		
CNJ	80	*Ceanothus americanus*	New Jersey Tea	24" - 30"		#5 CONT		
IG	115	*Ilex glabra*	Inkberry Holly	24" - 30"		#5 CONT		
IT	93	*Itea virginana*	Virginia Sweetspire	24" - 30"		#5 CONT		
IV	22	*Ilex verticillata*	Winterberry Holly	30" - 36"		#5 CONT	Plant 4 "Jim Dandy" as pollinator	
VT	12	*Virburnum trilobum*	Cranberry Viburnum	30" - 36"		#5 CONT		

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400

WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5394

PRELIMINARY & FINAL MAJOR SITE PLAN

LANDSCAPE PLAN "A"

FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 40'	APRIL 25, 2022	18123	12 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

File: H:\PROJECTS\18123\18123 s11 Landscaping.dwg Layout: s11 Landscape A Jun 01, 2023 - 2:44pm

LANDSCAPE LEGEND

- SHADE TREE
- ORNAMENTAL TREE
- EVERGREEN
- SHRUB
- BAMBOO SCREEN
- EXISTING TREE
- EXISTING TREE TO REMAIN
- EXISTING TREE TO BE REMOVED
- TREE CLEARING LIMIT
- TREE PROTECTION FENCE
- PLANT KEY
- PLANT QUANTITY

GRAPHIC SCALE
40 0 40 80 160
1"=40'

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

LANDSCAPE PLAN "B"

FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 60'	APRIL 25, 2022	18123	13 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

LANDSCAPE NOTES

1. GENERAL NOTES

A. THIS PLAN SHALL BE UTILIZED FOR LANDSCAPE AND TREE SAVE USES ONLY. PLEASE REFER TO SITE PLANS FOR CONSTRUCTION OF SITE IMPROVEMENTS.

B. ALL TREES ARE DRAWN TO THEIR ANTICIPATED MATURE DRIPLINE.

C. CONTRACTOR SHALL EXAMINE DRAWINGS AND REQUEST A MARKOUT OF FIELD CONDITIONS FOR SPECIFIC LOCATIONS OF UTILITIES, STRUCTURES, ETC. NOTIFY THE ENGINEER IN WRITING IMMEDIATELY, IN REFERENCE TO DISCREPANCIES OR LOCATION CONFLICTS.

D. IN THE EVENT THAT PLANT QUANTITY DISCREPANCIES OR MATERIAL OMISSIONS OCCUR IN THE PLANTING SCHEDULE, THE PLAN SHALL SUPERSEDE.

E. ALL PLANTING MATERIAL AND METHODS SHALL MEET OR EXCEED THE REQUIREMENTS OF THE MUNICIPAL ORDINANCES OF THE TOWNSHIP OF MANCHESTER AND ANSI Z-60.1 (CURRENT VERSION), "THE AMERICAN STANDARD FOR NURSERY STOCK," PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN. IN THE EVENT OF CONFLICT BETWEEN A.A.N. AND MUNICIPAL STANDARDS, THE MUNICIPAL REQUIREMENTS SHALL SUPERCEDE.

F. ALL LANDSCAPING SHALL BE PLANTED SO AS TO NOT INTERFERE WITH UTILITY LINES, SIGHT TRIANGLES, UNDERGROUND UTILITIES, PUBLIC WALKWAYS OR OTHER EXISTING OR PROPOSED STRUCTURES. ALL PLANT MATERIAL PROPOSED WITHIN THE REQUIRED SIGHT DISTANCES OR SIGHT TRIANGLES ARE SELECTED SO AS TO NOT EXCEED A MATURE HEIGHT GREATER THAN 30" ABOVE THE ELEVATION OF THE ADJACENT ROADWAY. STREET TREES AND SHADE TREES PLANTED NEAR PEDESTRIAN OR VEHICULAR ACCESSES, OR WITHIN REQUIRED SIGHT DISTANCES / SIGHT TRIANGLE EASEMENTS SHALL NOT BE BRANCHED ANY LOWER THAN 7'-0" ABOVE GRADE, AND MUST BE APPROPRIATELY PRUNED. NO WOODY PLANTS, EXCEPT GROUND COVERS, ARE TO HAVE THEIR CENTERS CLOSER THAN 36" TO THE BACK OF THE CURB. NO STREET TREES ARE TO BE PLANTED IN SIGHT TRIANGLES IN ACCORDANCE WITH MANCHESTER TOWNSHIP ORDINANCE.

2. PLANTING

A. SOIL MUST BE FROST-FREE, FRIABLE AND NOT MUDDY AT THE TIME OF PLANTING.

B. BACKFILL MATERIAL FOR PLANTING PITS SHALL BE COMPOSED OF 70% TOPSOIL, 20% FULLY COMPOSTED COW OR HORSE MANURE AND 10% PEAT MOSS. TOPSOIL SHALL MEET NJDOT 2007 STANDARD SPECIFICATIONS SECTION 917.01, AND MAY BE FROM ON-SITE OR IMPORTED SOURCES. SOIL SHALL CONTAIN NO ACIDIC MARL, NOR ANY LARGE STONES.

C. PLANTS SHALL BE SET TO ULTIMATE FINISHED GRADE SO THAT THEY WILL BE LEFT IN THE RELATIONSHIP TO THE SURROUNDING GROUND AS THEY HAD, PRIOR TO BEING DUG. IF EVIDENCE OF SATURATED SOILS IS ENCOUNTERED DURING EXCAVATION OF THE PLANTING PITS, UPON DIRECTION BY THE ENGINEER, PLANTS SHALL BE SET SO THAT THEIR ROOT CROWNS ARE APPROXIMATELY THREE INCHES ABOVE THE FINAL GRADE, WITH TOPSOIL AND MULCH GENTLY MOUNDED TO AVOID EXCESSIVE DRYING AT THE SURFACE. UNDER NO CIRCUMSTANCES SHALL PLANTINGS AT RELATIVELY DRY LOCATIONS BE PERFORMED IN A MOUNDED MANNER.

D. THE CORD BINDING THE BALL OF ALL BALLED AND BURLAPPED (B&B) PLANTS SHALL BE CUT AND REMOVED, AND BURLAP ON THE UPPER ⅓ OF THE ROOT BALL SHALL BE REMOVED. PLANTS WITH SYNTHETIC NON-DEGRADEABLE ROOT BALL WRAPS SHALL NOT BE ACCEPTABLE.

E. ALL WIRE BASKETS MUST BE REMOVED PRIOR TO PLANTING.

F. ALL PROPOSED TREES SHALL BE SET IN BEDS MULCHED TO THE LIMIT OF THEIR PLANTING PITS. EXCEPT AS NOTED ALL OTHER TYPES OF PLANTINGS SHALL BE SET IN CONTINUOUS, MASSED PLANTING BEDS, RATHER THAN ISOLATED INDIVIDUALS. ALL TREE AND SHRUB BEDS SHALL RECEIVE A 3" THICK APPLICATION OF A THOROUGHLY COMPOSTED ORGANIC MULCH FREE FROM ANY OBJECTIONABLE OR FOREIGN MATERIALS.

G. THE MULCH AT THE OUTER PERIMETER OF PLANTING PITS AND BEDS SHALL BE PREPARED SO THAT A 2" HIGH RIM TO RETAIN MOISTURE IS CONSTRUCTED. THE THICKNESS OF THE MULCH SHALL BE FEATHERED WITHIN 3" OF STEMS OR TRUNK , SO THAT NO MULCH IS IN DIRECT PHYSICAL CONTACT WITH THE PLANTS' BRANCHING OR TRUNKS. PLANTING OF GROUNDCOVERS MAY BE SUBSTITUTED FOR MULCH IN PARKING LOT ISLANDS.

H. TREES SHALL NOT BE GUYED, EXCEPT IF AND WHERE REQUIRED BY THE MUNICIPALITY; WHEREIN TREES GREATER THAN FIVE FEET IN HEIGHT MAY BE STAKED AND GUYED PER THE DETAILS.

3. PLANT MATERIAL

A. NO PLANT SUBSTITUTION SHALL BE ALLOWED WITH REGARD TO SIZE, SPECIES, NAMED VARIETY OR CULTIVAR, WITHOUT PRIOR PERMISSION FROM THE TOWNSHIP TREE SPECIALIST. ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE TOWNSHIP TREE SPECIALIST FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.

B. ALL PLANTS SHALL BE DUG, PACKED, TRANSPORTED AND HANDLED WITH THE UTMOST CARE TO ENSURE ADEQUATE PROTECTION FROM INJURY DESICCATION.

C. ALL PLANTS SHALL BE FREE FROM DISEASE AND INFESTATION, AND ALL LEGALLY REQUIRED AGRICULTURAL CERTIFICATIONS.

D. ALL PLANTS SHALL BE PRUNED TO ENHANCE VIGOR PRIOR TO, OR UPON INSTALLATION, WHILE RETAINING NATURAL GROWTH HABIT OF THE PLANTS. THE CENTRAL LEADER SHALL NOT BE CUT; PLANTS PROVIDED IN THIS CONDITION SHALL NOT BE ACCEPTED. DAMAGED, BROKEN OR CONFLICTING BRANCHES SHALL BE PRUNED CLEANLY, FLUSH WITH THE MAIN TRUNK OR BRANCH.

E. ALL PLANTS SHALL BE NURSERY-GROWN AND TAGGED WITH A DURABLE LABEL INDICATING THE GENUS, SPECIES, SPECIFIED VARIETY OR CULTIVAR, PLANT PATENT NUMBER (IF A PATENTED TREE), AS WELL AS CULTURAL REQUIREMENTS, INCLUDING WATERING AND FERTILIZATION.

4. MAINTENANCE

A. ALL PLANTING SHALL BE WATERED AS NECESSARY FOR SOUND HORTICULTURAL PRACTICE DURING THE FIRST GROWING SEASON, TO ENSURE THEIR PROPER ESTABLISHMENT.
ALL TREES IN A SCREENING AREA SHALL BE WATERED WEEKLY THROUGH THE FIRST GROWING SEASON.

B. IN GENERAL, SHRUBS ARE TO BE PLANTED AT INTERVALS WHICH WILL ALLOW THEM TO FULLY DEVELOP INTO CONTINUOUS MASSES OF THE INDIVIDUAL SPECIES. SHEARING OR SHAPING IS ONLY REQUIRED OR DESIRABLE WHERE DEAD OR CONFLICTING BRANCHING DEVELOPS.

C. STAKING SHALL BE ATTACHED TO THE TREE WITH TWELVE GAUGE GALVANIZED WIRE COVERED WITH RUBBER OR PLASTIC HOSE, OR TREE TIES ESPECIALLY MANUFACTURED FOR THIS PURPOSE. THE LOOP IN CONTACT WITH THE TREE SHALL BE LOOSE ENOUGH TO PERMIT GROWTH AND PREVENT GIRDLING FOR TWO YEARS, BUT SHALL BE TIGHTLY BOUND TO THE STAKE TO PREVENT SLIPPING.

D. EACH TREE SHALL BE WRAPPED WITH AN EXPANDABLE PAPER OR CLOTH TREATED TO LAST ONE YEAR. THIS WRAP SHALL EXTEND FROM THE GROUND LEVEL UP THE TRUNK TO THE FIRST BRANCHES. THIS WRAP SHOULD BE ATTACHED OR FASTENED AT EACH END WITH A MATERIAL THAT WILL PERMIT TREE GROWTH.

E. A PERMANENT IRRIGATION SYSTEM SHALL BE INSTALLED TO ENSURE PROPER ESTABLISHMENT AND MAINTENANCE OF ALL PLANTINGS. THE APPLICANT SHOULD ADDRESS THE BOARD REGARDING THEIR PLANS TO INSTALL A PRIVATE WELL TO PROVIDE IRRIGATION WATER TO THE SITE.

F. A PRIVATE WELL SHALL BE PROVIDED TO SUPPLY IRRIGATION WATER TO THE SITE.

5. MISCELLANEOUS

D. NO TOPSOIL SHALL BE REMOVED FROM THE SITE OR USED AS SPOIL. TOPSOIL MOVED DURING THE COURSE OF CONSTRUCTION SHALL BE REDISTRIBUTED SO AS TO PROVIDE AT LEAST FOUR (4) INCHES OF SPREAD COVER TO ALL SEEDING AND PLANTING AREAS OF THE SITE AND SHALL BE STABILIZED BY SEEDING OR PLANTING. IN THE EVENT THAT THE QUANTITY OF TOPSOIL AT THE SITE IS INSUFFICIENT TO PROVIDE FOUR (4) INCHES OF COVER FOR ALL SEEDING AND PLANTING AREAS, THE DEVELOPER SHALL PROVIDE SUCH A COVER. TOPSOIL SHALL BE APPROVED BY THE TOWNSHIP ENGINEER.

E. TOPSOIL SHALL BE PROVIDED ON ALL LAWN AND PLANTING AREAS. TOPSOIL SHALL EITHER BE EXISTING MATERIAL THAT HAS BEEN STRIPPED AND STOCKPILED FOR REUSE OR NEWLY FURNISHED MATERIAL.

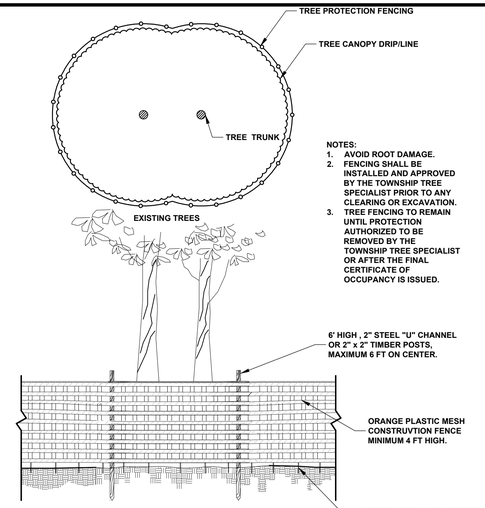
F. STREET AND PARKING LOT TREES SHALL HAVE NO BRANCHES LOWER THAN 7' ABOVE GRADE.

G. ALL DEAD OR SEVERELY DECLINING PLANTS SHALL BE REPLANTED WITHIN THE NEXT GROWING SEASON DURING PERFORMANCE AND MAINTENANCE BOND PERIODS.

H. THE TREE PROTECTION FENCING SHALL BE INSTALLED AND APPROVED BY THE TOWNSHIP TREE SPECIALIST PRIOR TO ANY CLEARING OR EXCAVATION. TREE FENCING TO REMAIN UNTIL PROTECTION AUTHORIZED TO BE REMOVED BY THE TOWNSHIP TREE SPECIALIST OR AFTER THE FINAL CERTIFICATE OF OCCUPANCY IS ISSUED.

TREE REMOVAL AND LANDSCAPE NOTES

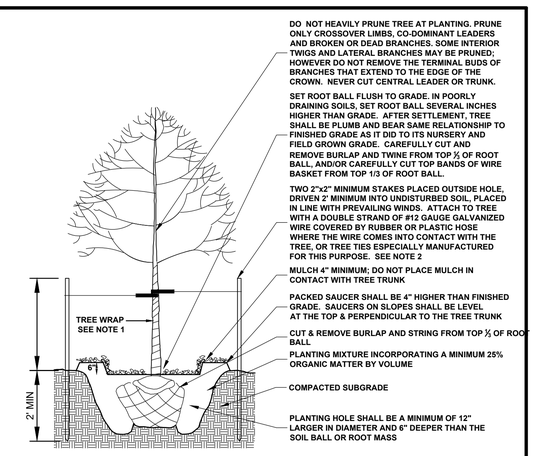
1. THE CONTRACTOR MUST PROVIDE WRITTEN NOTICE TO THE MANCHESTER TOWNSHIP FORESTER A MINIMUM OF 48 HOURS PRIOR TO COMMENCEMENT OF TREE REMOVAL OPERATIONS.
2. THE CONTRACTOR MUST COMPLY WITH ALL PROVISIONS OF MANCHESTER TOWNSHIP ORDINANCE
3. THE EXISTING TREES MUST BE PROTECTED BY INSTALLATION OF A 4 FOOT ORANGE CONSTRUCTION FENCING. THE FENCING MUST BE PLACED AT THE LIMIT OF CLEARING PRIOR TO COMMENCEMENT OF TREE REMOVAL OPERATIONS.
4. THE TREE PROTECTION FENCING SHALL BE INSTALLED AND APPROVED BY THE TOWNSHIP TREE SPECIALIST PRIOR TO ANY CLEARING OR EXCAVATION. TREE FENCING TO REMAIN UNTIL PROTECTION AUTHORIZED TO BE REMOVED BY THE TOWNSHIP TREE SPECIALIST OR AFTER THE FINAL CERTIFICATE OF OCCUPANCY IS ISSUED.
5. THE RETAINED TREES MUST BE IDENTIFIED BY FLAGGING EACH WITH RIBBON. THE CONTRACTOR MUST CONTACT THE MANCHESTER TOWNSHIP FORESTER TO SCHEDULE AN INSPECTION.
6. ALL REMAINING TREES ARE TO BE PRUNED AS NECESSARY IN ACCORDANCE WITH INDUSTRY STANDARDS BY A NJ CERTIFIED TREE EXPERT.
7. THE CONTRACTOR MUST COMPLY WITH ALL PROVISIONS OF MANCHESTER TOWNSHIP TREE REMOVAL ORDINANCE CHAPTER 403.
8. THE MANCHESTER TOWNSHIP FORESTER SHALL REQUIRE DEAD, BROKEN BRANCH AND SELECT RISK TREE REMOVAL ON REMAINING SPECIMEN TREES BEFORE PERFORMANCE BOND RELEASE.
9. THERE ARE NO SPECIMEN TREES LOCATED ON THIS SITE.
10. ALL TREE STUMPS AND OTHER TREE PARTS OR OTHER DEBRIS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN ACCORDANCE WITH THE LAND. NO TREE STUMPS, PORTIONS OF A TREE TRUNK OR LIMBS SHALL BE BURIED ANYWHERE IN THE DEVELOPMENT.



NOTES:
1. AVOID ROOT DAMAGE.
2. FENCING SHALL BE INSTALLED AND APPROVED BY THE TOWNSHIP TREE SPECIALIST PRIOR TO ANY CLEARING OR EXCAVATION.
3. TREE FENCING TO REMAIN UNTIL PROTECTION AUTHORIZED TO BE REMOVED BY THE TOWNSHIP TREE SPECIALIST OR AFTER THE FINAL CERTIFICATE OF OCCUPANCY IS ISSUED.

TREE PROTECTION FENCING

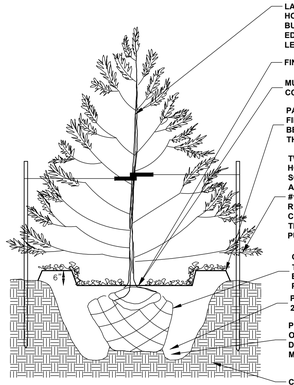
NOT TO SCALE



NOTE:
1. EACH TREE SHALL BE WRAPPED WITH AN EXPANDABLE PAPER OR CLOTH TREATED TO LAST ONE YEAR. THE WRAP SHALL EXTEND FROM THE GROUND LEVEL UP THE TRUNK TO THE FIRST BRANCHES. THE WRAP SHALL BE ATTACHED OR FASTENED AT EACH END WITH A MATERIAL THAT WILL PERMIT TREE GROWTH.
2. THE LOOP IN CONTACT WITH THE TREE SHALL BE LOOSE ENOUGH TO PERMIT GROWTH AND PREVENT GIRDLING FOR TWO YEARS, BUT SHALL BE TIGHTLY BOUND TO THE STAKE TO PREVENT SLIPPING.

TREE PLANTING

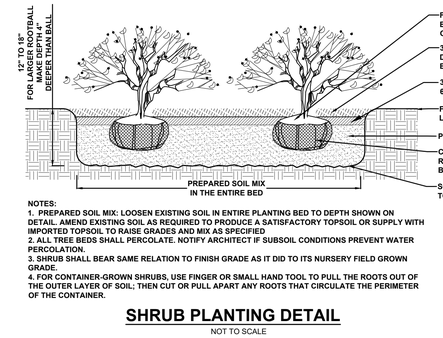
NOT TO SCALE



NOTE:
1. THE LOOP IN CONTACT WITH THE TREE SHALL BE LOOSE ENOUGH TO PERMIT GROWTH AND PREVENT GIRDLING FOR TWO YEARS, BUT SHALL BE TIGHTLY BOUND TO THE STAKE TO PREVENT SLIPPING.

EVERGREEN TREE PLANTING

NO SCALE



NOTES:
1. PREPARED SOIL MIX: LOOSEN EXISTING SOIL IN ENTIRE PLANTING BED TO DEPTH SHOWN ON DETAIL. AMEND EXISTING SOIL AS REQUIRED TO PRODUCE A SATISFACTORY TOPSOIL OR SUPPLY WITH IMPORTED TOPSOIL TO RAISE GRADES AND MIX AS SPECIFIED
2. ALL TREE BEDS SHALL PERCOLATE. NOTIFY ARCHITECT IF SUBSOIL CONDITIONS PREVENT WATER PERCOLATION.
3. SHRUB SHALL BEAR SAME RELATION TO FINISH GRADE AS IT DID TO ITS NURSERY FIELD GROWN GRADE.
4. FOR CONTAINER-GROWN SHRUBS, USE FINGER OR SMALL HAND TOOL TO PULL THE ROOTS OUT OF THE OUTER LAYER OF SOIL; THEN CUT OR PULL APART ANY ROOTS THAT CIRCULATE THE PERIMETER OF THE CONTAINER.

SHRUB PLANTING DETAIL

NOT TO SCALE

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

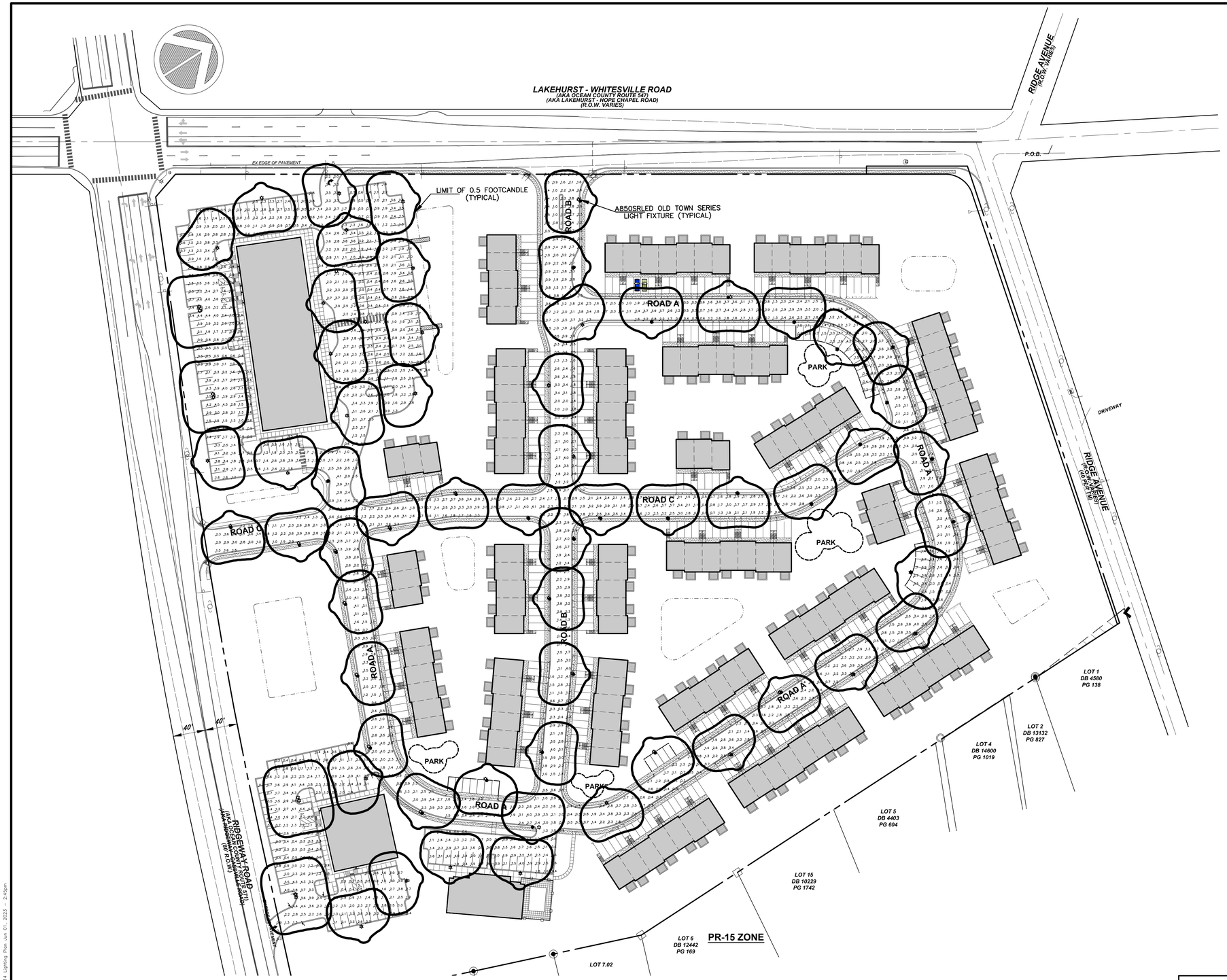
PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5394

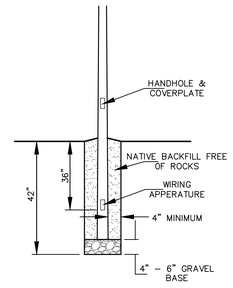
PRELIMINARY & FINAL MAJOR SITE PLAN

LANDSCAPE DETAILS

FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 60'	APRIL 25, 2022	18123	14
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	21





DIRECT BURY LIGHT POLE
NTS

LIGHTING NOTES

ALL LIGHTING SHALL PROVIDE FOR NON–GLARE LIGHTS FOCUSED DOWNWARD.

ALL LIGHTS WILL BE PROVIDED WITH HOUSE SIDE SHIELDS TO PREVENT LIGHT SPILLAGE ONTO ADJOINING PROPERTIES AND PROPOSED BUILDINGS.

60 0 60 120 240
GRAPHIC SCALE
1" = 60'

Statistics

Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Calc Zone #1	+	1.7 fc	4.6 fc	0.3 fc	15.3:1	5.7:1

Schedule

Symbol	Height	Quantity	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens Per Lamp	Light Loss Factor	Wattage
☼	16 ft.	60	Sternberg Lighting	A850SRLED–24L40T4–MDL018–BLOC	A850SRLED OLD TOWN SERIES ACORN, Luxeon 50–50 LED, T4, Bloc optic shield	Luxeon	1	A850SRLED–24L40T4–MDL018–BLOC.IES	7800	1	119
☼☼	16 ft.	4	Sternberg Lighting	A850SRLED–24L40T4–MDL018–BLOC	A850SRLED OLD TOWN SERIES ACORN, Luxeon 50–50 LED, T4, Bloc optic shield	Luxeon	1	A850SRLED–24L40T4–MDL018–BLOC.IES	7800	1	238

OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C., AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732.363.0160 FAX 732.363.0173
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

LIGHTING PLAN

FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 60'	APRIL 25, 2022	18123	15 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

A850SRLED OLD TOWN SERIES

LED

EPA 1.21(ft²) | WEIGHT 43 LBS | 7 YEAR WARRANTY | Lumen Range 2,380 to 14,110 | Life Span L70 MINIMUM 100,000 HOURS | UL LISTED | CLICK FOR FAQ's | RATED IP66

JOB NAME
FIXTURE TYPE
MEMO

BUILD A PART NUMBER

ORDERING EXAMPLE: 2A-A850SRLED-5P-16L40T5-MDL014-A-PEC-FHD/480PM/42I2FP4/GFF/BKT

Mounting Config.	Fixture	Fitter	LED	CCT	Distribution Type	Driver	Lens	Option Control Receptacle	Option Control	Option Fuse	Option Ring	Option GFI	Option Term. Block	Option House Side Shield	Arm (see Arm Spec Sheets)	Pole (see Pole Spec Sheets)	Finish

Mounting Configuration

[Click here to link to mounting configuration specification page]

- 1W · 2A · 3A90 · 1AM
- PT · 2A90 · 3APT · 2AM
- 1A · 2APT · 4A · 4SDPB
- 1APT · 3A · 4APT

W - Wall Mount, PT - Post Top, A - Arm Mount, AM - Arm Mid-Mount, PD - Pier Base

Fixture

- A850SRLED

Fitter

- 5P[1] · 99[1] · 99S[1] · OL3
- 73[1] · 99Z[1] · BD4 · OL4
- 74 · 99J[1] · BD5 · 588
- 99O[1] · 99W[1] · BD7 · C2097[2]

[1] Add "T" after fitter designation for optional "Twist-lock" fitter.
[2] Consult factory for use on concrete poles.

LED

- 32L · 24L · 16L · 12L

CCT - Color Temperature (K)

- 27(00) · 30(00) · 35(00) · 40(00) · 50(00)

Distribution Type

- T2 · T3 · T4 · T5

Driver

- **MDL018**[3] (120V-277V, 180mA)
- **MDH018**[3] (347V-480V, 180mA)
- **MDL016**[4] (120V-277V, 160mA)
- **MDH016**[4] (347V-480V, 160mA)
- **MDL014**[3] (120V-277V, 140mA)
- **MDH014**[3] (347V-480V, 140mA)
- **MDL008**[5] (120V-277V, 80mA)
- **MDH008**[5] (347V-480V, 80mA)

[3] JAL system only.
[4] SDL system only.
[5] JAL, RL or NDL system only.
[6] IDL system only.

Lens

- A (Acrylic) · P (Polycarbonate)

Options [Click here to view accessories sheet]

- **R7**[7] 7-Pin control receptacle only
- **SR17** Roof Mounted 7-Pin Control Receptacle Only
- **PE**[8] Twist-Lock Photocontrol (120V-277V)
- **PE4**[8] Twist-Lock Photocontrol (347V-480V)
- **SC**[8] Shorting Cap
- **PEC** Electronic Button Photocontrol (120V-277V)
- **PECA** Electronic Button Photocontrol (480V)
- **PHD**[9] Double Fuse and Holder
- **CDR** Cast Decorative Ring
- **CDRCL**[10] Cast Decorative Ring with Custom Logo
- **PBDR**[11] Perforated Brass Decorative Ring
- **GFI**[9] 15A Duplex GFI for Utility Fitter
- **TB**[9] Terminal Block
- **HSS**[9] 120° House Side Shield
- **BLOC** Bach Light Optical Control

[7] For 900 series utility fitter only.
[8] Requires control receptacle.
[9] Ships loose for installation in base.
[10] Consult factory for specification details.
[11] Standard is polished, for painted ring specify PBDR-P.

Arm [Click here to link to arm specification page]

See Arms & Wall Brackets specification sheets

- 50 · 70 · 480 · 6236 · TA · BA
- 478 · 80 · 55 · 579 · TASCR

Pole [Click here to link to pole specification page]

See Pole specification sheets

Finish [Click here to view paint finish sheet]

Standard Finishes[12]

- **BKT** Black Textured
- **WHT** White Textured
- **PGT** Park Green Textured
- **ABZT** Architectural Medium Bronze Textured
- **DBT** Dark Bronze Textured

[12] Smooth finishes are available upon request.

Custom Finishes[13]

- **CM** Custom Match
- **OI** Old Iron
- **RT** Rust
- **WBR** Weathered Brown
- **CD** Cedar
- **WBK** Weathered Black
- **TT** Two Tone

[13] Custom colors require upcharge.

Sternberg Select Finishes

- **VG** Verde Green
- **SI** Swedish Iron
- **OWGT** Old World Gray Textured

See next page

Specifications

Fixture

The luminaire shall be 16" diameter and 40-1/2" The acorn shall be supplied with a cast aluminum finial and a solid, cast aluminum roof which includes optimized heat sinks to provide maximum life and performance for the LED light sources. The acorn shall be sealed to the cast aluminum roof to provide a moisture-free and bug-free optics chamber for the LED light sources and Rated IP66. The optional perforated brass decorative ring (PBDR) is available in polished brass or painted finish. The 2-1/4" wide brass filigree allowing light transfer through decorative openings. The optional CDR is a heavy cast aluminum ring with four cast medallions finished in accent gold. Also available are custom medallions that can be specified with a name, initial or logo. The Luminaire shall be UL listed in US and Canada

Fitter - Standard

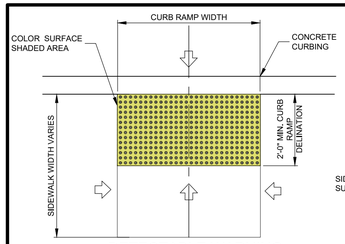
The fitter shall be heavy wall cast aluminum, 356 alloy for high tensile strength. It shall have an 8-1/2" inside diameter opening to attach to the 8" neck of the acorn globe. When ordered with a Sternberg aluminum pole, the fitter shall be welded to the pole top or tenon for safety and to ensure the fixture will be plumb, secure and level over the life of the installation. The fitter shall have a one-piece ring bug gasket to resist insect penetration into lamp assembly.

900 Series Utility Fitter Option

The fitter shall be heavy wall cast aluminum, 360 die cast alloy for high tensile strength. It shall have a 9-1/4" inside diameter opening to attach to the 8" neck of the acorn globe. It shall have a hinged, tool-less entry door that provides open access to all of the components. The 900 series shall have an optional terminal block for ease of wiring, an optional Twist-Lock Photocontrol receptacle, an optional single GFCI outlet for auxiliary power needs. The top mounted driver mounting plate shall be cast aluminum and provide tool-less removal from the housing using 2 finger latches. The fitter shall have a one-piece ring gasket to resist

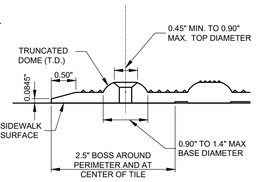
See next page

SternbergLighting
ESTABLISHED 1923 / EMPLOYEE OWNED
800-521-3376
555 Lawrence Ave., Roselle, IL 60172
info@sternberglighting.com
www.sternberglighting.com



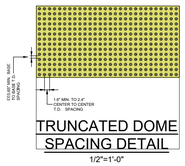
DETECTABLE WARNING SURFACE PLAN DETAIL

1/2"=1'-0"



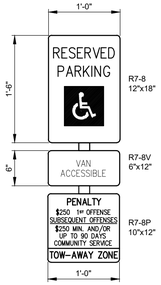
TRUNCATED DOME SECTION DETAIL

8"=1'-0"



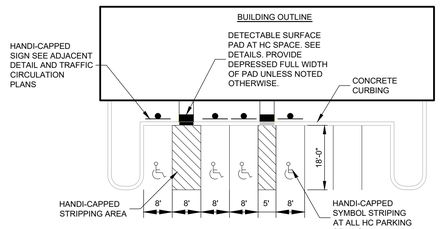
TRUNCATED DOME SPACING DETAIL

1/2"=1'-0"



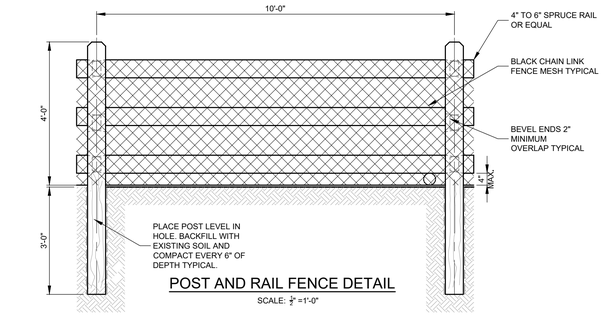
HANDICAPPED SIGN

SCALE:1"=1'-0"



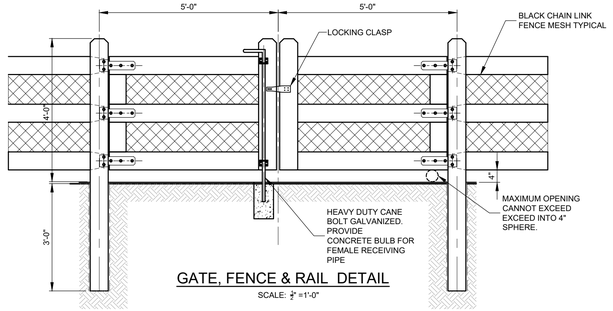
TYPICAL HANDICAPPED STALL DETAIL

SCALE: 1"=20'-0"



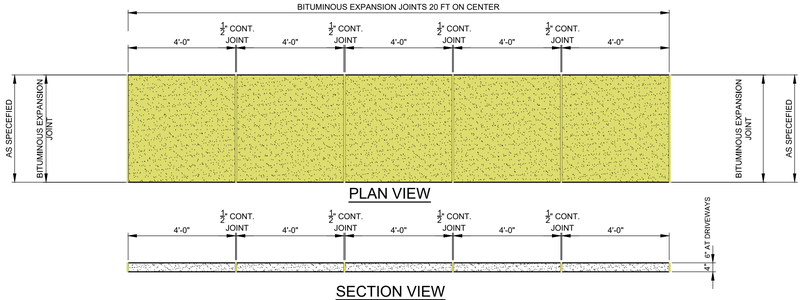
POST AND RAIL FENCE DETAIL

SCALE: 3/8" =1'-0"



GATE, FENCE & RAIL DETAIL

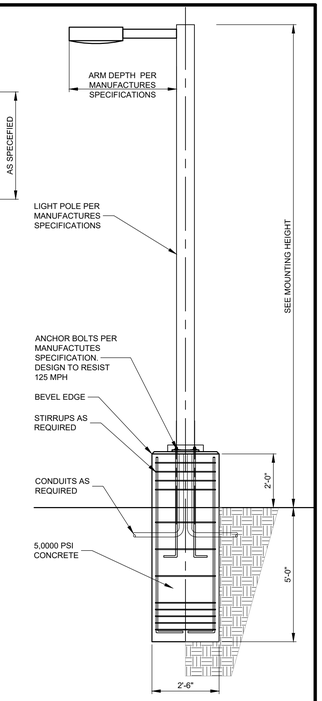
SCALE: 3/8" =1'-0"



1. A PREFORMED EXPANSION JOINT ½" THICK , 4" WIDE, AND EXTENDING THE FULL WIDTH OF THE WALK, UNBROKEN, SHALL BE INSTALLED EVERY 20 FT. CONTRACTION JOINTS SHALL BE INSTALLED EVERY 4 FT, THE FULL WALK WIDTH.
2. THERE SHALL BE A BROOM FINISH WITH THE EDGES FINISHED WITH A SUITABLE TOOL.
3. SIDEWALK SHALL CONSIST OF 4,000 PSI CONCRETE IN 28 DAYS.

CONCRETE SIDE WALK DETAIL

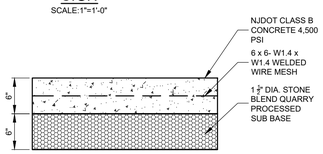
SCALE: 3/8"=1'-0"



FOOTING , ANCHOR BOLTS, STIRRUPS AND REINFORCING TO BE DESIGN BY A LICENSED NEW JERSEY ENGINEER
WIND SPEED CRITERIA 125 MPH

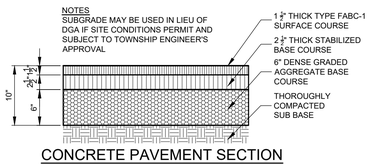
POLE MOUNT LIGHT DETAIL

SCALE: 3/8"=1'-0"



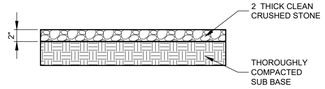
CONCRETE APRON SECTION

SCALE: 1"=1'-0"



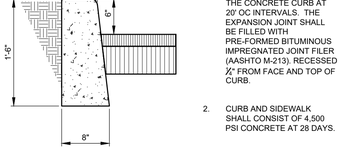
CONCRETE PAVEMENT SECTION

SCALE: 1"=1'-0"



BASIN GRAVEL ACCESS DRIVE SECTION

SCALE: 1"=1'-0"

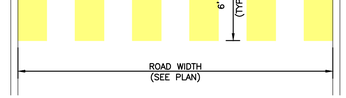


CURBING NOTES:

1. ½" WIDE TRANSVERSE EXPANSION JOINT SHALL BE INSTALLED IN THE CONCRETE CURB AT 20' OC INTERVALS. THE EXPANSION JOINT SHALL BE FILLED WITH PRE-FORMED BITUMINOUS IMPREGNATED JOINT FILER (AASHTO M-213). RECESSED ½" FROM FACE AND TOP OF CURB.
2. CURB AND SIDEWALK SHALL CONSIST OF 4,500 PSI CONCRETE AT 28 DAYS.

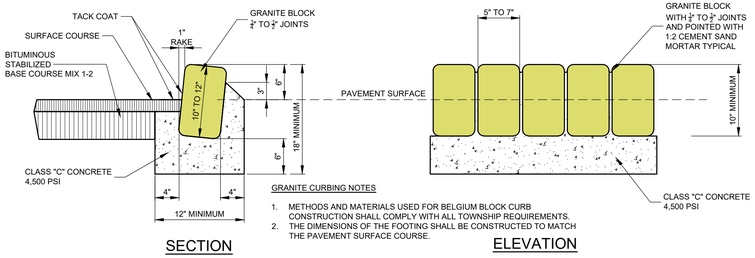
CONCRETE CURB VERTICAL

SCALE:1"=1'-0"



CROSSWALK STRIPING

N.T.S.



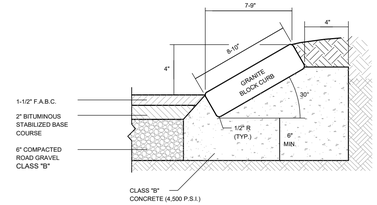
SECTION ELEVATION

GRANITE CURBING NOTES

1. METHODS AND MATERIALS USED FOR BELGIUM BLOCK CURB CONSTRUCTION SHALL COMPLY WITH ALL TOWNSHIP REQUIREMENTS.
2. THE DIMENSIONS OF THE FOOTING SHALL BE CONSTRUCTED TO MATCH THE PAVEMENT SURFACE COURSE.

GRANITE CURB VERTICAL

SCALE: 1"=1'-0"



SLOPING GRANITE BLOCK CURB DETAIL

N.T.S.

NOTE:
1. EXPANSION JOINTS SHALL BE PROVIDED AT 20' INTERVALS WITH CONSTRUCTION JOINTS BEING PROVIDED AT 10' INTERVALS.
2. TAPER CURB 10' EITHER SIDE OF STORM DRAINAGE INLETS TO MATCH GRATE & CURB PIECE.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0160 FAX 732 363 0173
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

CONSTRUCTION DETAILS
SITE DETAIL

FOR

BLOCK 65

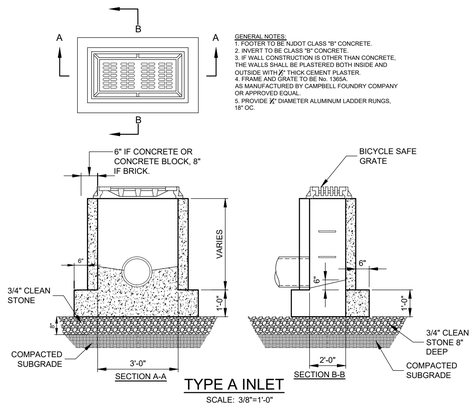
LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

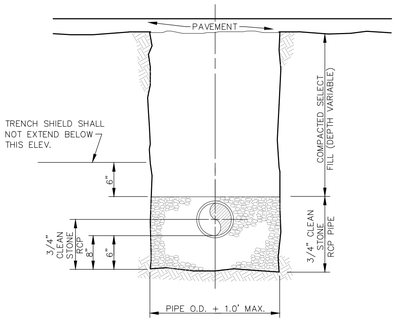
SCALE: NTS	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 16 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

File: W:\PROJECTS\18123\18123 sht5 Details (1).dwg Layout: sht4 Details - ESx Jun 02, 2023 - 9:45am



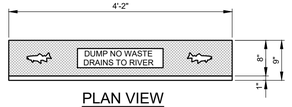
TYPE A INLET

SCALE: 3/8"=1'-0"

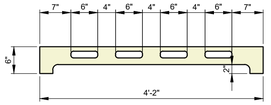


TYPICAL TRENCH UNDER PAVEMENTS

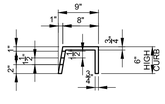
NTS



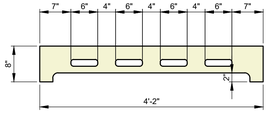
PLAN VIEW



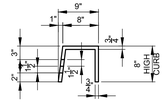
FRONT ELEVATION 6" HIGH CURB



END SECTION 6" HIGH CURB



FRONT ELEVATION 8" HIGH CURB



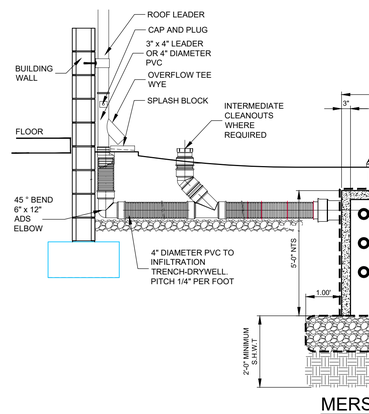
END SECTION 8" HIGH CURB

NOTES:

1. MATERIAL: GRAY CAST IRON ASTM A16-83, CLASS 30B.
2. IN RETROFIT SITUATIONS, THIS CURB PIECE (HEAD) WILL FIT EXISTING FOUNDRY CO. MANUFACTURED CURB INLETS FOR NJDOT TYPE B, B-1, D, D-1 AND D-2.
3. NAMEPLATE MESSAGE CAN BE MODIFIED TO SPECIFIC NEEDS WITHIN THE AREA SHOWN.
4. CASTING SUPPLIED WITHOUT SURFACE COATING.

TYPE "N" CURB PIECE INLET

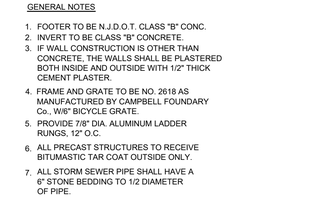
SCALE: 3/4"=1'-0"



MERSHON 1250 GALLON CONCRETE DRYWELL WITH OVERFLOW AND ROOF INLET

SCALE: 1/2"= 1'-0"

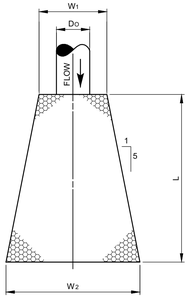
DRYWELL TO BE WRAPPED IN FILTER FABRIC
4,000 PSI CONCRETE STEEL REINFORCED.
CONCRETE CONFORMS TO ACI 318-16-4.5.1 AND ACI 318-16-4..5.2



PLAN

GENERAL NOTES

1. FOOTER TO BE N.J.D.O.T. CLASS "B" CONC.
2. INVERT TO BE CLASS "B" CONCRETE.
3. IF WALL CONSTRUCTION IS OTHER THAN CONCRETE, THE WALLS SHALL BE PLASTERED BOTH INSIDE AND OUTSIDE WITH 1/2" THICK CEMENT PLASTER.
4. FRAME AND GRATE TO BE NO. 2618 AS MANUFACTURED BY CAMPBELL FOUNDARY Co., W/6" BICYCLE GRATE.
5. PROVIDE 7/8" DIA. ALUMINUM LADDER RUNGS, 12" O.C.
6. ALL PRECAST STRUCTURES TO RECEIVE BITUMASTIC TAR COAT OUTSIDE ONLY.
7. ALL STORM SEWER PIPE SHALL HAVE A 6" STONE BEDDING TO 1/2 DIAMETER OF PIPE.

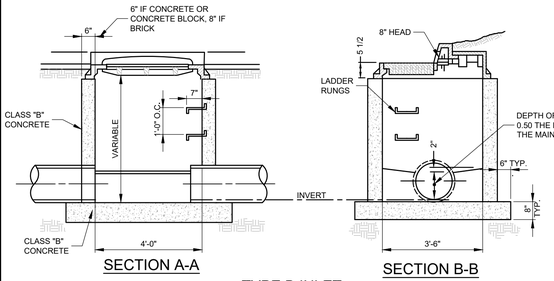


FLARED END SECTION NUMBER	d_O (FEET)	L (FEET)	W. (FEET)	W_1 (FEET)	d_{50} (INCHES)
1-1	1.5	15	3	20	4
1-2	1.5	15	3	20	4
1-3	2.0	22	4	28	6
3-1	1.5	15	3	20	4
3-2	1.5	12	3	17	4

NOTE: STONE THICKNESS TO BE 2X d50 OVER FILTER FABRIC

OUTLET CONDUIT PROTECTION

NOT TO SCALE

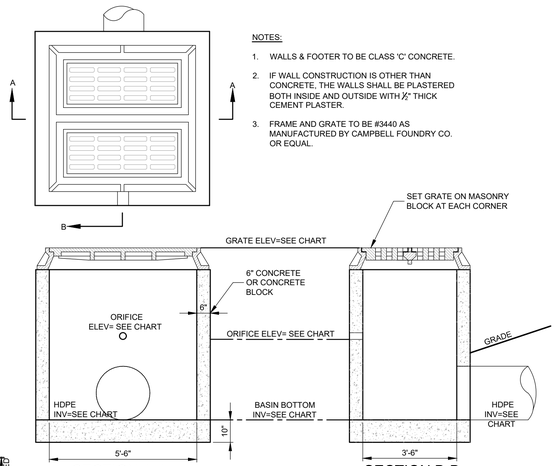


TYPE B INLET

SCALE: 3/8"=1'-0"

NOTES:

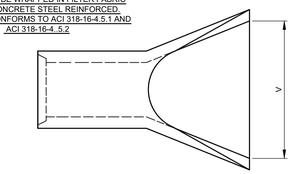
1. WALLS & FOOTER TO BE CLASS 'C' CONCRETE.
2. IF WALL CONSTRUCTION IS OTHER THAN CONCRETE, THE WALLS SHALL BE PLASTERED BOTH INSIDE AND OUTSIDE WITH ½" THICK CEMENT PLASTER.
3. FRAME AND GRATE TO BE #3440 AS MANUFACTURED BY CAMPBELL FOUNDRY CO. OR EQUAL.



OUTLET CONTROL STRUCTURE

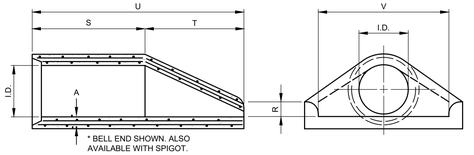
SCALE: 3/8"=1'-0"

BASIN	BASIN BOTTOM ELEV	ORIFICE DIAMTER	ORIFICE ELEV	GRATE ELEV
RG1	78.0	3"	80.0	82.0
RG2	75.0	3"	77.0	79.0
RG3	75.0	3"	77.0	79.0
RG4	75.0	3"	77.0	79.0
RG5	73.0	3"	75.0	77.0
1	SPILLWAY	SPILLWAY	SPILLWAY	SPILLWAY
2	68.0	3"	70.7	73.0



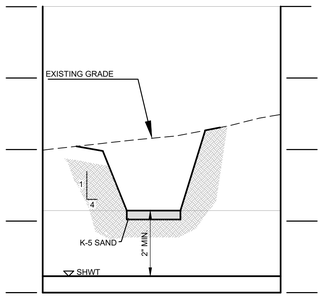
I.D.	12	15	18	24	30	36	42
A	2	2 1/4	2 1/2	3	3 1/2	4	4 1/2
R	4	6	9	9 1/2	12	15	21
S	48	46	46	30	19 3/4	34 3/4	35
T	24	27	27	43 1/2	54	63	63
U	6'-0"	6'-1"	6'-1"	6'-1 1/2"	6'-1 3/4"	8'-1 3/4"	8'-2"
V	24	30	36	48	60	72	78
WT. PC POUNDS	530	740	990	1520	2190	4100	5380

NOTE: ALL NUMBERS REPRESENT INCHES UNLESS OTHERWISE SPECIFIED.



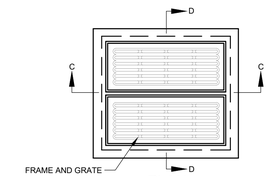
HEADWALL- ENDWALL FLARED END SECTION REINFORCED CONCRETE PIPE SCHEDULE

NOT TO SCALE



INFILTRATION BASIN SECTION

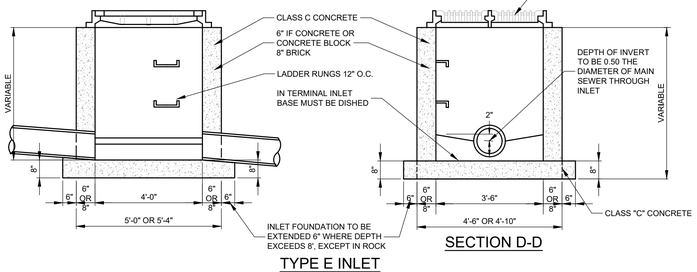
BASIN #	BASIN BOTTOM ELEV	SHWT
RG1	78.0	<75.0
RG2	75.0	<72.0
RG3	75.0	<72.0
RG4	75.0	<72.0
RG5	73.0	<70.0
BASIN 1	68.0	<65.0
BASIN 2	68.0	<65.0



PLAN

NOTES

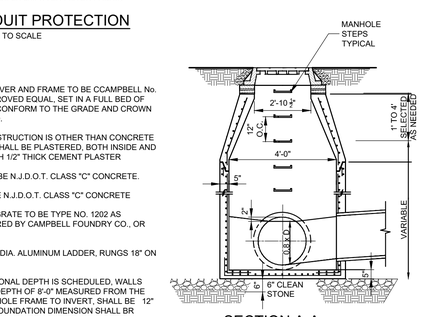
1. INVERTS TO BE ELIMINATED IN BOTTOM OF TERMINAL INLETS. BOTTOMS SHALL BE DISHED AND SLOPED TORWARDS THE OUTLET PIPE AT A RATE OF GRADE OF 2 INCHES PER FOOT.
2. THIS INLET MAY BE CONSTRUCTED OF BRICK, CONCRETE OR CONCRETE BLOCK. IF BRICK OR CONCRETE BLOCK IS USED, THE BOTTOM SHALL BE AS SHOWN FOR CONCRETE & THE OUTSIDE OF THE WALLS SHALL BE PLASTERED WITH 1/2" COAT OF 1:2 CEMENT SAND MORTAR.
3. INLET FRAME AND GRATES TO BE CAMPBELL FOUNDRY PATTERN NO. 3440 OR APPROVED EQUAL.



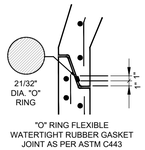
TYPE E INLET

SCALE: 3/8"=1'-0"

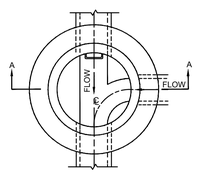
SECTION D-D



SECTION A-A



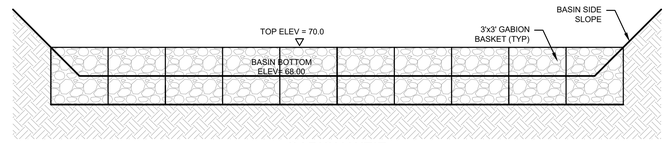
"O" RING FLEXIBLE WATERTIGHT RUBBER GASKET JOINT AS PER ASTM C443



PLAN VIEW

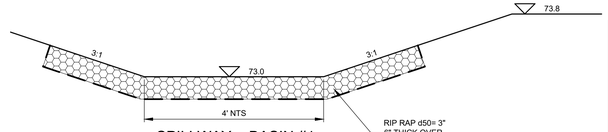
STORM DRAINAGE MANHOLE

SCALE: 3/8"=1'-0"



GABION WEIR

N.T.S.



SPILLWAY - BASIN #1

NTS

OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C., AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL
1	11/16/2022	REVISED PER PINELANDS COMMISSION	EMC

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732.363.0160 FAX 732.363.0023
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

CONSTRUCTION DETAILS
STORMWATER DETAILS

FOR

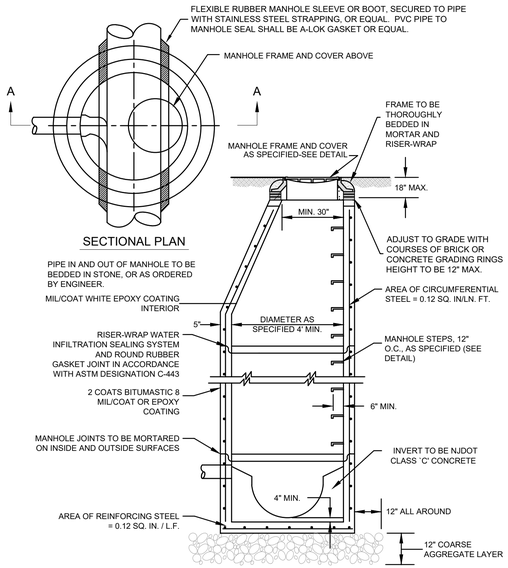
BLOCK 65
LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE: NTS	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 17
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	21

File: K:\PROJECTS\18123\18123_sht5_Details (11x17).dwg Layout: sht5_Details - Storm Jun 02, 2023 - 7:45am

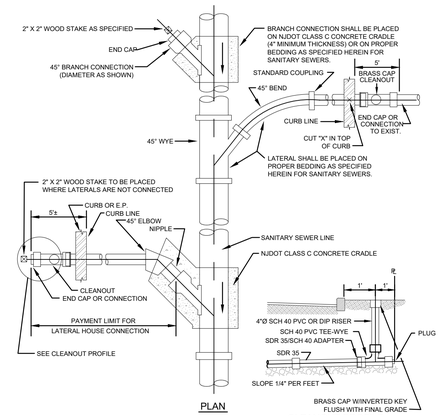


CONSTRUCTION NOTES:

1. FRAME AND GRATE TO BE CAMPBELL FOUNDRY No. 2618 BICYCLE GRATE WITH TYPE "J" ECO CURB PIECE OR APPROVED EQUAL.
2. PROVIDE CAMPBELL FOUNDRY No. 2593-2254 DESIGN TO CONFORM TO HS-25 TRAFFIC LOADING.

SANITARY PRECAST CONCRETE MANHOLE

N.T.S.

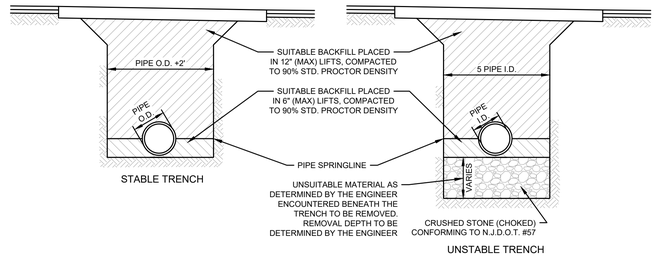


CONSTRUCTION NOTES:

1. DETAIL SHOWS CONSTRUCTION OF A "BRANCH CONNECTION" AND OF TWO DIFFERENT TYPES OF "LATERAL HOUSE CONNECTION". TYPE OF CONNECTION IS AT CONTRACTOR'S OPTION.
2. SIZE OF LATERAL TO BE AS SHOWN ON THE PLANS OR AS DIRECTED, 4" MINIMUM.
3. CLEAN-OUTS IN DRIVEWAYS SHALL BE COVERED WITH A MONUMENT BOX - CAMPBELL PATTERN NO. 4155 OR EQUAL.

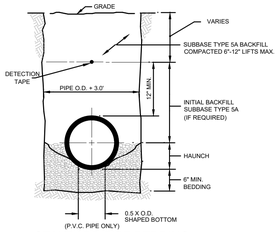
BRANCH AND LATERAL HOUSE CONNECTIONS

N.T.S.



DUCTILE IRON PIPE BEDDING/BACKFILL DETAIL

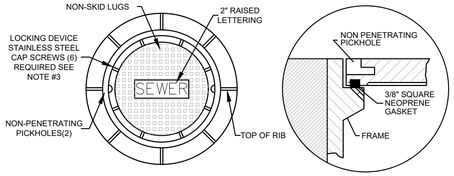
N.T.S.



STANDARD PIPE BEDDING FOR P.V.C. PIPE (SEWER)

N.T.S.

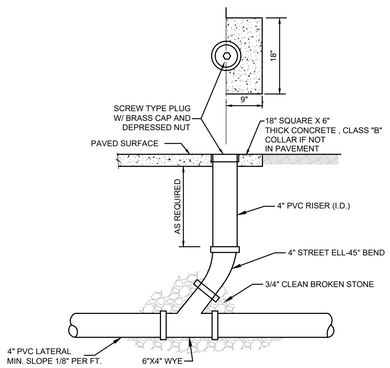
NOTE:
1. HAUNCH & BEDDING 3/4" WELL GRADED CRUSHED STONE OR GRAVEL (NJDOT #57, COARSE AGGREGATE) (IF REQUIRED)
2. HYDROHAMMERS ARE NOT TO BE USED 3' OR LESS FROM TOP OF PIPE.



1. MANHOLE FRAME AND COVER SHALL BE PATTERN NO. 1202 AS MANUFACTURED BY THE CAMPBELL FOUNDRY CO., OR APPROVED EQUAL.

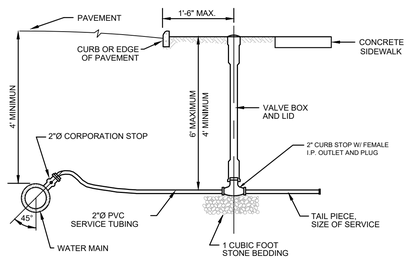
SANITARY MANHOLE FRAME & COVER

N.T.S.



STANDARD CLEANOUT DETAIL

N.T.S.

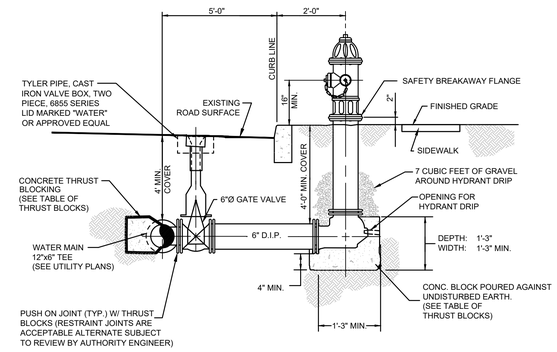


NOTES:

1. YOKE ASSEMBLY INCLUDING INTEGRAL INLET VALVE, EXPANSION FITTING AND OUTLET VALVE TO BE INSTALLED WITHIN STRUCTURE BY APPLICANT.
2. METER AND REMOTE READOUT TO BE INSTALLED BY THE APPLICANT IN LOCATION APPROVED BY THE MANCHESTER TOWNSHIP DEPARTMENT OF UTILITIES.
3. CONTRACTOR SHALL CUT A "W" IN THE TOP OF THE CURB OVER THE WATER SERVICE.

WATER SERVICE CONNECTION

NTS



NOTES:

1. HYDRANT TO BE MUELLER COMPANY SUPER CENTURION 250, MODEL A-423.

FIRE HYDRANT DETAIL

N.T.S.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS, ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

CONSTRUCTION DETAIL
UTILITY DETAILS

FOR

BLOCK 65

LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE: 1" = 60'	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 18 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

LAKEHURST - WHITESVILLE ROAD
(AKA OCEAN COUNTY ROUTE 527)
(AKA LAKEHURST - HOPE CHAPEL ROAD)
(R.O.W. VARIES)

RIDGE AVENUE
(R.O.W. VARIES)

RIDGEWAY ROAD
(AKA OCEAN COUNTY ROUTE 571)
(AKA RIDGEWAY TRAILER ROAD)
(R.O.W. VARIES)

P.O.B.

SITE

EXISTING DRAINAGE AREA
22.3 ACRES

tc FLOWPATH

DRIVEWAY

TYPE B INLET
GR=71.38
INV=68.69 (12" DIP OUT)

TYPE B INLET
GR=73.03
INV=72.04

TYPE E INLET
GR=74.16
INV=71.45 (12" RCP)
INV=71.33 (18" HDPE)

TYPE B INLET
GR=77.13
INV=73.39

TYPE E INLET
GR=77.16
INV=73.73

TYPE B INLET
GR=79.32
INV=76.93

STORM MH
GR=74.18
INV=71.08

TYPE A INLET
GR=74.31
INV=71.14 (IN)
INV=69.57 (OUT)

TYPE A INLET
GR=75.81
INV=73.13

12" GAS MAIN

TYPE E INLET
GR=70.93
INV=66.61 (12" DIP IN)
INV=67.12 (18" HDPE)
INV=67.12 (18" HDPE)

TYPE B INLET
GR=72.86
INV=69.49
INV=69.36

TYPE A INLET
GR=72.01
INV=68.35 (18")
INV=67.70 (24")

FLARED END SECTION
INV=63.50

TYPE E INLET
GR = 73.08
INV = 71.26

TYPE E INLET
GR = 73.14
INV = 71.15 (12")
INV = 64.51 (18")
INV = 64.56 (30" IN)
INV = 64.47 (30" OUT)

TYPE E INLET
GR = 73.08
INV = 71.29 (12")
INV = 70.92 (18")

TYPE E INLET
GR = 73.10
INV = 71.39

EX EDGE OF PAVEMENT

LOT 1
DB 4580
PG 138

LOT 2
DB 13132
PG 827

LOT 4
DB 14600
PG 1019

SHED
0.7 (+-)

LOT 5
DB 4403
PG 604

LOT 15
DB 10229
PG 1742

LOT 6
DB 12442
PG 169

LOT 7.02

LOT 7.01

F.M. I-2705

LOT 10
DB 14739
PG 1318

GRAVEL DRIVE

GRAVEL DRIVE OVER P/L

40'

40'

60 0 60 120 240
GRAPHIC SCALE
1" = 60'

OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C., AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

PRE CONSTRUCTION DRAINAGE AREA MAP

FOR

BLOCK 65

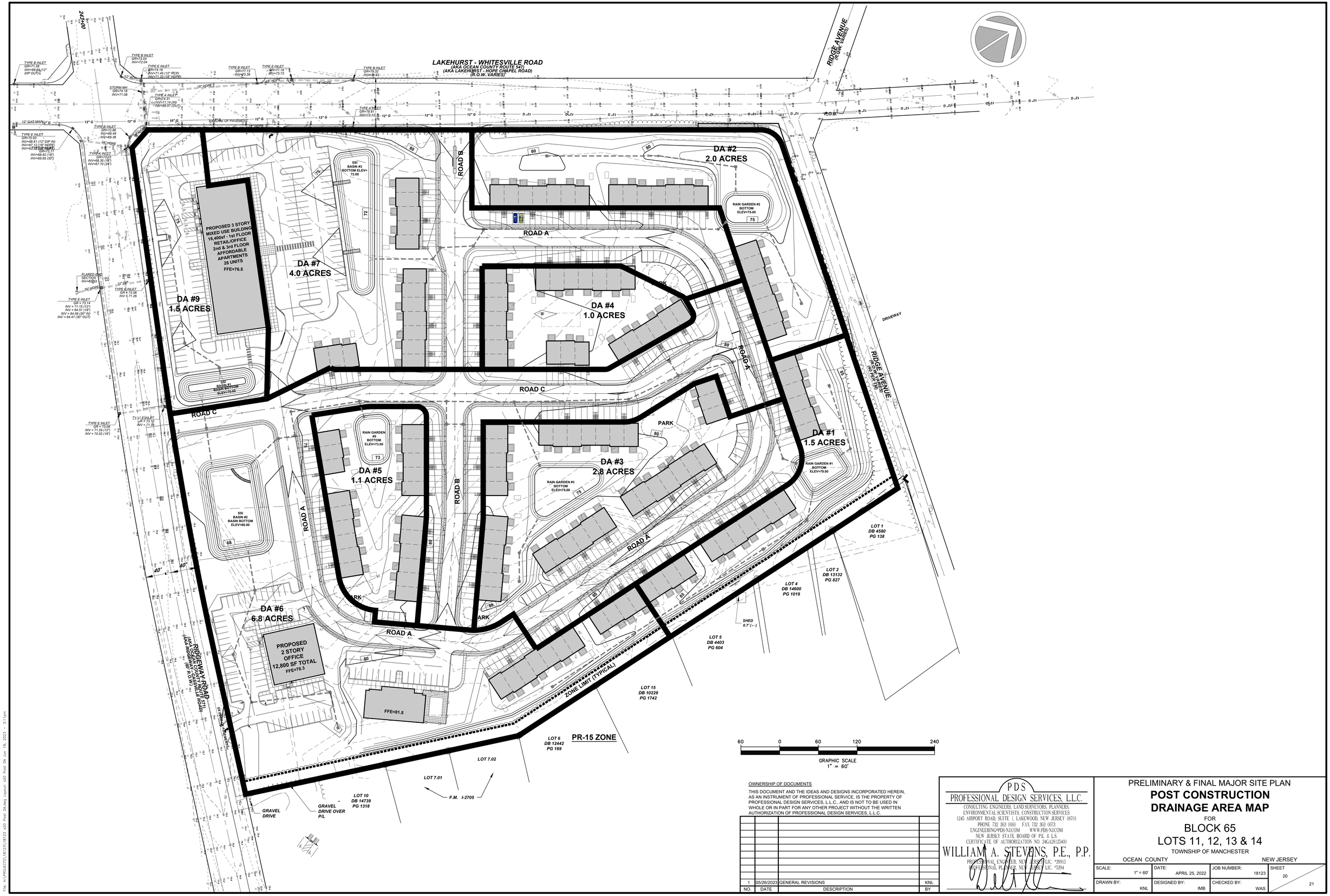
LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 60'	APRIL 25, 2022	18123	19 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

Plot: N:\PROJECTS\18123\18123 -19 Pre 64-Dwg Layout -65' Pre 64 Jun 02, 2023 - 9:44am



60 0 60 120 240

GRAPHIC SCALE
1" = 60'

OWNERSHIP OF DOCUMENTS

THIS DOCUMENT AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF PROFESSIONAL DESIGN SERVICES, L.L.C., AND IS NOT TO BE USED IN WHOLE OR IN PART FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF PROFESSIONAL DESIGN SERVICES, L.L.C.

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

POST CONSTRUCTION DRAINAGE AREA MAP

FOR

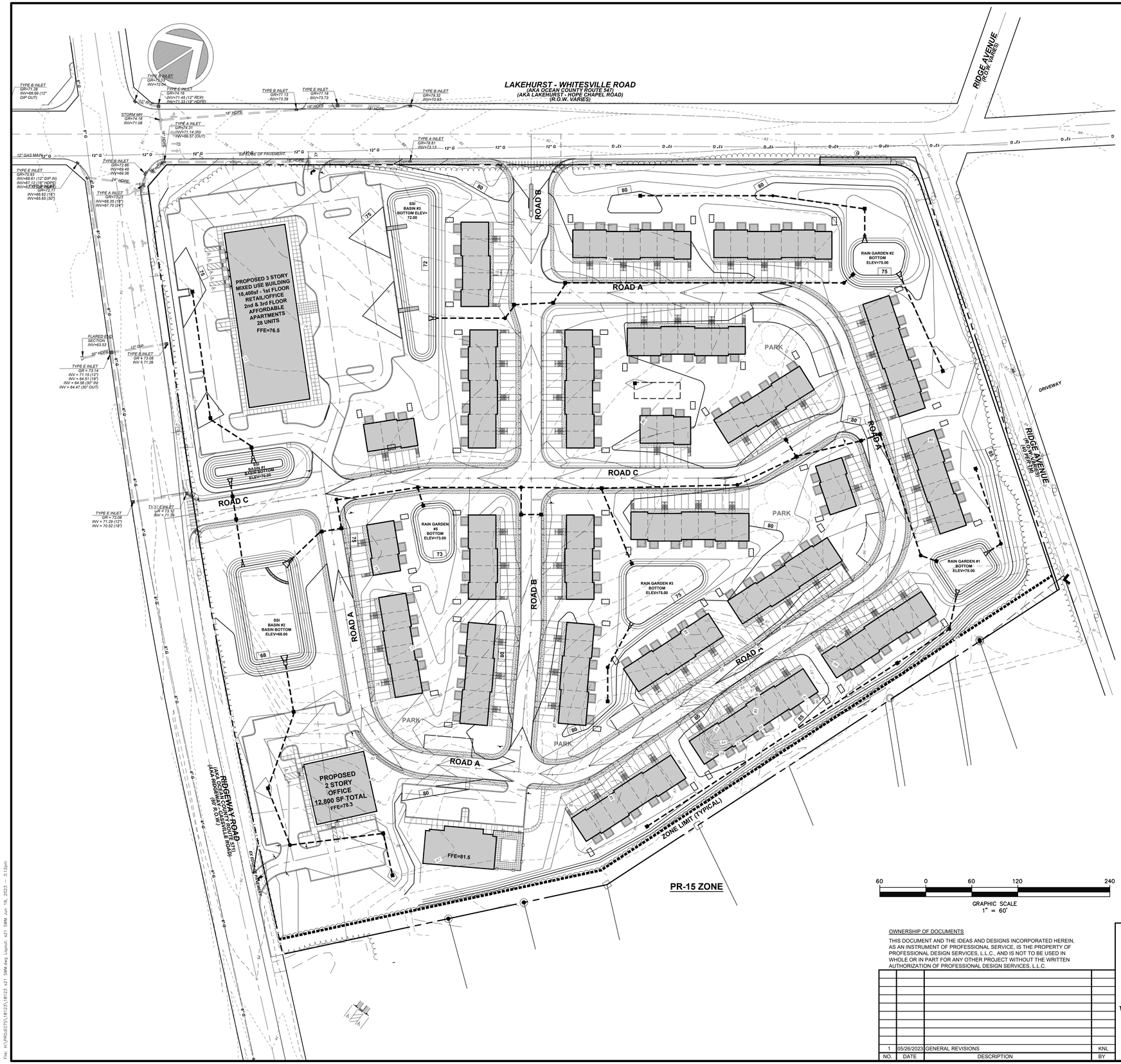
BLOCK 65

LOTS 11, 12, 13 & 14

TOWNSHIP OF MANCHESTER

OCEAN COUNTY NEW JERSEY

SCALE:	DATE:	JOB NUMBER:	SHEET
1" = 60'	APRIL 25, 2022	18123	20 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	



MAINTENANCE NOTES

REQUIRED MAINTENANCE PLAN PROCEDURES:

1. COPIES OF THE MAINTENANCE PLAN MUST BE PROVIDED TO THE OWNER AND OPERATOR OF THE STORMWATER MANAGEMENT MEASURE AND TO ALL REVIEWING AGENCIES. A COPY SHOULD ALSO BE PROVIDED TO THE LOCAL MOSQUITO CONTROL OR EXTERMINATION COMMISSION UPON REQUEST.
2. THE TITLE AND DATE OF THE MAINTENANCE PLAN AND THE NAME AND/OR TITLE AND ADDRESS OF THE PERSON WITH OVERALL MAINTENANCE RESPONSIBILITY MUST BE RECORDED ON THE DEED OF THE PROPERTY ON WHICH THE STORMWATER MANAGEMENT MEASURE IS LOCATED. ANY CHANGE IN THE NAME OR TITLE MUST ALSO BE RECORDED ON THE DEED, PARTICULARLY IF THERE IS A CHANGE OF PROPERTY OWNERSHIP.
3. THE MAINTENANCE PLAN MUST BE EVALUATED FOR EFFECTIVENESS AT LEAST ANNUALLY AND MUST BE REVISE AS NEEDED.
4. A DETAILED, WRITTEN LOG OF ALL PREVENTATIVE AND CORRECTIVE MAINTENANCE PERFORMED AT THE STORMWATER MANAGEMENT MEASURE MUST BE KEPT, INCLUDING A RECORD OF ALL INSPECTIONS AND COPIES OF MAINTENANCE WORK ORDERS.
5. THE PERSON WITH OVERALL MAINTENANCE RESPONSIBILITY MUST MAKE THE MAINTENANCE PLAN, LOGS, AND OTHER RECORDS AVAILABLE FOR REVIEW UPON REQUEST FROM A PUBLIC ENTITY WITH JURISDICTION OVER ACTIVITIES AT THE SITE.

REQUIRED MAINTENANCE PLAN COMMENTS:

1. ENTITY RESPONSIBLE FOR OVERALL MAINTENANCE OF THE STORMWATER MANAGEMENT MEASURE:
   HOMEOWNERS ASSOCIATION

2. SCHEDULE OF MAINTENANCE INSPECTIONS AND MAINTENANCE TASKS:
   EXTENDED DETENTION BASIN:

   A. **GENERAL MAINTENANCE:**
   ALL EXTENDED DETENTION BASIN COMPONENTS EXPECTED TO RECEIVE AND/OR TRAP DEBRIS AND SEDIMENT MUST BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION AT LEAST FOUR TIMES ANNUALLY AS WELL AS AFTER EVERY STORM EXCEEDING 1 INCH OF RAINFALL. SUCH COMPONENTS MAY INCLUDE BOTTOMS, TRASH RACKS, LOW FLOW CHANNELS, OUTLET STRUCTURES, RIPRAP OR GABION APRONS, AND INLETS. SEDIMENT REMOVAL SHOULD TAKE PLACE WHEN THE BASIN IS THOROUGHLY DRY. DISPOSAL OF DEBRIS AND TRASH SHOULD BE DONE AT SUITABLE DISPOSAL/RECYCLING SITES AND IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WASTE REGULATIONS.

   B. **VEGETATED AREAS:**
   MOWING AND/OR TRIMMING OF VEGETATION MUST BE PERFORMED ON A REGULAR SCHEDULE BASED ON SPECIFIC SITE CONDITIONS. GRASS SHOULD BE MOWED AT LEAST ONCE A MONTH DURING THE GROWING SEASON. VEGETATE AREAS MUST ALSO BE INSPECTED AT LEAST ANNUALLY FOR EROSION AND SCOUR. VEGETATED AREAS SHOULD ALSO BE INSPECTED AT LEAST ANNUALLY FOR UNWANTED TREE GROWTH, WHICH SHOULD BE REMOVED WITH MINIMUM DISRUPTION TO THE BOTTOM SURFACE AND REMAINING VEGETATION. WHEN ESTABLISHING OR RESTORING VEGETATION, BIWEEKLY INSPECTIONS OF VEGETATION HEALTH SHOULD BE PERFORMED DURING THE FIRST GROWING SEASON OR UNTIL THE VEGETATION IS ESTABLISHED. ONCE ESTABLISHED, INSPECTIONS OF VEGETATION HEALTH, DENSITY AND DIVERSITY SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY DURING BOTH THE GROWING AND NON-GROWING SEASONS. THE VEGETATIVE COVER SHOULD BE MAINTAINED AT 85% IF VEGETATION HAS GREATER THE 50% DAMAGE, THE AREA SHOULD BE REESTABLISHED IN ACCORDANCE WITH THE ORIGINAL SPECIFICATIONS AND THE INSPECTION REQUIREMENTS PRESENTED ABOVE. ALL USE OF FERTILIZERS, MECHANICAL TREATMENTS, PESTICIDES AND OTHER MEANS TO ASSURE OPTIMUM VEGETATION HEALTH SHALL NOT COMPROMISE THE INTENDED PURPOSE OF THE EXTENDED DETENTION BASIN. ALL VEGETATION DEFICIENCIES SHOULD BE ADDRESSED WITHOUT THE USE OF FERTILIZERS AND PESTICIDES WHENEVER POSSIBLE.

   C. **STRUCTURAL COMPONENTS:**
   ALL STRUCTURAL COMPONENTS MUST BE INSPECTED FOR CRACKING, SUBSIDENCE, SPALLING, EROSION, AND DETERIORATION AT LEAST ANNUALLY.

   D. **OTHER MAINTENANCE CRITERIA:**
   THE OPERATION AND MAINTENANCE PLAN MUST INDICATE THE APPROXIMATE TIME THAT THE SYSTEM WOULD NORMALLY TAKE TO COMPLETELY DRAIN THE STORMWATER QUALITY DESIGN STORM RUNOFF VOLUME. THIS NORMAL DRAIN TIME SHOULD THEN BE USED TO EVALUATE THE SYSTEM'S ACTUAL PERFORMANCE. IF SIGNIFICANT INCREASES OR DECREASES IN THE DRAIN TIME ARE OBSERVED. THE SYSTEM'S OUTLET STRUCTURE, UNDERDRAIN SYSTEM, AND BOTH GROUNDWATER AND TAILWATER LEVELS MUST BE EVALUATED AND APPROPRIATE MEASURES TAKEN TO COMPLY WITH THE MAXIMUM DRAIN TIME REQUIREMENTS AND MAINTAIN THE PROPER FUNCTIONING OF THE BASIN.

   INFILTRATION BASIN:

   A. **GENERAL MAINTENANCE:**
   ALL INFILTRATION BASIN COMPONENTS EXPECTED TO RECEIVE AND/OR TRAP DEBRIS AND SEDIMENT MUST BE INSPECTED FOR CLOGGING AND EXCESSIVE DEBRIS AND SEDIMENT ACCUMULATION AT LEAST FOUR TIMES ANNUALLY AS WELL AS AFTER EVERY STORM EXCEEDING 1 INCH OF RAINFALL. SUCH COMPONENTS MAY INCLUDE BOTTOMS, RIPRAP OR GABION APRONS, AND INFLOW POINTS. THIS APPLIES TO BOTH SURFACE AND SUBSURFACE INFILTRATION BASINS. SEDIMENT REMOVAL SHOULD TAKE PLACE WHEN THE BASIN IS THOROUGHLY DRY. DISPOSAL OF DEBRIS AND TRASH SHOULD BE DONE AT SUITABLE DISPOSAL/RECYCLING SITES AND IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL WASTE REGULATIONS. STUDIES HAVE SHOWN THAT READILY VISIBLE STORMWATER MANAGEMENT FACILITIES LIKE INFILTRATION BASINS RECEIVE MORE FREQUENT AND THOROUGH MAINTENANCE THAN THOSE IN LESS VISIBLE, MORE REMOTE LOCATIONS. READILY VISIBLE FACILITIES CAN ALSO BE INSPECTED FASTER AND MORE EASILY BY MAINTENANCE AND MOSQUITO CONTROL PERSONNEL.

   B. **VEGETATED AREAS:**
   MOWING AND/OR TRIMMING OF VEGETATION MUST BE PERFORMED ON A REGULAR SCHEDULE BASED ON SPECIFIC SITE CONDITIONS. GRASS SHOULD BE MOWED AT LEAST ONCE A MONTH DURING THE GROWING SEASON. VEGETATED AREAS MUST ALSO BE INSPECTED AT LEAST ANNUALLY FOR EROSION AND SCOUR. THE STRUCTURE MUST BE INSPECTED FOR UNWANTED TREE GROWTH AT LEAST ONCE A YEAR. WHEN ESTABLISHING OR RESTORING VEGETATION, BIWEEKLY INSPECTIONS OF VEGETATION HEALTH SHOULD BE PERFORMED DURING THE FIRST GROWING SEASON OR UNTIL THE VEGETATION IS ESTABLISHED. ONCE ESTABLISHED, INSPECTIONS OF VEGETATION HEALTH, DENSITY AND DIVERSITY SHOULD SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY DURING BOTH THE GROWING AND NON-GROWING SEASON. IF VEGETATION HAS GREATER THAN 50% DAMAGE, THE AREA SHOULD BE REESTABLISHED IN ACCORDANCE WITH THE ORIGINAL SPECIFICATIONS AND THE INSPECTION REQUIREMENTS PRESENTED ABOVE. ALL USE OF FERTILIZERS, MECHANICAL TREATMENTS, PESTICIDES AND OTHER MEANS TO ASSURE OPTIMUM VEGETATION HEALTH MUST NOT COMPROMISE THE INTENDED PURPOSE OF THE BIORETENTION SYSTEM. ALL VEGETATION DEFICIENCIES SHOULD BE ADDRESSED WITHOUT THE USE OF FERTILIZERS AND PESTICIDES WHENEVER POSSIBLE. ALL VEGETATED AREAS SHOULD BE INSPECTED AT LEAST ANNUALLY FOR UNWANTED GROWTH. WHICH SHOULD BE REMOVED WITH MINIMUM DISTRUPTION TO THE REMAINING VEGETATION AND BASIN SUBSOIL.

   C. **STRUCTURAL COMPONENTS:**
   ALL STRUCTURAL COMPONENTS MUST BE INSPECTED FOR CRACKING, SUBSIDENCE, SPALLING, EROSION AND DETERIORATION AT LEAST ANNUALLY.

   D. **OTHER MAINTENANCE CRITERIA:**
   THE OPERATION AND MAINTENANCE PLAN MUST INDICATE THE APPROXIMATE TIME THAT THE BASIN WOULD NORMALLY TAKE TO DRAIN THE STORMWATER QUALITY DESIGN STORM RUNOFF VOLUME BELOW THE GROUND SURFACE. THIS NORMAL DRAIN OR DRAWDOWN TIME SHOULD THEN BE USED TO EVALUATE THE BASIN'S ACTUAL PERFORMANCE. IF SIGNIFICANT INCREASES OR DECREASES IN THE DRAIN TIME ARE OBSERVED, THE BASIN'S BOTTOM SURFACE, SUBSOIL AND BOTH GROUNDWATER AND TAILWATER LEVELS MUST BE EVALUATED AND APPROPIATE MEASURES TAKEN TO COMPLY WITH THE MAXIMUM DRAIN TIME REQUIREMENTS AND MAINTAIN THE PROPER FUNCTIONING OF THE BASIN. THIS APPLIES TO BOTH SURFACE INFILTRATION BASINS. THE BOTTOM SAND LAYER IN A SURFACE INFILTRATION BASIN SHOULD BE INSPECTED AT LEAST MONTHLY AS WELL AS AFTER EVERY STORM EXCEEDING ONE INCH OF RAINFALL. THE PERMANENTLY RATE OF THE SOIL BELOW THE BASIN MAY ALSO BE RETESTED PERIODICALY. IF THE WATER FAILS TO 72 HOURS AFTER THE END OF THE STORM, CORRECTIVE MEASURES MUST BE TAKEN. ANNUAL TILLING NY LIGHT EQUIPMENT CAN ASSIST IN MAINTAINING INFILTRATION CAPACITY AND BREAK UP CLOGGED SURFACES.

3. PROBLEMS FOUND DURING MAINTENANCE INSPECTIONS SHALL BE CORRECTED. THESE INCLUDE THE RESTORATION OF ERODED AREAS, REPAIR OR REPLACEMENT OF STORMWATER MANAGEMENT MEASURE COMPONENTS, RESTORATION OF VEGETATION, AND REPAIR OR REPLACEMENT OF NON-VEGETATED LININGS.

4. THE EQUIPMENT NECESSARY TO PERFORM THE MAINTENANCE TASKS ARE AS FOLLOWS:

A. LAWN MOWING EQUIPMENT	G. WHEEL BARROWS
B. GAS POWERED TRIMMERS	H. GAS POWERED HEDGE TRIMMERS
C. GAS POWERED BLOWERS	I. CHAIN SAW
D. RAKES	J. FERTILIZER/PESTICIDE APPLICATION
E. SHOVELS	K. WASTER RECEPTACLES
F. PICKS	L. MAINTENANCE VEHICLES

5. COST ESTIMATE OF THE INSPECTION AND MAINTENANCE TASKS:

ITEM	EST. ANNUAL COST
1. INSPECT BASIN, REMOVE AND DISPOSE OF SILT & DEBRIS 4 TIMES PER YEAR.	$800
2. MOW & BAG GRASS CLIPPINGS MONTHLY DURING GROWING SEASON 7 TIMES PER YEAR.	$700
3. INSPECT BOTTOM SAND LAYER AFTER EVERY STORM EVENT EXCEEDING 1 INCH OF RAINFALL 3 TIMES PER YEAR.	$450
4. INSPECT & MAINTAIN FENCE & BASIN ACCESS DRIVE 2 TIMES PER YEAR.	$300
5. DEEP TILL & RE-GRADE SAND BOTTOM ONCE EVERY 5 YEARS ($1,000)	$200
TOTAL ANNUAL MAINTENANCE COST	$2,450

MAINTENANCE PLAN CONSIDERATIONS

ACCESS:
ALL STORMWATER MANAGEMENT MEASURES COMPONENTS MUST BE READILY ACCESSIBLE FOR INSPECTION AND MAINTENANCE. THEREFORE, ACCESS MUST BE PROVIDED TO THE ENTIRE STORMWATER MEASURE VIA ROADWAYS AND PATHS. TREES, SHRUBS, AND UNDERBRUSH MUST BE PRUNED OR TRIMMED AS NECESSARY TO MAINTAIN THIS ACCESS. THIS INCLUDES PATHWAYS THROUGH THE VEGETATION ALONG PERMANENT POOL PERIMETERS, INCLUDING AQUATIC BENCHES, TO ALLOW FOR THE INSPECTION AND CONTROL OF MOSQUITO

BREEDING:
INSPECTION AND MAINTENANCE EASEMENTS CONNECTED TO THE STREET OR RIGHT-OF-WAY SHOULD BE PROVIDED AROUND THE ENTIRE FACILITY. THE EXACT LIMITS OF THE EASEMENTS OR RIGHTS-OF-WAY SHOULD BE SPECIFIED ON THE PROJECT PLANS AND INCLUDED IN THE MAINTENANCE PLAN. ACCESS ROADS AND GATES SHOULD BE WIDE ENOUGH TO ALLOW PASSAGE OF NECESSARY MAINTENANCE VEHICLES AND EQUIPMENT, INCLUDING TRUCKS, BACKHOES, GRASS MOWERS, AND MOSQUITO CONTROL EQUIPMENT. IN GENERAL, A MINIMUM ACCESS ROADWAY WIDTH OF 12 FEET INSIDE A MINIMUM RIGHT-OF-WAY WIDTH OF 15 FEET IS RECOMMENDED. TO FACILITATE ENTRY, A CURB SHOULD BE PROVIDED WHERE AN ACCESS ROAD MEETS

A CURBED ROADWAY:
TO ALLOW SAFE MOVEMENT OF MAINTENANCE VEHICLES, ACCESS RAMPS SHOULD BE PROVIDED TO THE SHORELINE OR BOTTOM OF ALL FACILITIES WITH SIDE SLOPES GREATER THAN 3 FEET IN HEIGHT. ACCESS RAMPS SHOULD NOT EXCEED 10 PERCENT IN GRADE AND SHOULD BE SUITABLY STABILIZED TO PREVENT DAMAGE BY VEHICLES AND EQUIPMENT. TURNAROUNDS SHOULD BE PROVIDED WHERE BACKING UP IS DIFFICULT OR DANGEROUS. TO EXPEDITE OVERALL MAINTENANCE, VEHICLE AND EQUIPMENT STAGING AREAS SHOULD BE PROVIDED AT OR NEAR EACH FACILITY SITE.

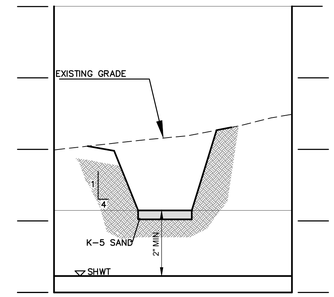
TRAINING OF MAINTENANCE PERSONNEL:
DEPENDING ON THE SIZE, CHARACTER, COMPONENTS, AND LOCATION OF A STORMWATER MANAGEMENT MEASURE, MAINTENANCE PERSONNEL MAY REQUIRE SPECIALIZED TRAINING TO ENSURE THAT THE MEASURE IS MAINTAINED IN A MANNER CONSISTENT WITH ITS FUNCTION. SUCH TRAINING MAY ADDRESS SPECIALIZED INSPECTION OR MAINTENANCE TASKS AND/OR THE OPERATION OF SPECIALIZED MAINTENANCE EQUIPMENT.

DISPOSAL:
COLLECTION AND DISPOSAL OF SEDIMENT, DEBRIS, AND TRASH FROM STORMWATER MANAGEMENT MEASURES MUST COMPLY WITH LOCAL, STATE, AND FEDERAL WASTE HANDLING AND DISPOSAL REGULATIONS. ALL COLLECTED MATERIAL MUST BE SENT TO APPROPRIATE DISPOSAL/RECYCLING FACILITIES.

AESTHETICS:
THE SAFETY, NEEDS AND AESTHETIC PREFERENCES OF THE ADJACENT COMMUNITY CAN HELP DETERMINE THE TYPE, AMOUNT, AND FREQUENCY OF NECESSARY MAINTENANCE.

EMERGENCY MAINTENANCE:
EMERGENCY MAINTENANCE AND REPAIRS MUST BE PERFORMED IN A TIMELY MANNER.

SAFETY:
DEVELOPMENT OF A STORMWATER MANAGEMENT MEASURE DESIGN AND THE INSPECTION AND MAINTENANCE TASKS NECESSARY TO KEEP IT FUNCTIONING RELIABLY MUST INCLUDE CONSIDERATIONS FOR THE SAFETY OF INSPECTION AND MAINTENANCE PERSONNEL WHO WILL BE WORKING IN OR NEAR THE MEASURE.



INFILTRATION BASIN SECTION

BASIN #	BASIN BOTTOM ELEV	SHWT
RG1	78.0	<75.0
RG2	75.0	<72.0
RG3	75.0	<72.0
RG4	75.0	<72.0
RG5	73.0	<70.0
BASIN 1	68.0	<65.0
BASIN 2	68.0	<65.0

NO.	DATE	DESCRIPTION	BY
1	05/26/2023	GENERAL REVISIONS	KNL

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.
CONSULTING ENGINEERS, LAND SURVEYORS, PLANNERS,
ENVIRONMENTAL SCIENTISTS, CONSTRUCTION SERVICES
1245 AIRPORT ROAD, SUITE 1, LAKEWOOD, NEW JERSEY 08701
PHONE 732 363 0060 FAX 732 363 0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM
NEW JERSEY STATE BOARD OF P.E. & L.S.
CERTIFICATE OF AUTHORIZATION NO. 24GA28125400
WILLIAM A. STEVENS, P.E., P.P.
PROFESSIONAL ENGINEER, NEW JERSEY LIC. #39915
PROFESSIONAL PLANNER, NEW JERSEY LIC. #5894

PRELIMINARY & FINAL MAJOR SITE PLAN

STORMWATER MAINTENANCE PLAN

FOR
BLOCK 65
LOTS 11, 12, 13 & 14
TOWNSHIP OF MANCHESTER
OCEAN COUNTY NEW JERSEY

SCALE: 1" = 60'	DATE: APRIL 25, 2022	JOB NUMBER: 18123	SHEET 21 / 21
DRAWN BY: KNL	DESIGNED BY: IMB	CHECKED BY: WAS	

File: W:\PROJECTS\18123\18123 - 021 ORM.dwg Layout: x21 SBM Jun 19, 2023 - 3:12pm

PDS

PROFESSIONAL DESIGN SERVICES, L.L.C.

1245 AIRPORT ROAD● SUITE 1 ● LAKEWOOD ● NEW JERSEY 08701● 732-363-0060 ● FAX 732-363-0073
ENGINEERING@PDS-NJ.COM WWW.PDS-NJ.COM

WILLIAM A. STEVENS, P.E., P.P.
VICE PRESIDENT

SEAN D. COUGHLAN
ASSOCIATE

IAN M. BORDEN, P.P.
PRESIDENT

GRAHAM J. MACFARLANE, P.E., P.P., C.M.E.
ASSOCIATE

STEVEN L. METELSKI, P.L.S.
ASSOCIATE

June 21, 2023

Ms. Amanda Kisty
Manchester Township Planning Board
One Colonial Drive
Lakehurst, NJ 08759

Re: Parkwood Square
Preliminary & Final Major Site Plan
Block: 65 – Lots: 11, 12, 13 & 14
Manchester Township, Ocean County
PDS Ref. #18123

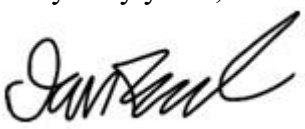
Dear Ms. Kisty:

Per your request, enclosed please find the following plans and supporting data with respect to a site plan approval for the above referenced project:

1. Five (5) copies of Manchester Township Planning Board Application, revised consistent to the plans provided to your office on June 20, 2023.

Should you have any questions or require additional information, please do not hesitate to contact this office.

Very truly yours,



Ian M. Borden, P.P., President
Professional Design Services, L.L.C.

IMB/ma
Enclosure
Cc: Parkwood Center
Sal Alfieri, Esq. w/ encl.

245 Attachment 7

Township of Manchester

Appendix 7
Application for Development Before Zoning Board of Adjustment and Planning Board
(§ 245-12B)

Parkwood Square LP & Parkwood Center B LLC

1500 River Avenue, Lakewood, NJ 08701

732-901-0701

Sal Alfieri, Esq.

Cleary Giacobbe Alfieri Jacobs, LLC - 955 NJ-34, Matawan, NJ 07747

732-583-7474

Proposed mixed use development with 31,200 sq. ft. commercial, 28 residential apartments & 141 residential townhouse units

Vacant

4

1

13. Location of Premises: Lakehurst Whitesville Road
Tax Map Block 65 and Lot 11, 12, 13 & 14
Tax Map Sheet
Size of Tract: (Acres) 20.86 (Square Feet) _____
Zoning District PB Zone

14. If there has been a previous appeal or application involving these premises, give details.
None

15. Give a brief statement of facts in support of this application.
Commercial Use is permitted in PB-1 zone. Apartment (245-68) and Townhouse (245-74) uses are permitted as conforming conditional uses per Ordinance 17-025

16. If Application involves a variance, what section of the chapter is applicant seeking relief from:
No Variance is required

17. If a variance is involved, state under what subsection of N.J.S.A. 40:55D-70:
(a) _____ (b) _____ (c) _____ (d) _____

18. Names and Addresses of Persons Preparing Submission:
Architect: _____ Phone: _____ Fax: _____
Engineer: Professional Design Services, LLC Phone: 732-363-0060 Fax: _____
Other – Designate: _____ Phone: _____ Fax: _____

19. Names and addresses of all witnesses Applicant intends to call. This is not intended to limit the number of witnesses the Applicant intends to call.
Ian Borden P.P., Bill Stevens P.E., P.P., John Rea P.E.

20. In the event the Applicant is a corporation, set forth names and addresses of officers of the corporation and individuals owning 10% or more of the capital stock.

21. Environmental Impact Statement: For all major subdivisions and major site plans and in special cases as determined by the Approving Agency. Included in submittal

I (We) hereby depose and say that the foregoing statements contained in the papers submitted herewith are true and correct to the best of my (our) knowledge.

M. Eichorn (Applicant)
Parkwood Square LP and Parkwood Center B LLC - Mordechai Eichorn
Sworn and subscribed to before me on this _____ day of _____ 20____

I (We) the Owners(s) hereby depose and say that the foregoing statements contained in the papers submitted herewith are true and correct to the best of my (our) knowledge. (Used if the Applicant is not the Owner). M. Eichorn
Parkwood Square LP and Parkwood Center B LLC - Mordechai Eichorn
Sworn and subscribed to before me on this _____ day of _____ 20____

Failure to complete this application in its entirety and submit the required documents will result in the determination that this application is incomplete, in which event the application will not be considered by the Board. The applicant is hereby informed that in addition to the documents set forth herein, he must present evidence that he has met the notification requirements as set forth in the municipal notice of application of development forms and Chapter 245 of the Manchester Township Code.

ENVIRONMENTAL IMPACT STATEMENT

For

MAJOR SITE PLAN

Block 65 Lots 11, 12, 13 & 14
Manchester Township
Ocean County, New Jersey

Prepared By:

PROFESSIONAL DESIGN SERVICES, L.L.C.
1245 Airport Road, Suite 1
Lakewood, NJ 08701
PDS #18123

MARCH 3, 2023

IAN M. BORDEN P.P., PRESIDENT

TABLE OF CONTENTS

FIGURES

APPENDICES

1.0 PROJECT DESCRIPTION

1.1 Introduction

Being known as Block 65, Lots 11 thru 14, the project site contains 20.9 acres and is located at the northeast corner of South Hope Chapel Road (OC Route 547) and Ridgeway Road (OC Route 571) in Manchester Township, Ocean County, New Jersey. Figure 1 is a location map for the project site. The surrounding area is developed with residential single family homes to the north and east. The intersection of South Hope Chapel Road and Ridgeway Road is signalized with dedicated left turn lanes at all approaches.

The property is zoned PB-1 (Pinelands Business). It is proposed to develop the site with commercial, residential apartment and townhouse units as permitted in the PB-1 zone consistent with the Township Master Plan and Fair Share Housing Plan. 31,200 square feet of commercial retail and office use, 28 residential apartments and 141 residential townhouse units are proposed. The 28 residential apartments are located above a portion of the commercial use will be affordable housing units.

The property does not contain any freshwater wetlands or wetlands transition area. There are no regulated flood hazard areas nor riparian buffers on site.

The project is located within the Pinelands National Reserve and, therefore, regulated by the NJ Pinelands Commission pursuant to the Comprehensive Management Plan (NJAC 7:50-1.1 et. seq.). The site is located within the Regional Growth Land Use Management area as defined by the Pinelands Comprehensive Management Plan (CMP). The Pinelands Commission has issued a Certificate of Filing for the project and a copy is included in the appendices.

The project will be serviced by public water and sewer.

The project is proposed to be developed consistent with the Manchester Township Land Use and Development Regulations and the Pinelands Comprehensive Management Plan.

The Environmental Impact Statement (EIS) and site design have been prepared in conformance with the Manchester Township Ordinance regarding preparation and content of an EIS (Section 109-169). Township and County Master Plans, the Manchester Township Natural Resources Inventory and various other pertinent planning documents were reviewed to assist in the preparation of this document. The EIS addresses specific elements of the proposed site design (i.e., stormwater runoff) and potential impacts and steps taken to minimize or avoid adverse environmental impacts (Environmental Performance Controls).

Site development plans have been prepared by Professional Design Services; these plans have been utilized in support of the preparation of this document.

1.2 Land Use and Zoning

The site is located within the Regional Growth Land Use Management area as defined by the Pinelands Comprehensive Management Plan (CMP); the Regional Growth area is defined by the CMP as areas of existing growth capable of accommodating regional growth influences while protecting the essential character and environment of the Pinelands. The subject properties are

located within the Pinelands Business PB-1 zone which permits commercial use on a lot larger than 20,000 square feet as well as apartment and townhouse residential development on tracts larger than 10 acres. Manchester Township Ordinance 17-025, as certified by the Pinelands Commission in 2018, permits residential apartment and townhouse units on tracts larger than 10 acres. The ordinance, which was created to be consistent with the Township affordable housing settlement and updated Master Plan, also requires affordable housing residential units be provided of 20% of the number of units. The project fully conforms to the Apartment (245-68) and Townhouse zone requirements (245-74) and no variances are required.

The project is being developed consistent to the Residential Site Improvement Standards. All of the proposed streets contain 26' of pavement with curb and sidewalk on both sides. Parking is provided in a driveway for each unit as well as off-street spaces.

1.3 Utility Plans

The Manchester Township Municipal Utilities Authority owns and operates public potable water and sanitary sewer systems in Manchester Township. The site lies within the JTMUA's franchise area and also within the Central Sewer Service Area of the OCUA.

There is no public sewer in this portion of Manchester Township; An off-site extension will be constructed by the developer of the Jackson Trails project located in Jackson Township to allow for public sewer service to the project. The off-site extension will include extension of the Manchester Township System (MTDOU) from its nearest location in County Route 571, approximately 2 miles southeast of the site. An on-site collection system will be constructed to convey flows to the proposed extension of the MTDOU system. Similarly, public water main does not exist along the site frontage; however, an off-site extension of the water system will be constructed by the Jackson Trails project to provide for potable water and fire service to the project. Water main will be extended by Jackson Trails from the existing water main located within Ridgeway Road east of the site through the intersection of South Hope Chapel Road and within South Hope Chapel Road to the existing JTMUA water system at Whitesville Road (OC Route 527).

1.4 Stormwater Management

The stormwater management plan will provide green infrastructure and non-structural low impact measures with management practices to efficiently collect and control increased stormwater runoff. Design standards of the Pinelands Commission (NJAC 7:50-6.84) require the applicant manage stormwater runoff by recharging all increased runoff from impervious areas from the 10-year, 24 hour storm and controlling runoff peaks for the 2, 10 and 100 year storm events to less than pre-development runoff levels.

Multiple stormwater management facilities will be constructed to provide green infrastructure, in a decentralized system to reduce the nitrate loading of runoff while providing groundwater recharge and flood control attenuation.

The Stormwater Management Report prepared by PDS contains the description, design methodology and outlines the regulatory compliance of the proposed stormwater management

system.

2.0 SITE DESCRIPTION AND INVENTORY

Investigations of the project site were conducted by the author and PDS staff from 2018 till 2023. The following inventory describes the existing environmental conditions onsite.

2.1 Topography and Hydrology

The project site lies within the outer coastal plain physiographic province. The project site is located within the Coastal Plain geomorphic province. The geologic framework of the Coastal Plain is one of underlying gently southeastward dipping unconsolidated clays, marls, silts and sands of the tertiary (65 to 1.75 million years ago) period.

The project lies within the Kirkwood Formation, which is overlain by the Cohansey Sand and underlain by the Shark River/Manasquan Marl. The Kirkwood Formation crops out along the northern part of Ocean County. The Kirkwood Formation ranges in thickness from a minimum of 50 feet in the outcrop area to a maximum reported thickness of about 800 feet in Atlantic City (Geology and Groundwater Resources of Ocean County, NJ 1969). The topography of the site slopes gradually from the southwest towards the northeast.

Figure 2 is a copy of the USGS Quadrangle Topography Map with the site located.

2.2 Soils

The project site is underlain by the following soils as depicted by the U.S. Department of Agriculture; Ocean County Soil Survey (issued April 1980 and reissued February 1989). Figure 3 is a copy of the Soil Survey with the site located.

Soil Type	**% Slope**	**Depth to SHWT***
DoB- Downer Sand	0-5	>6.0’

**SHWT = Seasonal High Water Table*

The permeability of the Downer soil series are typically rapid and the available water capacity is low. The depth to seasonal high water is typically greater than 6 feet. This soil series typically have an acidic reaction but are not acid-producing. The use of lime in landscaped areas is required to neutralize the soil to provide adequate growing conditions.

Soil borings were performed throughout the project site to assess soil conditions and seasonal high water table. The depth to seasonal high water occurs at a depth greater than five (5) feet. The soils are permeable and do not pose any significant limitations on the proposed development.

2.3 Surface Water

There is no surface waters located on the site.

2.4 Subsurface Water

The upper part of the Kirkwood Formation and the Cohansey Sand are hydraulically connected and together function as an aquifer system. Underlying the Kirkwood-Cohansey aquifer system is the composite confining unit, a complex series of geologic units that, depending on location, can include as many as nine distinct units. The part of the composite confining unit of interest in this area ranges in age from Palecene to early Miocene and is made up of the Vincentown Formation, Manasquan Formation, Shark River Formation, Piney Point Formation, and basal clay of the Kirkwood Formation. Two minor aquifers are present in this part of the composite confining unit. The Vincentown aquifer consists of the Vincentown Formation, which is comprised of moderately permeable Quartz sand. The Vincentown aquifer is used as a source of water only in and near the outcrop areas, in the northwestern part of the County. The other minor aquifer, Piney Point aquifer, is confined and is composed of fin to coarse grained glauconitic quartz sand and shell beds.

Based upon field observations, there are approximately 22 wells currently located with 500 feet of the project site. Such wells are typically screened in the unconfined portion of the Cohansey/Kirkwood Aquifer at depths between 40 and 120 feet in depth and are used to service existing single family homes located around the subject property on the northern and eastern sides.

The project will also recharge stormwater runoff to this aquifer by virtue of compliance with the Pinelands Stormwater Management Regulations. As a result, the runoff from all impervious surfaces during a 10 year, 24 hour storm (5.4 inches) event will be retained on the site and recharged to this aquifer.

2.5 Topography and Existing Development Features

Topographic contours and all existing feature onsite and within 50 feet of the site are depicted on the Subdivision Plans.

2.6 Wetlands and State Open Waters

Wetlands are areas where the substrate is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include lands with poorly drained or very poorly drained soils, as designated by the National Cooperative Soil Survey of the Soil Conservation Service of the United States Department of Agriculture. All activities must comply the Pinelands Comprehensive Management Plan.

There are no freshwater wetlands located on or within 300 feet of the site. There is no disturbance proposed to the freshwater wetlands or wetland buffer area.

2.7 Floodplains

There is no floodplain or riparian buffer located on or within the property. No development is proposed within any regulated flood hazard areas or flood plain.

2.8 Vegetation

The subject property is forested with an oak/ pine forest. The portion of the property at

the intersection is a successional pine forest over a small area. Vegetation identified on the site include tree species such as White oak (Quercus alba), Eastern black oak (Quercus velutina), Eastern red cedar (Juniperus virginiana), and Pitch pine (Pinus rigida). The understory comprises of American holly (Ilex opaca), Green briar (Smilax rotundifolia), Mountain laurel (Kalmia latifolia), Late low-bush blueberry (Vaccinium angustifolium), and Numblewill (Muhlengergia schreberi).

2.9 Wildlife

The property does not contain critical habitat for threatened or endangered species based on the studies performed by Dubois Environmental.

2.10 Noise

Noise is defined as "any sound of such level to be injurious to human health or welfare, or which would unreasonably interfere with the enjoyment of life or property throughout the state or in any portion thereof, but excludes noise emanating from residential structures." Ambient noise levels are assumed to be well below the NJDEP standards, due to the nature of the area.

The existing noise characteristics within the area are representative of a residential setting and are influenced by auto traffic on South Hope Chapel Road. Typical daytime noise levels of residential communities range from 45 to 50 dBA (decibel). As the general project area is low-density residential and accounts for a low volume of traffic, noise levels are minimal. Local traffic in the site vicinity is the primary on-site noise contributor.

Lakehurst Naval Air Engineering Station (NAES) is located approximately 3 miles southwest of the project site. McGuire Air Force Base, Fort Dix and NAES have been combined to form a Joint Base in 2009. This consolidation has created an increase in the tempo of aviation operations at NAES by deployment of additional Air National Guard aircraft and adding Assault Landing Zone training for C-17 aircraft. An Air Installation Compatible Use Zone (AICUZ) Study completed in July 2013 determined the project site is not located within any noise zone areas.

2.11 Cultural, Historical and Archaeological Resources

Historic and archaeological resources may include objects, structures, shipwrecks, neighborhoods, districts, and manmade or man-modified features of the landscape and seascape, including archaeological sites, which either are on or are eligible for inclusion on the State or National Register of Historic Places. The property does not contain any cultural, historic or archaeological resources.

2.12 Land Use

The site is currently forested. The surrounding land uses to the north and east are existing residential lots.

The Manchester Township Land Use and Development Ordinance (Chapter 245) zones the property within the Regional Growth Zone as PB-1. The project complies with all of the zone requirements. Purchase of 10.5 Pinelands Development Quarter Credits is required as outlined in

the certified ordinance 17-025 as is the development of 28 affordable housing units.

The project proposes a total of 141 market rate townhouse units and 28 low/moderate apartment housing units. The resulting density for the 141 to townhouse residential units proposed is 6.7 units per gross acre, less than the maximum permitted density of 8.0 units per acre for townhouse development. The resulting density for the 28 apartment residential units proposed is 1.4 units per gross acre, less than the maximum permitted density of 6.0 units per acre for apartment development. The project is consistent with the Manchester Township Zoning Ordinance and Pinelands Comprehensive Management Plan.

2.13 Air Quality

The subject property lies within a rural residential setting of Manchester Township and is zone PB-1. There are no point sources of air pollution within or surrounding the subject property, including fossil-fueled electric power generating plants, industrial boilers or processing plants. The air quality within this setting is generally good.

The NJDEP, Bureau of Air Monitoring maintains two (2) air quality monitoring stations in Ocean County (the Colliers Mills Fish & Wildlife Management Area Station and the Toms River Elementary School Station) and a station in Burlington County (at the Lebanon State Forest). The Colliers Mills station is in close proximity to the site and is indicative of the ambient air quality in the "northern coastal region" of New Jersey.

The tables from the NJDEP, Bureau of Air Monitoring 2000 Air Quality Report describe the ambient air quality monitoring results of the monitoring stations. As indicated in the table, the air quality standards for the State are generally good at the three stations.

Due to the residential nature of the project proposed, the most significant potential air quality impact would arise from carbon monoxide vehicle emissions. Localized increases typically occur at places of vehicular concentration and delays, such as intersections. Based on the traffic impact study performed by McDonough, Rea & Associates the project will not create any air quality impacts from vehicular concentrations and delays.

3.0 ENVIRONMENTAL IMPACT STATEMENT

The Manchester Township Ordinance regarding preparation and content of an Environmental Impact Statement requires an assessment of both adverse and positive impacts of the proposed activity. These impacts have been previously addressed within the site description and inventory. The following brief list of impacts is provided in summary:

a. Soil Erosion and Sedimentation

Run-off shall be directed to catch basins and a collection system for sedimentation control and direction to detention basins. No erosion is anticipated along the roadways since the project proposes curbing to stabilize the edge of pavement. The proposed development shall be reviewed by the Ocean County Soil Conservation District and complies with their standards. All disturbed areas not occupied by improvements such as roads and houses will be vegetatively stabilized as required by the certified plan.

b. Floodplain

No regulated floodplain areas are located on the project site. No development activities are proposed within any floodplain areas.

c. Surface Water

No surface waters are located on the project site.

d. Ground Water

Significant subsurface disruption will not occur and major impacts to groundwater resources are not anticipated. Potable water will be provided by the JTMUA. Estimated average demand will be approximately 57,000 GPD for the project, based upon the NJ Residential Site Improvement Standards, NJAC 5:21.

e. Ground Water Capabilities

Potable water will be provided by the Manchester Township public water supply system. The groundwater withdrawal will be regulated by the NJDEP under the Manchester Township's diversion and allocation permit. There will be no local impact from the project as there is no groundwater withdrawal proposed at the project site.

f. Sewage Disposal

Sewage will be conveyed to the MTDOU system, and ultimately to the OCUA for treatment. Estimated discharge of approximately 50,000 GPD will result from the project.

g. Solid Waste Disposal

1. Construction All solid waste generated during tree removal activities shall be recycled by creating mulch or firewood for reuse, as appropriate and market conditions dictate. All solid waste generated during construction such as lumber, paper, etc. will be collected in dumpsters located on the site and disposed of in a manner consistent with local ordinances and the Ocean County Recycling Plan. Care will be taken to ensure that all construction debris is collected frequently to prevent any temporary adverse impacts such as wind blown movement.

2. Residences Solid waste generated by the homes will be collected, recycled and disposed of in a manner consistent with local ordinances and the Ocean County Recycling Plan.

h. Vegetation

Approximately 20 acres of forest vegetation will be removed. The project will comply with the Manchester Township Land Use and Tree Ordinance.

i. Wildlife Habitats

Upland forested wildlife habitat will be cleared and developed by the project. No critical wildlife habitats for threatened or endangered species are located on this property.

j. Scenic and Historic Features

No scenic or historic features exist onsite.

k. Air Quality

Decreased air quality because of air-borne dust associated with the proposed construction activities is a projected short-term impact. Methods to control soil erosion and sediment control will be implemented in order to minimize air quality degradation. Long-term degradation of air quality as a result of an increase in traffic is not expected. Levels of service at nearby intersections will not degrade as a result of the project. The proposed project by itself is not anticipated to result in a significant impact on ambient air quality since it will not generate traffic delays.

l. Noise

Projected noise levels, as a result of the proposed development, is not anticipated to increase ambient noise levels above NJDEP standards as described in Section 2.10. The noise levels during construction will be temporarily increased but are subject to regulatory constraints such as maximum noise levels and permissible construction times.

m. Energy Utilization

The proposed development is designed to include energy conservation fixtures and measures, as appropriate.

n. Wetland Impacts

Freshwater wetlands on the project site will not be impacted since no development activities are proposed within freshwater wetlands or the wetland transition area. No irreversible or significant adverse impacts to any wetlands or wetland buffers will occur as a result of this proposed development.

4.0 ENVIRONMENTAL PERFORMANCE CONTROLS

As discussed in the previous sections, various measures have been utilized throughout the design process to avoid or minimize potential adverse environmental impacts. These measures are specifically addressed for individual resource item. In general, the following steps have been taken in order to avoid or minimize adverse environmental impacts:

1. Design of stormwater management system in accordance with current regulations, including green infrastructure and de-centralized stormwater management measures to promote nitrate attenuation, groundwater recharge and flood control.
2. Installation and maintenance of soil erosion control measures during construction.
3. A significant investment in off-site potable water and sanitary sewage systems to provide public water and sewer service to the project, and to minimize any local impacts.

5.0 COMMITMENT OF RESOURCES AND UNAVOIDABLE IMPACTS

The applicant and its consultants have designed and planned this community in concert with the existing and surrounding natural resources. The project will require the following irreversible and irretrievable commitment of resources as well as produce the following unavoidable impacts:

1. Removal of 20 acres of forested vegetation.
2. Increased utilization of municipal services such as solid waste disposal, recycling and educational services by potential population increase.
3. Increased utilization of energy such as electricity and natural gas.
4. Decrease in air quality due to increased traffic.

Compliance with all state, local and municipal regulations shall be demonstrated by the necessity to obtain all required approvals prior to the commencement of construction.

6.0 ALTERNATIVES AND MITIGATING MEASURES

The alternatives to the proposed project are "no-build" which would deny the property owner their lawful use of the land as permitted by Manchester Township Zoning Regulations and the Pinelands Comprehensive Management Plan. The current zoning regulations were established to comply with the affordable housing settlement agreement with Fair Share Housing Council and the Regional Growth requirements in the Pinelands Comprehensive Management Plan. The project serves to meet the goals and objectives of the Master Plan and Fair Share Plan.

The project serves to meet the objectives of the Pinelands Comprehensive Management Plan as residential development within a Regional Growth Zone that will construct affordable housing units and purchase Pineland Development Credits.

There are no environmental factors present on this site to limit the extent of development of the subject property. These factors include freshwater wetlands and wetlands buffers. Layout of the proposed development features is based upon Township Ordinances and setback requirements as well as the Pinelands Comprehensive Management Plan. The site development layout reflects best management practices regarding avoidance and/or minimization of adverse impacts on the environmental resources within the project area.

The stormwater management system meets the criteria for water quality and flood control in the Manchester Township, Ocean County and Pinelands Commission regulations. Alternative designs were investigated in consideration of the existing site limitations (i.e. depth to groundwater, topography). The proposed design provides for green infrastructure, groundwater recharge, water quality and flood control in accordance with applicable regulations.

The resulting design is consistent with applicable State and Local requirements. The proposed design, use of native species in the landscaping plan, adherence to the Soil Erosion and Sediment Control Plan, and utilization of the public water and sewer facilities are the primary mitigating measures incorporated into the project design.

After reviewing a variety of alternatives permitted under the Land Use Ordinances, it was determined that the project, as proposed, will not have any significant impact upon the environment. As proposed, the development is consistent with adopted regulations and standards of the Municipality, State and NJ Pinelands Commission. The mitigating measures included in the site design will offset any potential adverse impacts associated with the project.

7.0 OTHER REQUIRED APPROVALS

The following Table 7.0-5 lists all applicable licenses, permits and approvals required by Federal, State, County and Municipal law, to the best of our knowledge. Copies of each approval will be provided to Manchester Township when received.

TABLE 7.0-5

LIST OF ALL APPLICABLE APPROVALS AND PERMITS

Permit/Approval		Required
Federal		No
State -		
Pinelands Commission		Yes
NJDEP -	CAFRA	No
	Wetlands	No
	Stream Encroachment	No
	Sewer Extension	Yes
	Water Quality Certification	No
	Water Extension	Yes
	Well Permits	No
NJDOT -	Drainage	No
	Access	No
Ocean County		
Preliminary Approval		Yes
Final Approval		Yes
OCUA (Sewerage Authority)		Yes
Soil Erosion (OCSCD)		Yes
Health Dept. (Well & Septic)		No
Health Dept. (Subdivision)		Yes
Manchester Township		
Preliminary Site Plan and Subdivision Approval		Yes
Final Site Plan and Subdivision Approval		Yes
Manchester MUA - Preliminary		Yes - Tentative
		Yes

		- Final
		Yes
Local Clearing Permit		
		Yes
Environmental Commission	Yes	
Bureau of Fire Prevention	Yes	

8.0 REFERENCES

Kummel, H.B. The Geology of New Jersey, 1940 N.J. Dept. Conserv. Del. Bull. 50, 203 pp.
McCormick, J. The Pine Barrens: A Preliminary Ecological Study (1970).
Munsell, Munsell Soil Color Chart, Baltimore, MD, 1975.
"New Jersey's Record Trees," New Jersey Outdoors, September/October 1984.
National Wetland Inventory Map, Lakehurst, NJ Quadrangle.
Shaw, Frank, 1990. Eastern Birds. W.H. Smith Publishers, Inc., New York.
United States Department of Agriculture, Soil Conservation Service, Soil Survey of Ocean County, New Jersey, 1980.
USGS Lakehurst, NJ Quadrangle.
Wolfe, Peter E., The Geology and Landscapes of New Jersey, 1977. Crane, Russak & Company, Inc. New York.
USGS Simulation of groundwater flow in the unconfined aquifer system of the Toms River, Metedeconk River, and Kettle Creek Basins, New Jersey; Water Resources Investigations Report 97-4066; 1997.
Traffic Impact Study prepared by McDonough & Rea Associates
Pinelands Comprehensive Management Plan, NJAC 7:50-1.1 et seq.
Manchester Township Master Plan and Fair Share Housing Plan
Joint Base McGuire-Dix-Lakehurst Joint Land Use Study for Counties of Ocean and Burlington, May, 2009.

FIGURES

APPENDIX A

CERTIFICATE OF FILING

State of New Jersey
THE PINELANDS COMMISSION
PO BOX 359
NEW LISBON, NJ 08064
(609) 894-7300
www.nj.gov/pinelands

PHILIP D. MURPHY
Governor
SHEILA Y. OLIVER
Lt. Governor

LAURA E. MATOS
Chair
SUSAN R. GROGAN
Executive Director

General Information: Info@pinelands.nj.gov
Application Specific Information: AppInfo@pinelands.nj.gov

March 1, 2023

Mordechai Eichorn (via email)
Parkwood Square LP and Parkwood Center B, LLC
1500 River Ave.
Lakewood NJ 08701

Re: Application # 1985-1254.004
Block 65, Lots 11 - 14
Manchester Township

Dear Mr. Eichorn:

Pursuant to N.J.A.C. 7:50-4.34 of the Pinelands Comprehensive Management Plan, the completion of this application has resulted in the issuance of the enclosed *Inconsistent Certificate of Filing*. The reason(s) for the inconsistency is explained on Page 3 and must be resolved.

The Inconsistent Certificate of Filing is not an approval. It is the document necessary to allow any municipal or county agency to review and act on the proposed development application. All municipal and county permits and approvals granted for the proposed development are subject to review by the Pinelands Commission. **No permit or approval shall take effect and no development may occur until the Commission issues a letter indicating that the municipal or county permit or approval may take effect.**

Upon receipt of any municipal or county permit or approval, please submit a copy to the Commission's office with the additional items listed on the enclosed *Local Agency Approval Submission Checklist*.

If you have any questions, please contact Ernest M. Deman of our staff.

Sincerely,

for Charles M. Horner, P.P.
Director of Regulatory Programs

Enc: Inconsistent Certificate of Filing
Local Agency Approval Submission Checklist
(Above form(s) may be found at nj.gov/pinelands/appli/tools/.)

c: Secretary, Manchester Township Planning Board (via email)
Manchester Township Construction Code Official (via email)
Manchester Township Environmental Commission (via email)

Secretary, Ocean County Planning Board (via email)
Ian M Borden, PP, AICP (via email)

.

New Jersey Pinelands Commission
PO Box 359
New Lisbon, NJ 08064
(609) 894-7300

Inconsistent
CERTIFICATE OF FILING

Application #: 1985-1254.004
Applicant: Parkwood Square LP and Parkwood Center B, LLC
Municipality: Manchester Township
Block 65, Lots 11 - 14
Regional Growth Area, PB-1 Zoning District: 20.86 acres

Proposed Development
Construction of 167 dwelling units and a clubhouse

Plan(s) Subject of Certificate of Filing
Site Plan, consisting of 19 sheets, prepared by Professional Design Services, L.L.C. and dated as follows:
Sheets 1-19, dated 4/25/2022

for **Charles M. Horner, P.P.**
Director of Regulatory Programs

March 1, 2023
Date

BACKGROUND

Existing development:

- Vacant land

Relevant Information:

- The proposed development will be serviced by public sanitary sewer.
- The parcel is located in Manchester Township's PB-1 zoning district.
- The Manchester Township land use ordinance requires that Pinelands Development Credits (PDCs) must be acquired and redeemed for 30 percent of the proposed market rate units in any townhouse development located within the PB-1 zoning district. The applicant has indicated that 139 market rate units are proposed. A total of 10.50 PDCs are required.
- The Manchester Township land use ordinance permits townhouses at a maximum density of eight dwelling units per acre in the PB-1 zoning district. The "by-right" density on the 20.86 acre parcel is 166 dwelling units. The applicant proposes a total of 167 dwelling units. To maintain consistency with the density requirement of the Manchester Township land use ordinance, 0.25 PDCs must be acquired and redeemed.

CONDITIONS

1. Prior to Commission issuance of a letter advising that any submitted municipal construction permit may take effect, the Commission must receive documentation from the Pinelands Development Credit (PDC) Bank that the requisite 10.75 PDCs have been acquired and submitted to the PDC Bank for redemption.

2. Item(s) on the attached *inconsistencies* document must be resolved prior to Commission issuance of a letter indicating that any approvals or permits can take effect.

NEXT STEPS

- This Certificate of Filing is not an approval.
- Submit a copy of this Certificate of Filing to all county and municipal agencies that are required to review and act on your application (municipal planning board, building department, county health department, etc.).
- Send a copy of all approvals/permits that are issued by the county or municipality to the Pinelands Commission for review. Please use the attached *Local Agency Approval Submission Checklist* to make sure you are submitting all required documentation related to the approval/permit.
- No local approval/permit takes effect and no development can occur until the Pinelands Commission has reviewed the approval. When we complete our review, we will issue you a letter stating that the approval/permit can take effect.

INCONSISTENCIES:

This application as currently proposed is inconsistent with the following standard(s) of the Manchester Township certified land use ordinance and the Pinelands Comprehensive Management Plan (CMP):

1. Stormwater (N.J.A.C. 7:50-6.84(a)6)

   The Manchester Township land use ordinance and the CMP require that all development meet the stormwater standards. The application has not provided the information required to demonstrate that the proposed development will meet this standard.

2. Protection of threatened or endangered plants and wildlife (N.J.A.C. 7:50-6.27 & 6.33)

   The Manchester Township land use ordinance and the CMP require that all development be designed to avoid irreversible adverse impacts on the survival of any local population of threatened or endangered plant species and on habitats that are critical to the survival of any local populations of threatened or endangered animal species. The applicant has not provided the information required to demonstrate that the proposed development will meet these standards.

Commission receipt of any county or municipal approval or permit for the development as currently proposed will likely result in the scheduling of a Commission staff public hearing to review the issues raised by the above-referenced inconsistency(ies).

PDS
PROFESSIONAL DESIGN SERVICES, L.L.C.

1245 AIRPORT ROAD • SUITE 1 • LAKEWOOD • NEW JERSEY 08701 • 732-363-0060 • FAX 732-363-0073
ENGINEERING@PDS-NJ.COM

IAN M. BORDEN, P.P., PRESIDENT
SEAN D. COUGHLAN ASSOCIATE
WILLIAM A. STEVENS, P.E., P.P. VICE PRESIDENT
GRAHAM J. MACFARLANE, P.E., P.P., C.M.E. ASSOCIATE

June 19, 2023

Ms. Amanda Kisty
Manchester Township Planning Board
One Colonial Drive
Lakehurst, NJ 08759

RECEIVED
JUN 2 0 2023

Re: Parkwood Square
Preliminary & Final Major Site Plan
Manchester Township, Ocean County
PDS Ref. #18123

Dear Ms. Kisty:

The above captioned application was deemed complete. The project has been revised to include commercial uses along Route 571 as well as the affordable housing units in apartment units located above a portion of the commercial uses as well as the townhouse residential units. Enclosed please find the following information:

1. Four (4) sets of Major Site Plans
2. Four (4) copies of Stormwater Management Report
3. Four (4) copies of Environmental Impact Statement
4. Four (4) copies of Traffic Report prepared by McDonough Rea & Associates dated May 30, 2023

Should you have any questions or require additional information, please do not hesitate to contact this office.

Very truly yours,

Ian M. Borden, P.P., President
Professional Design Services, L.L.C.

IMB/ec
Enclosure
Cc: Parkwood Square, LLC

McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

Kevin P. McDonough (1953-1994)
John H. Rea, P.E.
Jay S. Troutman, Jr., P.E.
Scott T. Kennel

Revised May 30, 2023
May 10, 2022

Manchester Township Planning Board
1 Colonial Drive
Manchester, New Jersey 08759

Re: Townhouse Plan/Mixed-Use Plan
Lots 11, 12, 13 and 14 in Block 65
Manchester Township, Ocean County
MRA File No. 22-147

Dear Board Members:

McDonough & Rea Associates (MRA) has been asked to provide the Planning Board with a *Traffic Impact Analysis* for plans to construct 169 multi-family homes and office/retail space on the noted property. The subject property is on the northeast corner of Ridgeway Road (CR 571) and South Hope Chapel Road (CR 547), as shown on *Figure 1, Site location Map* in the *Appendix*.

Access is proposed to both CR 571 and CR 547 which are both under the jurisdiction of Ocean County.

SCOPE OF STUDY

In order to prepare a thorough *Traffic Impact Analysis* for the townhome project, MRA conducted the following tasks:

1. Made field visits to the site to inventory existing roadway and traffic conditions in the area.

2. Conducted peak hour traffic counts at the intersection of CR 571/CR 547 during the critical AM and PM peak hours when traffic flow on the adjacent roadway network and traffic generated by the townhomes will be at maximum levels

3. Prepared trip generation estimates based on the Institute of Transportation Engineers (ITE) data.

4. Distributed site generated traffic from the multi-family homes and office/retail space in accordance with anticipated origins and destinations.

Please reply to:
☒ **1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673**
☐ **105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181**

McDonough & Rea Associates, Inc.
Traffic and Transportation Consulting
1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

5. Prepared estimates of future traffic volume demand for a design year of 2033 in accordance with Ocean County Planning Board protocol including background traffic growth and traffic generated by other adjacent development projects.

6. Conducted level of service capacity analyses for the 2 site driveways to CR 571 and CR 547 as well as the off-site signalized intersection of CR 571/CR 547.

7. Reviewed the *Site Plan* with respect to availability and accessibility of the parking supply and conformance to New Jersey Residential Site Improvement Standards (RSIS).

The following report sets forth the database accumulated and the conclusions reached with respect to the Manchester townhomes.

EXISTING CONDITIONS

The subject property is located on the northeast corner of CR 571/CR 547 and contains approximately 20.86 acres and is located within the PB-1 Zone. South Hope Chapel Road, also known as CR 547, is a north/south Ocean County arterial roadway in the vicinity of the site. Ridgeway Road, also known as CR 571, is an east/west Ocean County arterial roadway in the vicinity of the site.

CR 547 intersects CR 571 at a signalized intersection. All 4 legs to the intersection provide for 3 approach lanes. The intersection has crosswalks across all 4 corners and also has pedestrian pushbuttons and pedestrian signals. All 4 approaches to the intersection have protected/permissive left turn arrows.

EXISTING TRAFFIC VOLUMES

Traffic volume data was collected at CR 571/CR 547 intersection by conducting manual turning movement counts in April 2022. The AM peak street hour counts were conducted on April 6, 2022 and the PM peak street hour counts on April 11, 2022. Design year 2033 no-build volues are shown on *Figure 2R* in the *Appendix* and include background traffic growth and traffic from other approved projects in the area.

McDonough & Rea Associates, Inc.
Traffic and Transportation Consulting
1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

TRIP GENERATION/DISTRIBUTION

Estimates of traffic to be generated by the 169 multi-family homes and office/retail uses were made after consulting the *11th Edition* of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. *Table I* illustrates the anticipated peak hour traffic generation from the project.

TABLE I
TRIP GENERATION
169 MULTI-FAMILY HOMES & OFFICE/RETAIL SPACE

	AM PSH			PM PSH		
USE	IN	OUT	TOTAL	IN	OUT	TOTAL
9,200 SF Retail	13	9	22	30	30	60
22,000 SF Office	30	4	34	6	26	32
169 Multi-Family Units	18	58	76	59	34	93
Total	**61**	**71**	**132**	**95**	**90**	**185**

With respect to the distribution of site generated traffic, a review was made of existing traffic patterns in the area, locations of employment centers and access to higher order roadways. Based on this review, traffic was distributed as follows:

- 25 percent to/from the north on CR 547
- 25 percent to/from the south on CR 547
- 25 percent to/from the east on CR 571
- 25 percent to/from the west on CR 571

Site generated and distributed traffic volumes are shown on *Figure 3R* in the *Appendix*.

ANALYSIS OF FUTURE TRAFFIC CONDITIONS

A design year of 2033 was assumed in accordance with Ocean County Planning Board protocol. Existing 2023 traffic volumes were expanded by 10 percent to include background traffic growth based on New Jersey Department of Transportation (NJDOT) historical growth rate data for the area. In addition to the foregoing, traffic from the following projects was included in a projection of future 2033 design year volumes.

McDonough & Rea Associates, Inc.
Traffic and Transportation Consulting
1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

- *Jackson Trails* residential project on CR 547 in Jackson Township north of the Manchester Township border (467 units).
- Manchester Township office/retail project on CR 547 north of the subject property.
- Proposed Ocean County park on the southeast corner of CR 571/CR 547 (250 acres; scheduled for a passive/recreational park).

Figure 4R in the *Appendix*, illustrates design year 2033 *build* traffic volumes, including the aforementioned projects and other background traffic growth as described.

Traffic engineers calculate levels of service of unsignalized and signalized intersections which relate to the quality of traffic flow. Level of service is a measure of average control delay. Average control delay is the time lost due to deceleration and the amount of time from when a vehicle is stopped for a traffic control device (or at the end of the queue) to when the vehicle departs the intersection. Delay is a relative quantity of driver discomfort, frustration, fuel consumption, and loss in travel time.

Levels of service range from "A" to "F," with "A" being the highest, or best attainable level of service. Level of service "E" with average control delays of not more than 50 seconds per vehicle at an unsignalized intersection or 80 seconds per vehicle at a signalized intersection indicates near to at capacity conditions and is generally considered the limit of acceptable level of service and delay.

Full definitions of levels of service for unsignalized and signalized intersections and level of service summaries are included in the *Appendix*. The intersections studied by this report were analyzed according to the procedures set forth in the *Highway Capacity Manual 2010*, using the *McTrans Highway Capacity Software (HCS7)*, release 7.9.5.

CR 571/CR 547

At the signalized CR 571/CR 547 intersection the signalized level of service protocol was followed with a finding that the intersection will operate at an overall level of service "C" for the AM peak street hour for both the *no-build* and *build* condition in the 2033 design year. The intersection will operate at an overall level of service "D" for the PM peak street hour for both the *no-build* and *build* condition. Incremental increases in delay at the intersection are minimal due to the project.

McDonough & Rea Associates, Inc.
Traffic and Transportation Consulting
1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

SITE ACCESS TO CR 571

At the site access to CR 571, findings were that exiting movements from the project to CR 571 will do so at level of service "C" for the AM peak street hour and level of service "D" for the PM peak street hour for the 2033 design year. Therefore, this intersection will operate within accepted traffic engineering parameters.

SITE ACCESS TO CR 547

At the site access to CR 547, findings were that exiting movements will do so at level of service "B" during the AM peak street hour and level of service "C" for the PM peak street hour. Therefore, this intersection will operate within accepted traffic engineering parameters.

CONCLUSIONS

It is concluded, based on MRA's analyses of the Manchester Township residential/office/retail project, that it can be approved and operate compatibly with future traffic conditions in the area. The site driveways to CR 571 and CR 547 will operate at acceptable levels of service for the 2033 design year as will the signalized offsite intersection of CR 571/CR 547.

A representative from MRA will attend an upcoming Manchester Township Planning Board meeting to provide expert testimony and answer questions Board members, Board experts or the public may have.

Very truly yours,

John H. Rea

John H. Rea, PE
Principal

Scott T. Kennel
Sr. Associate

cc: Mordechai Eichorn
Ian Borden, PE

APPENDIX

McDONOUGH & REA ASSOCIATES

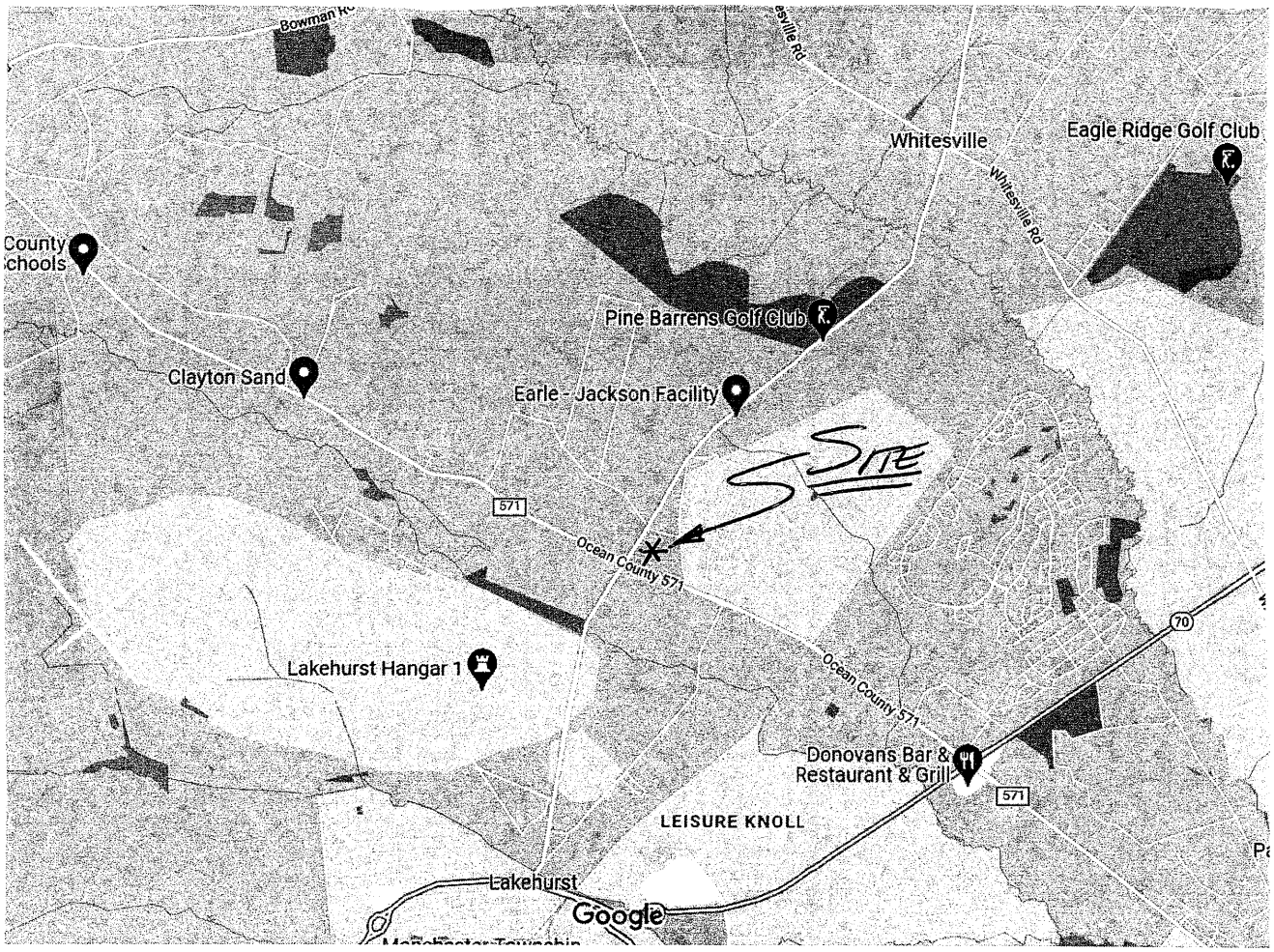
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 1

JOB NO. 22-147

DATE: APR 2022

SUBJECT: MANCHESTER TOWNHOMES
SITE LOCATION MAP



McDONOUGH & REA ASSOCIATES

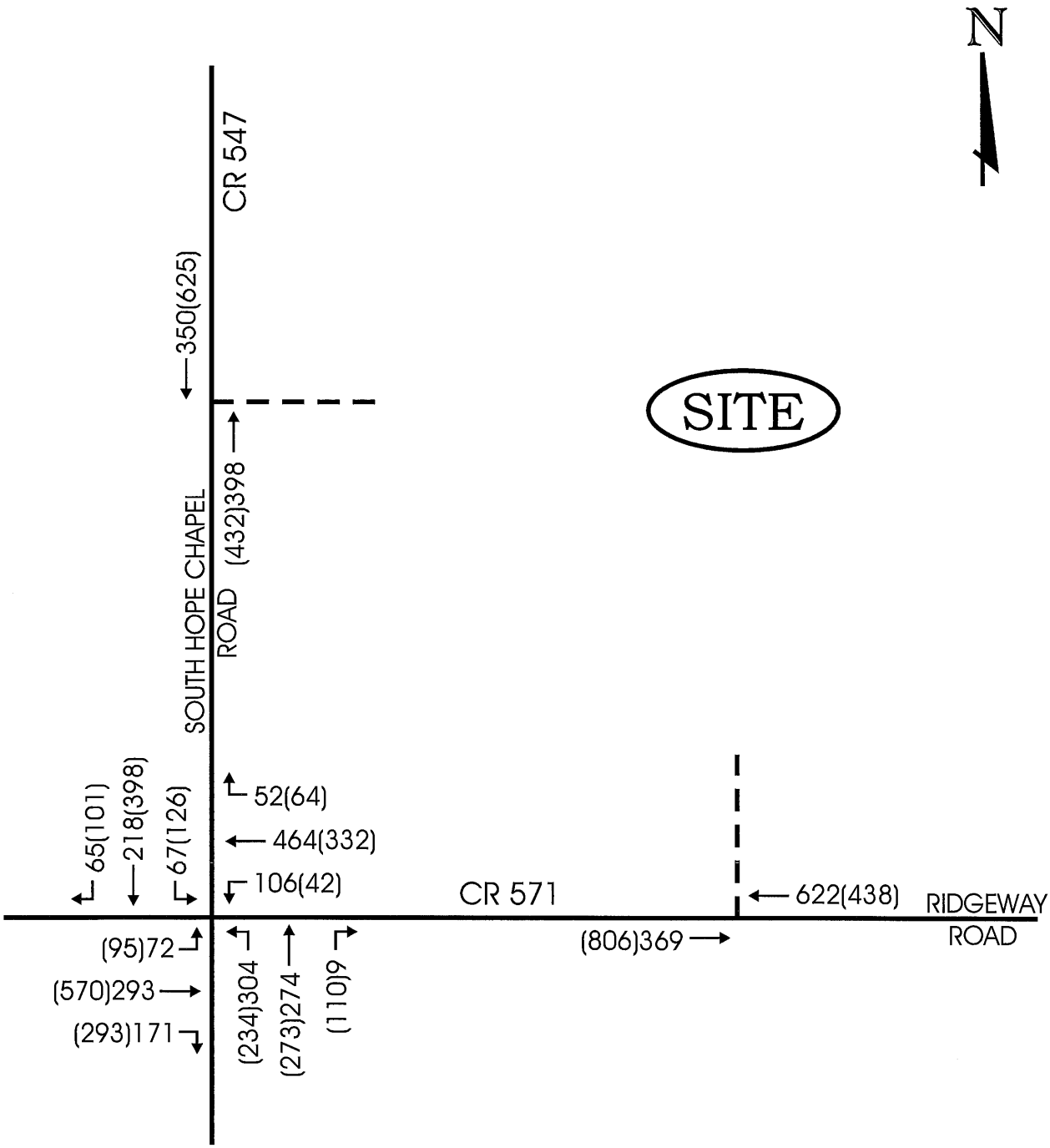
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 2R

JOB NO. 22-147

DATE: MAY 2023

SUBJECT: MANCHESTER TOWNHOMES
2033 NO - BUILD TRAFFIC VOLUMES



LEGEND:← AM PSH(PM PSH)

McDONOUGH & REA ASSOCIATES

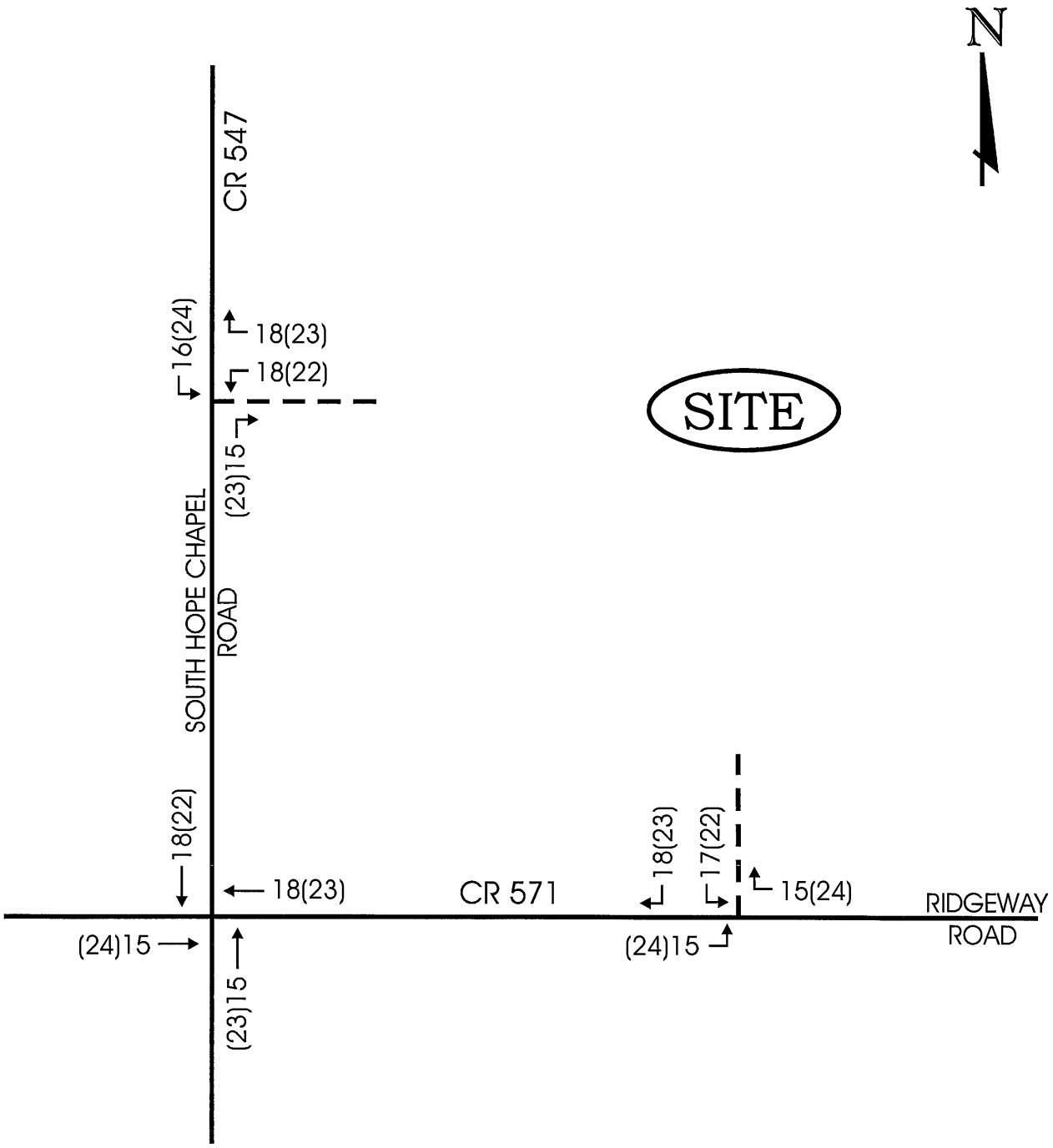
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 3R

JOB NO. 22-147

DATE: MAY 2023

SUBJECT: MANCHESTER TOWNHOMES
SITE GENERATED TRAFFIC VOLUMES



LEGEND:← AM PSH(PM PSH)

McDONOUGH & REA ASSOCIATES

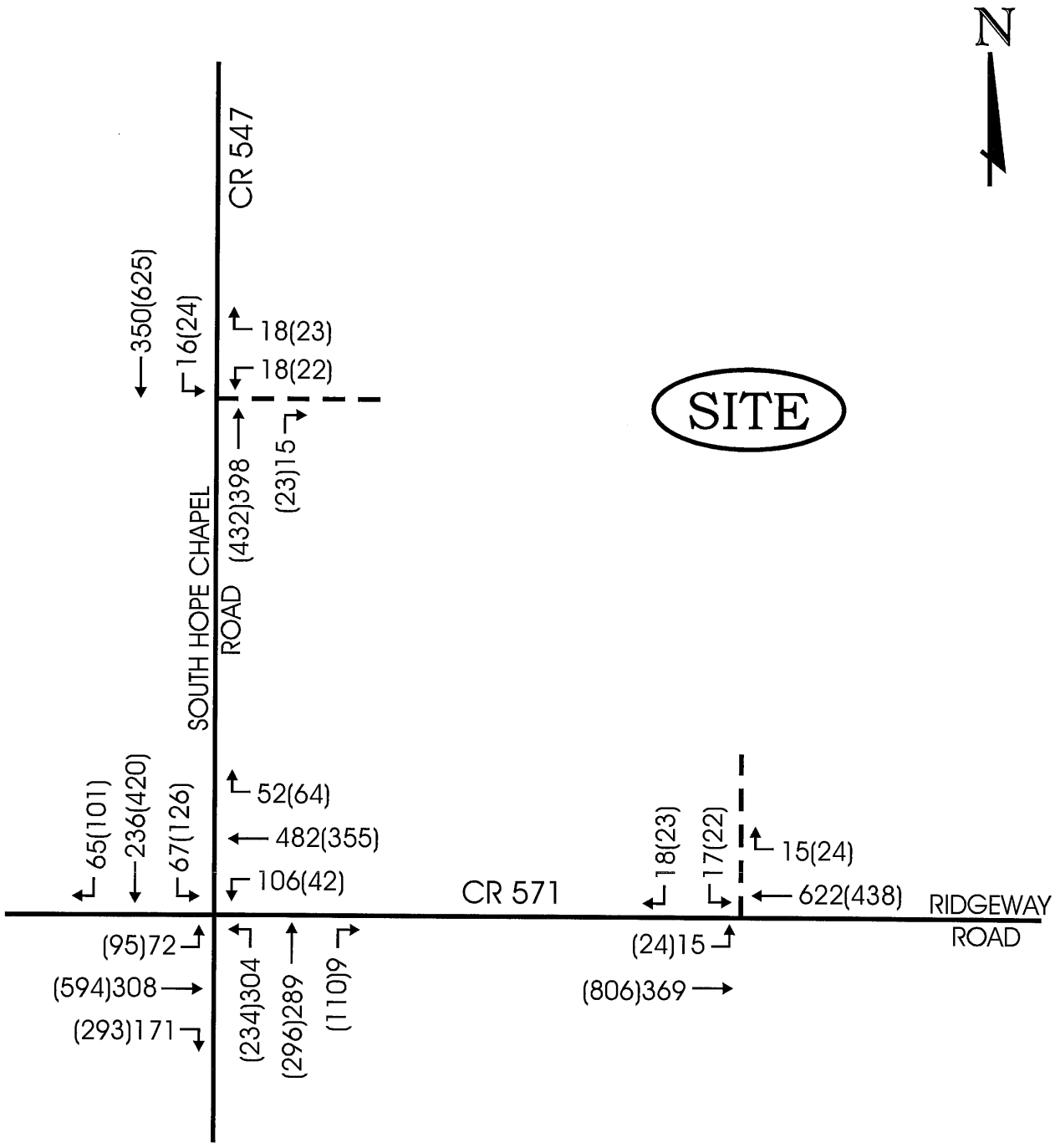
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 4R

JOB NO. 22-147

DATE: MAY 2023

SUBJECT: MANCHESTER TOWNHOMES
2033 BUILD TRAFFIC VOLUMES



LEGEND:⟵ AM PSH(PM PSH)

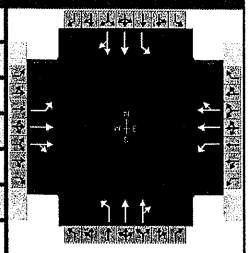
LEVEL OF SERVICE
FOR
SIGNALIZED INTERSECTIONS[1]

Level of Service	Description	Control (Signal) Delay Per Vehicle (Seconds)
A	Very short delay, good progression; most vehicles do not stop at intersection.	≤ 10.0
B	Generally good progression and/or short cycle length; more vehicles stop at intersection than at Level of Service "A."	> 10.0 and ≤ 20.0
C	Fair progression and/or longer cycle length; significant number of vehicles stop at intersection, though many still pass through without stopping.	> 20.0 and ≤ 35.0
D	Congestion becomes noticeable; longer delays from unfavorable progression, long cycle lengths, or high volume/capacity ratios; many vehicles stop at intersection.	> 35.0 and ≤ 55.0
E	Considered to be the limit of acceptable delay; indicative of poor progression, long cycle lengths, or high volume/capacity ratios; frequent individual cycles failures.	> 55.0 and ≤ 80.0
F	Often an indication of over-saturation (i.e., arrival flow exceeds capacity); also caused by poor progression and long cycles lengths; capacity is not necessarily exceeded under this level of service.	> 80.0

[1] Transportation Research Board, Highway Capacity Manual 2010, National Research Council, Washington, DC, 2010.

HCS Signalized Intersection Results Summary

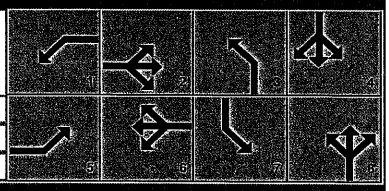
General Information				Intersection Information	
Agency	MRA			Duration, h	0.250
Analyst	STK	Analysis Date		Area Type	Other
Jurisdiction		Time Period	AM	PHF	0.90
Urban Street	CR 571-CR 547	Analysis Year	2033 NOBUILD	Analysis Period	1> 7:00
Intersection		File Name	22-147ANB-1.xus		
Project Description	22-147ANB-1				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	72	293	171	106	464	52	304	274	9	67	218	65

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.0	25.0	10.0	26.0	0.0	0.0	
Yellow	3.0	5.0	5.0	5.0	0.0	0.0	
Red	0.0	2.0	0.0	2.0	0.0	0.0	



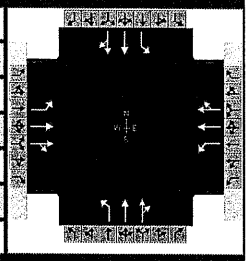
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	32.0	10.0	32.0	15.0	33.0	15.0	33.0
Change Period, ($Y+R_c$), s	3.0	7.0	3.0	7.0	5.0	7.0	5.0	7.0
Max Allow Headway (*MAH*), s	2.7	0.0	2.7	0.0	2.7	2.9	2.7	2.9
Queue Clearance Time (g_s), s	4.7		6.1		12.0	7.9	4.4	8.3
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.00	0.01	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	80	271	244	118	291	282	338	158	157	74	161	154
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1641	1781	1870	1804	1781	1870	1849	1781	1870	1725
Queue Service Time (g_s), s	2.7	11.0	11.4	4.1	12.0	12.1	10.0	5.9	5.9	2.4	6.0	6.3
Cycle Queue Clearance Time (g_c), s	2.7	11.0	11.4	4.1	12.0	12.1	10.0	5.9	5.9	2.4	6.0	6.3
Green Ratio (*g/C*)	0.36	0.28	0.28	0.36	0.28	0.28	0.40	0.29	0.29	0.40	0.29	0.29
Capacity (*c*), veh/h	321	520	456	333	520	501	488	540	534	492	540	498
Volume-to-Capacity Ratio (*X*)	0.250	0.522	0.536	0.354	0.560	0.563	0.692	0.292	0.293	0.151	0.297	0.309
Back of Queue (*Q*), ft/ln (85 th percentile)	54.6	188	172.4	81.9	202.6	195.6	208.7	109.1	106.8	43.8	111	106.4
Back of Queue (*Q*), veh/ln (85 th percentile)	2.1	7.4	6.9	3.2	8.0	7.8	8.2	4.3	4.3	1.7	4.4	4.3
Queue Storage Ratio (*RQ*) (85 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.8	27.5	27.6	21.2	27.8	27.8	22.2	24.9	24.9	17.3	24.9	25.0
Incremental Delay (d_2), s/veh	1.9	3.7	4.5	2.9	4.3	4.5	7.9	1.4	1.4	0.7	1.4	1.6
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	22.6	31.2	32.1	24.1	32.1	32.4	30.1	26.2	26.3	17.9	26.3	26.6
Level of Service (LOS)	C	C	C	C	C	C	C	C	C	B	C	C
Approach Delay, s/veh / LOS	30.4	C		30.8	C		28.2	C		24.8	C	
Intersection Delay, s/veh / LOS	29.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS Signalized Intersection Results Summary

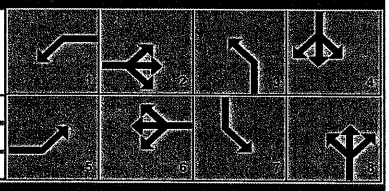
General Information				Intersection Information	
Agency	MRA			Duration, h	0.250
Analyst	STK	Analysis Date		Area Type	Other
Jurisdiction		Time Period	AM	PHF	0.90
Urban Street	CR 571-CR 547	Analysis Year	2033 BUILD	Analysis Period	1> 7:00
Intersection		File Name	22-147AFB-1.xus		
Project Description	22-147AFB-1				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	72	308	171	106	482	52	304	289	9	67	236	65

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.0	25.0	10.0	26.0	0.0	0.0	
Yellow	3.0	5.0	5.0	5.0	0.0	0.0	
Red	0.0	2.0	0.0	2.0	0.0	0.0	



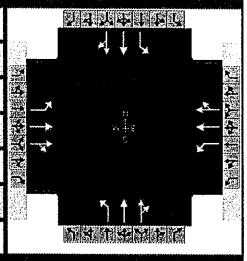
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	32.0	10.0	32.0	15.0	33.0	15.0	33.0
Change Period, ($Y+R_c$), s	3.0	7.0	3.0	7.0	5.0	7.0	5.0	7.0
Max Allow Headway (MAH), s	2.7	0.0	2.7	0.0	2.7	2.9	2.7	2.9
Queue Clearance Time (g_s), s	4.7		6.1		12.0	8.3	4.4	8.7
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		1.00		1.00	0.00	0.01	0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	80	280	253	118	301	292	338	166	165	74	171	164
Adjusted Saturation Flow Rate (s), veh/h/ln	1781	1870	1647	1781	1870	1806	1781	1870	1850	1781	1870	1733
Queue Service Time (g_s), s	2.7	11.4	11.8	4.1	12.5	12.5	10.0	6.2	6.3	2.4	6.4	6.7
Cycle Queue Clearance Time (g_c), s	2.7	11.4	11.8	4.1	12.5	12.5	10.0	6.2	6.3	2.4	6.4	6.7
Green Ratio (g/C)	0.36	0.28	0.28	0.36	0.28	0.28	0.40	0.29	0.29	0.40	0.29	0.29
Capacity (c), veh/h	314	520	458	327	520	502	479	540	535	485	540	501
Volume-to-Capacity Ratio (X)	0.255	0.538	0.552	0.360	0.579	0.583	0.705	0.307	0.309	0.154	0.316	0.327
Back of Queue (Q), ft/ln (85 th percentile)	54.8	194.3	178.8	82.2	210.4	203.3	210.5	114.4	112	43.9	117.2	112.3
Back of Queue (Q), veh/ln (85 th percentile)	2.2	7.7	7.2	3.2	8.3	8.1	8.3	4.5	4.5	1.7	4.6	4.5
Queue Storage Ratio (RQ) (85 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.9	27.6	27.7	21.2	28.0	28.0	22.4	25.0	25.0	17.3	25.0	25.1
Incremental Delay (d_2), s/veh	1.9	4.0	4.7	3.1	4.7	4.9	8.4	1.5	1.5	0.7	1.5	1.7
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	22.8	31.6	32.5	24.3	32.6	32.9	30.8	26.4	26.5	18.0	26.6	26.9
Level of Service (LOS)	C	C	C	C	C	C	C	C	C	B	C	C
Approach Delay, s/veh / LOS	30.8	C		31.4	C		28.7	C		25.1	C	
Intersection Delay, s/veh / LOS	29.4						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS Signalized Intersection Results Summary

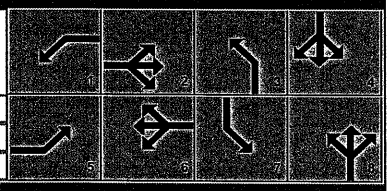
General Information				Intersection Information	
Agency	MRA			Duration, h	0.250
Analyst	STK	Analysis Date		Area Type	Other
Jurisdiction		Time Period	PM	PHF	0.90
Urban Street	CR 571-CR 547	Analysis Year	2033 NOBUILD	Analysis Period	1> 7:00
Intersection		File Name	22-147PNB-1.xus		
Project Description	22-147PNB-1				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	95	570	293	42	332	64	234	273	110	126	398	101

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.0	25.0	10.0	26.0	0.0	0.0	
Yellow	3.0	5.0	5.0	5.0	0.0	0.0	
Red	0.0	2.0	0.0	2.0	0.0	0.0	



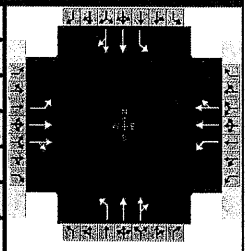
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	32.0	10.0	32.0	15.0	33.0	15.0	33.0
Change Period, ($Y+R_c$), s	3.0	7.0	3.0	7.0	5.0	7.0	5.0	7.0
Max Allow Headway (*MAH*), s	2.7	0.0	2.7	0.0	2.7	3.0	2.7	3.0
Queue Clearance Time (g_s), s	5.7		3.6		11.2	10.9	6.6	13.7
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	1.6	0.0	1.5
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		0.21		1.00	0.01	0.36	0.03

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	106	509	450	47	224	216	260	220	205	140	285	269
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1655	1781	1870	1766	1781	1870	1689	1781	1870	1740
Queue Service Time (g_s), s	3.7	24.3	24.3	1.6	8.9	9.0	9.2	8.5	8.9	4.6	11.5	11.7
Cycle Queue Clearance Time (g_c), s	3.7	24.3	24.3	1.6	8.9	9.0	9.2	8.5	8.9	4.6	11.5	11.7
Green Ratio (*g/C*)	0.36	0.28	0.28	0.36	0.28	0.28	0.40	0.29	0.29	0.40	0.29	0.29
Capacity (*c*), veh/h	366	520	460	219	520	490	395	540	488	440	540	503
Volume-to-Capacity Ratio (*X*)	0.289	0.979	0.979	0.214	0.432	0.439	0.659	0.408	0.421	0.318	0.528	0.535
Back of Queue (*Q*), ft/ln (85 th percentile)	72.2	482.3	435	33.1	154.8	148.3	164.6	149.2	140.2	85.8	194	183.7
Back of Queue (*Q*), veh/ln (85 th percentile)	2.8	19.0	17.4	1.3	6.1	5.9	6.5	5.9	5.6	3.4	7.6	7.3
Queue Storage Ratio (*RQ*) (85 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.6	32.2	32.2	22.7	26.7	26.7	20.5	25.8	25.9	18.3	26.9	26.9
Incremental Delay (d_2), s/veh	2.0	34.7	37.1	2.2	2.6	2.8	8.4	2.3	2.7	1.9	3.7	4.0
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	22.6	66.9	69.4	24.9	29.3	29.6	28.8	28.1	28.6	20.2	30.5	31.0
Level of Service (LOS)	C	E	E	C	C	C	C	C	C	C	C	C
Approach Delay, s/veh / LOS	63.6	E		29.0	C		28.5	C		28.6	C	
Intersection Delay, s/veh / LOS	41.3						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

HCS Signalized Intersection Results Summary

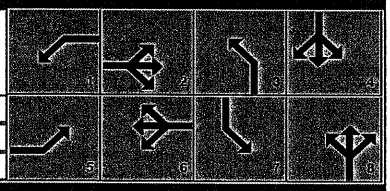
General Information				Intersection Information	
Agency	MRA			Duration, h	0.250
Analyst	STK	Analysis Date		Area Type	Other
Jurisdiction		Time Period	PM	PHF	0.90
Urban Street	CR 571-CR 547	Analysis Year	2033 BUILD	Analysis Period	1> 7:00
Intersection		File Name	22-147PFB-1.xus		
Project Description	22-147PFB-1				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	95	594	293	42	355	64	234	296	110	126	420	101

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	7.0	25.0	10.0	26.0	0.0	0.0	
Yellow	3.0	5.0	5.0	5.0	0.0	0.0	
Red	0.0	2.0	0.0	2.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase	5	2	1	6	3	8	7	4
Case Number	1.1	4.0	1.1	4.0	1.1	4.0	1.1	4.0
Phase Duration, s	10.0	32.0	10.0	32.0	15.0	33.0	15.0	33.0
Change Period, ($Y+R_c$), s	3.0	7.0	3.0	7.0	5.0	7.0	5.0	7.0
Max Allow Headway (*MAH*), s	2.7	0.0	2.7	0.0	2.7	3.0	2.7	3.0
Queue Clearance Time (g_s), s	5.7		3.6		11.2	11.4	6.6	14.3
Green Extension Time (g_e), s	0.0	0.0	0.0	0.0	0.0	1.7	0.0	1.6
Phase Call Probability	1.00		1.00		1.00	1.00	1.00	1.00
Max Out Probability	1.00		0.21		1.00	0.01	0.36	0.04

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	106	522	463	47	237	228	260	233	218	140	298	281
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1781	1870	1660	1781	1870	1771	1781	1870	1699	1781	1870	1745
Queue Service Time (g_s), s	3.7	25.0	25.0	1.6	9.5	9.6	9.2	9.1	9.4	4.6	12.1	12.3
Cycle Queue Clearance Time (g_c), s	3.7	25.0	25.0	1.6	9.5	9.6	9.2	9.1	9.4	4.6	12.1	12.3
Green Ratio (*g/C*)	0.36	0.28	0.28	0.36	0.28	0.28	0.40	0.29	0.29	0.40	0.29	0.29
Capacity (*c*), veh/h	356	520	461	219	520	492	387	540	491	430	540	504
Volume-to-Capacity Ratio (*X*)	0.296	1.005	1.005	0.214	0.457	0.464	0.673	0.432	0.444	0.325	0.551	0.557
Back of Queue (*Q*), ft/ln (85 th percentile)	72.6	517.1	466.3	33.1	163.6	157	166.2	157.6	148.3	86	203.5	192.3
Back of Queue (*Q*), veh/ln (85 th percentile)	2.9	20.4	18.7	1.3	6.4	6.3	6.5	6.2	5.9	3.4	8.0	7.7
Queue Storage Ratio (*RQ*) (85 th percentile)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Uniform Delay (d_1), s/veh	20.7	32.5	32.5	22.7	26.9	26.9	20.6	26.0	26.1	18.4	27.1	27.1
Incremental Delay (d_2), s/veh	2.1	40.7	43.1	2.2	2.9	3.1	9.0	2.5	2.9	2.0	4.0	4.4
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (*d*), s/veh	22.8	73.2	75.6	24.9	29.8	30.1	29.6	28.5	29.0	20.4	31.1	31.5
Level of Service (LOS)	C	F	F	C	C	C	C	C	C	C	C	C
Approach Delay, s/veh / LOS	69.3	E		29.5	C		29.1	C		29.2	C	
Intersection Delay, s/veh / LOS	43.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS								
Bicycle LOS Score / LOS								

LEVEL OF SERVICE CRITERIA
FOR
TWO-WAY STOP-CONTROLLED INTERSECTIONS[1]

Level of Service	Average Control Delay
A	$\leq$ 10.0 Seconds Per Vehicle
B	> 10.0 and $\leq$ 15.0 Seconds Per Vehicle
C	> 15.0 and $\leq$ 25.0 Seconds Per Vehicle
D	> 25.0 and $\leq$ 35.0 Seconds Per Vehicle
E	> 35.0 and $\leq$ 50.0 Seconds Per Vehicle
F	> 50.0 Seconds Per Vehicle

[1] Transportation Research Board, Highway Capacity Manual 2010, National Research Council, Washington, DC, 2010.

HCS Two-Way Stop-Control Report

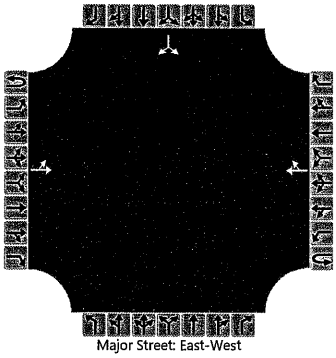
General Information

Analyst	STK
Agency/Co.	MRA
Date Performed	5/24/2023
Analysis Year	2033
Time Analyzed	AM
Intersection Orientation	East-West
Project Description	22-147AFB-2 BUILD

Site Information

Intersection	RT 571 & SITE ACCESS
Jurisdiction	
East/West Street	RT 571
North/South Street	SITE ACCESS
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		15	369				622	15						17		18
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		17													39	
Capacity, c (veh/h)		886													291	
v/c Ratio		0.02													0.13	
95% Queue Length, Q_{95} (veh)		0.1													0.5	
Control Delay (s/veh)		9.1	0.2												19.3	
Level of Service (LOS)		A	A												C	
Approach Delay (s/veh)	0.6												19.3			
Approach LOS	A												C			

HCS Two-Way Stop-Control Report

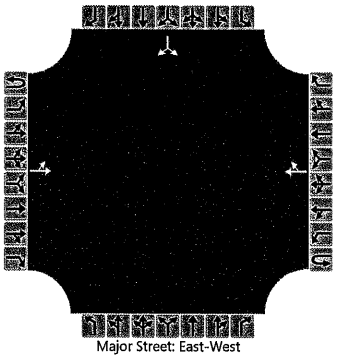
General Information

Analyst	STK
Agency/Co.	MRA
Date Performed	5/24/2023
Analysis Year	2033
Time Analyzed	PM
Intersection Orientation	East-West
Project Description	22-147PFB-2 BUILD

Site Information

Intersection	RT 571 & SITE ACCESS
Jurisdiction	
East/West Street	RT 571
North/South Street	SITE ACCESS
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	0	0		0	1	0
Configuration		LT						TR							LR	
Volume (veh/h)		24	806				438	24						22		23
Percent Heavy Vehicles (%)		3												3		3
Proportion Time Blocked																
Percent Grade (%)														0		
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		4.1												7.1		6.2
Critical Headway (sec)		4.13												6.43		6.23
Base Follow-Up Headway (sec)		2.2												3.5		3.3
Follow-Up Headway (sec)		2.23												3.53		3.33

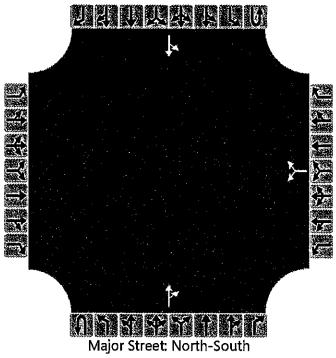
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)		27													50	
Capacity, c (veh/h)		1047													223	
v/c Ratio		0.03													0.22	
95% Queue Length, Q_{95} (veh)		0.1													0.8	
Control Delay (s/veh)		8.5	0.4												25.7	
Level of Service (LOS)		A	A												D	
Approach Delay (s/veh)	0.7												25.7			
Approach LOS	A												D			

HCS Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RT 547 & SITE ACCESS
Agency/Co.	MRA	Jurisdiction	
Date Performed	5/24/2023	East/West Street	SITE ACCESS
Analysis Year	2033	North/South Street	RT 547
Time Analyzed	AM	Peak Hour Factor	0.90
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	22-147AFB-3 BUILD		

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						18		18			398	15		16	350	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							40							18		
Capacity, c (veh/h)							412							1097		
v/c Ratio							0.10							0.02		
95% Queue Length, Q_{95} (veh)							0.3							0.0		
Control Delay (s/veh)							14.7							8.3	0.2	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)					14.7								0.5			
Approach LOS					B								A			

HCS Two-Way Stop-Control Report

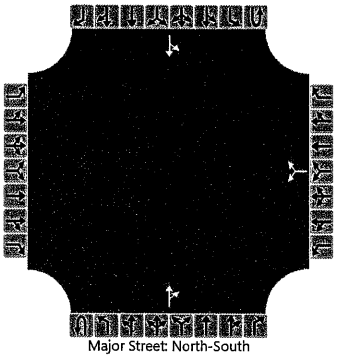
General Information

Analyst	STK
Agency/Co.	MRA
Date Performed	5/24/2023
Analysis Year	2033
Time Analyzed	PM
Intersection Orientation	North-South
Project Description	22-147PFB-3 BUILD

Site Information

Intersection	RT 547 & SITE ACCESS
Jurisdiction	
East/West Street	SITE ACCESS
North/South Street	RT 547
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						22		23			432	23		24	625	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.43		6.23						4.13		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.53		3.33						2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							50							27		
Capacity, c (veh/h)							282							1054		
v/c Ratio							0.18							0.03		
95% Queue Length, Q_{95} (veh)							0.6							0.1		
Control Delay (s/veh)							20.5							8.5	0.4	
Level of Service (LOS)							C							A	A	
Approach Delay (s/veh)						20.5								0.7		
Approach LOS						C								A		

McDonough & Rea Associates
1431 Lakewood Road Suite C
Manasquan NJ 08736
(732) 528-7076

MANCHESTER T.H.
S. HOPE CHAPEL ROAD & RIDGEWAY ROAD
MANCHESTER TOWNSHIP, OCEAN COUNTY
MRA JOB 22-147 WEDNESDAY AM COUNT

File Name : 22147 ridgeway & hope chapel am1
Site Code : 00022147
Start Date : 4/6/2022
Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

	S. Hope Chapel Road (CR 547) Southbound					Ridgeway Road (CR 571) Westbound					S. Hope Chapel Road (CR 547) Northbound					Ridgeway Road (CR 571) Eastbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
07:00 AM	8	31	3	0	42	22	110	2	0	134	48	60	2	1	111	7	57	26	9	99	386
07:15 AM	4	43	6	1	54	34	120	6	1	161	74	53	2	3	132	9	48	34	9	100	447
07:30 AM	11	39	9	2	61	31	120	5	1	157	62	62	1	1	126	8	74	31	17	130	474
07:45 AM	12	39	9	3	63	17	85	5	2	109	79	67	0	0	146	9	74	30	8	121	439
Total	35	152	27	6	220	104	435	18	4	561	263	242	5	5	515	33	253	121	43	450	1746
08:00 AM	13	46	3	5	67	14	97	3	3	117	61	37	1	0	99	15	70	20	6	111	394
08:15 AM	4	46	10	3	63	15	105	9	0	129	47	60	2	0	109	9	59	37	2	107	408
08:30 AM	15	43	6	6	70	15	80	2	5	102	33	58	4	1	96	10	70	23	8	111	379
08:45 AM	14	47	5	5	71	19	60	7	3	89	43	46	1	2	92	14	81	26	5	126	378
Total	46	182	24	19	271	63	342	21	11	437	184	201	8	3	396	48	280	106	21	455	1559
09:00 AM	13	37	3	6	59	19	68	10	2	99	29	45	2	4	80	18	57	20	4	99	337
09:15 AM	13	36	6	5	60	11	47	14	2	74	29	37	1	3	70	7	59	27	7	100	304
Grand Total	107	407	60	36	610	197	892	63	19	1171	505	525	16	15	1061	106	649	274	75	1104	3946
Apprch %	17.5	66.7	9.8	5.9		16.8	76.2	5.4	1.6		47.6	49.5	1.5	1.4		9.6	58.8	24.8	6.8		
Total %	2.7	10.3	1.5	0.9	15.5	5.0	22.6	1.6	0.5	29.7	12.8	13.3	0.4	0.4	26.9	2.7	16.4	6.9	1.9	28.0	

	S. Hope Chapel Road (CR 547) Southbound					Ridgeway Road (CR 571) Westbound					S. Hope Chapel Road (CR 547) Northbound					Ridgeway Road (CR 571) Eastbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour From 07:00 AM to 09:15 AM - Peak 1 of 1																					
Intersection	07:15 AM																				
Volume	40	167	27	11	245	96	422	19	7	544	276	219	4	4	503	41	266	115	40	462	1754
Percent	16.3	68.2	11.0	4.5		17.6	77.6	3.5	1.3		54.9	43.5	0.8	0.8		8.9	57.6	24.9	8.7		
07:30 Volume	11	39	9	2	61	31	120	5	1	157	62	62	1	1	126	8	74	31	17	130	474
Peak Factor																					0.925
High Int.	08:00 AM					07:15 AM					07:45 AM					07:30 AM					
Volume	13	46	3	5	67	34	120	6	1	161	79	67	0	0	146	8	74	31	17	130	
Peak Factor					0.914					0.845					0.861					0.888	

McDonough & Rea Associates
1431 Lakewood Road Suite C
Manasquan NJ 08736
(732) 528-7076

MANCHESTER T.H.
S. HOPE CHAPEL ROAD & RIDGEWAY ROAD
MANCHESTER TOWNSHIP, OCEAN COUNTY
MRA JOB 22-147 MONDAY PM COUNT

File Name : 22147 ridgeway & hope chapel pm1
Site Code : 00022147
Start Date : 4/11/2022
Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

	S. Hope Chapel Road (CR 547) Southbound					Ridgeway Road (CR 571) Westbound					S. Hope Chapel Road (CR 547) Northbound					Ridgeway Road (CR 571) Eastbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
02:00 PM	10	36	2	5	53	12	55	4	2	73	34	41	6	5	86	13	60	32	8	113	325
02:15 PM	9	41	5	6	61	12	54	5	4	75	54	45	8	5	112	15	70	30	10	125	373
02:30 PM	14	45	3	9	71	12	58	9	4	83	30	53	6	6	95	12	79	30	11	132	381
02:45 PM	8	53	14	6	81	12	58	1	2	73	32	43	8	3	86	9	89	37	11	146	386
Total	41	175	24	26	266	48	225	19	12	304	150	182	28	19	379	49	298	129	40	516	1465
03:00 PM	12	36	4	5	57	4	49	6	0	59	41	52	11	4	108	11	94	26	7	138	362
03:15 PM	16	60	8	6	90	11	50	5	3	69	45	46	9	6	106	7	101	48	6	162	427
03:30 PM	14	52	9	3	78	15	70	3	2	90	39	50	23	11	123	12	100	35	4	151	442
03:45 PM	18	62	6	3	89	4	75	6	2	87	42	63	11	5	121	10	122	44	8	184	481
Total	60	210	27	17	314	34	244	20	7	305	167	211	54	26	458	40	417	153	25	635	1712
04:00 PM	17	59	7	2	85	9	50	5	3	67	48	57	13	15	133	14	114	40	4	172	457
04:15 PM	17	56	4	1	78	6	79	7	3	95	49	60	9	7	125	6	125	40	8	179	477
04:30 PM	11	80	7	5	103	6	69	5	1	81	44	47	14	19	124	11	149	66	13	239	547
04:45 PM	17	81	9	4	111	8	82	5	1	96	53	46	9	12	120	9	131	54	11	205	532
Total	62	276	27	12	377	29	280	22	8	339	194	210	45	53	502	40	519	200	36	795	2013
05:00 PM	22	76	5	4	107	15	70	4	4	93	51	67	8	14	140	14	115	45	26	200	540
05:15 PM	23	76	6	9	114	9	81	9	4	103	65	38	16	8	127	15	123	47	4	189	533
05:30 PM	13	61	6	5	85	6	54	3	3	66	43	44	9	3	99	15	97	59	12	183	433
05:45 PM	14	55	7	2	78	11	60	1	1	73	44	31	6	7	88	11	119	40	7	177	416
Total	72	268	24	20	384	41	265	17	12	335	203	180	39	32	454	55	454	191	49	749	1922
Grand Total	235	929	102	75	1341	152	1014	78	39	1283	714	783	166	130	1793	184	1688	673	150	2695	7112
Apprch %	17.5	69.3	7.6	5.6		11.8	79.0	6.1	3.0		39.8	43.7	9.3	7.3		6.8	62.6	25.0	5.6		
Total %	3.3	13.1	1.4	1.1	18.9	2.1	14.3	1.1	0.5	18.0	10.0	11.0	2.3	1.8	25.2	2.6	23.7	9.5	2.1	37.9	

	S. Hope Chapel Road (CR 547) Southbound					Ridgeway Road (CR 571) Westbound					S. Hope Chapel Road (CR 547) Northbound					Ridgeway Road (CR 571) Eastbound					
Start Time	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total
Peak Hour From 02:00 PM to 05:45 PM - Peak 1 of 1																					
Intersection	04:30 PM																				
Volume	73	313	27	22	435	38	302	23	10	373	213	198	47	53	511	49	518	212	54	833	2152
Percent	16.8	72.0	6.2	5.1		10.2	81.0	6.2	2.7		41.7	38.7	9.2	10.4		5.9	62.2	25.5	6.5		
04:30 Volume	11	80	7	5	103	6	69	5	1	81	44	47	14	19	124	11	149	66	13	239	547
Peak Factor																					0.984
High Int.	05:15 PM					05:15 PM					05:00 PM					04:30 PM					
Volume	23	76	6	9	114	9	81	9	4	103	51	67	8	14	140	11	149	66	13	239	
Peak Factor					0.954					0.905					0.913					0.871	

MORGANMUNICIPAL
engineering services

MORGAN
engineering & surveying

130 Central Avenue, Island Heights, NJ 08732
P. O. Box 5232, Toms River, NJ 08754
732.270.9690 / Fax 732.270.9691

Engineers
Surveyors
Planners
Flood Plain Managers

July 19, 2023

Ms. Amanda Kisty, Secretary
Manchester Township Planning Board
1 Colonial Drive
Manchester, NJ 08759

Application No. PB-2023-05 "Parkwood Square LP & Parkwood Center B LLC"
Preliminary & Final Site Plan Submission
Block 65, Lots: 11, 12, 13 and 14
Manchester Township, Ocean County, New Jersey
Morgan Engineering, LLC - Project No MTPB23-011

Dear Ms. Kisty:

We have received a follow up response to the above referenced Application for Preliminary & Final Site Plan Submission for Completeness. The subject of the Application is to develop the existing four (4) lots for a 167 Townhouse Development. The properties have been designated as Zone District PB-1.
This project has been deemed complete.

These New/Revised comments are in BOLD.

The following additional documents were received:

1. List of property owners within 200 feet of the subject property (B.23.), Owner's List dated April 24, 2023.

2. Lighting Plan for Block 65, Lots 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P of Professional Design Services, dated April 25, 2022, last revised 5/26/23.
3. Map of Survey for Block 65, Lot 11, 12, 13 & 14, prepared by Steven Metelski, Jr., P.L.S. of Professional Design Services, dated, 11/29/21, revised 6/28/22.
4. Preliminary & Final Major Site Plan for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
5. Overall Site Plan for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
6. Site Plan "A" for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
7. Site Plan "B" for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
8. Overall Grading Plan & Storm Drainage Plan for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
9. Grading & Storm Drainage Plan "A" for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
10. Grading Plan & Storm Drainage Plan "B" for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
11. Overall Utility Plan for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
12. Road Profiles for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
13. Landscape Plan "A" for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
14. Landscape Plan "B" for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
15. Landscape Details for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
16. Construction Details & Site Details for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
17. Construction Details & Stormwater Details for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
18. Construction Details & Utility Details for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022,

revised 5/26/23.

19. Pre Construction Drainage Area Map for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
20. Post Construction Drainage Area Map for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
21. Preconstruction Drainage Area Map for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.
22. Stormwater Maintenance Plan for Block 65, Lot 11, 12, 13 & 14, prepared by William A. Stevens, P.E., P.P. of Professional Design Services, dated April 25, 2022, revised 5/26/23.

Completeness

The Applicant is deemed incomplete based on receipt of the following:

1. Metes and bounds descriptions with dimensions and bearing of the existing and proposed lots (B.14.). or request a waiver from providing same. **The applicant has requested a waiver.**

2. Metes and bounds descriptions with dimensions and bearing of all existing right-of-way centerlines (B.15.) or request a waiver from providing same. **The applicant has requested a waiver.**

3. ~~List of property owners within 200 feet of the subject property (B.23.).~~ **This comment has been addressed.**

4. Lighting plan (C.6) including location and height of proposed fixtures (C.6.1) and detail for construction of fixture (C.6.2.). **This comment has been addressed.**

5. Supplementary Documents (D). **This comment has been addressed. The applicant shall provide testimony as to any existing or proposed deed restrictions or covenants.**

Morgan Engineering, LLC has reviewed the completeness of the submitted documents for the Planning Board's consideration and has found this applicant to be **complete**.

Should you have any concerns or require any additional information please do not hesitate to contact me directly.

Respectfully submitted,

Frank Sadeghi, P.E., C.M.E.
Morgan Engineering, LLC
Manchester Township Planning Board Engineer
frank@morganenigneeringllc.com

FS/bq

CC: Pasquale Popolizio, Township Zoning Board Official
Joseph D. Coronato, Jr., Esq., Planning Board Attorney
Gary T. Sylvester, CPWM, Twp. Director of Inspections & Land Use
Ian M. Borden, P.P., Applicant's Engineer

STORMWATER MANAGEMENT REPORT

For

Block 65 Lot 11, 12, 13 & 14
Manchester Township
Ocean County, New Jersey

Prepared By:

PROFESSIONAL DESIGN SERVICES, LLC

1245 Airport Unit 1
Lakewood, New Jersey 08701
PDS Ref. No. 18123

_____

WILLIAM A. STEVENS P.E., P.P. LICENSE No. 39915

April 25, 2022

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION

Being known as Block 65 Lots 11, 12, 13 & 14 10, the project site contains 22.3 acres and is located at the corner of Ridgeway Road (OC Route 547) and South Hope Chapel Road in Manchester Township, Ocean County, New Jersey. Figure 1 is a location map for the project site.

It is proposed to develop the property into townhouse residential unitsincluding affordable housing units as shown on Preliminary & Final Major Subdivision Plans prepared by Professional Design Services, in accordance with Manchester Township Land Use Regulations.

This report outlines the methodologies and results for management of the increased stormwater runoff created as a result of the development.

2.0 EXISTING SITE CONDITIONS

The following analysis describes the existing environmental conditions based upon literature review and field investigation.

2.1 Topography and Hydrology

The project site lies within the outer coastal plain physiographic province. The site is forested and the topography of the site slopes from the north towards the south. There are no freshwater wetlands or riparian areas on the property.

Figure 2 is a copy of the USGS Quadrangle Topography Map with the site located.

2.2 Soils

The upland portion of the project site is underlain by the following soils as depicted by the U.S. Department of Agriculture; Ocean County Soil Survey. Figure 3 is a copy of the Soil Survey with the site located.

Soil Type	% Slope	Depth to SHWT*
DoA –Downer Loamy Sand	0-5	>6.0'

**SHWT = Seasonal High Water Table*

The permeability of this soil is typically rapid and the available water capacity is low. The depth to seasonal high water is typically greater than 6 feet. Downer is hydrologic soil group A.

Soil test pits were performed at stormwater basin locations and other locations to assess soil conditions and seasonal high water table. The depth to seasonal high water occurs at a depth greater than five (5) feet. The location of each test pit and log are shown on the site plans.

3.0 REGULATORY STANDARDS

1. REGULATIONS

A. Applicable Regulations

All increased stormwater runoff resulting from the proposed development must be managed both qualitatively and quantitatively in accordance with New Jersey Regulations.

On February 4, 2004, the New Jersey Department of Environmental Protection (DEP) adopted new Stormwater Management Rules (NJAC 7:8) which require all major developments to address storwmater-related water quality, groundwater recharge and water quantity impacts. The Pinelands Commission subsequently adopted amendments to the Comprehensive Management Plan (NJAC 7:50) which integrate the new DEP rules into the CMP stormwater runoff rules. These amendments became effective May 2007 and the project is required to comply with these standards as well as the DEP rules.

The Flood Hazard Area, Freshwater Wetland Regulations and Residential Site Improvement Standards (RSIS), as administered by the Pinelands Commission require the utilization of best available technology to minimize the amount of stormwater runoff, maintain existing onsite infiltration, simulate natural drainage systems and minimize the discharge of pollutants to ground or

surface waters. The overall goal of the post-construction stormwater management system design shall be to meet the erosion control, groundwater recharge, stormwater runoff quantity and quality standards at N.J.A.C. 7:8-5.4 and 5.5.

The stormwater management must be design to:

1. Reduce flood damage, including damage to life and property;
2. Minimize, to the extent practical, any increase in stormwater runoff from any new development;
3. Reduce soil erosion from any development or construction project;
4. Assure the adequacy of exiting and proposed culverts and bridges, and other in-stream structures;
5. Maintain groundwater recharge;
6. Prevent, to the greatest extent feasible, an increase in nonpoint pollution;
7. Maintain the integrity of stream channels for their biological functions, as well as for drainage;
8. Minimize pollutants in stormwater runoff from new and existing development in order to restore, enhance and maintain the chemical, physical, and biological integrity of the waters of the State, to protect public health, to safeguard fish and aquatic life and scenic and ecological values and to enhance the domestic, municipal, recreational, industrial and other uses of water; and
9. Protect public safety through the proper design and operation of stormwater management basins.

These standards shall be met by utilizing nonstructural stormwater management strategies (7:8-5.3) into the design. Structural measures (7:8-5.7) will be used as necessary where the nonstructural measures are not sufficient. Analysis of each strategy will utilize the New Jersey Stormwater Best Management Practices (BMP) Manual as guidance.

Nonstructural stormwater management strategies incorporated into site design shall:

1. Protect areas that provide water quality benefits or areas particularly susceptible to erosion and sediment loss;
2. Minimize impervious surfaces and break up or disconnect the flow of runoff over impervious surfaces;
3. Maximize the protection of natural drainage features and vegetation;
4. Minimize the decrease in the "time of concentration" from pre-construction to post-construction. "Time of Concentration" is defined as the time to takes for runoff to travel from the hydraulically most distant point of the drainage area to the point of interest within a watershed;
5. Minimize land disturbance including clearing and grading;

6. Minimize soil compaction;
7. Provide low-maintenance landscaping that encourages retention and planting of native vegetation and minimizes the use of lawns, fertilizers and pesticides;
8. Provide vegetated open-channel conveyance systems discharging into through stable vegetated areas; and
9. Provide other source controls to prevent or minimize the use or exposure of pollutants at the site in order to prevent or minimize the release of those pollutants into stormwater runoff.

B. Design and Performance Standards

1. Erosion Control

The minimum design and performance standards for erosion control are those established under the Soil Erosion and Sediment Control Act, N.J.S.A. 4:24-39 et seq. and implementing rules.

2. Groundwater Recharge

The minimum design and performance standards for groundwater recharge require compliance with either of the following:

a. Demonstrate through hydrologic and hydraulic analysis that the site and its stormwater management measures maintain 100 percent of the average annual pre-construction groundwater recharge volume for the site.
b. Demonstrate through hydrologic and hydraulic analysis that the increase of stormwater runoff volume from pre-construction to post-construction for the two-year storm is infiltrated.

3. Runoff Quantity

In order to control stormwater runoff quantity impacts one of the following must be demonstrated:

a. Demonstrate through hydrologic and hydraulic analysis that for stormwater leaving the site, post-construction runoff hydrographs for the two, 10 and 100-year storm events do not exceed, at any point in time, the pre-construction runoff hydrographs for the same storm events;
b. Demonstrate through hydrologic and hydraulic analysis that there is no increase, as compared to the pre-construction condition, in the peak runoff rates of stormwater leaving the site for the two, 10 and 100-year storm events and that the increase volume or change in timing of stormwater runoff will not increase flood damage at or downstream of the site. This analysis shall include the analysis of impacts of existing land uses and projected land uses assuming full

development under existing zoning and land use ordinances in the drainage area;

c. Design stormwater management measures so that the post-construction peak runoff rates for the two, 10 and 100-year storm events are 50, 75 and 80 percent, respectively, of the pre-construction peak runoff rates. The percentages apply only to the post-construction stormwater runoff that is attributable to the portion of the site on which the proposed development or project is to be constructed.

4. Water Quality

Stormwater management measures shall be designed to reduce the post-construction load of total suspended solids (TSS) in stormwater runoff generated from the water quality design storm by 80 percent of the anticipated load from the development site expressed as an annual average.

In accordance with the definition of FW1 at N.J.A.C. 7:9B-1.4, stormwater management measures shall be designed to prevent any increase in stormwater runoff to waters classified as FW1.

5. Mounding Analysis

In order to ensure design performance, the newly adopted Pinelands Commission regulations require a groundwater mounding analysis for the detention/retention basins was performed by utilizing a commercially available computer model called MODRET. The model uses the modified Green and Ampt infiltration equation to calculate unsaturated infiltration and a modified USGS model "A Modular Three-Dimensional Finite Difference Ground Water Flow Model (MODFLOW)," McDonald and Harbaugh, 1984, to calculate saturated infiltration. MODRET stimulates the unsaturated and saturated infiltration which normally occurs within stormwater detention/retention ponds. In order to compute these infiltration losses and to estimate the overflow from a detention/retention pond, the following hydrologic and hydraulic characteristics are given as input to the model simulation:

Hydraulic Conductivity

Hydraulic conductivity can be defined as the discharge rate through a unit area under a unit hydraulic gradient. The model requires unsaturated vertical hydraulic conductivity to analyze the infiltration

through the unsaturated zone; and saturated horizontal hydraulic conductivity to simulate lateral dissipation of the groundwater mound through the saturated zone of the unconfined aquifer.

The average unsaturated vertical hydraulic conductivity was determined by multiplying the equivalent saturated vertical hydraulic conductivity as determined by permeability testing by a factor of 0.67. A safety factor of 2.0 was used to further reduce the hydraulic conductivity during the model applications. This safety factor is primarily to account for potential long-term clogging due to the effects of sediment accumulation.

As the infiltration process continues, the groundwater mound has to be dissipated laterally within the saturated zone of the groundwater aquifer. The process is dependent on the horizontal hydraulic conductivity that was also measured in the field through the piezometers tests and included in the geotechnical report in the

Appendix C. The average horizontal hydraulic conductivity used in the model after applying a safety factor of two was 10.1 ft/day for Basin 1 and 17.43 ft/day for Basin 2.

Effective Storage Coefficient of Soil

The void space in which water is stored after passing of the wetting front during the stormwater infiltration process is the difference between the initial moisture content and the moisture content in the transmissive zone. These values depend on the soil types, in-situ moisture content of the soil, and the average groundwater mounding during the infiltration process. THE MODRET model requires the coefficient for both saturated and unsaturated analyses. For the present study, these values are estimated from Table A-1 (Stormwater Retention Pond Infiltration Analysis is Unconfined Aquifer, Nicolas E. Andreyev, PE, March 1989). As shown in this table, storage coefficient value increases with the effective depth to the groundwater table (measured from the pond bottom for unsaturated analysis and from the design high water level in the detention pond for saturated analysis).

Elevation of Effective Aquifer Base

The effective aquifer base can be defined as the top of the first semi-confining soil layer or poorly permeable soil layer that occurs below the

stormwater detention/retention pond. In other words, the model requires the thickness of the present study, the aquifer thickness is assumed to be 20 ft.

Basin Characteristics

The MODRET program assumes a rectangular shape of pond bottom to simulate the stormwater infiltration. The design high water level (DHWL) is the maximum water surface elevation during a design storm event. The pond volume is the actual storage volume of the pond between the bottom of the pond and the DHWL. The MODRET program utilizes the pond bottom area in combination with pond volume, DHWL, and length-to-width ratio to calculate the average length and width of pond for subsequent sizing of the finite difference grid system for saturated infiltration simulation by MODFLOW. The average pond-bottom area and length-to-width ratio to calculate the average length and width of the pond for subsequent sizing of the finite difference grid system for saturated infiltration simulation by MODFLOW. The average pond-bottom area and length-to-width ratio for each basin are estimated from the actual geometric configuration of each particular basin. The specified values of pond volume and DHWL are adjusted by trial and error, as needed, to match the assumed DHWL and the actual simulated maximum water surface elevation in each basin.

2. PINELANDS COMPREHENSIVE MANAGEMENT PLAN

The Pinelands Comprehensive Management Plan (CMP) administered by the Pinelands Commission requires that the total runoff generated from impervious surfaces during a 10 year storm be retained and infiltrated on-site in a management system employing the green infrastructure standards for a decentralized The CMP also of stormwater runoff to any surface prohibits direct discharge waterbody. In addition, stormwater runoff shall not be directed in such a way as to increase the volume and rate of discharge into any surface waterbody from that which existed prior to development of the parcel. The CMP further provides standards for permanent stormwater facility maintenance, and address management of onsite soils resources including post construction soil and site assessments to field verify that as-built site conditions are consistent with stormwater design assumptions.

4.0 PROPOSED STORMWATER MANAGEMENT PLAN

As shown on the Subdivision Plans, the proposed stormwater management plan consists of a conventional storm sewer system to collect and convey onsite runoff to a number of de-centralized stormwater management systems which will contain sufficient volume to retain the increased runoff

from impervious surfaces for the 10 year 24 hour storm event and control any increased runoff from the proposed development for the 2, 10 and 100 year 24 hour storm events. A series of small scale infiltration basins are proposed to manage the additional runoff generated by the project.

5.0 METHODOLOGY

Low Impact Design techniques will be utilized to interact with the hydrologic process to control stormwater runoff and pollutants closer to their source while providing site design measures that can significantly reduce the overall impact of land development on stormwater runoff as required by the Stormwater Management Rules.

The methodology typically used to estimate the stormwater runoff peak flows and volumes for the required storm events is the 24-hour storm using the rainfall distribution recommended by the U.S. Department of Agriculture Soil Conservation Service as defined in Technical Release - 55 (TR-55) dated June 1986. The time of concentrations utilized will be calculated for each contributory area utilizing the TR-55 methodology.

For the purpose of calculating runoff coefficients and groundwater recharge, there is a presumption that the pre-construction condition of a site or portion thereof is a wooded land use with good hydrologic condition. A runoff coefficient or a groundwater recharge land cover for an existing condition may be used on all or a portion of the site if the hydrologic condition has existed on the site or portion of the site for at least five years without interruption prior to the time of application.

The runoff computations shall account for all significant land features and structures, such as ponds, wetlands, depressions, hedgerows, or culverts, that may reduce pre-construction stormwater runoff rates and volumes.

The management systems proposed contains a series of small scale infiltration basins. The system contains 2 types of outflows, the first being exfiltration from the various systems and the second being outflow from the system as controlled by the various outlet control structures. Based upon soil testing performed by PDS, we have confirmed a permeability rate of around 13 - 18 inches/hour for the natural material below both the basin. For design purposes, we have utilized 6 inches/hour for the recharge rate (0.00013 feet per second), allowing for adequate factor of safety. The recharge to groundwater is shown as "discarded" flows in the flood routings. The runoff calculations separately tabulate the impervious and pervious contributory drainage areas and sequentially route the inflow through the basin for each design storm to ensure that each of the design goals are met.

The water quality design storm is 1.25 inches of rainfall in two hours. Water quality calculations shall take into account the distribution of rain from the water quality design storm, as reflected in the New Jersey Stormwater Rules. The calculation of the volume of runoff may take into account the implementation of non-structural and structural stormwater management measures.

All hydrologic and flood routing computations will utilize the Haested Methods (1989) computer software. The stormwater drainage collection system will be designed in accordance with

RSIS standards. The Rational Formula was used to compute peak runoff rates for design of the proposed internal collection system. A 25 year frequency storm was used for design as required by RSIS and the rainfall intensities were obtained from the NJDEP Rainfall Intensity Curves. The sub-areas tributary to each inlet are shown on the Drainage Area Plans. Soil erosion and sediment controls will also be employed as required by the "Standards for Soil Erosion and Sediment Control in New Jersey."

Copies of the TR-55 hydrologic computations, detention basin routings, and Rational Formula computations are contained within the appendices of this report.

6.0 SUMMARY

The stormwater basins have been designed to provide a minimum separation of two (2) feet between the basin bottom and seasonal high water table. The existing soils have a permeability of less than 20 inches per hour. A forebay has been provided in the two (2) larger basins to provide temporary sediment storage during construction. The subdivision plans contain the performance and maintenance standards required to maintain maximum soil infiltration capacity.

Low Impact Design

The project complies with the low impact design criteria to the maximum extent practicable given the design limitations imposed by Municipal zoning and Residential Site Improvement Standard Regulations.

The project has implemented several low impact design techniques as follows:

A. Providing low maintenance landscaping by usage of native grasses.

B. De-centralized stormwater management systems

Erosion Control

The project complies with the "New Jersey Standards for Soil Erosion and Sediment Control." Certification for the project must be granted by the Ocean County Soil Conservation District prior to commencement of construction.

Groundwater Recharge

The increase in runoff volume from the pre-construction to post-construction for the 2 and 10 year storm will be retained in the retention basins as summarized below.

STORM EVENT	RETENTION VOLUME REQUIRED	RETENTION VOLUME PROVIDED
2	1.9 acre feet (1)	
10	3.0 acre feet (2)	6.6 acre feet

(1) Increased volume from pre-developed to post developed condition per Stormwater Regulations.

(2) Runoff from impervious surfaces per Pinelands regulations, 0.43' per s.f.

Runoff Quantity

The following is a summary of the runoff from the project site for the flood storm events:

Storm Event	Pre-Developed Peak Flow	Allowable Peak Flow	Post-Developed Peak Flow
2	0	0	0
10	0	0	0
100	2.7	2.2	2.2

Water Quality

The system will perform water quality control by the utilization of an infiltration basin, which will retain runoff from the stormwater quality design storm thereby promoting pollutant removal through sedimentation and biological processing. The forebay of the basin will retain and infiltrate all of the water quality storm runoff volume thereby reducing the post-construction loading of TSS by 100%.

Mounding

The mounding analysis was performed by utilizing one of the MODRET simulation schemes identified as the recovery of pollution abatement volume of a dry retention pond. It was assumed that (i) runoff would occur in a relatively short period of time, (ii) the entire runoff would occur instantaneously, and (iii) the basin was completely full up to the retention storage volume.

The mounding that will occur beneath and adjacent to the basin will only be temporary after large storm events and will not alter groundwater levels. As a result, the basins will not adversely impact wetlands, surface water bodies, septic systems or man-made structures.

7.0 MAINTENANCE

All maintenance activities for the stormwater collection system and retention basins will be the responsibility of the property owner.

APPENDIX A

EXISTING CONDITION CALCULATIONS

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Site: Site Runoff Area=22.300 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=1,175' Tc=42.3 min CN=30 Runoff=0.00 cfs 0.000 af

Total Runoff Area = 22.300 ac Runoff Volume = 0.000 af Average Runoff Depth = 0.00"
100.00% Pervious = 22.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment Site: Site

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 2 year Rainfall=3.40"

Area (ac)	CN	Description
22.300	30	Woods, Good, HSG A
22.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	75	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
29.9	1,100	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.3	1,175	Total			

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Site: Site Runoff Area=22.300 ac 0.00% Impervious Runoff Depth>0.02"
Flow Length=1,175' Tc=42.3 min CN=30 Runoff=0.08 cfs 0.042 af

Total Runoff Area = 22.300 ac Runoff Volume = 0.042 af Average Runoff Depth = 0.02"
100.00% Pervious = 22.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment Site: Site

Runoff = 0.08 cfs @ 24.05 hrs, Volume= 0.042 af, Depth> 0.02"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 10 year Rainfall=5.40"

Area (ac)	CN	Description
22.300	30	Woods, Good, HSG A
22.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	75	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
29.9	1,100	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.3	1,175	Total			

Time span=0.00-28.00 hrs, dt=0.05 hrs, 561 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Site: Site Runoff Area=22.300 ac 0.00% Impervious Runoff Depth>0.74"
Flow Length=1,175' Tc=42.3 min CN=30 Runoff=2.73 cfs 1.370 af

Total Runoff Area = 22.300 ac Runoff Volume = 1.370 af Average Runoff Depth = 0.74"
100.00% Pervious = 22.300 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment Site: Site

Runoff = 2.73 cfs @ 13.47 hrs, Volume= 1.370 af, Depth> 0.74"

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.05 hrs
NOAA 24-hr D 100 year Rainfall=9.20"

Area (ac)	CN	Description
22.300	30	Woods, Good, HSG A
22.300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	75	0.0400	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.50"
29.9	1,100	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
42.3	1,175	Total			

APPENDIX B

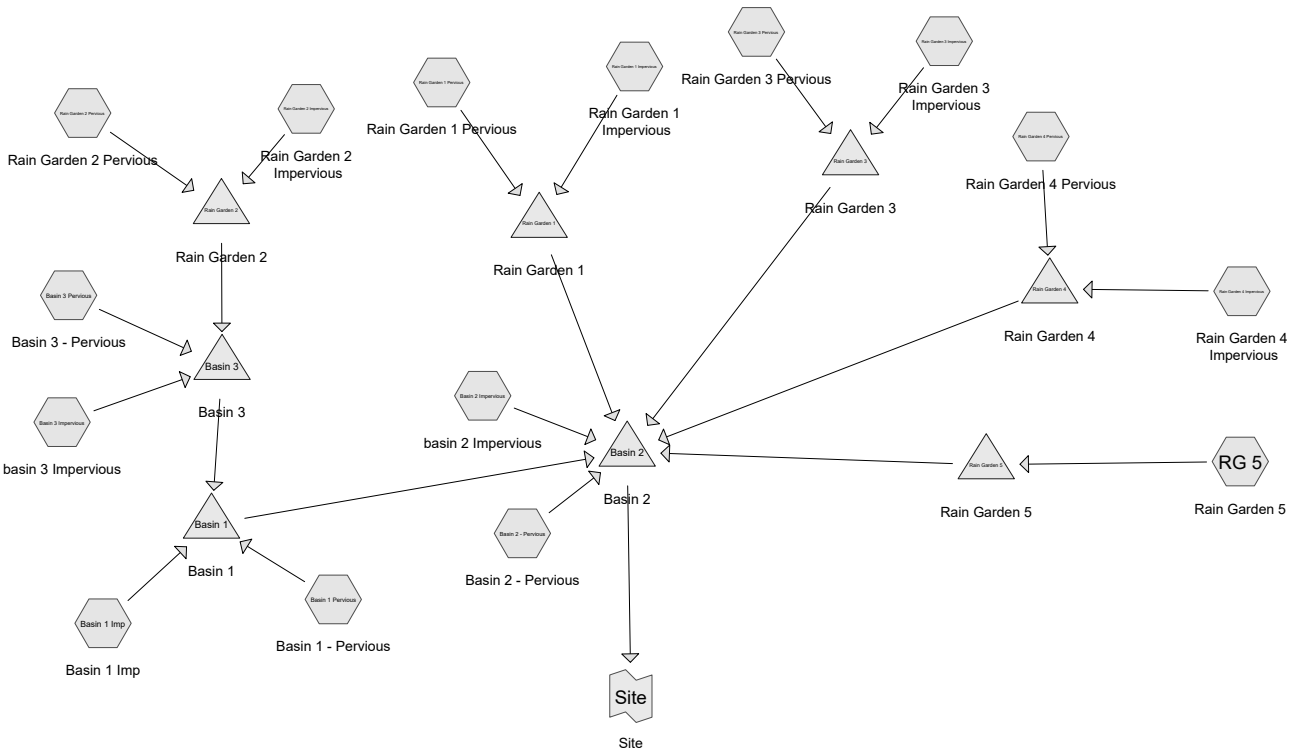
PROPOSED CONDITION CALCULATIONS

B1 - WATER QUALITY CALCULATIONS

B2 - RETENTION BASIN CALCULATIONS

BASIN VOLUME
BASIN OUTFLOW
BASIN ROUTINGS
CUMULATIVE BASIN OUTFLOW HYDROGRAPH

B3. MOUNDING CERTIFICATION



Subcat Reach Pond Link

Routing Diagram for Post Developed

Prepared by Professional Design Services, Printed 6/19/2023

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 year	NRCC 24-hr	D	Default	24.00	1	3.40	2
2	10 year	NRCC 24-hr	D	Default	24.00	1	5.40	2
3	25 year	NRCC 24-hr	D	Default	24.00	1	6.70	2
4	100 year	NRCC 24-hr	D	Default	24.00	1	9.20	2
5	WQ storm	NRCC 24-hr	D	Default	24.00	1	1.25	2

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Basin 1 Imp: Basin 1 Imp Runoff Area=0.900 ac 100.00% Impervious Runoff Depth>3.05"
Tc=10.0 min CN=98 Runoff=1.77 cfs 0.229 af

Subcatchment Basin 1 Pervious: Basin 1 - Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Basin 2 - Pervious: Basin 2 - Runoff Area=4.050 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.01 cfs 0.002 af

Subcatchment Basin 2 Impervious: basin Runoff Area=2.750 ac 100.00% Impervious Runoff Depth>3.05"
Tc=10.0 min CN=98 Runoff=5.41 cfs 0.699 af

Subcatchment Basin 3 Impervious: basin Runoff Area=2.400 ac 100.00% Impervious Runoff Depth>3.05"
Tc=10.0 min CN=98 Runoff=4.72 cfs 0.610 af

Subcatchment Basin 3 Pervious: Basin 3 - Runoff Area=1.600 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment Rain Garden 1 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>3.05"
Tc=10.0 min CN=98 Runoff=0.69 cfs 0.089 af

Subcatchment Rain Garden 1 Pervious: Rain Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Rain Garden 2 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>3.05"
Tc=10.0 min CN=98 Runoff=0.69 cfs 0.089 af

Subcatchment Rain Garden 2 Pervious: Rain Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment Rain Garden 3 Impervious: Runoff Area=1.450 ac 100.00% Impervious Runoff Depth>3.05"
Tc=10.0 min CN=98 Runoff=2.85 cfs 0.369 af

Subcatchment Rain Garden 3 Pervious: Rain Runoff Area=1.350 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.001 af

Subcatchment Rain Garden 4 Impervious: Runoff Area=0.400 ac 100.00% Impervious Runoff Depth>3.05"
Tc=10.0 min CN=98 Runoff=0.79 cfs 0.102 af

Subcatchment Rain Garden 4 Pervious: Rain Runoff Area=0.600 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment RG 5: Rain Garden 5 Runoff Area=1.100 ac 36.36% Impervious Runoff Depth=0.49"
Tc=10.0 min CN=60 Runoff=0.23 cfs 0.045 af

Pond Basin 1: Basin 1 Peak Elev=71.95' Storage=0.078 af Inflow=1.77 cfs 0.229 af
Discarded=0.20 cfs 0.229 af Primary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.229 af

Pond Basin 2: Basin 2 Peak Elev=68.77' Storage=0.231 af Inflow=6.09 cfs 0.790 af
Discarded=1.00 cfs 0.790 af Primary=0.00 cfs 0.000 af Outflow=1.00 cfs 0.790 af

Pond Basin 3: Basin 3 Peak Elev=73.29' Storage=0.287 af Inflow=4.72 cfs 0.611 af
Discarded=0.30 cfs 0.565 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.565 af

Pond Rain Garden 1: Rain Garden 1 Peak Elev=78.00' Storage=0.000 af Inflow=0.69 cfs 0.089 af
Discarded=0.00 cfs 0.000 af Primary=0.69 cfs 0.089 af Outflow=0.69 cfs 0.089 af

Pond Rain Garden 2: Rain Garden 2 Peak Elev=75.20' Storage=0.011 af Inflow=0.69 cfs 0.090 af
Discarded=0.30 cfs 0.090 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.090 af

Pond Rain Garden 3: Rain Garden 3 Peak Elev=75.72' Storage=0.135 af Inflow=2.85 cfs 0.369 af
Discarded=0.30 cfs 0.369 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.369 af

Pond Rain Garden 4: Rain Garden 4 Peak Elev=75.19' Storage=0.016 af Inflow=0.79 cfs 0.102 af
Discarded=0.30 cfs 0.102 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.102 af

Pond Rain Garden 5: Rain Garden 5 Peak Elev=73.03' Storage=0.003 af Inflow=0.23 cfs 0.045 af
Discarded=0.18 cfs 0.045 af Primary=0.00 cfs 0.000 af Outflow=0.18 cfs 0.045 af

Link Site: Site Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 20.600 ac Runoff Volume = 2.235 af Average Runoff Depth = 1.30"
56.31% Pervious = 11.600 ac 43.69% Impervious = 9.000 ac

Summary for Subcatchment Basin 1 Imp: Basin 1 Imp

Runoff = 1.77 cfs @ 12.19 hrs, Volume= 0.229 af, Depth> 3.05"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.500	98	Pavement
*	0.400	98	Roof
	0.900	98	Weighted Average
	0.900		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Basin 1 Pervious: Basin 1 - Pervious

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.500	39	lawn, A soils
	0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 - Pervious: Basin 2 - Pervious

Runoff = 0.01 cfs @ 24.03 hrs, Volume= 0.002 af, Depth= 0.00"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	4.050	39	lawn, A soils
	4.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 Impervious: basin 2 Impervious

Runoff = 5.41 cfs @ 12.19 hrs, Volume= 0.699 af, Depth> 3.05"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.600	98	Parking
*	0.450	98	Roof
*	0.700	98	Driveways
*	1.000	98	Road & Sidewalk
	2.750	98	Weighted Average
	2.750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Impervious: basin 3 Impervious

Runoff = 4.72 cfs @ 12.19 hrs, Volume= 0.610 af, Depth> 3.05"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.900	98	Parking
*	0.300	98	Roof
*	0.500	98	Driveways
*	0.700	98	Road & Sidewalk
	2.400	98	Weighted Average
	2.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Pervious: Basin 3 - Pervious

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af, Depth= 0.00"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	1.600	39	lawn, A soils
	1.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 1 Impervious: Rain Garden 1 Impervious

Runoff = 0.69 cfs @ 12.19 hrs, Volume= 0.089 af, Depth> 3.05"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 1 Pervious: Rain Garden 1 Pervious

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	1.150	39	lawn, A soils
	1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 2 Impervious: Rain Garden 2 Impervious

Runoff = 0.69 cfs @ 12.19 hrs, Volume= 0.089 af, Depth> 3.05"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 2 Pervious: Rain Garden 2 Pervious

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af, Depth= 0.00"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	1.650	39	lawn, A soils
	1.650		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 3 Impervious: Rain Garden 3 Impervious

Runoff = 2.85 cfs @ 12.19 hrs, Volume= 0.369 af, Depth> 3.05"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.450	98	Pavement
*	0.600	98	Roof
*	0.400	98	Driveway
	1.450	98	Weighted Average
	1.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 3 Pervious: Rain Garden 3 Pervious

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.001 af, Depth= 0.00"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	1.350	39	lawn, A soils
	1.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 4 Impervious: Rain Garden 4 Impervious

Runoff = 0.79 cfs @ 12.19 hrs, Volume= 0.102 af, Depth> 3.05"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.400	98	Roof
	0.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 4 Pervious: Rain Garden 4 Pervious

Runoff = 0.00 cfs @ 24.03 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.600	39	lawn, A soils
	0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment RG 5: Rain Garden 5

Runoff = 0.23 cfs @ 12.25 hrs, Volume= 0.045 af, Depth= 0.49"
Routed to Pond Rain Garden 5 : Rain Garden 5

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.40"

	Area (ac)	CN	Description
*	0.400	98	Roof
*	0.700	39	Lawn A soils
	1.100	60	Weighted Average
	0.700		63.64% Pervious Area
	0.400		36.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Pond Basin 1: Basin 1

Inflow Area = 7.400 ac, 49.32% Impervious, Inflow Depth > 0.37" for 2 year event
Inflow = 1.77 cfs @ 12.19 hrs, Volume= 0.229 af
Outflow = 0.20 cfs @ 11.10 hrs, Volume= 0.229 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.20 cfs @ 11.10 hrs, Volume= 0.229 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 71.95' @ 13.58 hrs Surf.Area= 0.049 ac Storage= 0.078 af

Plug-Flow detention time= 123.8 min calculated for 0.229 af (100% of inflow)
Center-of-Mass det. time= 123.3 min (913.9 - 790.6)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.200 af	**retention basin (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.030	0.000	0.000
71.00	0.040	0.035	0.035
72.00	0.050	0.045	0.080
73.00	0.060	0.055	0.135
74.00	0.070	0.065	0.200

Device	Routing	Invert	Outlet Devices
#1	Discarded	70.00'	**0.20 cfs Exfiltration when above 70.00'**
#2	Primary	72.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	74.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.20 cfs @ 11.10 hrs HW=70.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=70.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 2: Basin 2

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth > 0.46" for 2 year event
Inflow = 6.09 cfs @ 12.19 hrs, Volume= 0.790 af
Outflow = 1.00 cfs @ 11.70 hrs, Volume= 0.790 af, Atten= 84%, Lag= 0.0 min
Discarded = 1.00 cfs @ 11.70 hrs, Volume= 0.790 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Link Site : Site

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 68.77' @ 13.13 hrs Surf.Area= 0.332 ac Storage= 0.231 af

Plug-Flow detention time= 72.0 min calculated for 0.789 af (100% of inflow)
Center-of-Mass det. time= 71.2 min (862.8 - 791.6)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	3.600 af	**Custom Stage Data (Prismatic)** Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
68.00	0.200	0.000	0.000
69.00	0.300	0.250	0.250
70.00	0.400	0.350	0.600
71.00	0.500	0.450	1.050
72.00	0.600	0.550	1.600
73.00	0.700	0.650	2.250
74.00	0.800	0.750	3.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.00'	**1.00 cfs Exfiltration when above 68.00'**
#2	Primary	70.70'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	73.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.00 cfs @ 11.70 hrs HW=68.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=68.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 3: Basin 3

Inflow Area = 6.000 ac, 45.83% Impervious, Inflow Depth > 1.22" for 2 year event
Inflow = 4.72 cfs @ 12.19 hrs, Volume= 0.611 af
Outflow = 0.30 cfs @ 10.10 hrs, Volume= 0.565 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.30 cfs @ 10.10 hrs, Volume= 0.565 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 1 : Basin 1

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 73.29' @ 15.04 hrs Surf.Area= 0.257 ac Storage= 0.287 af

Plug-Flow detention time= 366.7 min calculated for 0.563 af (92% of inflow)
Center-of-Mass det. time= 323.3 min (1,113.9 - 790.7)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	1.200 af	**Custom Stage Data (Prismatic)**Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
72.00	0.150	0.000	0.000
73.00	0.200	0.175	0.175
74.00	0.250	0.225	0.400
75.00	0.300	0.275	0.675
76.00	0.350	0.325	1.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	72.00'	**0.30 cfs Exfiltration when above 72.00'**
#2	Primary	74.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	75.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 10.10 hrs HW=72.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=72.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 1: Rain Garden 1

Inflow Area = 1.500 ac, 23.33% Impervious, Inflow Depth > 0.72" for 2 year event
Inflow = 0.69 cfs @ 12.19 hrs, Volume= 0.089 af
Outflow = 0.69 cfs @ 12.19 hrs, Volume= 0.089 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.19 hrs, Volume= 0.000 af
Primary = 0.69 cfs @ 12.19 hrs, Volume= 0.089 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 78.00' @ 12.19 hrs Surf.Area= 0.060 ac Storage= 0.000 af

Plug-Flow detention time= 0.0 min calculated for 0.089 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (792.9 - 792.9)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	0.400 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
78.00	0.060	0.000	0.000
79.00	0.080	0.070	0.070
80.00	0.100	0.090	0.160
81.00	0.120	0.110	0.270
82.00	0.140	0.130	0.400

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	80.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.19 hrs HW=78.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=301.47 cfs @ 12.19 hrs HW=78.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 301.47 cfs @ 21.53 fps)

Summary for Pond Rain Garden 2: Rain Garden 2

Inflow Area = 2.000 ac, 17.50% Impervious, Inflow Depth > 0.54" for 2 year event
Inflow = 0.69 cfs @ 12.19 hrs, Volume= 0.090 af
Outflow = 0.30 cfs @ 12.05 hrs, Volume= 0.090 af, Atten= 56%, Lag= 0.0 min
Discarded = 0.30 cfs @ 12.05 hrs, Volume= 0.090 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 3 : Basin 3

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 75.20' @ 12.56 hrs Surf.Area= 0.057 ac Storage= 0.011 af

Plug-Flow detention time= 10.3 min calculated for 0.089 af (100% of inflow)
Center-of-Mass det. time= 9.9 min (804.0 - 794.2)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.055	0.000	0.000
76.00	0.065	0.060	0.060
77.00	0.075	0.070	0.130
78.00	0.085	0.080	0.210
79.00	0.095	0.090	0.300

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.05 hrs HW=75.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 3: Rain Garden 3

Inflow Area = 2.800 ac, 51.79% Impervious, Inflow Depth > 1.58" for 2 year event
Inflow = 2.85 cfs @ 12.19 hrs, Volume= 0.369 af
Outflow = 0.30 cfs @ 11.15 hrs, Volume= 0.369 af, Atten= 89%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.15 hrs, Volume= 0.369 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 75.72' @ 13.68 hrs Surf.Area= 0.222 ac Storage= 0.135 af

Plug-Flow detention time= 155.0 min calculated for 0.369 af (100% of inflow)
Center-of-Mass det. time= 154.2 min (945.1 - 790.9)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	2.000 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.150	0.000	0.000
76.00	0.250	0.200	0.200
77.00	0.350	0.300	0.500
78.00	0.450	0.400	0.900
79.00	0.550	0.500	1.400
80.00	0.650	0.600	2.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.15 hrs HW=75.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 4: Rain Garden 4

Inflow Area = 1.000 ac, 40.00% Impervious, Inflow Depth > 1.22" for 2 year event
Inflow = 0.79 cfs @ 12.19 hrs, Volume= 0.102 af
Outflow = 0.30 cfs @ 12.10 hrs, Volume= 0.102 af, Atten= 62%, Lag= 0.0 min
Discarded = 0.30 cfs @ 12.10 hrs, Volume= 0.102 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 75.19' @ 12.61 hrs Surf.Area= 0.087 ac Storage= 0.016 af

Plug-Flow detention time= 17.4 min calculated for 0.102 af (100% of inflow)
Center-of-Mass det. time= 16.8 min (808.2 - 791.4)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.550 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.085	0.000	0.000
76.00	0.095	0.090	0.090
77.00	0.105	0.100	0.190
78.00	0.115	0.110	0.300
79.00	0.125	0.120	0.420
80.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.10 hrs HW=75.06' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 5: Rain Garden 5

Inflow Area = 1.100 ac, 36.36% Impervious, Inflow Depth = 0.49" for 2 year event
Inflow = 0.23 cfs @ 12.25 hrs, Volume= 0.045 af
Outflow = 0.18 cfs @ 12.47 hrs, Volume= 0.045 af, Atten= 21%, Lag= 13.3 min
Discarded = 0.18 cfs @ 12.47 hrs, Volume= 0.045 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 73.03' @ 12.47 hrs Surf.Area= 0.085 ac Storage= 0.003 af

Plug-Flow detention time= 10.3 min calculated for 0.045 af (100% of inflow)
Center-of-Mass det. time= 10.3 min (976.4 - 966.1)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	0.550 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
73.00	0.085	0.000	0.000
74.00	0.095	0.090	0.090
75.00	0.105	0.100	0.190
76.00	0.115	0.110	0.300
77.00	0.125	0.120	0.420
78.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	73.00'	**0.30 cfs Exfiltration when above 73.00'**
#2	Primary	75.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	77.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.47 hrs HW=73.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=73.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Link Site: Site

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth = 0.00" for 2 year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Basin 1 Imp: Basin 1 Imp Runoff Area=0.900 ac 100.00% Impervious Runoff Depth>4.92"
Tc=10.0 min CN=98 Runoff=2.83 cfs 0.369 af

Subcatchment Basin 1 Pervious: Basin 1 - Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=0.29"
Tc=15.0 min CN=39 Runoff=0.02 cfs 0.012 af

Subcatchment Basin 2 - Pervious: Basin 2 - Runoff Area=4.050 ac 0.00% Impervious Runoff Depth=0.29"
Tc=15.0 min CN=39 Runoff=0.16 cfs 0.097 af

Subcatchment Basin 2 Impervious: basin Runoff Area=2.750 ac 100.00% Impervious Runoff Depth>4.92"
Tc=10.0 min CN=98 Runoff=8.65 cfs 1.127 af

Subcatchment Basin 3 Impervious: basin Runoff Area=2.400 ac 100.00% Impervious Runoff Depth>4.92"
Tc=10.0 min CN=98 Runoff=7.55 cfs 0.983 af

Subcatchment Basin 3 Pervious: Basin 3 - Runoff Area=1.600 ac 0.00% Impervious Runoff Depth=0.29"
Tc=15.0 min CN=39 Runoff=0.06 cfs 0.038 af

Subcatchment Rain Garden 1 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>4.92"
Tc=10.0 min CN=98 Runoff=1.10 cfs 0.143 af

Subcatchment Rain Garden 1 Pervious: Rain Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=0.29"
Tc=15.0 min CN=39 Runoff=0.04 cfs 0.028 af

Subcatchment Rain Garden 2 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>4.92"
Tc=10.0 min CN=98 Runoff=1.10 cfs 0.143 af

Subcatchment Rain Garden 2 Pervious: Rain Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.29"
Tc=15.0 min CN=39 Runoff=0.06 cfs 0.040 af

Subcatchment Rain Garden 3 Impervious: Runoff Area=1.450 ac 100.00% Impervious Runoff Depth>4.92"
Tc=10.0 min CN=98 Runoff=4.56 cfs 0.594 af

Subcatchment Rain Garden 3 Pervious: Rain Runoff Area=1.350 ac 0.00% Impervious Runoff Depth=0.29"
Tc=15.0 min CN=39 Runoff=0.05 cfs 0.032 af

Subcatchment Rain Garden 4 Impervious: Runoff Area=0.400 ac 100.00% Impervious Runoff Depth>4.92"
Tc=10.0 min CN=98 Runoff=1.26 cfs 0.164 af

Subcatchment Rain Garden 4 Pervious: Rain Runoff Area=0.600 ac 0.00% Impervious Runoff Depth=0.29"
Tc=15.0 min CN=39 Runoff=0.02 cfs 0.014 af

Subcatchment RG 5: Rain Garden 5 Runoff Area=1.100 ac 36.36% Impervious Runoff Depth=1.54"
Tc=10.0 min CN=60 Runoff=1.07 cfs 0.141 af

Pond Basin 1: Basin 1 Peak Elev=72.86' Storage=0.127 af Inflow=2.83 cfs 0.435 af
Discarded=0.20 cfs 0.343 af Primary=0.35 cfs 0.092 af Outflow=0.55 cfs 0.435 af

Pond Basin 2: Basin 2 Peak Elev=69.59' Storage=0.547 af Inflow=9.75 cfs 1.486 af
Discarded=1.00 cfs 1.486 af Primary=0.00 cfs 0.000 af Outflow=1.00 cfs 1.486 af

Pond Basin 3: Basin 3 Peak Elev=74.25' Storage=0.563 af Inflow=7.55 cfs 1.022 af
Discarded=0.30 cfs 0.599 af Primary=0.08 cfs 0.054 af Outflow=0.38 cfs 0.653 af

Pond Rain Garden 1: Rain Garden 1 Peak Elev=78.00' Storage=0.000 af Inflow=1.10 cfs 0.171 af
Discarded=0.00 cfs 0.000 af Primary=1.10 cfs 0.171 af Outflow=1.10 cfs 0.171 af

Pond Rain Garden 2: Rain Garden 2 Peak Elev=75.51' Storage=0.029 af Inflow=1.10 cfs 0.183 af
Discarded=0.30 cfs 0.183 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.183 af

Pond Rain Garden 3: Rain Garden 3 Peak Elev=76.30' Storage=0.279 af Inflow=4.56 cfs 0.626 af
Discarded=0.30 cfs 0.572 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.572 af

Pond Rain Garden 4: Rain Garden 4 Peak Elev=75.43' Storage=0.037 af Inflow=1.26 cfs 0.178 af
Discarded=0.30 cfs 0.178 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.178 af

Pond Rain Garden 5: Rain Garden 5 Peak Elev=73.34' Storage=0.029 af Inflow=1.07 cfs 0.141 af
Discarded=0.30 cfs 0.141 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.141 af

Link Site: Site Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 20.600 ac Runoff Volume = 3.926 af Average Runoff Depth = 2.29"
56.31% Pervious = 11.600 ac 43.69% Impervious = 9.000 ac

Summary for Subcatchment Basin 1 Imp: Basin 1 Imp

Runoff = 2.83 cfs @ 12.19 hrs, Volume= 0.369 af, Depth> 4.92"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.500	98	Pavement
*	0.400	98	Roof
	0.900	98	Weighted Average
	0.900		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Basin 1 Pervious: Basin 1 - Pervious

Runoff = 0.02 cfs @ 13.21 hrs, Volume= 0.012 af, Depth= 0.29"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.500	39	lawn, A soils
	0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 - Pervious: Basin 2 - Pervious

Runoff = 0.16 cfs @ 13.21 hrs, Volume= 0.097 af, Depth= 0.29"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	4.050	39	lawn, A soils
	4.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 Impervious: basin 2 Impervious

Runoff = 8.65 cfs @ 12.19 hrs, Volume= 1.127 af, Depth> 4.92"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.600	98	Parking
*	0.450	98	Roof
*	0.700	98	Driveways
*	1.000	98	Road & Sidewalk
	2.750	98	Weighted Average
	2.750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Impervious: basin 3 Impervious

Runoff = 7.55 cfs @ 12.19 hrs, Volume= 0.983 af, Depth> 4.92"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.900	98	Parking
*	0.300	98	Roof
*	0.500	98	Driveways
*	0.700	98	Road & Sidewalk
	2.400	98	Weighted Average
	2.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Pervious: Basin 3 - Pervious

Runoff = 0.06 cfs @ 13.21 hrs, Volume= 0.038 af, Depth= 0.29"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	1.600	39	lawn, A soils
	1.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 1 Impervious: Rain Garden 1 Impervious

Runoff = 1.10 cfs @ 12.19 hrs, Volume= 0.143 af, Depth> 4.92"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 1 Pervious: Rain Garden 1 Pervious

Runoff = 0.04 cfs @ 13.21 hrs, Volume= 0.028 af, Depth= 0.29"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	1.150	39	lawn, A soils
	1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 2 Impervious: Rain Garden 2 Impervious

Runoff = 1.10 cfs @ 12.19 hrs, Volume= 0.143 af, Depth> 4.92"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 2 Pervious: Rain Garden 2 Pervious

Runoff = 0.06 cfs @ 13.21 hrs, Volume= 0.040 af, Depth= 0.29"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	1.650	39	lawn, A soils
	1.650		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 3 Impervious: Rain Garden 3 Impervious

Runoff = 4.56 cfs @ 12.19 hrs, Volume= 0.594 af, Depth> 4.92"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.450	98	Pavement
*	0.600	98	Roof
*	0.400	98	Driveway
	1.450	98	Weighted Average
	1.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 3 Pervious: Rain Garden 3 Pervious

Runoff = 0.05 cfs @ 13.21 hrs, Volume= 0.032 af, Depth= 0.29"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	1.350	39	lawn, A soils
	1.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 4 Impervious: Rain Garden 4 Impervious

Runoff = 1.26 cfs @ 12.19 hrs, Volume= 0.164 af, Depth> 4.92"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.400	98	Roof
	0.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 4 Pervious: Rain Garden 4 Pervious

Runoff = 0.02 cfs @ 13.21 hrs, Volume= 0.014 af, Depth= 0.29"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.600	39	lawn, A soils
	0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment RG 5: Rain Garden 5

Runoff = 1.07 cfs @ 12.21 hrs, Volume= 0.141 af, Depth= 1.54"
Routed to Pond Rain Garden 5 : Rain Garden 5

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 10 year Rainfall=5.40"

	Area (ac)	CN	Description
*	0.400	98	Roof
*	0.700	39	Lawn A soils
	1.100	60	Weighted Average
	0.700		63.64% Pervious Area
	0.400		36.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Pond Basin 1: Basin 1

Inflow Area = 7.400 ac, 49.32% Impervious, Inflow Depth > 0.71" for 10 year event
Inflow = 2.83 cfs @ 12.19 hrs, Volume= 0.435 af
Outflow = 0.55 cfs @ 13.02 hrs, Volume= 0.435 af, Atten= 81%, Lag= 49.6 min
Discarded = 0.20 cfs @ 9.95 hrs, Volume= 0.343 af
Primary = 0.35 cfs @ 13.02 hrs, Volume= 0.092 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 72.86' @ 13.02 hrs Surf.Area= 0.059 ac Storage= 0.127 af

Plug-Flow detention time= 166.0 min calculated for 0.434 af (100% of inflow)
Center-of-Mass det. time= 165.6 min (999.0 - 833.4)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.200 af	**retention basin (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.030	0.000	0.000
71.00	0.040	0.035	0.035
72.00	0.050	0.045	0.080
73.00	0.060	0.055	0.135
74.00	0.070	0.065	0.200

Device	Routing	Invert	Outlet Devices
#1	Discarded	70.00'	**0.20 cfs Exfiltration when above 70.00'**
#2	Primary	72.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	74.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.20 cfs @ 9.95 hrs HW=70.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.35 cfs @ 13.02 hrs HW=72.86' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.35 cfs @ 4.01 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 2: Basin 2

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth > 0.87" for 10 year event
Inflow = 9.75 cfs @ 12.19 hrs, Volume= 1.486 af
Outflow = 1.00 cfs @ 11.10 hrs, Volume= 1.486 af, Atten= 90%, Lag= 0.0 min
Discarded = 1.00 cfs @ 11.10 hrs, Volume= 1.486 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Link Site : Site

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 69.59' @ 14.97 hrs Surf.Area= 0.431 ac Storage= 0.547 af

Plug-Flow detention time= 213.5 min calculated for 1.486 af (100% of inflow)
Center-of-Mass det. time= 212.8 min (1,027.3 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	3.600 af	**Custom Stage Data (Prismatic)** Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
68.00	0.200	0.000	0.000
69.00	0.300	0.250	0.250
70.00	0.400	0.350	0.600
71.00	0.500	0.450	1.050
72.00	0.600	0.550	1.600
73.00	0.700	0.650	2.250
74.00	0.800	0.750	3.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.00'	**1.00 cfs Exfiltration when above 68.00'**
#2	Primary	70.70'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	73.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.00 cfs @ 11.10 hrs HW=68.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=68.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 3: Basin 3

Inflow Area = 6.000 ac, 45.83% Impervious, Inflow Depth > 2.04" for 10 year event
Inflow = 7.55 cfs @ 12.19 hrs, Volume= 1.022 af
Outflow = 0.38 cfs @ 16.87 hrs, Volume= 0.653 af, Atten= 95%, Lag= 281.0 min
Discarded = 0.30 cfs @ 7.75 hrs, Volume= 0.599 af
Primary = 0.08 cfs @ 16.87 hrs, Volume= 0.054 af
Routed to Pond Basin 1 : Basin 1

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 74.25' @ 16.87 hrs Surf.Area= 0.315 ac Storage= 0.563 af

Plug-Flow detention time= 410.1 min calculated for 0.651 af (64% of inflow)
Center-of-Mass det. time= 280.8 min (1,078.0 - 797.2)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	1.200 af	**Custom Stage Data (Prismatic)**Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
72.00	0.150	0.000	0.000
73.00	0.200	0.175	0.175
74.00	0.250	0.225	0.400
75.00	0.300	0.275	0.675
76.00	0.350	0.325	1.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	72.00'	**0.30 cfs Exfiltration when above 72.00'**
#2	Primary	74.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	75.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 7.75 hrs HW=72.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.08 cfs @ 16.87 hrs HW=74.25' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.08 cfs @ 1.72 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 1: Rain Garden 1

Inflow Area = 1.500 ac, 23.33% Impervious, Inflow Depth > 1.37" for 10 year event
Inflow = 1.10 cfs @ 12.19 hrs, Volume= 0.171 af
Outflow = 1.10 cfs @ 12.19 hrs, Volume= 0.171 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.19 hrs, Volume= 0.000 af
Primary = 1.10 cfs @ 12.19 hrs, Volume= 0.171 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 78.00' @ 12.19 hrs Surf.Area= 0.060 ac Storage= 0.000 af

Plug-Flow detention time= 0.0 min calculated for 0.171 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (831.1 - 831.1)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	0.400 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
78.00	0.060	0.000	0.000
79.00	0.080	0.070	0.070
80.00	0.100	0.090	0.160
81.00	0.120	0.110	0.270
82.00	0.140	0.130	0.400

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	80.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.19 hrs HW=78.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=301.47 cfs @ 12.19 hrs HW=78.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 301.47 cfs @ 21.53 fps)

Summary for Pond Rain Garden 2: Rain Garden 2

Inflow Area = 2.000 ac, 17.50% Impervious, Inflow Depth > 1.10" for 10 year event
Inflow = 1.10 cfs @ 12.19 hrs, Volume= 0.183 af
Outflow = 0.30 cfs @ 11.90 hrs, Volume= 0.183 af, Atten= 73%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.90 hrs, Volume= 0.183 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 3 : Basin 3

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 75.51' @ 12.90 hrs Surf.Area= 0.060 ac Storage= 0.029 af

Plug-Flow detention time= 23.9 min calculated for 0.183 af (100% of inflow)
Center-of-Mass det. time= 23.5 min (869.7 - 846.1)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.055	0.000	0.000
76.00	0.065	0.060	0.060
77.00	0.075	0.070	0.130
78.00	0.085	0.080	0.210
79.00	0.095	0.090	0.300

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.90 hrs HW=75.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 3: Rain Garden 3

Inflow Area = 2.800 ac, 51.79% Impervious, Inflow Depth > 2.68" for 10 year event
Inflow = 4.56 cfs @ 12.19 hrs, Volume= 0.626 af
Outflow = 0.30 cfs @ 9.95 hrs, Volume= 0.572 af, Atten= 93%, Lag= 0.0 min
Discarded = 0.30 cfs @ 9.95 hrs, Volume= 0.572 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 76.30' @ 15.34 hrs Surf.Area= 0.280 ac Storage= 0.279 af

Plug-Flow detention time= 354.3 min calculated for 0.570 af (91% of inflow)
Center-of-Mass det. time= 304.4 min (1,105.5 - 801.0)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	2.000 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.150	0.000	0.000
76.00	0.250	0.200	0.200
77.00	0.350	0.300	0.500
78.00	0.450	0.400	0.900
79.00	0.550	0.500	1.400
80.00	0.650	0.600	2.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 9.95 hrs HW=75.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 4: Rain Garden 4

Inflow Area = 1.000 ac, 40.00% Impervious, Inflow Depth > 2.14" for 10 year event
Inflow = 1.26 cfs @ 12.19 hrs, Volume= 0.178 af
Outflow = 0.30 cfs @ 11.90 hrs, Volume= 0.178 af, Atten= 76%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.90 hrs, Volume= 0.178 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 75.43' @ 12.89 hrs Surf.Area= 0.089 ac Storage= 0.037 af

Plug-Flow detention time= 34.2 min calculated for 0.178 af (100% of inflow)
Center-of-Mass det. time= 33.7 min (842.7 - 809.0)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.550 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.085	0.000	0.000
76.00	0.095	0.090	0.090
77.00	0.105	0.100	0.190
78.00	0.115	0.110	0.300
79.00	0.125	0.120	0.420
80.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.90 hrs HW=75.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 5: Rain Garden 5

Inflow Area = 1.100 ac, 36.36% Impervious, Inflow Depth = 1.54" for 10 year event
Inflow = 1.07 cfs @ 12.21 hrs, Volume= 0.141 af
Outflow = 0.30 cfs @ 12.10 hrs, Volume= 0.141 af, Atten= 72%, Lag= 0.0 min
Discarded = 0.30 cfs @ 12.10 hrs, Volume= 0.141 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 73.34' @ 12.99 hrs Surf.Area= 0.088 ac Storage= 0.029 af

Plug-Flow detention time= 31.5 min calculated for 0.141 af (100% of inflow)
Center-of-Mass det. time= 31.3 min (945.6 - 914.4)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	0.550 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
73.00	0.085	0.000	0.000
74.00	0.095	0.090	0.090
75.00	0.105	0.100	0.190
76.00	0.115	0.110	0.300
77.00	0.125	0.120	0.420
78.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	73.00'	**0.30 cfs Exfiltration when above 73.00'**
#2	Primary	75.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	77.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.10 hrs HW=73.06' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=73.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Link Site: Site

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth = 0.00" for 10 year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Basin 1 Imp: Basin 1 Imp Runoff Area=0.900 ac 100.00% Impervious Runoff Depth>6.12"
Tc=10.0 min CN=98 Runoff=3.52 cfs 0.459 af

Subcatchment Basin 1 Pervious: Basin 1 - Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=0.66"
Tc=15.0 min CN=39 Runoff=0.08 cfs 0.028 af

Subcatchment Basin 2 - Pervious: Basin 2 - Runoff Area=4.050 ac 0.00% Impervious Runoff Depth=0.66"
Tc=15.0 min CN=39 Runoff=0.62 cfs 0.224 af

Subcatchment Basin 2 Impervious: basin Runoff Area=2.750 ac 100.00% Impervious Runoff Depth>6.12"
Tc=10.0 min CN=98 Runoff=10.75 cfs 1.403 af

Subcatchment Basin 3 Impervious: basin Runoff Area=2.400 ac 100.00% Impervious Runoff Depth>6.12"
Tc=10.0 min CN=98 Runoff=9.38 cfs 1.225 af

Subcatchment Basin 3 Pervious: Basin 3 - Runoff Area=1.600 ac 0.00% Impervious Runoff Depth=0.66"
Tc=15.0 min CN=39 Runoff=0.24 cfs 0.089 af

Subcatchment Rain Garden 1 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>6.12"
Tc=10.0 min CN=98 Runoff=1.37 cfs 0.179 af

Subcatchment Rain Garden 1 Pervious: Rain Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=0.66"
Tc=15.0 min CN=39 Runoff=0.18 cfs 0.064 af

Subcatchment Rain Garden 2 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>6.12"
Tc=10.0 min CN=98 Runoff=1.37 cfs 0.179 af

Subcatchment Rain Garden 2 Pervious: Rain Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.66"
Tc=15.0 min CN=39 Runoff=0.25 cfs 0.091 af

Subcatchment Rain Garden 3 Impervious: Runoff Area=1.450 ac 100.00% Impervious Runoff Depth>6.12"
Tc=10.0 min CN=98 Runoff=5.67 cfs 0.740 af

Subcatchment Rain Garden 3 Pervious: Rain Runoff Area=1.350 ac 0.00% Impervious Runoff Depth=0.66"
Tc=15.0 min CN=39 Runoff=0.21 cfs 0.075 af

Subcatchment Rain Garden 4 Impervious: Runoff Area=0.400 ac 100.00% Impervious Runoff Depth>6.12"
Tc=10.0 min CN=98 Runoff=1.56 cfs 0.204 af

Subcatchment Rain Garden 4 Pervious: Rain Runoff Area=0.600 ac 0.00% Impervious Runoff Depth=0.66"
Tc=15.0 min CN=39 Runoff=0.09 cfs 0.033 af

Subcatchment RG 5: Rain Garden 5 Runoff Area=1.100 ac 36.36% Impervious Runoff Depth=2.39"
Tc=10.0 min CN=60 Runoff=1.75 cfs 0.219 af

Pond Basin 1: Basin 1 Peak Elev=73.61' Storage=0.175 af Inflow=3.55 cfs 0.702 af
Discarded=0.20 cfs 0.393 af Primary=0.51 cfs 0.277 af Outflow=0.71 cfs 0.669 af

Pond Basin 2: Basin 2 Peak Elev=70.37' Storage=0.921 af Inflow=12.67 cfs 2.146 af
Discarded=1.00 cfs 1.854 af Primary=0.00 cfs 0.000 af Outflow=1.00 cfs 1.854 af

Pond Basin 3: Basin 3 Peak Elev=74.82' Storage=0.749 af Inflow=9.50 cfs 1.313 af
Discarded=0.30 cfs 0.608 af Primary=0.20 cfs 0.215 af Outflow=0.50 cfs 0.823 af

Pond Rain Garden 1: Rain Garden 1 Peak Elev=78.00' Storage=0.000 af Inflow=1.46 cfs 0.242 af
Discarded=0.00 cfs 0.000 af Primary=1.45 cfs 0.242 af Outflow=1.46 cfs 0.242 af

Pond Rain Garden 2: Rain Garden 2 Peak Elev=75.99' Storage=0.059 af Inflow=1.50 cfs 0.270 af
Discarded=0.30 cfs 0.270 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.270 af

Pond Rain Garden 3: Rain Garden 3 Peak Elev=76.74' Storage=0.411 af Inflow=5.77 cfs 0.815 af
Discarded=0.30 cfs 0.589 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.589 af

Pond Rain Garden 4: Rain Garden 4 Peak Elev=75.66' Storage=0.058 af Inflow=1.61 cfs 0.237 af
Discarded=0.30 cfs 0.237 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.237 af

Pond Rain Garden 5: Rain Garden 5 Peak Elev=73.73' Storage=0.064 af Inflow=1.75 cfs 0.219 af
Discarded=0.30 cfs 0.219 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.219 af

Link Site: Site Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 20.600 ac Runoff Volume = 5.211 af Average Runoff Depth = 3.04"
56.31% Pervious = 11.600 ac 43.69% Impervious = 9.000 ac

Summary for Subcatchment Basin 1 Imp: Basin 1 Imp

Runoff = 3.52 cfs @ 12.19 hrs, Volume= 0.459 af, Depth> 6.12"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.500	98	Pavement
*	0.400	98	Roof
	0.900	98	Weighted Average
	0.900		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Basin 1 Pervious: Basin 1 - Pervious

Runoff = 0.08 cfs @ 12.50 hrs, Volume= 0.028 af, Depth= 0.66"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.500	39	lawn, A soils
	0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 - Pervious: Basin 2 - Pervious

Runoff = 0.62 cfs @ 12.50 hrs, Volume= 0.224 af, Depth= 0.66"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	4.050	39	lawn, A soils
	4.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 Impervious: basin 2 Impervious

Runoff = 10.75 cfs @ 12.19 hrs, Volume= 1.403 af, Depth> 6.12"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.600	98	Parking
*	0.450	98	Roof
*	0.700	98	Driveways
*	1.000	98	Road & Sidewalk
	2.750	98	Weighted Average
	2.750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Impervious: basin 3 Impervious

Runoff = 9.38 cfs @ 12.19 hrs, Volume= 1.225 af, Depth> 6.12"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.900	98	Parking
*	0.300	98	Roof
*	0.500	98	Driveways
*	0.700	98	Road & Sidewalk
	2.400	98	Weighted Average
	2.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Pervious: Basin 3 - Pervious

Runoff = 0.24 cfs @ 12.50 hrs, Volume= 0.089 af, Depth= 0.66"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	1.600	39	lawn, A soils
	1.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 1 Impervious: Rain Garden 1 Impervious

Runoff = 1.37 cfs @ 12.19 hrs, Volume= 0.179 af, Depth> 6.12"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 1 Pervious: Rain Garden 1 Pervious

Runoff = 0.18 cfs @ 12.50 hrs, Volume= 0.064 af, Depth= 0.66"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	1.150	39	lawn, A soils
	1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 2 Impervious: Rain Garden 2 Impervious

Runoff = 1.37 cfs @ 12.19 hrs, Volume= 0.179 af, Depth> 6.12"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 2 Pervious: Rain Garden 2 Pervious

Runoff = 0.25 cfs @ 12.50 hrs, Volume= 0.091 af, Depth= 0.66"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	1.650	39	lawn, A soils
	1.650		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 3 Impervious: Rain Garden 3 Impervious

Runoff = 5.67 cfs @ 12.19 hrs, Volume= 0.740 af, Depth> 6.12"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.450	98	Pavement
*	0.600	98	Roof
*	0.400	98	Driveway
	1.450	98	Weighted Average
	1.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 3 Pervious: Rain Garden 3 Pervious

Runoff = 0.21 cfs @ 12.50 hrs, Volume= 0.075 af, Depth= 0.66"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	1.350	39	lawn, A soils
	1.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 4 Impervious: Rain Garden 4 Impervious

Runoff = 1.56 cfs @ 12.19 hrs, Volume= 0.204 af, Depth> 6.12"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.400	98	Roof
	0.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 4 Pervious: Rain Garden 4 Pervious

Runoff = 0.09 cfs @ 12.50 hrs, Volume= 0.033 af, Depth= 0.66"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.600	39	lawn, A soils
	0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment RG 5: Rain Garden 5

Runoff = 1.75 cfs @ 12.20 hrs, Volume= 0.219 af, Depth= 2.39"
Routed to Pond Rain Garden 5 : Rain Garden 5

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 25 year Rainfall=6.70"

	Area (ac)	CN	Description
*	0.400	98	Roof
*	0.700	39	Lawn A soils
	1.100	60	Weighted Average
	0.700		63.64% Pervious Area
	0.400		36.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Pond Basin 1: Basin 1

Inflow Area = 7.400 ac, 49.32% Impervious, Inflow Depth > 1.14" for 25 year event
Inflow = 3.55 cfs @ 12.19 hrs, Volume= 0.702 af
Outflow = 0.71 cfs @ 13.30 hrs, Volume= 0.669 af, Atten= 80%, Lag= 66.2 min
Discarded = 0.20 cfs @ 9.30 hrs, Volume= 0.393 af
Primary = 0.51 cfs @ 13.30 hrs, Volume= 0.277 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 73.61' @ 13.30 hrs Surf.Area= 0.066 ac Storage= 0.175 af

Plug-Flow detention time= 160.3 min calculated for 0.669 af (95% of inflow)
Center-of-Mass det. time= 126.8 min (1,046.2 - 919.4)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.200 af	**retention basin (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.030	0.000	0.000
71.00	0.040	0.035	0.035
72.00	0.050	0.045	0.080
73.00	0.060	0.055	0.135
74.00	0.070	0.065	0.200

Device	Routing	Invert	Outlet Devices
#1	Discarded	70.00'	**0.20 cfs Exfiltration when above 70.00'**
#2	Primary	72.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	74.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.20 cfs @ 9.30 hrs HW=70.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.51 cfs @ 13.30 hrs HW=73.61' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.51 cfs @ 5.79 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 2: Basin 2

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth > 1.25" for 25 year event
Inflow = 12.67 cfs @ 12.20 hrs, Volume= 2.146 af
Outflow = 1.00 cfs @ 10.65 hrs, Volume= 1.854 af, Atten= 92%, Lag= 0.0 min
Discarded = 1.00 cfs @ 10.65 hrs, Volume= 1.854 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Link Site : Site

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 70.37' @ 17.68 hrs Surf.Area= 0.525 ac Storage= 0.921 af

Plug-Flow detention time= 351.9 min calculated for 1.849 af (86% of inflow)
Center-of-Mass det. time= 281.2 min (1,122.8 - 841.5)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	3.600 af	**Custom Stage Data (Prismatic)** Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
68.00	0.200	0.000	0.000
69.00	0.300	0.250	0.250
70.00	0.400	0.350	0.600
71.00	0.500	0.450	1.050
72.00	0.600	0.550	1.600
73.00	0.700	0.650	2.250
74.00	0.800	0.750	3.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.00'	**1.00 cfs Exfiltration when above 68.00'**
#2	Primary	70.70'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	73.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.00 cfs @ 10.65 hrs HW=68.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=68.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 3: Basin 3

Inflow Area = 6.000 ac, 45.83% Impervious, Inflow Depth > 2.63" for 25 year event
Inflow = 9.50 cfs @ 12.19 hrs, Volume= 1.313 af
Outflow = 0.50 cfs @ 16.98 hrs, Volume= 0.823 af, Atten= 95%, Lag= 287.4 min
Discarded = 0.30 cfs @ 6.65 hrs, Volume= 0.608 af
Primary = 0.20 cfs @ 16.98 hrs, Volume= 0.215 af
Routed to Pond Basin 1 : Basin 1

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 74.82' @ 16.98 hrs Surf.Area= 0.349 ac Storage= 0.749 af

Plug-Flow detention time= 431.3 min calculated for 0.821 af (63% of inflow)
Center-of-Mass det. time= 298.4 min (1,099.1 - 800.7)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	1.200 af	**Custom Stage Data (Prismatic)**Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
72.00	0.150	0.000	0.000
73.00	0.200	0.175	0.175
74.00	0.250	0.225	0.400
75.00	0.300	0.275	0.675
76.00	0.350	0.325	1.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	72.00'	**0.30 cfs Exfiltration when above 72.00'**
#2	Primary	74.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	75.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 6.65 hrs HW=72.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.20 cfs @ 16.98 hrs HW=74.82' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.20 cfs @ 4.00 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 1: Rain Garden 1

Inflow Area = 1.500 ac, 23.33% Impervious, Inflow Depth > 1.94" for 25 year event
Inflow = 1.46 cfs @ 12.20 hrs, Volume= 0.242 af
Outflow = 1.46 cfs @ 12.20 hrs, Volume= 0.242 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.20 hrs, Volume= 0.000 af
Primary = 1.45 cfs @ 12.20 hrs, Volume= 0.242 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 78.00' @ 12.20 hrs Surf.Area= 0.060 ac Storage= 0.000 af

Plug-Flow detention time= 0.0 min calculated for 0.242 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (843.3 - 843.3)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	0.400 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
78.00	0.060	0.000	0.000
79.00	0.080	0.070	0.070
80.00	0.100	0.090	0.160
81.00	0.120	0.110	0.270
82.00	0.140	0.130	0.400

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	80.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.20 hrs HW=78.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=301.47 cfs @ 12.20 hrs HW=78.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 301.47 cfs @ 21.53 fps)

Summary for Pond Rain Garden 2: Rain Garden 2

Inflow Area = 2.000 ac, 17.50% Impervious, Inflow Depth > 1.62" for 25 year event
Inflow = 1.50 cfs @ 12.21 hrs, Volume= 0.270 af
Outflow = 0.30 cfs @ 11.80 hrs, Volume= 0.270 af, Atten= 80%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.80 hrs, Volume= 0.270 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 3 : Basin 3

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 75.99' @ 13.62 hrs Surf.Area= 0.065 ac Storage= 0.059 af

Plug-Flow detention time= 60.5 min calculated for 0.269 af (100% of inflow)
Center-of-Mass det. time= 60.1 min (920.0 - 859.8)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.055	0.000	0.000
76.00	0.065	0.060	0.060
77.00	0.075	0.070	0.130
78.00	0.085	0.080	0.210
79.00	0.095	0.090	0.300

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.80 hrs HW=75.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 3: Rain Garden 3

Inflow Area = 2.800 ac, 51.79% Impervious, Inflow Depth > 3.49" for 25 year event
Inflow = 5.77 cfs @ 12.19 hrs, Volume= 0.815 af
Outflow = 0.30 cfs @ 9.15 hrs, Volume= 0.589 af, Atten= 95%, Lag= 0.0 min
Discarded = 0.30 cfs @ 9.15 hrs, Volume= 0.589 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 76.74' @ 17.36 hrs Surf.Area= 0.324 ac Storage= 0.411 af

Plug-Flow detention time= 397.3 min calculated for 0.589 af (72% of inflow)
Center-of-Mass det. time= 280.6 min (1,086.6 - 806.0)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	2.000 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.150	0.000	0.000
76.00	0.250	0.200	0.200
77.00	0.350	0.300	0.500
78.00	0.450	0.400	0.900
79.00	0.550	0.500	1.400
80.00	0.650	0.600	2.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 9.15 hrs HW=75.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 4: Rain Garden 4

Inflow Area = 1.000 ac, 40.00% Impervious, Inflow Depth > 2.85" for 25 year event
Inflow = 1.61 cfs @ 12.20 hrs, Volume= 0.237 af
Outflow = 0.30 cfs @ 11.75 hrs, Volume= 0.237 af, Atten= 81%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.75 hrs, Volume= 0.237 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 75.66' @ 13.23 hrs Surf.Area= 0.092 ac Storage= 0.058 af

Plug-Flow detention time= 57.1 min calculated for 0.237 af (100% of inflow)
Center-of-Mass det. time= 56.6 min (873.1 - 816.5)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.550 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.085	0.000	0.000
76.00	0.095	0.090	0.090
77.00	0.105	0.100	0.190
78.00	0.115	0.110	0.300
79.00	0.125	0.120	0.420
80.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.75 hrs HW=75.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 5: Rain Garden 5

Inflow Area = 1.100 ac, 36.36% Impervious, Inflow Depth = 2.39" for 25 year event
Inflow = 1.75 cfs @ 12.20 hrs, Volume= 0.219 af
Outflow = 0.30 cfs @ 11.95 hrs, Volume= 0.219 af, Atten= 83%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.95 hrs, Volume= 0.219 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 73.73' @ 13.49 hrs Surf.Area= 0.092 ac Storage= 0.064 af

Plug-Flow detention time= 77.2 min calculated for 0.219 af (100% of inflow)
Center-of-Mass det. time= 77.1 min (974.3 - 897.2)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	0.550 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
73.00	0.085	0.000	0.000
74.00	0.095	0.090	0.090
75.00	0.105	0.100	0.190
76.00	0.115	0.110	0.300
77.00	0.125	0.120	0.420
78.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	73.00'	**0.30 cfs Exfiltration when above 73.00'**
#2	Primary	75.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	77.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.95 hrs HW=73.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=73.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Link Site: Site

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth = 0.00" for 25 year event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Basin 1 Imp: Basin 1 Imp Runoff Area=0.900 ac 100.00% Impervious Runoff Depth>8.44"
Tc=10.0 min CN=98 Runoff=4.84 cfs 0.633 af

Subcatchment Basin 1 Pervious: Basin 1 - Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=1.70"
Tc=15.0 min CN=39 Runoff=0.35 cfs 0.071 af

Subcatchment Basin 2 - Pervious: Basin 2 - Runoff Area=4.050 ac 0.00% Impervious Runoff Depth=1.70"
Tc=15.0 min CN=39 Runoff=2.83 cfs 0.573 af

Subcatchment Basin 2 Impervious: basin Runoff Area=2.750 ac 100.00% Impervious Runoff Depth>8.44"
Tc=10.0 min CN=98 Runoff=14.79 cfs 1.934 af

Subcatchment Basin 3 Impervious: basin Runoff Area=2.400 ac 100.00% Impervious Runoff Depth>8.44"
Tc=10.0 min CN=98 Runoff=12.90 cfs 1.688 af

Subcatchment Basin 3 Pervious: Basin 3 - Runoff Area=1.600 ac 0.00% Impervious Runoff Depth=1.70"
Tc=15.0 min CN=39 Runoff=1.12 cfs 0.226 af

Subcatchment Rain Garden 1 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>8.44"
Tc=10.0 min CN=98 Runoff=1.88 cfs 0.246 af

Subcatchment Rain Garden 1 Pervious: Rain Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=1.70"
Tc=15.0 min CN=39 Runoff=0.80 cfs 0.163 af

Subcatchment Rain Garden 2 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>8.44"
Tc=10.0 min CN=98 Runoff=1.88 cfs 0.246 af

Subcatchment Rain Garden 2 Pervious: Rain Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=1.70"
Tc=15.0 min CN=39 Runoff=1.15 cfs 0.233 af

Subcatchment Rain Garden 3 Impervious: Runoff Area=1.450 ac 100.00% Impervious Runoff Depth>8.44"
Tc=10.0 min CN=98 Runoff=7.80 cfs 1.020 af

Subcatchment Rain Garden 3 Pervious: Rain Runoff Area=1.350 ac 0.00% Impervious Runoff Depth=1.70"
Tc=15.0 min CN=39 Runoff=0.94 cfs 0.191 af

Subcatchment Rain Garden 4 Impervious: Runoff Area=0.400 ac 100.00% Impervious Runoff Depth>8.44"
Tc=10.0 min CN=98 Runoff=2.15 cfs 0.281 af

Subcatchment Rain Garden 4 Pervious: Rain Runoff Area=0.600 ac 0.00% Impervious Runoff Depth=1.70"
Tc=15.0 min CN=39 Runoff=0.42 cfs 0.085 af

Subcatchment RG 5: Rain Garden 5 Runoff Area=1.100 ac 36.36% Impervious Runoff Depth=4.26"
Tc=10.0 min CN=60 Runoff=3.22 cfs 0.390 af

Pond Basin 1: Basin 1 Peak Elev=74.17' Storage=0.200 af Inflow=5.20 cfs 1.459 af
Discarded=0.20 cfs 0.407 af Primary=4.25 cfs 0.984 af Outflow=4.45 cfs 1.391 af

Pond Basin 2: Basin 2 Peak Elev=72.46' Storage=2.281 af Inflow=20.16 cfs 4.036 af
Discarded=1.00 cfs 1.937 af Primary=0.30 cfs 0.387 af Outflow=1.30 cfs 2.324 af

Pond Basin 3: Basin 3 Peak Elev=75.32' Storage=0.934 af Inflow=13.82 cfs 1.947 af
Discarded=0.30 cfs 0.614 af Primary=2.28 cfs 0.755 af Outflow=2.58 cfs 1.369 af

Pond Rain Garden 1: Rain Garden 1 Peak Elev=78.00' Storage=0.000 af Inflow=2.57 cfs 0.409 af
Discarded=0.00 cfs 0.000 af Primary=2.57 cfs 0.409 af Outflow=2.57 cfs 0.409 af

Pond Rain Garden 2: Rain Garden 2 Peak Elev=77.38' Storage=0.159 af Inflow=2.89 cfs 0.480 af
Discarded=0.30 cfs 0.447 af Primary=0.12 cfs 0.033 af Outflow=0.42 cfs 0.480 af

Pond Rain Garden 3: Rain Garden 3 Peak Elev=77.48' Storage=0.678 af Inflow=8.57 cfs 1.211 af
Discarded=0.30 cfs 0.608 af Primary=0.14 cfs 0.136 af Outflow=0.44 cfs 0.743 af

Pond Rain Garden 4: Rain Garden 4 Peak Elev=76.31' Storage=0.120 af Inflow=2.50 cfs 0.366 af
Discarded=0.30 cfs 0.366 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.366 af

Pond Rain Garden 5: Rain Garden 5 Peak Elev=74.70' Storage=0.159 af Inflow=3.22 cfs 0.390 af
Discarded=0.30 cfs 0.390 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.390 af

Link Site: Site Inflow=0.30 cfs 0.387 af
Primary=0.30 cfs 0.387 af

Total Runoff Area = 20.600 ac Runoff Volume = 7.982 af Average Runoff Depth = 4.65"
56.31% Pervious = 11.600 ac 43.69% Impervious = 9.000 ac

Summary for Subcatchment Basin 1 Imp: Basin 1 Imp

Runoff = 4.84 cfs @ 12.19 hrs, Volume= 0.633 af, Depth> 8.44"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.500	98	Pavement
*	0.400	98	Roof
	0.900	98	Weighted Average
	0.900		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Basin 1 Pervious: Basin 1 - Pervious

Runoff = 0.35 cfs @ 12.31 hrs, Volume= 0.071 af, Depth= 1.70"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.500	39	lawn, A soils
	0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 - Pervious: Basin 2 - Pervious

Runoff = 2.83 cfs @ 12.31 hrs, Volume= 0.573 af, Depth= 1.70"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	4.050	39	lawn, A soils
	4.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 Impervious: basin 2 Impervious

Runoff = 14.79 cfs @ 12.19 hrs, Volume= 1.934 af, Depth> 8.44"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.600	98	Parking
*	0.450	98	Roof
*	0.700	98	Driveways
*	1.000	98	Road & Sidewalk
	2.750	98	Weighted Average
	2.750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Impervious: basin 3 Impervious

Runoff = 12.90 cfs @ 12.19 hrs, Volume= 1.688 af, Depth> 8.44"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.900	98	Parking
*	0.300	98	Roof
*	0.500	98	Driveways
*	0.700	98	Road & Sidewalk
	2.400	98	Weighted Average
	2.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Pervious: Basin 3 - Pervious

Runoff = 1.12 cfs @ 12.31 hrs, Volume= 0.226 af, Depth= 1.70"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	1.600	39	lawn, A soils
	1.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 1 Impervious: Rain Garden 1 Impervious

Runoff = 1.88 cfs @ 12.19 hrs, Volume= 0.246 af, Depth> 8.44"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 1 Pervious: Rain Garden 1 Pervious

Runoff = 0.80 cfs @ 12.31 hrs, Volume= 0.163 af, Depth= 1.70"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	1.150	39	lawn, A soils
	1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 2 Impervious: Rain Garden 2 Impervious

Runoff = 1.88 cfs @ 12.19 hrs, Volume= 0.246 af, Depth> 8.44"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 2 Pervious: Rain Garden 2 Pervious

Runoff = 1.15 cfs @ 12.31 hrs, Volume= 0.233 af, Depth= 1.70"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	1.650	39	lawn, A soils
	1.650		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 3 Impervious: Rain Garden 3 Impervious

Runoff = 7.80 cfs @ 12.19 hrs, Volume= 1.020 af, Depth> 8.44"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.450	98	Pavement
*	0.600	98	Roof
*	0.400	98	Driveway
	1.450	98	Weighted Average
	1.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 3 Pervious: Rain Garden 3 Pervious

Runoff = 0.94 cfs @ 12.31 hrs, Volume= 0.191 af, Depth= 1.70"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	1.350	39	lawn, A soils
	1.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 4 Impervious: Rain Garden 4 Impervious

Runoff = 2.15 cfs @ 12.19 hrs, Volume= 0.281 af, Depth> 8.44"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.400	98	Roof
	0.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 4 Pervious: Rain Garden 4 Pervious

Runoff = 0.42 cfs @ 12.31 hrs, Volume= 0.085 af, Depth= 1.70"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.600	39	lawn, A soils
	0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment RG 5: Rain Garden 5

Runoff = 3.22 cfs @ 12.20 hrs, Volume= 0.390 af, Depth= 4.26"
Routed to Pond Rain Garden 5 : Rain Garden 5

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 100 year Rainfall=9.20"

	Area (ac)	CN	Description
*	0.400	98	Roof
*	0.700	39	Lawn A soils
	1.100	60	Weighted Average
	0.700		63.64% Pervious Area
	0.400		36.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Pond Basin 1: Basin 1

Inflow Area = 7.400 ac, 49.32% Impervious, Inflow Depth > 2.37" for 100 year event
Inflow = 5.20 cfs @ 12.20 hrs, Volume= 1.459 af
Outflow = 4.45 cfs @ 12.39 hrs, Volume= 1.391 af, Atten= 14%, Lag= 11.7 min
Discarded = 0.20 cfs @ 7.30 hrs, Volume= 0.407 af
Primary = 4.25 cfs @ 12.39 hrs, Volume= 0.984 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 74.17' @ 12.39 hrs Surf.Area= 0.070 ac Storage= 0.200 af

Plug-Flow detention time= 109.4 min calculated for 1.388 af (95% of inflow)
Center-of-Mass det. time= 75.0 min (990.5 - 915.5)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.200 af	**retention basin (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.030	0.000	0.000
71.00	0.040	0.035	0.035
72.00	0.050	0.045	0.080
73.00	0.060	0.055	0.135
74.00	0.070	0.065	0.200

Device	Routing	Invert	Outlet Devices
#1	Discarded	70.00'	**0.20 cfs Exfiltration when above 70.00'**
#2	Primary	72.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	74.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.20 cfs @ 7.30 hrs HW=70.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=4.06 cfs @ 12.39 hrs HW=74.16' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.59 cfs @ 6.80 fps)
└**3=Orifice/Grate** (Weir Controls 3.47 cfs @ 1.32 fps)

Summary for Pond Basin 2: Basin 2

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth > 2.35" for 100 year event
Inflow = 20.16 cfs @ 12.21 hrs, Volume= 4.036 af
Outflow = 1.30 cfs @ 22.54 hrs, Volume= 2.324 af, Atten= 94%, Lag= 620.2 min
Discarded = 1.00 cfs @ 9.65 hrs, Volume= 1.937 af
Primary = 0.30 cfs @ 22.54 hrs, Volume= 0.387 af
Routed to Link Site : Site

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 72.46' @ 22.54 hrs Surf.Area= 0.776 ac Storage= 2.281 af

Plug-Flow detention time= 418.2 min calculated for 2.318 af (57% of inflow)
Center-of-Mass det. time= 256.3 min (1,128.3 - 872.0)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	3.600 af	**Custom Stage Data (Prismatic)** Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
68.00	0.200	0.000	0.000
69.00	0.300	0.250	0.250
70.00	0.400	0.350	0.600
71.00	0.500	0.450	1.050
72.00	0.600	0.550	1.600
73.00	0.700	0.650	2.250
74.00	0.800	0.750	3.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.00'	**1.00 cfs Exfiltration when above 68.00'**
#2	Primary	70.70'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	73.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.00 cfs @ 9.65 hrs HW=68.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.00 cfs)

Primary OutFlow Max=0.30 cfs @ 22.54 hrs HW=72.46' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.30 cfs @ 6.16 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 3: Basin 3

Inflow Area = 6.000 ac, 45.83% Impervious, Inflow Depth > 3.89" for 100 year event
Inflow = 13.82 cfs @ 12.20 hrs, Volume= 1.947 af
Outflow = 2.58 cfs @ 13.17 hrs, Volume= 1.369 af, Atten= 81%, Lag= 58.5 min
Discarded = 0.30 cfs @ 5.70 hrs, Volume= 0.614 af
Primary = 2.28 cfs @ 13.17 hrs, Volume= 0.755 af
Routed to Pond Basin 1 : Basin 1

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 75.32' @ 13.17 hrs Surf.Area= 0.379 ac Storage= 0.934 af

Plug-Flow detention time= 350.1 min calculated for 1.368 af (70% of inflow)
Center-of-Mass det. time= 231.3 min (1,038.0 - 806.7)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	1.200 af	**Custom Stage Data (Prismatic)**Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
72.00	0.150	0.000	0.000
73.00	0.200	0.175	0.175
74.00	0.250	0.225	0.400
75.00	0.300	0.275	0.675
76.00	0.350	0.325	1.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	72.00'	**0.30 cfs Exfiltration when above 72.00'**
#2	Primary	74.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	75.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 5.70 hrs HW=72.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=2.28 cfs @ 13.17 hrs HW=75.32' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 5.26 fps)
└**3=Orifice/Grate** (Orifice Controls 2.02 cfs @ 1.81 fps)

Summary for Pond Rain Garden 1: Rain Garden 1

Inflow Area = 1.500 ac, 23.33% Impervious, Inflow Depth > 3.27" for 100 year event
Inflow = 2.57 cfs @ 12.22 hrs, Volume= 0.409 af
Outflow = 2.57 cfs @ 12.22 hrs, Volume= 0.409 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.22 hrs, Volume= 0.000 af
Primary = 2.57 cfs @ 12.22 hrs, Volume= 0.409 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 78.00' @ 12.22 hrs Surf.Area= 0.060 ac Storage= 0.000 af

Plug-Flow detention time= 0.0 min calculated for 0.408 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (852.5 - 852.5)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	0.400 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
78.00	0.060	0.000	0.000
79.00	0.080	0.070	0.070
80.00	0.100	0.090	0.160
81.00	0.120	0.110	0.270
82.00	0.140	0.130	0.400

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	80.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.22 hrs HW=78.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=301.47 cfs @ 12.22 hrs HW=78.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 301.47 cfs @ 21.53 fps)

Summary for Pond Rain Garden 2: Rain Garden 2

Inflow Area = 2.000 ac, 17.50% Impervious, Inflow Depth > 2.88" for 100 year event
Inflow = 2.89 cfs @ 12.22 hrs, Volume= 0.480 af
Outflow = 0.42 cfs @ 14.38 hrs, Volume= 0.480 af, Atten= 86%, Lag= 129.6 min
Discarded = 0.30 cfs @ 11.50 hrs, Volume= 0.447 af
Primary = 0.12 cfs @ 14.38 hrs, Volume= 0.033 af
Routed to Pond Basin 3 : Basin 3

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 77.38' @ 14.38 hrs Surf.Area= 0.079 ac Storage= 0.159 af

Plug-Flow detention time= 200.6 min calculated for 0.479 af (100% of inflow)
Center-of-Mass det. time= 200.2 min (1,067.7 - 867.5)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.055	0.000	0.000
76.00	0.065	0.060	0.060
77.00	0.075	0.070	0.130
78.00	0.085	0.080	0.210
79.00	0.095	0.090	0.300

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.50 hrs HW=75.04' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.12 cfs @ 14.38 hrs HW=77.38' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.12 cfs @ 2.41 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 3: Rain Garden 3

Inflow Area = 2.800 ac, 51.79% Impervious, Inflow Depth > 5.19" for 100 year event
Inflow = 8.57 cfs @ 12.20 hrs, Volume= 1.211 af
Outflow = 0.44 cfs @ 17.59 hrs, Volume= 0.743 af, Atten= 95%, Lag= 323.7 min
Discarded = 0.30 cfs @ 7.15 hrs, Volume= 0.608 af
Primary = 0.14 cfs @ 17.59 hrs, Volume= 0.136 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 77.48' @ 17.59 hrs Surf.Area= 0.398 ac Storage= 0.678 af

Plug-Flow detention time= 412.1 min calculated for 0.742 af (61% of inflow)
Center-of-Mass det. time= 274.3 min (1,086.1 - 811.8)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	2.000 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.150	0.000	0.000
76.00	0.250	0.200	0.200
77.00	0.350	0.300	0.500
78.00	0.450	0.400	0.900
79.00	0.550	0.500	1.400
80.00	0.650	0.600	2.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 7.15 hrs HW=75.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.14 cfs @ 17.59 hrs HW=77.48' (Free Discharge)
├**2=Orifice/Grate** (Orifice Controls 0.14 cfs @ 2.85 fps)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 4: Rain Garden 4

Inflow Area = 1.000 ac, 40.00% Impervious, Inflow Depth > 4.40" for 100 year event
Inflow = 2.50 cfs @ 12.20 hrs, Volume= 0.366 af
Outflow = 0.30 cfs @ 11.40 hrs, Volume= 0.366 af, Atten= 88%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.40 hrs, Volume= 0.366 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 76.31' @ 14.02 hrs Surf.Area= 0.098 ac Storage= 0.120 af

Plug-Flow detention time= 142.5 min calculated for 0.365 af (100% of inflow)
Center-of-Mass det. time= 141.8 min (966.1 - 824.3)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.550 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.085	0.000	0.000
76.00	0.095	0.090	0.090
77.00	0.105	0.100	0.190
78.00	0.115	0.110	0.300
79.00	0.125	0.120	0.420
80.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.40 hrs HW=75.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 5: Rain Garden 5

Inflow Area = 1.100 ac, 36.36% Impervious, Inflow Depth = 4.26" for 100 year event
Inflow = 3.22 cfs @ 12.20 hrs, Volume= 0.390 af
Outflow = 0.30 cfs @ 11.55 hrs, Volume= 0.390 af, Atten= 91%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.55 hrs, Volume= 0.390 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 74.70' @ 14.76 hrs Surf.Area= 0.102 ac Storage= 0.159 af

Plug-Flow detention time= 234.2 min calculated for 0.390 af (100% of inflow)
Center-of-Mass det. time= 234.1 min (1,109.6 - 875.5)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	0.550 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
73.00	0.085	0.000	0.000
74.00	0.095	0.090	0.090
75.00	0.105	0.100	0.190
76.00	0.115	0.110	0.300
77.00	0.125	0.120	0.420
78.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	73.00'	**0.30 cfs Exfiltration when above 73.00'**
#2	Primary	75.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	77.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.55 hrs HW=73.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=73.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Link Site: Site

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth > 0.23" for 100 year event
Inflow = 0.30 cfs @ 22.54 hrs, Volume= 0.387 af
Primary = 0.30 cfs @ 22.54 hrs, Volume= 0.387 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Time span=5.00-30.00 hrs, dt=0.05 hrs, 501 points
Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment Basin 1 Imp: Basin 1 Imp Runoff Area=0.900 ac 100.00% Impervious Runoff Depth>1.02"
Tc=10.0 min CN=98 Runoff=0.61 cfs 0.077 af

Subcatchment Basin 1 Pervious: Basin 1 - Runoff Area=0.500 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Basin 2 - Pervious: Basin 2 - Runoff Area=4.050 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Basin 2 Impervious: basin Runoff Area=2.750 ac 100.00% Impervious Runoff Depth>1.02"
Tc=10.0 min CN=98 Runoff=1.87 cfs 0.234 af

Subcatchment Basin 3 Impervious: basin Runoff Area=2.400 ac 100.00% Impervious Runoff Depth>1.02"
Tc=10.0 min CN=98 Runoff=1.63 cfs 0.204 af

Subcatchment Basin 3 Pervious: Basin 3 - Runoff Area=1.600 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Rain Garden 1 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>1.02"
Tc=10.0 min CN=98 Runoff=0.24 cfs 0.030 af

Subcatchment Rain Garden 1 Pervious: Rain Runoff Area=1.150 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Rain Garden 2 Impervious: Runoff Area=0.350 ac 100.00% Impervious Runoff Depth>1.02"
Tc=10.0 min CN=98 Runoff=0.24 cfs 0.030 af

Subcatchment Rain Garden 2 Pervious: Rain Runoff Area=1.650 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Rain Garden 3 Impervious: Runoff Area=1.450 ac 100.00% Impervious Runoff Depth>1.02"
Tc=10.0 min CN=98 Runoff=0.99 cfs 0.124 af

Subcatchment Rain Garden 3 Pervious: Rain Runoff Area=1.350 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment Rain Garden 4 Impervious: Runoff Area=0.400 ac 100.00% Impervious Runoff Depth>1.02"
Tc=10.0 min CN=98 Runoff=0.27 cfs 0.034 af

Subcatchment Rain Garden 4 Pervious: Rain Runoff Area=0.600 ac 0.00% Impervious Runoff Depth=0.00"
Tc=15.0 min CN=39 Runoff=0.00 cfs 0.000 af

Subcatchment RG 5: Rain Garden 5 Runoff Area=1.100 ac 36.36% Impervious Runoff Depth=0.00"
Tc=10.0 min CN=60 Runoff=0.00 cfs 0.000 af

Pond Basin 1: Basin 1 Peak Elev=70.37' Storage=0.013 af Inflow=0.61 cfs 0.077 af
Discarded=0.20 cfs 0.077 af Primary=0.00 cfs 0.000 af Outflow=0.20 cfs 0.077 af

Pond Basin 2: Basin 2 Peak Elev=68.14' Storage=0.042 af Inflow=2.11 cfs 0.264 af
Discarded=1.00 cfs 0.264 af Primary=0.00 cfs 0.000 af Outflow=1.00 cfs 0.264 af

Pond Basin 3: Basin 3 Peak Elev=72.30' Storage=0.062 af Inflow=1.63 cfs 0.204 af
Discarded=0.30 cfs 0.204 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.204 af

Pond Rain Garden 1: Rain Garden 1 Peak Elev=78.00' Storage=0.000 af Inflow=0.24 cfs 0.030 af
Discarded=0.00 cfs 0.000 af Primary=0.24 cfs 0.030 af Outflow=0.24 cfs 0.030 af

Pond Rain Garden 2: Rain Garden 2 Peak Elev=75.03' Storage=0.002 af Inflow=0.24 cfs 0.030 af
Discarded=0.21 cfs 0.030 af Primary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.030 af

Pond Rain Garden 3: Rain Garden 3 Peak Elev=75.17' Storage=0.026 af Inflow=0.99 cfs 0.124 af
Discarded=0.30 cfs 0.124 af Primary=0.00 cfs 0.000 af Outflow=0.30 cfs 0.124 af

Pond Rain Garden 4: Rain Garden 4 Peak Elev=75.04' Storage=0.003 af Inflow=0.27 cfs 0.034 af
Discarded=0.21 cfs 0.034 af Primary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.034 af

Pond Rain Garden 5: Rain Garden 5 Peak Elev=73.00' Storage=0.000 af Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Link Site: Site Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Total Runoff Area = 20.600 ac Runoff Volume = 0.733 af Average Runoff Depth = 0.43"
56.31% Pervious = 11.600 ac 43.69% Impervious = 9.000 ac

Summary for Subcatchment Basin 1 Imp: Basin 1 Imp

Runoff = 0.61 cfs @ 12.19 hrs, Volume= 0.077 af, Depth> 1.02"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.500	98	Pavement
*	0.400	98	Roof
	0.900	98	Weighted Average
	0.900		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Basin 1 Pervious: Basin 1 - Pervious

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Basin 1 : Basin 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.500	39	lawn, A soils
	0.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 - Pervious: Basin 2 - Pervious

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	4.050	39	lawn, A soils
	4.050		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Basin 2 Impervious: basin 2 Impervious

Runoff = 1.87 cfs @ 12.19 hrs, Volume= 0.234 af, Depth> 1.02"
Routed to Pond Basin 2 : Basin 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.600	98	Parking
*	0.450	98	Roof
*	0.700	98	Driveways
*	1.000	98	Road & Sidewalk
	2.750	98	Weighted Average
	2.750		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Impervious: basin 3 Impervious

Runoff = 1.63 cfs @ 12.19 hrs, Volume= 0.204 af, Depth> 1.02"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.900	98	Parking
*	0.300	98	Roof
*	0.500	98	Driveways
*	0.700	98	Road & Sidewalk
	2.400	98	Weighted Average
	2.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement**

Summary for Subcatchment Basin 3 Pervious: Basin 3 - Pervious

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Basin 3 : Basin 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	1.600	39	lawn, A soils
	1.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 1 Impervious: Rain Garden 1 Impervious

Runoff = 0.24 cfs @ 12.19 hrs, Volume= 0.030 af, Depth> 1.02"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 1 Pervious: Rain Garden 1 Pervious

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Rain Garden 1 : Rain Garden 1

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	1.150	39	lawn, A soils
	1.150		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 2 Impervious: Rain Garden 2 Impervious

Runoff = 0.24 cfs @ 12.19 hrs, Volume= 0.030 af, Depth> 1.02"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.350	98	Roof
	0.350		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 2 Pervious: Rain Garden 2 Pervious

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Rain Garden 2 : Rain Garden 2

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	1.650	39	lawn, A soils
	1.650		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 3 Impervious: Rain Garden 3 Impervious

Runoff = 0.99 cfs @ 12.19 hrs, Volume= 0.124 af, Depth> 1.02"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.450	98	Pavement
*	0.600	98	Roof
*	0.400	98	Driveway
	1.450	98	Weighted Average
	1.450		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 3 Pervious: Rain Garden 3 Pervious

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Rain Garden 3 : Rain Garden 3

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	1.350	39	lawn, A soils
	1.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment Rain Garden 4 Impervious: Rain Garden 4 Impervious

Runoff = 0.27 cfs @ 12.19 hrs, Volume= 0.034 af, Depth> 1.02"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.400	98	Roof
	0.400		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Subcatchment Rain Garden 4 Pervious: Rain Garden 4 Pervious

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Rain Garden 4 : Rain Garden 4

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.600	39	lawn, A soils
	0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment RG 5: Rain Garden 5

Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Pond Rain Garden 5 : Rain Garden 5

Runoff by SCS TR-20 method, UH=Delmarva, Weighted-CN, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
NRCC 24-hr D WQ storm Rainfall=1.25"

	Area (ac)	CN	Description
*	0.400	98	Roof
*	0.700	39	Lawn A soils
	1.100	60	Weighted Average
	0.700		63.64% Pervious Area
	0.400		36.36% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					**Direct Entry, pavement and pipe**

Summary for Pond Basin 1: Basin 1

Inflow Area = 7.400 ac, 49.32% Impervious, Inflow Depth > 0.12" for WQ storm event
Inflow = 0.61 cfs @ 12.19 hrs, Volume= 0.077 af
Outflow = 0.20 cfs @ 12.00 hrs, Volume= 0.077 af, Atten= 67%, Lag= 0.0 min
Discarded = 0.20 cfs @ 12.00 hrs, Volume= 0.077 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 70.37' @ 12.69 hrs Surf.Area= 0.034 ac Storage= 0.013 af

Plug-Flow detention time= 16.6 min calculated for 0.077 af (100% of inflow)
Center-of-Mass det. time= 16.4 min (823.4 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	70.00'	0.200 af	**retention basin (Prismatic)**Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
70.00	0.030	0.000	0.000
71.00	0.040	0.035	0.035
72.00	0.050	0.045	0.080
73.00	0.060	0.055	0.135
74.00	0.070	0.065	0.200

Device	Routing	Invert	Outlet Devices
#1	Discarded	70.00'	**0.20 cfs Exfiltration when above 70.00'**
#2	Primary	72.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	74.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.20 cfs @ 12.00 hrs HW=70.05' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.20 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=70.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 2: Basin 2

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth > 0.15" for WQ storm event
Inflow = 2.11 cfs @ 12.19 hrs, Volume= 0.264 af
Outflow = 1.00 cfs @ 12.20 hrs, Volume= 0.264 af, Atten= 53%, Lag= 0.5 min
Discarded = 1.00 cfs @ 12.20 hrs, Volume= 0.264 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Link Site : Site

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 68.14' @ 12.52 hrs Surf.Area= 0.257 ac Storage= 0.042 af

Plug-Flow detention time= 20.8 min calculated for 0.263 af (100% of inflow)
Center-of-Mass det. time= 20.6 min (827.6 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	68.00'	3.600 af	**Custom Stage Data (Prismatic)** Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
68.00	0.200	0.000	0.000
69.00	0.300	0.250	0.250
70.00	0.400	0.350	0.600
71.00	0.500	0.450	1.050
72.00	0.600	0.550	1.600
73.00	0.700	0.650	2.250
74.00	0.800	0.750	3.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	68.00'	**1.00 cfs Exfiltration when above 68.00'**
#2	Primary	70.70'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	73.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.00 cfs @ 12.20 hrs HW=68.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 1.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=68.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Basin 3: Basin 3

Inflow Area = 6.000 ac, 45.83% Impervious, Inflow Depth > 0.41" for WQ storm event
Inflow = 1.63 cfs @ 12.19 hrs, Volume= 0.204 af
Outflow = 0.30 cfs @ 11.95 hrs, Volume= 0.204 af, Atten= 82%, Lag= 0.0 min
Discarded = 0.30 cfs @ 11.95 hrs, Volume= 0.204 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 1 : Basin 1

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 72.30' @ 13.06 hrs Surf.Area= 0.198 ac Storage= 0.062 af

Plug-Flow detention time= 73.6 min calculated for 0.204 af (100% of inflow)
Center-of-Mass det. time= 73.1 min (880.2 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	72.00'	1.200 af	**Custom Stage Data (Prismatic)**Listed below x 1.2

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
72.00	0.150	0.000	0.000
73.00	0.200	0.175	0.175
74.00	0.250	0.225	0.400
75.00	0.300	0.275	0.675
76.00	0.350	0.325	1.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	72.00'	**0.30 cfs Exfiltration when above 72.00'**
#2	Primary	74.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	75.00'	**42.0" W x 42.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 11.95 hrs HW=72.07' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=72.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 1: Rain Garden 1

Inflow Area = 1.500 ac, 23.33% Impervious, Inflow Depth > 0.24" for WQ storm event
Inflow = 0.24 cfs @ 12.19 hrs, Volume= 0.030 af
Outflow = 0.24 cfs @ 12.19 hrs, Volume= 0.030 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.19 hrs, Volume= 0.000 af
Primary = 0.24 cfs @ 12.19 hrs, Volume= 0.030 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 78.00' @ 12.19 hrs Surf.Area= 0.060 ac Storage= 0.000 af

Plug-Flow detention time= 0.0 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (807.0 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	78.00'	0.400 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
78.00	0.060	0.000	0.000
79.00	0.080	0.070	0.070
80.00	0.100	0.090	0.160
81.00	0.120	0.110	0.270
82.00	0.140	0.130	0.400

Device	Routing	Invert	Outlet Devices
#1	Discarded	78.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	80.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	58.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.19 hrs HW=78.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=301.47 cfs @ 12.19 hrs HW=78.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Orifice Controls 301.47 cfs @ 21.53 fps)

Summary for Pond Rain Garden 2: Rain Garden 2

Inflow Area = 2.000 ac, 17.50% Impervious, Inflow Depth > 0.18" for WQ storm event
Inflow = 0.24 cfs @ 12.19 hrs, Volume= 0.030 af
Outflow = 0.21 cfs @ 12.27 hrs, Volume= 0.030 af, Atten= 12%, Lag= 4.8 min
Discarded = 0.21 cfs @ 12.27 hrs, Volume= 0.030 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 3 : Basin 3

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Peak Elev= 75.03' @ 12.27 hrs Surf.Area= 0.055 ac Storage= 0.002 af

Plug-Flow detention time= 5.7 min calculated for 0.030 af (100% of inflow)
Center-of-Mass det. time= 5.3 min (812.4 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.300 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.055	0.000	0.000
76.00	0.065	0.060	0.060
77.00	0.075	0.070	0.130
78.00	0.085	0.080	0.210
79.00	0.095	0.090	0.300

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.27 hrs HW=75.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 3: Rain Garden 3

Inflow Area = 2.800 ac, 51.79% Impervious, Inflow Depth > 0.53" for WQ storm event
Inflow = 0.99 cfs @ 12.19 hrs, Volume= 0.124 af
Outflow = 0.30 cfs @ 12.10 hrs, Volume= 0.124 af, Atten= 70%, Lag= 0.0 min
Discarded = 0.30 cfs @ 12.10 hrs, Volume= 0.124 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 75.17' @ 12.72 hrs Surf.Area= 0.167 ac Storage= 0.026 af

Plug-Flow detention time= 30.9 min calculated for 0.124 af (100% of inflow)
Center-of-Mass det. time= 30.4 min (837.4 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	2.000 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.150	0.000	0.000
76.00	0.250	0.200	0.200
77.00	0.350	0.300	0.500
78.00	0.450	0.400	0.900
79.00	0.550	0.500	1.400
80.00	0.650	0.600	2.000

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.10 hrs HW=75.06' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 4: Rain Garden 4

Inflow Area = 1.000 ac, 40.00% Impervious, Inflow Depth > 0.41" for WQ storm event
Inflow = 0.27 cfs @ 12.19 hrs, Volume= 0.034 af
Outflow = 0.21 cfs @ 12.33 hrs, Volume= 0.034 af, Atten= 23%, Lag= 8.1 min
Discarded = 0.21 cfs @ 12.33 hrs, Volume= 0.034 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 75.04' @ 12.33 hrs Surf.Area= 0.085 ac Storage= 0.003 af

Plug-Flow detention time= 10.8 min calculated for 0.034 af (100% of inflow)
Center-of-Mass det. time= 10.3 min (817.4 - 807.0)

Volume	Invert	Avail.Storage	Storage Description
#1	75.00'	0.550 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
75.00	0.085	0.000	0.000
76.00	0.095	0.090	0.090
77.00	0.105	0.100	0.190
78.00	0.115	0.110	0.300
79.00	0.125	0.120	0.420
80.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	**0.30 cfs Exfiltration when above 75.00'**
#2	Primary	77.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	79.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.30 cfs @ 12.33 hrs HW=75.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=75.00' (Free Discharge)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Pond Rain Garden 5: Rain Garden 5

Inflow Area = 1.100 ac, 36.36% Impervious, Inflow Depth = 0.00" for WQ storm event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Pond Basin 2 : Basin 2

Routing by Stor-Ind method, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs
Peak Elev= 73.00' @ 5.00 hrs Surf.Area= 0.085 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	73.00'	0.550 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
73.00	0.085	0.000	0.000
74.00	0.095	0.090	0.090
75.00	0.105	0.100	0.190
76.00	0.115	0.110	0.300
77.00	0.125	0.120	0.420
78.00	0.135	0.130	0.550

Device	Routing	Invert	Outlet Devices
#1	Discarded	73.00'	**0.30 cfs Exfiltration when above 73.00'**
#2	Primary	75.00'	**3.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Primary	77.00'	**42.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=73.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=73.00' (Free Discharge)
└**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Grate** (Controls 0.00 cfs)

Summary for Link Site: Site

Inflow Area = 20.600 ac, 43.69% Impervious, Inflow Depth = 0.00" for WQ storm event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-30.00 hrs, dt= 0.05 hrs

Post Developed
Prepared by Professional Design Services

TABLE OF CONTENTS

PROFESSIONAL ENGINEER'S
GROUNDWATER MOUNDING ANALYSIS CERTIFICATION

Submitted to
STATE OF NEW JERSEY
PINELANDS COMMISSION
PO BOX 7
NEW LISBON, NJ 08064

Part A. General Information

Pinelands Application Number: _____
Project Location: Ridgeway Road
Municipality: Manchester Township
Block(s): 65 Lot(s): 11, 12, 13 & 14

1. Facility Location: Either latitude and longitude for the approximate canter each stormwater Infiltration facility, or electronic map or site plan.
   Facility a. Basin
   Facility b. _____
   Facility c. _____
   Facility d. _____
   Facility e. _____

Part B. Professional Engineer's Certification

I hereby certify that, pursuant to the requirements of the Pinelands Comprehensive Management Plan (N.J.A.C. 7:50-6.84(a)6.iv.(3)), I have performed a groundwater mounding analysis for each of the stormwater infiltration facilities identified in Part A, above, for the purpose of assessing the hydraulic impacts on the water table from infiltrating stormwater runoff from the maximum design storm. I further certify the infiltration of stormwater runoff from the maximum design storm at each of these infiltration facilities will not cause stormwater or groundwater to breakout to the land surface of cause any changes to the hydrology of adjacent water bodies, wetlands or cause adverse impacts to subsurface structures, including, but not limited to basements and septic systems. In performing this analysis, I utilized the following methods:

MODRET .
[Specify mounding analysis method(s)]

_____	39915
(Signature and seal)	(License Number)
	April 25, 2022
William Stevens	_____
(Name - Type or Print)	(Date)

TIME TO DRAIN CALCULATIONS

Basin 1:
Exfiltration Area
: Bottom area
Exfiltration rate at 3 in/hour
= 0.00007 ft/sec

Basin #	Bottom Area(af)	Rate (cfs)	Volume(af)	Time (hrs)
RG1	0.06	0.19	0.16	9
RG2	0.055	0.17	0.13	9
RG3	0.15	0.45	0.50	13
RG4	0.085	0.26	0.19	8.8
1	0.30	0.91	0.80	11
2	0.30	0.91	2.4	32

APPENDIX C

COLLECTION SYSTEM COMPUTATIONS

APPENDIX D

SOIL EROSION CALCULATION

OUTLET PROTECTION CALCULATIONS
OFSITE STABILITY CALCULATIONS
SEDIMENT BASIN CALCULATIONS

CONDUIT OUTLET DESIGN

Use 25 Year storm, Q (cfs)

Level Apron

Tw(ft) calculated from:
(1) 2 Year flood routing for outlets into stormwater management basins
(2) outlets from basins use 0.2 * D

q = Q/Wo

Calculate length & width of rip rap apron:
For Tw < ½ Pipe Size
- Length = (1.8 q/Do1/2) + 7Do
- Width = 3 Wo + L

For Tw > ½ Pipe Size
- Length = 3 q/Do1/2
- Width = 3 Do + 0.4L

Calculate D50 stone size (in):

$$= \frac{0.02}{Tw} (q)^{1.33}$$

Scour Hole

Depth = 0.5(Do)

Width = 2 Wo
Length = 3 Do

$$D50 = \frac{0.0125\, q^{1.33}}{TW}$$

Outlet #	Do	Wo	Q	Tw	q	L	W	D50
1-1	18	18	7	0.8 (1)	4.7	12	10	3”
1-2	18	18	7	0.8 (1)	4.7	12	10	3”
2-1	18	18	7	0.8 (1)	4.7	12	10	3”
2-2	18	18	7	0.8 (1)	4.7	12	10	3”
3-1	18	18	7	0.8 (1)	4.7	12	10	3”
3-2	18	18	7	0.8 (1)	4.7	12	10	3”

OFF-SITE STABILTY

The basins have been designed to comply with the off-site stability standard. The discharge from the system is basin 2 having an outlet towards Ridgeway Road. There is no discharge to an undeveloped or unpaved surface so the project meets the requirements for off-site stability.

-

SEDIMENT BASIN DESIGN

1.0 DESCRIPTION

It is necessary to control and prevent off-site sedimentation from the project site during construction. It is proposed to utilize the basin as a sediment basin during construction.

2.0 REGULATORY STANDARDS

A. Applicable Regulations

The Standards for Soil Erosion and Sediment Control contains standards for the design and construction of sediment basins (chapter 26). Sediment basins are permitted where failure of the basin will not result in loss of life or damage to homes, buildings, highways, railroads or public utilities. The maximum drainage area is 320 acres and the maximum height of the dam is 20 feet. The basin must be designed in accordance with the standards contained in Chapter 26.

The sediment basin will outlet into the existing natural drainage system by the outlet structure. This report demonstrates off-site stability at the point of discharge and downstream of the discharge point.

3.0 PROPOSED SEDIMENT BASIN PLAN

The contributory drainage area to the basin is less than 320 acres and the dam height is less than 20 feet (5 feet).

Each basin will be designed assuming the entire contributory drainage area is disturbed and non-vegetated. Sediment will be removed from the basin quarterly.

4.0 METHODOLOGY and DESIGN

Drainage Area = 12 Acres
Disturbed Area = 1240 Acres
Time for Development = one year with quarterly removal of sediment

Determine Minimum Basin Volume

I Determine Trap Efficiency
Set trap efficiency at 75%
From curve 26-1 find C/I = 0.025 (coarse sediment)
Average surface runoff for Toms River = 25 inches
I = (25 in.)(1 ft./12 in.)(12 ac.)
I = 18 ac. ft.

C = 18 ac. ft. (0.025)
C = 0.44 ac. ft. minimum Sediment Basin Volume

II. 1. Determine Volume for Sediment Storage Capacity

Construction Area
(DA)(A) = 12 ac. x 60 tons/ac./yr = 720 tons /yr.

Determine DR, Delivery Ratio
12/640 = 0.018 sq. mi
From curve 26-2 DR = 20% for sand

Determine the density of aerated sand
From Table 26-1 use 90 lbs./cf.

Determine the volume for the sediment storage for the life of the basin.
V = (DA)(A)(DR)(TE)(1/S)(2000 lbs./ton)(1/43560 sf./ac.)
V = (720)(0.20)(0.75)(1/90)(2000)(1/43560)
V = 0.03 ac. ft.

2. Determine the volume for the temporary floodwater storage

The required floodwater storage volume below the principal spillway is 0.5 ac ft based upon a drainage area of 12 acres, CN of 86 and a discharge from the principal spillway of 5 cfs. The required storage volume is provided at the principal spillway peak elevation.

Total required volume is 0.5 ac. ft. + 0.03 ac. ft. = 0.53 ac. Ft.

Use the larger of two values:

I = 0.44 ac. ft.

II = 0.53 ac. ft

Required basin volume to provide temporary floodwater storage governs, 0.53 ac. ft. is required. The basin provides 1.0 ac. ft. of storage volume below the principal spillway. The basin has adequate storage volume. Flood routing of the 2 year, 24 hour storm event through the sediment basin assuming the basin is full to the primary outlet is included in the report.