

Stormwater Pollution Prevention Plan (SWPPP)

Costco Wholesale at Crossgates Mall
Town of Guilderland
County of Albany, New York

March 10, 2023

Prepared for:

Costco Wholesale
45940 Horseshoe Drive, Suite 150
Sterling, VA 20166

Prepared by:

_____
Russell T. McFall, II
New York Professional Engineer
License No. 090030

Colliers Engineering & Design, Inc.
DBA Maser Consulting
410 Eagleview Boulevard, Suite 104
Exton, Pennsylvania 19341
Main: 484 212 7784
Colliersengineering.com

Table of Contents

INTRODUCTION 3
METHODOLOGY 3
TABLE 1: Summary Table 4
TABLE 2: Predevelopment and Post Development Peak Flow Summary to the Design Points 5
DISCUSSION 6
CONCLUSION 14

Appendices

APPENDIX 1 – PROJECT MAPS
APPENDIX 2 – DRAINAGE AREA MAPS
APPENDIX 3 – RAINFALL DATA AND RUNOFF COEFFICIENTS
APPENDIX 4 – HYDROCAD MODEL OUTPUT
APPENDIX 5 – STORM SEWER CALCULATIONS
APPENDIX 6 – SPDES GENERAL PERMIT GP- 0-20-001
APPENDIX 7– DRAFT MS4 STORMWATER POLLUTION PREVENTION PLAN (SWPPP) ACCEPTANCE FORM
APPENDIX 8 – DRAFT NOTICE OF INTENT (NOI)
APPENDIX 9 – DRAFT NOTICE OF TERMINATION (NOT)
APPENDIX 10 – DRAFT CONTRACTOR CERTIFICATION FORM
APPENDIX 11 – NEW YORK STANDARDS AND SPECS FOR EROSION AND SEDIMENT CONTROLS APPENDIX H: CONSTRUCTION SITE LOG BOOK
APPENDIX 12 – NYSDEC CONSTRUCTION STORMWATER INSPECTION MANUAL
APPENDIX 13 – NRCS SOILS REPORT
APPENDIX 14 – GEOTECHNICAL REPORT AND INFILTRATION TEST RESULTS
APPENDIX 15 – CHANNEL PROTECTION VOLUME CALCULATIONS
APPENDIX 16 – CONTECH CASCADE SEPARATOR DESIGN DOCUMENTS
APPENDIX 17 – NJCAT TECHNOLOGY VERIFICATION CONTECH CASCADE SEPARATOR
APPENDIX 18 – OPERATION & MAINTENANCE PLAN
APPENDIX 19 – EROSION & SEDIMENT CONTROL PLANS AND DRAINAGE DETAILS

INTRODUCTION

The parcel consists of approximately 16.46 acres which exist in the TOD (Transit Oriented Development) Zoning District. It is proposed to develop the site into a Costco Wholesale with associated infrastructure. The site will be serviced by municipal water and sewer. The proposed development and site improvements on this site require a study of the impacts on watercourses in and around the site. This study reviews the existing drainage conditions, as well as the proposed improvements to provide measures that will be used to control potential impacts due to storm water runoff. Due to the size and type of the project, a State Pollutant Discharge Elimination System Permit (SPDES GP-0-15-002) is required from the New York State Department of Environmental Conservation (NYSDEC).

Runoff from the site flows towards the north property line. This runoff discharges into a storm sewer system in Crossgates Mall Road which discharges to a tributary to Krum Kill. The tributary to Krum Kill (stream ID H-221-4-3) has a class A water quality. Mitigation for the increase in peak flow and to provide water quality benefits for this runoff shall be accomplished using a subsurface infiltration system, based on the requirements of Section 6.3 of the New York State Stormwater Management Design Manual. The infiltration system designed for the site provides the required water quality benefits, channel protection, overbank flood protection, and extreme flood protection. Runoff Reduction shall also be achieved through the aforementioned infiltration practices which are a standard Stormwater Management Practice (SMP) with Runoff Reduction Capacity as described in Table 3.5 of the updated New York State Storm Water Management Design Manual (NYSSMDM). An outlet control structure will be used in conjunction with the infiltration system to mitigate for peak flows prior to discharging off-site. Prior to entering the subsurface system, however, the runoff shall be pretreated through approved NYSDEC verified proprietary devices.

Also within the SWPPP is a discussion of the Erosion and Sediment Control Plan to be implemented during construction, and a long-term Operation & Maintenance Plan to be followed after construction is complete.

METHODOLOGY

1. The drainage areas are divided into subareas, by topography and land use. A summary of the drainage areas, composite curve numbers, and travel times are shown in Table 1.
2. Rainfall depths used for this analysis are those published by the Northeast Regional Climate Center for the project location for each storm event as directed in the NYSSMDM.
3. The required WQv was calculated in accordance with the Section 4.2 of the NYSSMDM. This is also the required RRv as per Section 4.3 of the NYSSMDM.
4. The peak flows from the drainage areas in the existing condition are computed using the runoff curve numbers taken from TR-55 to determine undeveloped peak runoff and runoff hydrographs at the design points. The existing peak flows are presented in Table 2.
5. In the post-development condition, the peak flows from the proposed development are computed using the runoff curve numbers taken from TR-55. The drainage areas are adjusted for the proposed improvements and grading of the site. The runoff flows are hydraulically routed for updated travel times, diversions, and new storage structures as necessary. The resulting proposed peak flows at each design point are presented in Table 2.

6. Two Contech Cascade Separators were sized to pre-treat runoff from the site prior to its entrance into the subsurface infiltration system.
7. A full Erosion & Sediment Control Plan (plans and construction sequencing) was designed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control (aka the "blue book") and is included in this report.
8. A Long-term Operation & Maintenance Plan was developed for the proposed post-construction stormwater control practices and is included in this report.
9. Maps indicating the various drainage conditions are enclosed in the appendix of this report. Schematic diagrams of the flow models in the existing and proposed conditions are enclosed in the HydroCAD output included in the appendix of this report.
10. The methods used are those presented in the HydroCAD computer program. The 100, 10, and 1-year frequency storms are studied. The SCS Type II - 24-hour storm distribution is used throughout. Soil types and hydrologic groups are based on soil maps from the NRCS online Web Soil Survey (included in appendix). Topographical mapping is taken from site-specific aerial mapping, confirmed by using ground survey techniques. Additional off-site information taken from USGS maps.

TABLE 1: Summary Table

Predevelopment			
Drainage Area	Area, Ac	CN	Tc, Hrs
Pre DA #1A	7.109	50	0.1767
Pre DA #1B	3.818	47	0.1550
Pre DA #1C	0.778	44	0.2867
Pre DA #1D	3.312	54	0.4850
Pre DA #2	0.295	42	0.1233
Pre DA #3	3.067	52	0.1267
Total	18.378	50	
Post Development			
Post DA #1A (bypass)	0.138	59	0.0833
Post DA #1B (bypass)	0.871	42	0.1417
Post DA #1C (basin)	16.072	91	0.1367
Post DA #1D (bypass)	0.782	41	0.1100
Post DA #2	0.000	0	0.0833
Post DA #3	0.516	52	0.0833
Total	18.378	85	

The Time of Concentration (Tc) paths are shown on the Drainage Area Maps found in the Appendix.

TABLE 2: Predevelopment and Post Development Peak Flow Summary to the Design Points

Design Point	Storm Event (Yr)	Predevelopment Peak Flow (Cfs)	Post Development Peak Flow (Cfs)	Net Change (Cfs)	Percent Change Over Prior Conditions
POI #1	1	3.33	2.05	-1.28	-38%
	10	9.30	9.05	-0.25	-2.7%
	100	19.95	19.84	-0.11	-0.6%
AOI #2	1	0.04	0.00	-0.04	-100%
	10	0.08	0.00	-0.08	-100%
	100	0.29	0.00	-0.29	-100%
AOI #3	1	1.93	0.36	-1.57	-81%
	10	3.52	0.65	-2.87	-82%
	100	7.14	1.32	-5.82	-82%
Combined	1	5.30	2.41	-2.89	-55%
	10	12.90	9.70	-3.20	-25%
	100	27.38	21.16	-6.22	-23%

Reduced peak flows at POI #1 are a result of the subsurface infiltration basin and its outlet control structure. While more area is draining to POI #1, the infiltration basin and outlet control structure more than account for this increase in area.

Reduced peak flows at AOI #2 are a result of diversions from the proposed grading/drainage design that creates a smaller area draining to this area (Pre DA #2 to Post DA #2).

Reduced peak flows at AOI #3 are a result of diversions from the proposed grading/drainage design that creates a smaller area draining to this area (Pre DA #3 to Post DA #3).

The peak flow analysis demonstrates that the proposed development will result in a reduction in flow rates entering the tributary to Krum Kill. Additionally, the proposed development will not have any adverse impacts on the storm sewer system in Crossgates Mall Road nor the adjacent properties to the east of the subject property.

DISCUSSION

Zero-Net Increase:

The proposed storm water improvements for the site provide the required channel protection, overbank flood protection, and extreme flood protection. Reductions in peak flows have been accomplished, exceeding the zero net increase in peak flow requirement at the design points. For example, the peak runoff flow for the 100-year storm event was reduced from 19.95 cfs in the existing condition to 19.84 cfs in the proposed condition at Design Point POI #1, which is a 0.6% reduction. An 82% reduction is realized at AOI #3 during both the 10 and 100 year storm events.

Pipe-Sizing:

The proposed drainage network (pipes, inlets, end sections) has been sized to adequately convey the 100-year storm event. Calculations and references for the pipe-sizing can be found in the Appendix of this document.

NRCS Soils:

The Web Soil Survey of Albany County, New York shows the site situated in an area having soil types, "CoC," "CoD," "EnA," "Gr," & "St." The hydrologic soil type for "CoC" and "CoD" is A. The hydrologic soil type for "EnA," "Gr," & "St" is A/D.

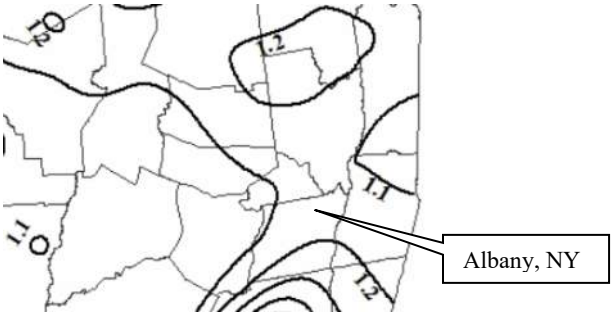
Wetlands & Floodplain:

A small strip of wetlands, approximately 10 to 20 feet wide and 350 feet long of some 4,051 square feet (0.093 ac.), is present on the site and is currently under Federal wetland regulatory jurisdiction. These wetlands occur at the bottom of a steeply-sided, man-altered drainage ditch. They occur to the northeast of the old Rapp Road (where an old drainage culvert exists) and extend to the northeast. At their terminus, they flow into an underground drainage system along Crossgates Mall Rd. They do not qualify as New York State Department of Environmental Conservation (NYSDEC) wetlands. An ACOE Nationwide Permit #39 is being sought to allow for the area to be piped into the existing underground drainage system and filled.

According to FEMA Flood Insurance Rate Maps 36001C0178D and 36001C0186D, which were both effective March 16, 2015, the site is outside the 100-year floodplain. The maps referenced in this section are included in the Appendix.

Water Quality Volume (WQv):

The Water Quality Volume (WQv) is designed to improve water quality sizing to capture and treat 90% of the average annual stormwater runoff volume. The WQv is directly related to the impervious cover created at a site. The 90% rainfall event value (P) used in the calculations (1.17) is shown below in the portion of Figure 4.1 from page 4.2 in the NYSSMDM.



90% Rule:

$WQ_v = [(P)(R_v)(A)] /12$
$Rv = 0.05+0.009(I)$
I = Impervious Cover (Percent)
Minimum Rv = 0.2
P = 90% Rainfall Event Number (See Figure 4.1)
A = site area in acres

Maser Consulting (MC) determined the total impervious area for the project site. The Runoff Coefficient "Rv" in the computation of Water Quality Volume WQv is dependent on the percent impervious cover. As per Section 4.2 of the NYSSMDM, 100% of the water quality volume shall be treated.

Drainage Area	Area A Acres	90% Rainfall Event Number P Inches	Percent Impervious I %	Runoff Coefficient Rv	Required WQv Ac-ft	Required WQv Cf
Entire Site	18.378	1.17	77.65	0.75	1.34	58,446

Total Water Quality Volume provided is defined as the volume stored below the first major orifice, in this case the orifice at elevation 272.20. Therefore, the WQv provided is 58,458 cf. 24-Hour detention is provided within the proposed basin and can be seen on the Hydrograph provided within the HydroCAD output that can be found at the end of this report.

The Channel Protection Volume (CPv) required calculation can be found in the Appendix. The CPv provided is equal to the volume provided within the basin at the 10-year storm elevation which in this case is 2.72 acre-feet. This is greater than the 1.72 acre-feet required.

Runoff Reduction Volume (RRv):

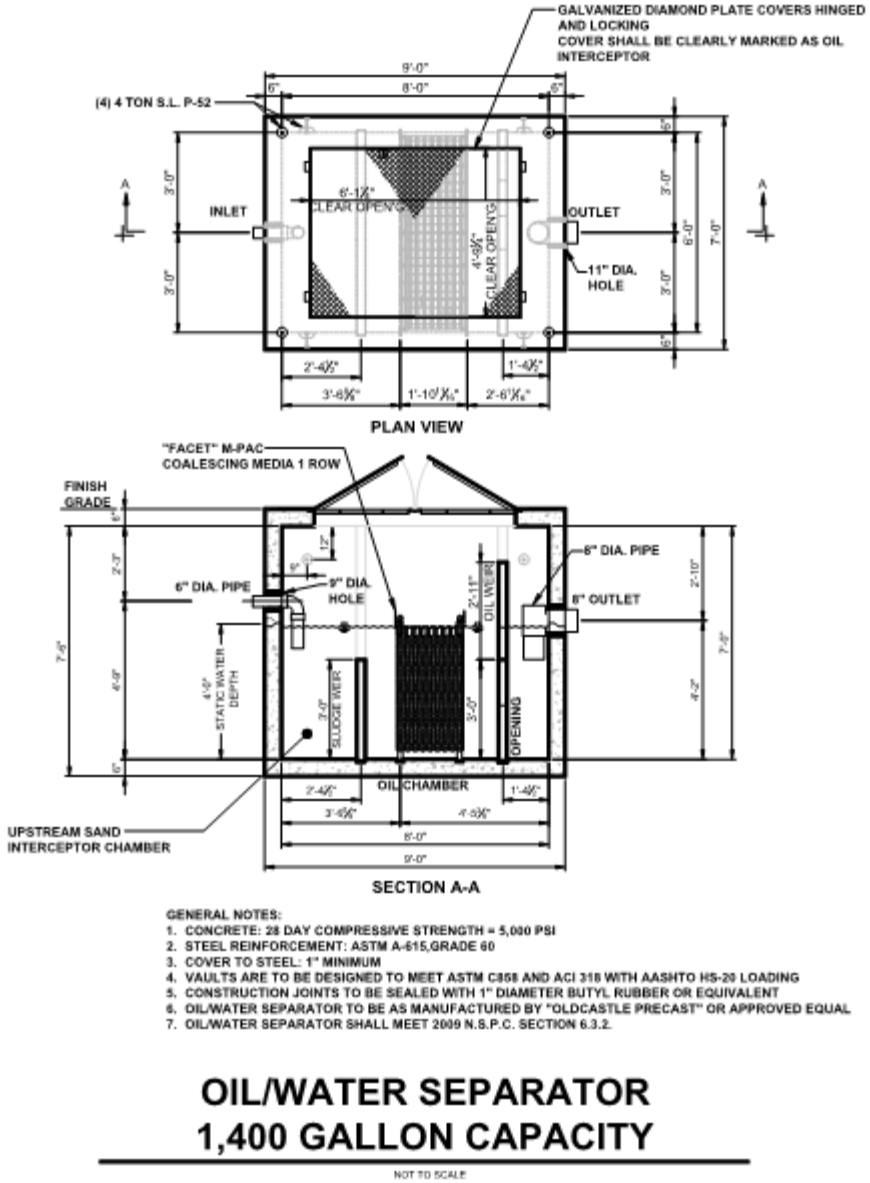
The runoff reduction volume requirements have been met through infiltrating the entire WQv using a subsurface StormTrap DoubleTrap infiltration system.

Hotspot treatment:

A stormwater hotspot is defined by NYSDEC as a land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants that are found in typical stormwater runoff, based on monitoring studies. If a site is designated a hotspot, stormwater runoff cannot be allowed to infiltrate untreated into groundwater, where it may contaminate water supplies. Table 4.3 in the NYSSMDM classifies vehicle fueling stations as stormwater hotspots.

An oil/water separator is proposed for this project to treat the runoff from the fuel facility. In addition, two Cascade Separator Stormwater Treatment Systems by Contech will be installed to

pretreat all runoff entering the subsurface infiltration basin to prevent pollutants from entering the facility and infiltrating into the ground or from being discharged into the receiving watercourse.

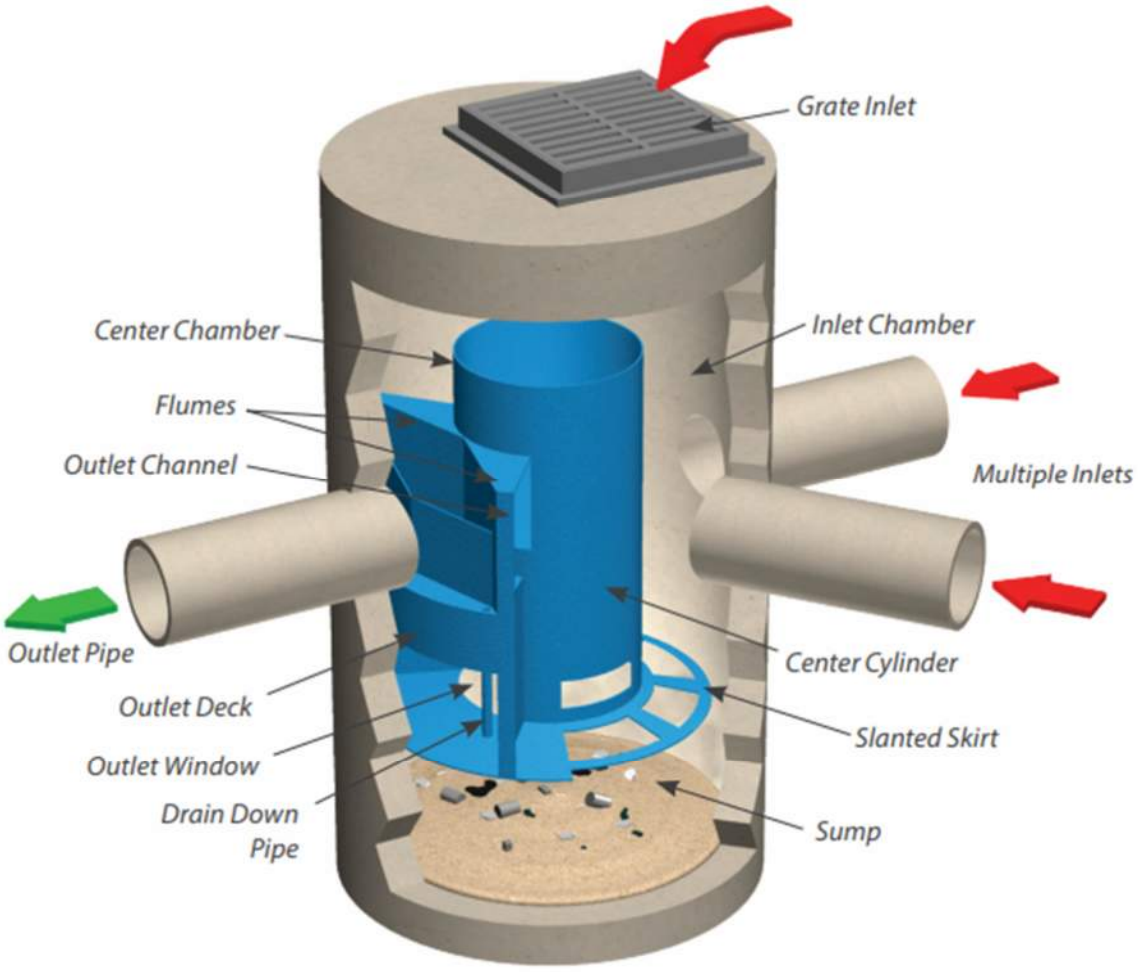


GENERAL NOTES:
1. CONCRETE: 28 DAY COMPRESSIVE STRENGTH = 5,000 PSI
2. STEEL REINFORCEMENT: ASTM A-615,GRADE 60
3. COVER TO STEEL: 1" MINIMUM
4. VAULTS ARE TO BE DESIGNED TO MEET ASTM C858 AND ACI 318 WITH AASHTO HS-20 LOADING
5. CONSTRUCTION JOINTS TO BE SEALED WITH 1" DIAMETER BUTYL RUBBER OR EQUIVALENT
6. OIL/WATER SEPARATOR TO BE AS MANUFACTURED BY "OLDCASTLE PRECAST" OR APPROVED EQUAL
7. OIL/WATER SEPARATOR SHALL MEET 2009 N.S.P.C. SECTION 6.3.2.

OIL/WATER SEPARATOR
1,400 GALLON CAPACITY

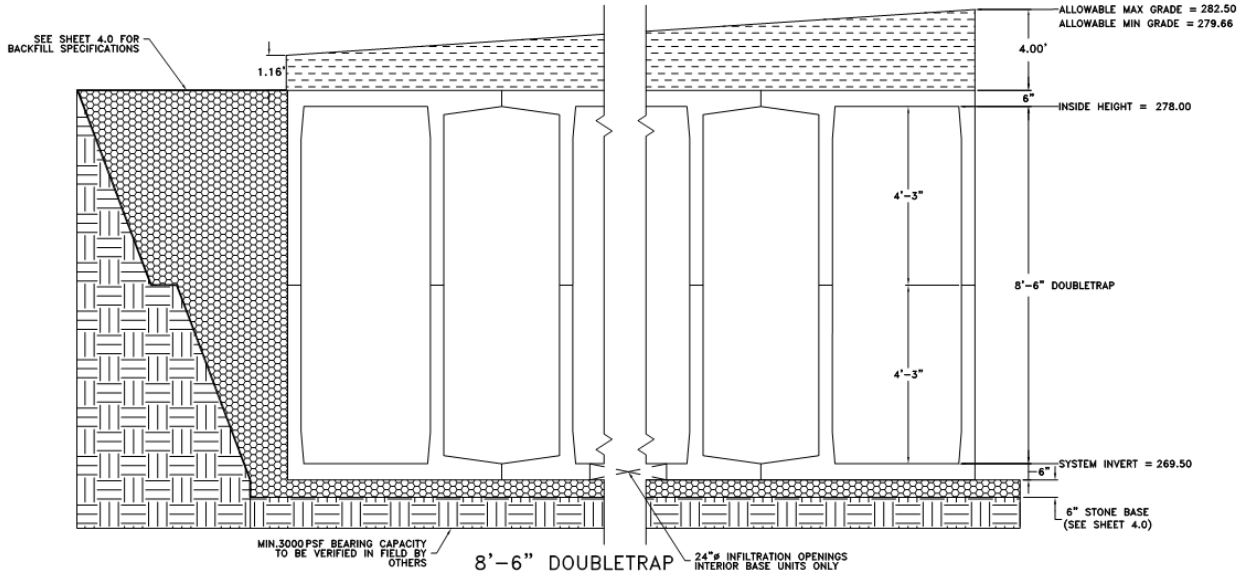
NOT TO SCALE

The oil/water separator is an underground concrete box with weir walls and a coalescing media that separate sediment, debris, oils, and grease from the stormwater runoff prior to discharging downstream.



The Contech Cascade Separator is a high-performance hydrodynamic separator. The Cascade Separator separates and traps debris, sediment, and oil and grease from stormwater runoff. The system was designed by Contech, and the design documents can be found in the Appendix of this report.

StormTrap DoubleTrap:



The StormTrap DoubleTrap is a concrete chamber that allows the storage of large volumes. Maser Consulting has designed an underground system of chambers that stores 211,148 cubic feet of volume within the chambers and stone voids (StormTrap assumes a porosity of 40%). The system discharges through an outlet control structure which consist of multiple orifices which reduce the peak rate of discharge from the system to meet the peak rate requirements. The system is designed to infiltrate the volume beneath the lowest orifice. The lowest orifice is at elevation 272.20 which provides an infiltration volume of 58,458 cf which is greater than the required WQv of 58,446 cf. Falling head infiltration tests were performed in the location of the infiltration basin. See the Appendix for test results and a map of test locations.

Erosion Control Measures:

A phased construction sequence has been developed for the project which incorporates stabilized construction accesses, compost filter sock, inlet protection, and temporary/permanent stabilization techniques to minimize erosion and sedimentation.

Construction Sequence:

Below is the phased construction sequence for the project. This info can also be found on the Erosion and Sediment Control Plan within the plan set.

Demolition Phase total disturbance = 16.88 acres

1. The Town of Guilderland and the Soil Conservation District shall be notified 72 hours prior to any land disturbance.
2. Install filter sock sediment control barriers as shown on this plan.
3. Install sediment control devices over existing storm sewer structures.
4. Locate and decommission all on-site utilities. Remove existing utility service features and connections. Utility removal shall be coordinated with each respective utility service provider.
5. Begin demolition of above ground structures and foundations.
6. Relocate or remove underground utilities.
7. Demolish remaining existing site elements and below grade structures including but not limited to building foundations, utility foundations, site lighting structures and foundations, underground vaults, wiring and piping. Remove and dispose all debris off site.
8. Backfill all voids created from demolition and utility removal with structural fill material placed and compacted in accordance with technical specification.
9. Remove asphalt paving, pavers and concrete pads. Dispose of debris off site.
10. Inspect and recondition erosion control measures in preparation for the next phase of site development.

Initial Site Prep Phase total disturbance = 16.88 acres

1. The Town of Guilderland and the Soil Conservation District shall be notified 72 hours prior to any land disturbance.
2. Inspect sediment control barriers installed as part of the demolition procedures. Re-establish sediment control barriers as necessary. Refer to details.
3. Verify all on site utilities have been located, decommissioned and removed. Utility removal shall be coordinated with each respective utility service provider.
4. Clear and grub areas of construction.
5. Strip and stockpile topsoil from construction areas. Stabilize topsoil stockpile with temporary seeding requirements.
6. Construct sanitary sewer main and storm sewers to the extents shown on this plan. Start placing fill for the building pad.
7. Demolish and remove the existing sanitary sewer main. Demolish and remove sections of storm sewer noted on this plan
8. Backfill all voids created from construction procedures with structural fill material placed and compacted in accordance with technical specification.
9. Inspect and recondition erosion control measures in preparation for the next phase of site development.

Rough Grading Phase total disturbance = 16.88 acres

1. Inspect all soil erosion / sediment control measures constructed as part of the initial site preparation activities including but not limited to sediment control barriers, inlet protection and construction access. Repair or replace as necessary.
2. Begin rough grading, filling and compacting site.
3. Construct storm sewers as rough grading operations permit.
4. All storm inlets constructed during rough grading operations are to have hoods raised on bricks to facilitate runoff entering the inlet during rough grading. All inlet boxes to have crushed stone sediment protection installed as soon as inlet tops are set.
5. Construction of sanitary sewers, water mains and gas service can be constructed as rough grading operations permit.
6. Curbing can be constructed as rough grading progresses and conditions allow.
7. Paving stone base can be placed as rough grading progresses and conditions allow.
8. Complete rough grading of site.
9. As soon as subgrade elevation has been established within the limits of the building, place and compact crushed stone building pad. Establish finish pad elevation.
10. Construct crushed stone laydown areas and 25 ft. Wide crushed stone access drive as indicated on this plan.
11. Construction of building can begin as soon as the building pad and laydown areas are in place and have been approved.
12. Construction of gasoline fueling facilities can begin as soon as the building pad and laydown areas are in place and have been approved.

13. Construct building utility service connections to within 5 feet of the building limits.
14. Inspect and recondition erosion control measures in preparation for the next phase of construction.

Final Phase total disturbance = 16.88 acres

1. Inspect all soil erosion / sediment control measures including but not limited to sediment control barriers and stone construction access. Repair or replace as necessary.
2. Construct underground stormwater management system complete with discharge control structure.
3. Finish construction of all remaining storm sewers.
4. Finish construction of all on site underground utilities and building service connections. Construct foundations for area light standards and run electric service to foundations and all locations for illuminated signs (directional, monument, and pylon).
5. Finish construction of all curbing around perimeter of new parking and driveway areas. Construct curbing around building. Construct curbing around landscape islands.
6. Finish placement of paving stone base course on areas to be paved and compacted.
7. All inlets set during rough grading operations with temporary grate elevations are to be set to permanent grate elevations as soon as paving stone base has been placed around the inlet. Replace crushed stone inlet protection with filter bag inlet protection.
8. Construct all concrete pads and concrete pavement.
9. Install asphalt paving binder course.
10. Install all signage on the site including traffic control and directional signs.
11. Spread topsoil in all areas to be landscaped or seeded and establish permanent ground cover and landscaping as specified by landscaping plan. Mulch all exposed areas as specified by these plans.
12. Install final paving wearing surface. Apply parking area and traffic control pavement paint.
13. Remove all temporary soil erosion and sediment controls. Establish permanent vegetation on all area disturbed by the removal of the temporary controls. An area shall be considered to have achieved final stabilization when it has a minimum uniform 85 percent perennial vegetative cover or other permanent non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements.

For additional, general Erosion and Sediment Control notes including seeding, please refer to the Erosion and Sediment Control Plans.

Operation & Maintenance Plan:

During construction, the contractor is responsible for maintaining all permanent stormwater mitigation features including catch basins, pipes, the Contech Cascade Separator water quality structures, the StormTrap DoubleTrap system, as well as temporary measures including compost filter sock, stabilized construction accesses, and inlet protection.

After construction is complete, the property owner shall be responsible for the maintenance of the proposed stormwater mitigation features, including catch basins, pipes, the Contech Cascade Separator water quality structures, and the StormTrap DoubleTrap system.

As per the Notice of Termination for stormwater discharges authorized under the SPDES GP-0-15-002 for construction activity, for post-construction stormwater management practices that will be privately owned, the deed of record must be modified to include a deed covenant that requires operation and maintenance of the practices in accordance with the operation and maintenance plan.

A complete Operation & Maintenance Plan is included within the Appendix of this report.

Lastly, the owner of a post-construction stormwater management practice shall erect or post, in the immediate vicinity of the stormwater management practice, a conspicuous and legible sign as directed by section 3.5 of the NYSSMDM. The sign should read:

STORMWATER MANAGEMENT PRACTICE – (Type of Practice)
Project Identification – SPDES Permit # NYR _ _ _ _ _ _
Must Be Maintained In Accordance With O&M Plan
DO NOT REMOVE OR ALTER

Summary of Proposed Stormwater Improvements:

Reductions in peak flow have been provided for the project for all storm events studied. The combination of peak flow reductions, runoff reduction volume treatment through green infrastructure techniques and additional water quality volume treatment should provide long-term treatment of runoff in keeping with the relevant standards.

CONCLUSION

As the proposed storm water pollution prevention plan provides reductions in peak flows for the required storms, and runoff reduction/water quality mitigation meeting the applicable standards, there should be no adverse impacts due to storm water, on-site or off-site, as a result of the proposed development.

APPENDIX 1

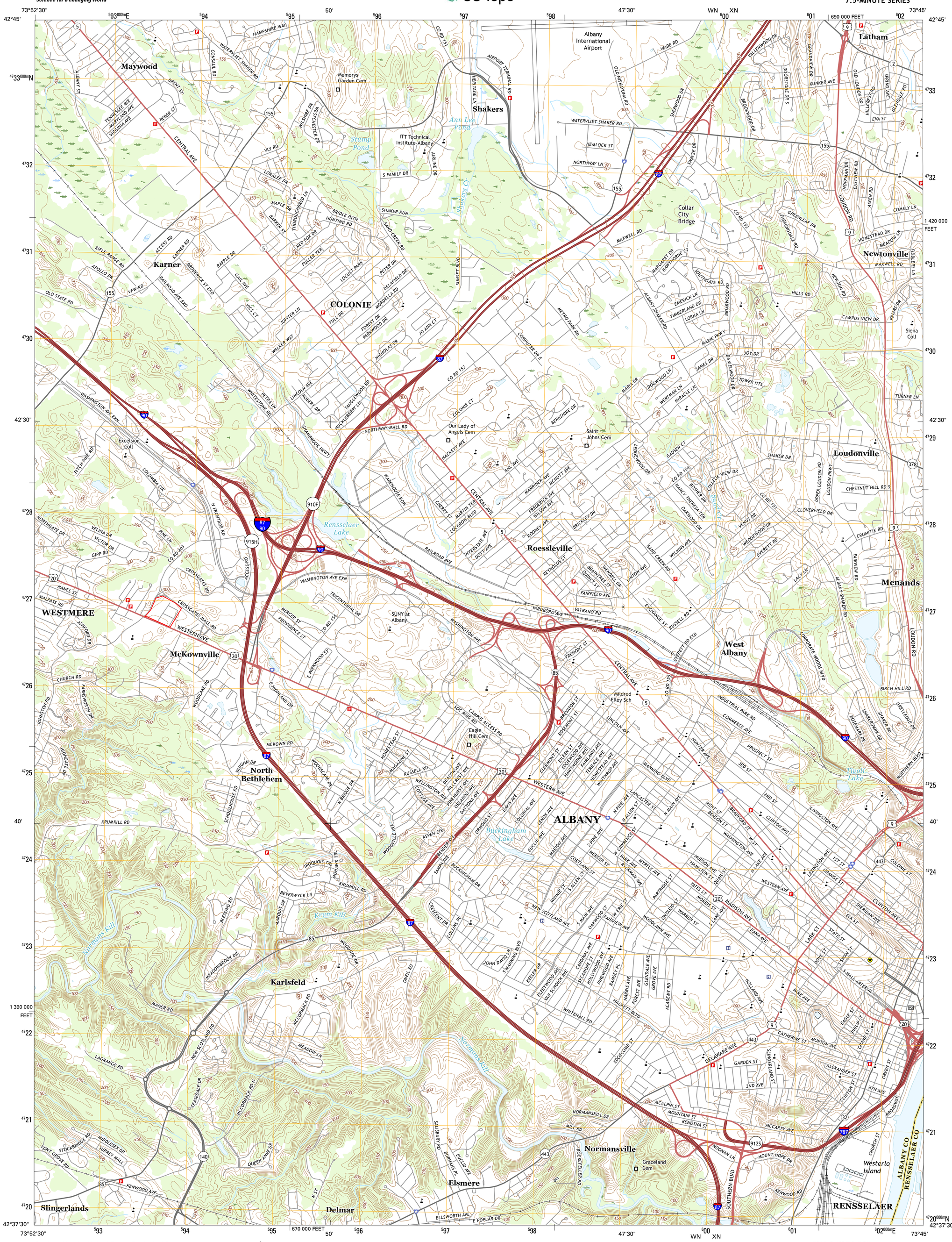
PROJECT MAPS

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

USGS science for a changing world

The National Map US Topo

ALBANY QUADRANGLE
NEW YORK
7.5-MINUTE SERIES


Maywood
Karner
COLONIE
Shakers
Albany International Airport
Memorys Garden Cem
ITT Technical Institute-Albany
Ann Lee Pond
Stump Pond
Collar City Bridge
Latham
Newtonville
Loudonville
Menands
Roessleville
West Albany
WESTMERE
McKownville
North Bethlehem
SUNY at Albany
Eagle Hill Cem
Mildred Elley Sch
ALBANY
Buckingham Lake
Tivoli Lake
Rensselaer Lake
Our Lady of Angels Cem
Saint Johns Cem
Excelsior Coll
Siena Coll
Karlsfeld
Elsmere
Delmar
Slingerlands
Normansville
Graceland Cem
Westerlo Island
RENSSELAER
ALBANY CO
RENSSELAER CO
Patroons Kill
Krum Kill
Normans Kill
Stuyvesant Falls
Shaker Creek
Watervliet Shaker Rd
Central Ave
Western Ave
Washington Ave Exn
Northway Mall Rd
Railroad Ave
Maxwell Rd
Loudon Rd
Hoffman Dr
Easterview Rd
Aspen Rd
Comely Ln
Homestead Dr
Meadow Ln
Fiddlers Ln
Greenleaf Dr
Farmingdale Rd
Hills Rd
Campus View Dr
Friars Dr
Newton Rd
Old Loudon Rd
Hillcrest Rd
Glendale Rd
Spring Ave
Eva St
Kunker Ave
Grandview Dr
Doorstone Dr S
Brookwood Dr
Sherwood Dr
Wade Rd
Vallenwood Dr
Old Niskayuna Rd
Swaize Dr
Hemlock St
Northway Ln
Hampshire Way
Consaul Rd
Albany St
Tennessee Ave
Maryland Ave
Virginia Ave
Brent St
Reber St
Wiltshire Dr
Westchester Dr
Vly Rd
Loralee Dr
Maple Dr
Barker St
Thoroughbred Ln
Bridle Path
Hunting Rd
Red Fox Dr
Fuller Ter
Shaker Run
Sand Creek Rd
Airline Dr
S Family Dr
Heritage Ln
Airport Terminal Rd
Co Rd 151
Rifle Range Rd
Apollo Dr
Access Rd
Karner Rd
Broderick St End
Railroad Ave End
VFW Rd
Old State Rd
Rapple Dr
Gail Ave
Vics Ct
Jupiter Ln
Walker Way
Locust Park
Peter Dr
Delafield Dr
Mordella Rd
Forest Dr
Parkwood Dr
Jo Ann Ct
Nicholas Dr
Tull Dr
Sunset Blvd
Metro Park Rd
Computer Dr E
Co Rd 153
Lincoln Ave
Robert Dr
Tanglewood Rd
Huckleberry Ln
Whitestone Rd
Petra Ln
Shambroon Pkwy
Colonie Ct
Berkshire Dr
Hackett Ave
Cherry St
Martin Ter
Lockrow Blvd
Central Ave
Ahl Ave
Marriner Ave
McNutt Ave
Frederick Ave
Wilson Ave
Rooney Ave
Interstate Ave
Dott Ave
Brickley Dr
Ledgewood Dr
Gadsen Ct
Co Rd 154
Nancy Theresa Ter
Bosher Dr
Oakwood Dr
College View Dr
Shaker Dr
Chestnut Hill Rd S
Upper Loudon Rd
Loudon Pkwy
Cloverfield Dr
Venus Dr
Wedgewood Dr
Everett Rd
Crumitie Rd
Fairview Rd
Lacy Ln
Albany Shaker Rd
Wilkins Ave
Linton Ave
Wendell Dr
Braintree St
Quincy St
Fairfield Ave
Reynolds St
Sand Creek Rd
Yardboro Ave
Vatrano Rd
Exchange St
Russell Rd
Everett Rd Exd
Tremont St
Corporate Woods Blvd
Industrial Park Rd
Commerce Ave
Prospect St
3rd St
Hunter Ave
Manning Blvd
Brevator St
Rosemont St
Lincoln Ave
Clermont St
Eileen St
Edgewood Ave
Hawthorne Ave
Fairlawn Ave
Terrace Ave
Homestead Ave
Winthrop Ave
Beacon Ave
Hillcrest Ave
Pinehurst Ave
Orlando Ave
Daytona Ave
Wellington Ave
Cottage Ave
Davis Ave
Colonial Ave
Lenox Ave
Euclid Ave
Ormond St
Bender Ave
Tamm Ave
Buckingham Dr
Aspen Cir
Woodville Ave
Woodlawn Ave
Woodside Dr
Woodcape Dr
N Bridge Dr
Homestead St
Magazine St
Russell Rd
Mckown Rd
Vaughn Dr
Schoolhouse Rd
Krumkill Rd
Iroquois Trl
Mohawk Trl
Beverwyck Ln
Blessing Rd
Meadowbrook Dr
Maher Rd
Lagrange Rd
New Scotland Rd
Teasedale Dr
McCormack Rd N
Meadow Ln
Oneil Rd
Salisbury Rd
Burhans Pl
Euclid Ave
Rockefeller Rd
N St
Ellsworth Ave
E Poplar Dr
Font Grove Rd
Stockbridge Rd
Middlesex Dr
Surrey Mall
Kenwood Ave
Queen Anne Dr
Hanes St
Malpass Rd
Ashford Dr
Crossgates Mall Rd
Crossgates Rd
Co Rd 203
Northgate Dr
Velina Dr
Victor Dr
Gipp Rd
Pine Ln
Pitch Pine Rd
Columbia Cir
N Frontage Rd
Access Rd
Co Rd 156
Mercer St
Providence St
E Parkwood St
E Highland Dr
Woodlawn Rd
Church Rd
Farnsworth Dr
Johnston Rd
Highgate Dr
Sdc Ring Rd
Campus Access Rd
Eagle Hill Cem
Tremont St
Mcmanning Blvd
John David Ln
Keeler Dr
Fleetwood Ave
Van Schoick Ave
Sycamore St
Cardinal Ave
Hollywood Ave
Pinewood Ave
Ramsey Pl
Harris Ave
Forest Ave
Glendale Ave
Grove Ave
Academy Rd
Hackett Blvd
Whitehall Rd
Edgecomb St
Holland Ave
Park Ave
Catherine St
Morton Ave
Delaware Ave
Garden St
2nd Ave
Mcalpin St
Mountain St
Kenosha St
Mccarty Ave
Noonan Ln
Mount Hope Dr
Southern Blvd
Alexander St
4th Ave
Clinton St
Broadway
Church St
Green St
Philip St
Grand St
Eagle St
Dove St
S Swan St
S Mall Arterial
Ontario St
Warren St
Woodlawn Ave
Fairview Ave
W Erie St
Oakwood St
S Main Ave
New Scotland Ave
Crescent Dr
Collins Pl
Winnie St
S Allen St
Cortland St
Mercer St
Park Ave
Ryckman Ave
Myrtle Ave
Partridge St
Yates St
Morris St
S Lake Ave
Hudson Ave
Hamilton St
Quail St
N Lake Ave
Washington Ave
W St
Bradford St
Benson St
Kent St
Clinton Ave
2nd St
N Pine Ave
N Allen St
W Lawrence St
Lancaster St
N Main Ave
Livingston Ave
1st St
Orange St
Lexington Ave
Colonie St
Sheridan Ave
Elk St
State St
Lark St
Dana Ave
Maria Dr
Dogwood Ln
Wertman Ln
Miracle Ln
Joy Dr
Danielwood Dr
Tower Hts
Turner Ln
Albany Shaker Rd
Old Goodman Rd
Timberland Dr
Lorna Ln
Emerick Ln
Southgate Rd
Margaret Dr
Hawthorne Ct
Greenleaf Dr
Homestead Dr
Meadow Ln
Comely Ln
Aspen Rd
Easterview Rd
Hoffman Dr
Loudon Rd
Maxwell Rd
Fiddlers Ln
Friars Dr
Newton Rd
Campus View Dr
Hills Rd
Old Loudon Rd
Hillcrest Rd
Glendale Rd
Spring Ave
Eva St
Kunker Ave
Grandview Dr
Doorstone Dr S
Brookwood Dr
Sherwood Dr
Wade Rd
Vallenwood Dr
Old Niskayuna Rd
Swaize Dr
Hemlock St
Northway Ln
Watervliet Shaker Rd
Airport Terminal Rd
Co Rd 151
Heritage Ln
Airline Dr
S Family Dr
Shaker Run
Sand Creek Rd
Hunting Rd
Bridle Path
Maple Dr
Barker St
Thoroughbred Ln
Loralee Dr
Vly Rd
Wiltshire Dr
Westchester Dr
Consaul Rd
Hampshire Way
Albany St
Tennessee Ave
Maryland Ave
Virginia Ave
Brent St
Reber St
Central Ave

U.S. Fish and Wildlife Service
National Wetlands Inventory

RAPP RD AND CROSSGATES MALL ROA



July 16, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

Environmental Resource Mapper



The coordinates of the point you clicked on are:

UTM 18	**Easting:**	593575.541	**Northing:**	4726933.470
Longitude/Latitude	**Longitude:**	-73.858	**Latitude:**	42.689

The approximate address of the point you clicked on is:
Crossgates Mall Rd, Albany, New York, 12203

County: Albany
Town: Guilderland
USGS Quad: ALBANY

DEC Region

Region 4:
(Capital Region/Northern Catskills) Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie counties. For more information visit **http://www.dec.ny.gov/about/611.html**.

Old or Potential Records (Not displayed on the map)

Common Name: Whip Nutrush
Scientific Name: Scleria triglomerata
Date Last Documented: 1937-08-24
Location: Blueberry Hill
NYS Protected: Endangered

Rare Plants and Rare Animals

This location is in the vicinity of Rare Animals and/or Rare Plants

If your project or action is within or near an area with a rare animal, a permit may be required if the species is listed as endangered or threatened and the department determines the action may be harmful to the species or its habitat.

If your project or action is within or near an area with rare plants and/or significant natural communities, the environmental impacts may need to be addressed.

The presence of a unique geological feature or landform near a project, unto itself, does not trigger a requirement for a NYS DEC permit. Readers are advised, however, that there is the chance that a unique feature may also show in another data layer (ie. a wetland) and thus be subject to permit jurisdiction.

Please refer to the "Need a Permit?" tab for permit information or other authorizations regarding these natural resources.

Disclaimer: If you are considering a project or action in, or near, a wetland or a stream, a NYS DEC permit may be required. The Environmental Resources Mapper does not show all natural resources which are regulated by NYS DEC, and for which permits from NYS DEC are required. For example, Regulated Tidal Wetlands, and Wild, Scenic, and Recreational Rivers, are currently not included on the maps.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 18N. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from digital orthophotography provided by the NY Office of Cyber Security and Critical Infrastructure Coordination from photography dated November 2007.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

CTP Cooperating Technical Partners

This digital FIRM was produced through a unique cooperative partnership between the New York State Department of Environmental Conservation (NYSDEC) and FEMA. As part of the effort, NYSDEC has joined in a Cooperative Technical Partnership agreement to produce and maintain FEMA's digital FIRM.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A A	Cross section line
23 23	Transect line
1 1	Limited Detail Cross section line
	Culvert
	Bridge
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
3100000 FT	5000-foot ticks: New York State Plane East Zone (FIPS Zone 3101), Transverse Mercator projection
4488000mN	1000-meter Universal Transverse Mercator grid values, zone 18N
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 16, 2015
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0186D

FIRM

FLOOD INSURANCE RATE MAP

ALBANY COUNTY, NEW YORK (ALL JURISDICTIONS)

PANEL 186 OF 434
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
BETHLEHEM, TOWN OF	361540	0186	D
GUILDERLAND, TOWN OF	360010	0186	D
NEW SCOTLAND, TOWN OF	360013	0186	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
36001C0186D
EFFECTIVE DATE
MARCH 16, 2015

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 18N. The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from digital orthophotography provided by the NY Office of Cyber Security and Critical Infrastructure Coordination from photography dated November 2007.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

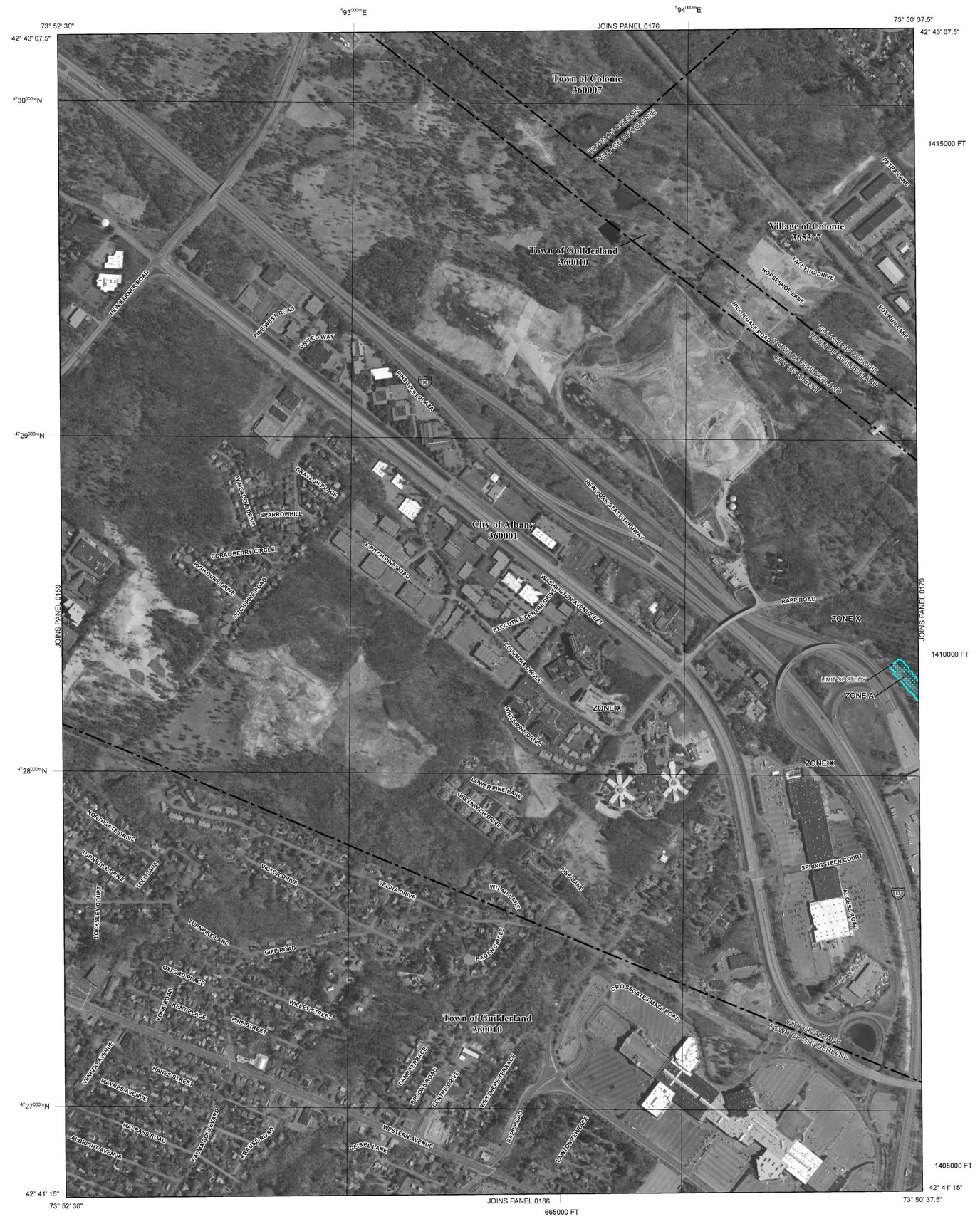
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

CTP Cooperating Technical Partners

This digital FIRM was produced through a unique cooperative partnership between the New York State Department of Environmental Conservation (NYSDEC) and FEMA. As part of the effort, NYSDEC has joined in a Cooperative Technical Partnership agreement to produce and maintain FEMA's digital FIRM.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 1 — 1 — Limited Detail Cross section line
- Culvert
- Bridge
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 3100000 FT — 5000-foot ticks: New York State Plane East Zone (FIPS Zone 3101), Transverse Mercator projection
- $^{4}88^{000m}$N — 1000-meter Universal Transverse Mercator grid values, zone 18N
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.5 • — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
MARCH 16, 2015
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0178D

FIRM

FLOOD INSURANCE RATE MAP

ALBANY COUNTY, NEW YORK (ALL JURISDICTIONS)

PANEL 178 OF 434
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBANY, CITY OF	360001	0178	D
COLONIE, TOWN OF	360007	0178	D
COLONIE, VILLAGE OF	365377	0178	D
GUILDERLAND, TOWN OF	360010	0178	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
36001C0178D
EFFECTIVE DATE
MARCH 16, 2015

Federal Emergency Management Agency

APPENDIX 2

DRAINAGE AREA MAPS

PRE-DEVELOPMENT DA #1A
309,654 S.F. (7.11 ACRES)
Tc = 10.6 MINUTES

PRE-DEVELOPMENT DA #1B
166,331 S.F. (3.82 ACRES)
Tc = 9.3 MINUTES

PRE-DEVELOPMENT DA #1C
33,871 S.F. (0.78 ACRES)
Tc = 17.2 MINUTES

PRE-DEVELOPMENT DA #1D
144,259 S.F. (3.31 ACRES)
Tc = 29.1 MINUTES

PRE-DEVELOPMENT DA #2
12,862 S.F. (0.30 ACRES)
Tc = 7.4 MINUTES

PRE-DEVELOPMENT DA #3
133,577 S.F. (3.07 ACRES)
Tc = 7.6 MINUTES

EXISTING BASIN #1B

EXISTING BASIN #1C

POI #1

AOI #2

AOI #3

CROSSGATES MALL RD.
(ASPHALT SURFACE)

RAPP RD.
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

GABRIEL TER
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

LAWTON TER
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

U.S. RT. 20
aka WESTERN AVE.
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	8/21/20	SVD	REVISED SITE LAYOUT AND ENGINEERING
2	10/14/20	SVD	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

SPECIAL USE PERMIT SITE PLANS
FOR
COSTCO WHOLESALE

CROSSGATES MALL TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIR	RTM

PROJECT NUMBER: 13001204A
DRAWING NAME: C-DRNG

SHEET TITLE:
EXISTING DRAINAGE AREA MAP

SHEET NUMBER:
1 of 3

2019.300.13001204.Engineering\Drawings\Working\Other\Civil\C-DRNG.dwg By: DDUNLAP

POST-DEVELOPMENT DA #1D
34,066 S.F. (0.78 ACRES)
Tc = 6.2 MINUTES

POST-DEVELOPMENT DA #1A
6,000 S.F. (0.14 ACRES)
Tc = 5.0 MINUTES

POST-DEVELOPMENT DA #1C
700,105 S.F. (16.07 ACRES)
Tc = 8.2 MINUTES

POST-DEVELOPMENT DA #1B
37,927 S.F. (0.87 ACRES)
Tc = 8.5 MINUTES

POST-DEVELOPMENT DA #2
0 S.F. (0.00 ACRES)
Tc = 5.0 MINUTES

POST-DEVELOPMENT DA #3
22,456 S.F. (0.52 ACRES)
Tc = 5.0 MINUTES

AOI #1
AOI #2
AOI #3

COSTCO WHOLESALE
FFE: 283.50

PROPOSED STORMWATER MANAGEMENT BASIN
STORMTRAP DOUBLETRAP
BTM: 269.00
TOP: 278.50

CART

TROUBRIDGE MAIN RD
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

RAPP RD
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

LAWTON TER
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

GABRIEL TER
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

U.S. RT. 20
aka WESTERN AVE.
PUBLIC RIGHT OF WAY
VARIABLE WIDTH
(ASPHALT SURFACE)

N
E
S
W

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	08/19/22	JWD	REVISED SITE LAYOUT AND ENGINEERING
2	10/28/22	JWD	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

SPECIAL USE PERMIT SITE PLANS

FOR

COSTCO WHOLESALE

CROSSGATES MALL TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIII	RTM

PROJECT NUMBER: 13001204A
DRAWING NAME: C-DRNG

SHEET TITLE:
PROPOSED DRAINAGE AREA MAP

SHEET NUMBER:
2 of 3

2013\13001204A\Engineering\Drawings\Maps\C-DRNG.dwg, C-DRNG, 10/28/2022 8:49:08 AM, By: STEVEN LEVE



Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	8/31/23	SYD	REVISED SITE LAYOUT AND ENGINEERING
2	10/19/23	SYD	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

SPECIAL USE PERMIT SITE PLANS

FOR

COSTCO WHOLESALE

CROSSGATES MALL TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIR	RTM

PROJECT NUMBER:	DRAWING NAME:
13001204A	C-DRNG

SHEET TITLE:
INLET DRAINAGE AREA MAP

SHEET NUMBER:
3 of 3

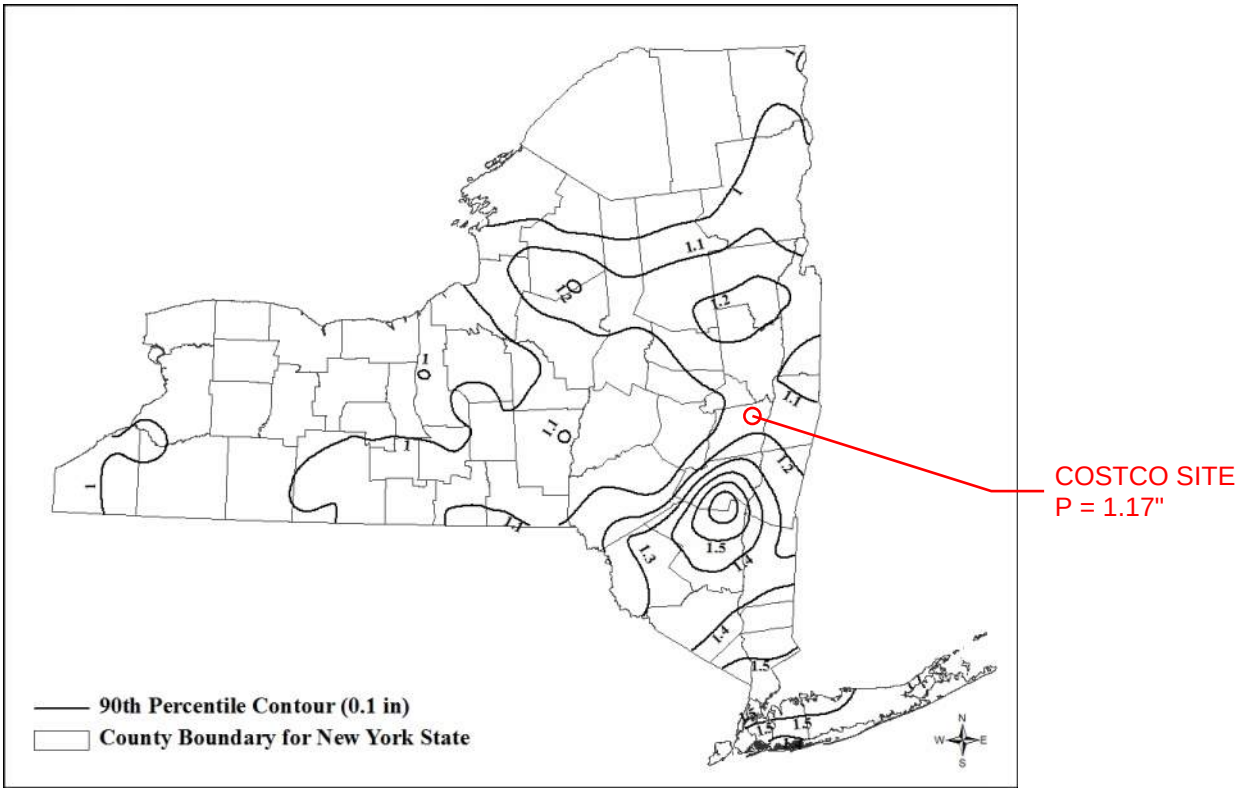
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2023-10-20 09:44 | Engineering\Drawings\Maps\C-DRNG.dwg | C-DRNG-Sheet1 | By: SYDNEY.RYE

APPENDIX 3

RAINFALL DATA AND RUNOFF COEFFICIENTS

Figure 4.1: 90th Percentile Rainfall in New York State (NYSDEC, 2013)

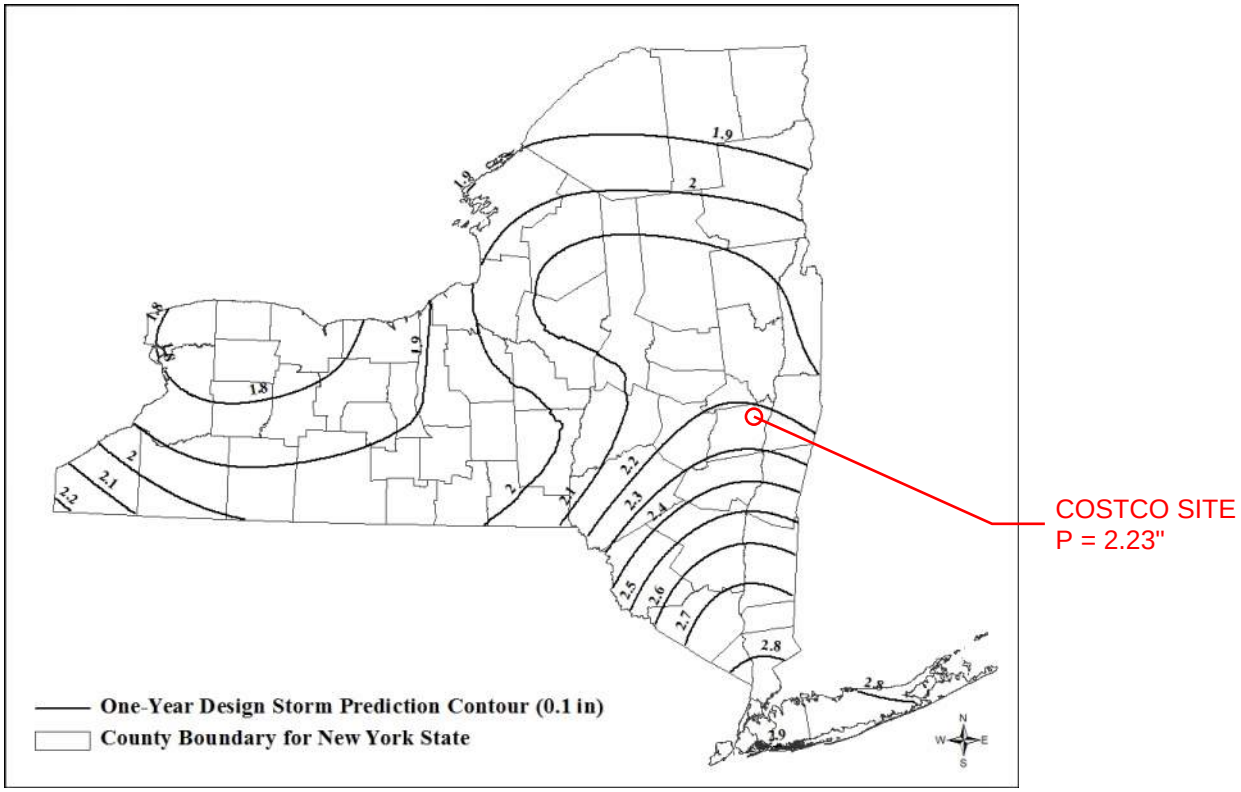


Basis of Design for Water Quality

As a basis for design, the following assumptions may be made:

Measuring Impervious Cover: the measured area of a site plan that does not have permanent vegetative or permeable cover shall be considered total impervious cover. Impervious cover is defined as all impermeable surfaces and includes: paved and gravel road surfaces, paved and gravel parking lots, paved driveways, building structures, paved sidewalks, and miscellaneous impermeable structures such as patios, pools, and sheds. Where site size makes direct measurement of impervious cover impractical, the land use/impervious cover relationships presented in Table 4.2 can be used to initially estimate impervious cover. In site specific planning impervious cover must be calculated based the specific proposed impervious cover.

Figure 4.2: One-Year Design Storm in New York State (NYSDEC, 2013)



Section 4.5 Overbank Flood Control Criteria (Q_p)

The primary purpose of the overbank flood control sizing criterion is to prevent an increase in the frequency and magnitude of out-of-bank flooding generated by urban development (i.e., flow events that exceed the bankfull capacity of the channel, and therefore must spill over into the floodplain).

Overbank control requires storage to attenuate the post development 10-year, 24-hour peak discharge rate (Q_p) to predevelopment rates.

The overbank flood control requirement (Q_p) does not apply in certain conditions, including:

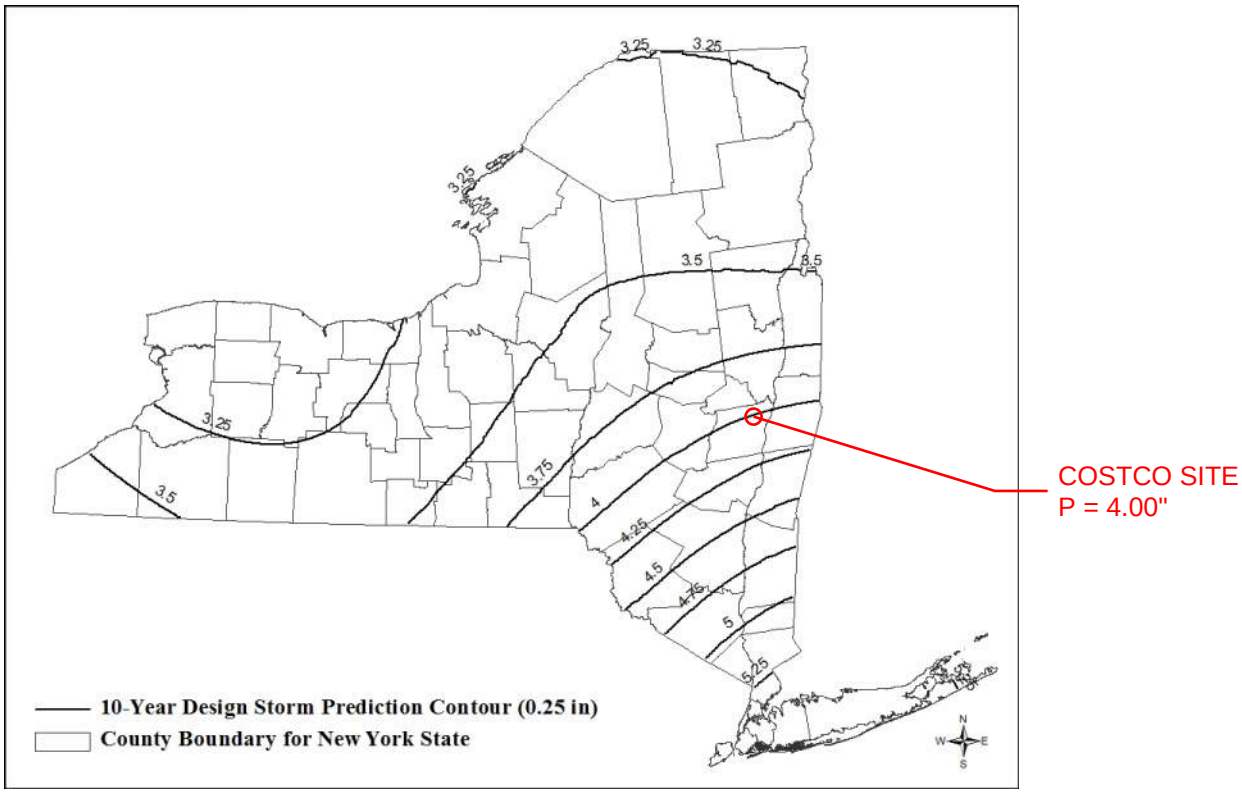
- The site discharges directly tidal waters or fifth order (fifth downstream) or larger streams. Refer to Section 4.3 for instructions.
- A downstream analysis reveals that overbank control is not needed (see section 4.10).

Basis for Design of Overbank Flood Control

When addressing the overbank flooding design criteria, the following represent the minimum basis for design:

- TR-55 and TR-20 (or approved equivalent) will be used to determine peak discharge rates.
- When the predevelopment land use is agriculture, the curve number for the pre-developed condition shall be “taken as meadow”.
- Off-site areas should be modeled as "present condition" for the 10-year storm event.
- Figure 4.3 indicates the depth of rainfall (24 hour) associated with the 10-year storm event throughout the State of New York.
- The length of overland flow used in t_c calculations is limited to no more than 150 feet for predevelopment conditions and 100 feet for post development conditions. On areas of extremely flat terrain (<1% average slope), this maximum distance is extended to 250 feet for predevelopment conditions and 150 feet for post development conditions.

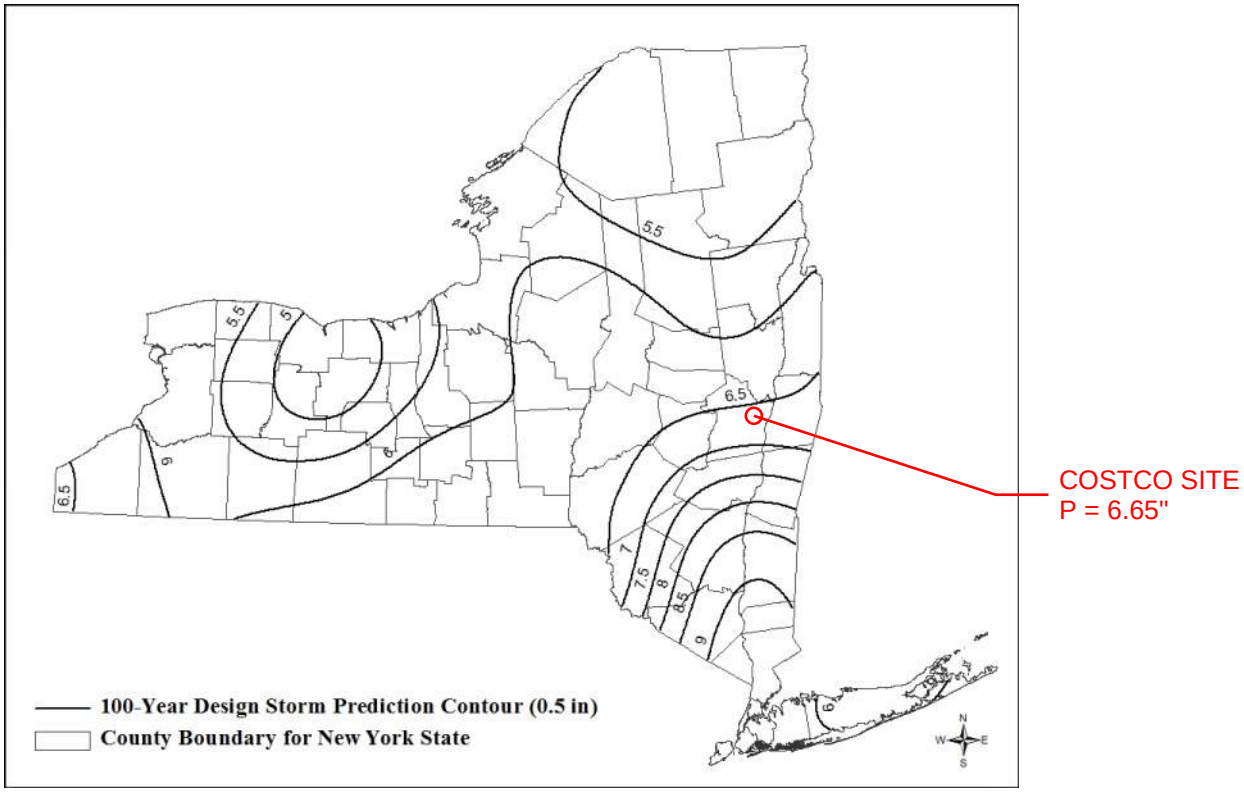
Figure 4.3: Ten-Year Design Storm in New York State (NYSDEC, 2013)



- When determining the storage required to reduce 100-year flood peaks, model off-site areas under current conditions.

- When determining storage required to safely pass the 100-year flood, model off-site areas under ultimate conditions.

Figure 4.4: One Hundred-Year Design Storm in New York State (NYSDEC, 2013)



Section 4.7 Alternative Method

New development causes changes to runoff volume, flow rates, timing of runoff and, most importantly, habitat destruction and degradation of the physical and chemical quality of the receiving waterbody. Traditionally, event based design storms are used for evaluation of hydrology and sizing of stormwater management practices. With an increasing need for assessment of the long term effects of development and maintenance of pre-development hydrology, the necessity of continuous simulation modeling as an effective tool for analysis and evaluation of flow-duration, downstream quality, quantity, biological, and hydro-habitat sustainability has been acknowledged.

Table 8-3 Values of Runoff Coefficient (C) for Use in the Rational Method

Type of Surface	Runoff Coefficient (C)[1]
Rural Areas	
Concrete, or Hot Mix Asphalt pavement	0.95 - 0.98
Gravel roadways or shoulders	0.4 - 0.6
Steep grassed areas (1:2, vert.:horiz.)	0.6 - 0.7
Turf meadows	0.1 - 0.4
Forested areas	0.1 - 0.3
Cultivated fields	0.2 - 0.4
Urban/Suburban Areas	
Flat residential, @ 30% of area impervious	0.40
Flat residential, @ 60% of area impervious	0.55
Moderately steep residential, @ 50% of area impervious	0.65
Moderately steep built up area, @ 70% of area impervious	0.80
Flat commercial, @ 90% of area impervious	0.80

1. For flat slopes and/or permeable soil, use lower values. For steep slopes and/or impermeable soil, use the higher values.

APPENDIX 4

HYDROCAD MODEL OUTPUT

MASER CONSULTING P.A.

Project: Albany Costco - SWM Areas Sheet: 1 of 1

Project #: 13001204A Scale:

Calculated By: SVD Date: 2/27/2023 Checked By: Date:

Office Submitted by: Date:

Engineers | Planners | Surveyors | Landscape Architects | Environmental Scientists

PRE-DEVELOPMENT DRAINAGE AREA BREAKDOWNS

Drainage Area	Impervious		Lawn		Woods		Total Area	
	S.F.	Acres	S.F.	Acres	S.F.	Acres	S.F.	Acres
Pre DA #1A	3,498	0.080	42,019	0.965	264,137	6.064	309,654	7.109
Pre DA #1B	32,895	0.755	80,185	1.841	53,251	1.222	166,331	3.818
Pre DA #1C	4,719	0.108	16,364	0.376	12,788	0.294	33,871	0.778
Pre DA #1D	37,564	0.862	98,672	2.265	8,023	0.184	144,259	3.312
Pre DA #2	617	0.014	12,245	0.281	0	0.000	12,862	0.295
Pre DA #3	28,632	0.657	104,945	2.409	0	0.000	133,577	3.067
Totals	107,925	2.478	354,430	8.137	338,199	7.764	800,554	18.378

POST-DEVELOPMENT DRAINAGE AREA BREAKDOWNS

Drainage Area	Impervious		Lawn		Woods		Total Area	
	S.F.	Acres	S.F.	Acres	S.F.	Acres	S.F.	Acres
Post DA #1A (bypass)	2,026	0.047	3,974	0.091	0	0.000	6,000	0.138
Post DA #1B (bypass)	1,875	0.043	36,052	0.828	0	0.000	37,927	0.871
Post DA #1C (to Basin)	611,764	14.044	88,341	2.028	0	0.000	700,105	16.072
Post DA #1D (bypass)	1,053	0.024	33,013	0.758	0	0.000	34,066	0.782
Post DA #2	0	0.000	0	0.000	0	0.000	0	0.000
Post DA #3	4,863	0.112	17,593	0.404	0	0.000	22,456	0.516
Totals	621,581	14.270	178,973	4.109	0	0.000	800,554	18.378

PEAK RATE SUMMARY

Drainage Area	1-Year Storm (2.23 inches)			10-Year Storm (4 inches)			100-Year Storm (6.65 inches)		
	Pre	Post	Reduction	Pre	Post	Reduction	Pre	Post	Reduction
POI #1	3.33	2.05	1.28	9.30	9.05	0.25	19.95	19.84	0.11
AOI #2	0.04	0	0.04	0.08	0	0.08	0.29	0.00	0.29
AOI #3	1.93	0.36	1.57	3.52	0.65	2.87	7.14	1.32	5.82
Combined Total	5.30	2.41	2.89	12.90	9.7	3.20	27.38	21.16	6.22

Water Quality Volume per NY State SWM Design Manual Chapter 4

WQv = P * Rv * A * (1/12) = 1.342 Ac-ft = **58,446 CF**

P = 1.17 inches (90% rainfall event number from NY SWM Manuel Fig 4.1)

Rv = 0.05 + 0.009 * I = 0.749

I = 77.64 % (% Impervious cover)

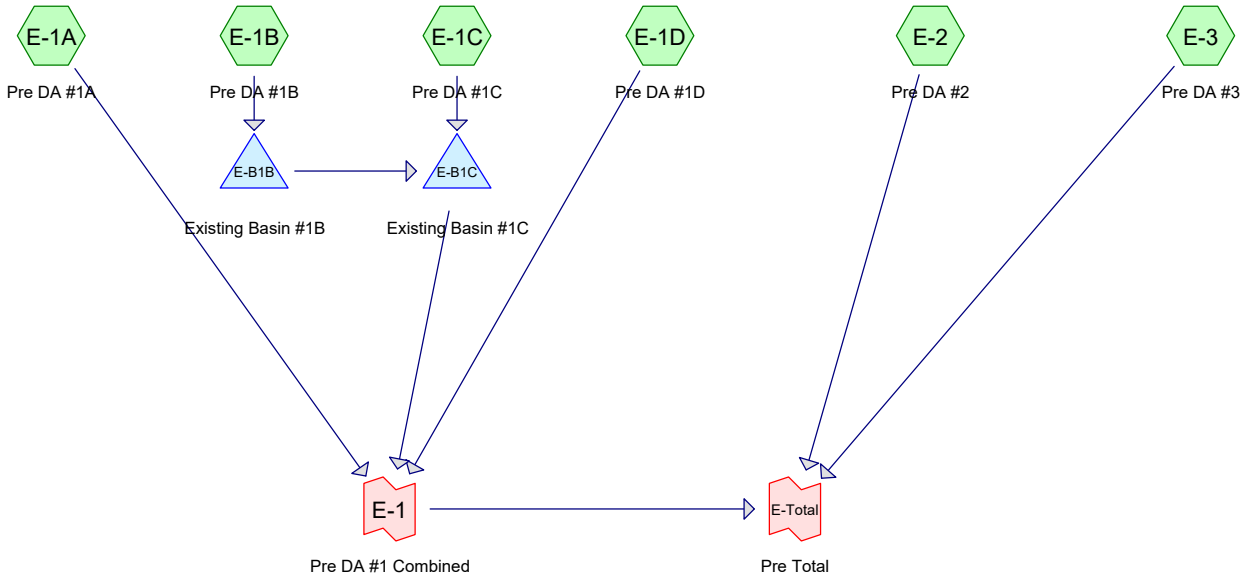
A = 18.378 acres (Total Area)

Runoff Reduction Volume per NY State SWM Design Manual Chapter 4

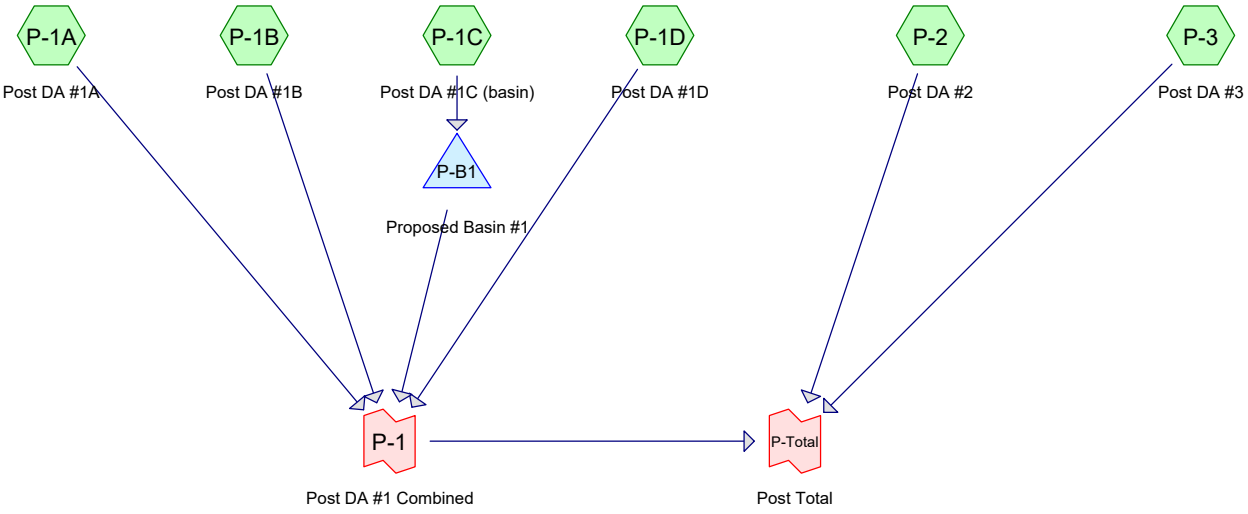
RRv = WQv = 1.342 Ac-ft = **58,446 CF**

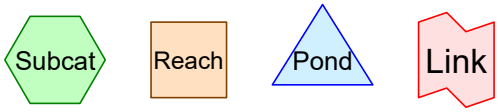
Infiltration Volume Provided = **58,458 CF** (volume provided below lowest orifice)

PRE-DEVELOPMENT



POST-DEVELOPMENT





Routing Diagram for 4B - Albany Costco
Prepared by Colliers Engineering & Design, Printed 3/9/2023
HydroCAD® 10.20-2g s/n 04431 © 2022 HydroCAD Software Solutions LLC

Summary for Subcatchment E-1A: Pre DA #1A

Runoff = 2.38 cfs @ 12.04 hrs, Volume= 0.142 af, Depth= 0.24"
Routed to Link E-1 : Pre DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	3,498	98	Impervious, HSG A
	42,019	39	>75% Grass cover, Good, HSG A
	147,551	30	Woods, Good, HSG A
*	116,586	77	Woods, Good, HSG D
	309,654		Weighted Average
	306,156	49	98.87% Pervious Area
	3,498	98	1.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	62	0.0900	0.25		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.9	141	0.0070	1.25		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
3.6	399	0.0150	1.84		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
0.2	79	0.0100	6.91	386.68	**Channel Flow, D-E** Area= 56.0 sf Perim= 27.0' r= 2.07' n= 0.035 Earth, dense weeds
0.3	85	0.0056	4.45	55.90	**Pipe Channel, E-F** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.025 Corrugated metal
0.5	358	0.0100	11.68	2,453.64	**Channel Flow, F-G** Area= 210.0 sf Perim= 46.0' r= 4.57' n= 0.035 Earth, dense weeds
10.6	1,124	Total			

Summary for Subcatchment E-1B: Pre DA #1B

Runoff = 2.10 cfs @ 12.00 hrs, Volume= 0.126 af, Depth= 0.40"
Routed to Pond E-B1B : Existing Basin #1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	32,895	98	Impervious, HSG A
	80,185	39	>75% Grass cover, Good, HSG A
	53,251	30	Woods, Good, HSG A
	166,331		Weighted Average
	133,436	35	80.22% Pervious Area
	32,895	98	19.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	92	0.0480	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.9	173	0.0480	3.29		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
1.2	58	0.0260	0.81		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
9.3	323	Total			

Summary for Subcatchment E-1C: Pre DA #1C

Runoff = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af, Depth= 0.28"
Routed to Pond E-B1C : Existing Basin #1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	4,719	98	Impervious, HSG A
	16,364	39	>75% Grass cover, Good, HSG A
	12,788	30	Woods, Good, HSG A
	33,871		Weighted Average
	29,152	35	86.07% Pervious Area
	4,719	98	13.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	150	0.0150	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.1	23	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.1	12	0.0600	1.71		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
17.2	185	Total			

Summary for Subcatchment E-1D: Pre DA #1D

Runoff = 1.42 cfs @ 12.22 hrs, Volume= 0.144 af, Depth= 0.52"
Routed to Link E-1 : Pre DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	37,564	98	Impervious, HSG A
	98,672	39	>75% Grass cover, Good, HSG A
	8,023	30	Woods, Good, HSG A
	144,259		Weighted Average
	106,695	38	73.96% Pervious Area
	37,564	98	26.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	16	0.3100	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.56"
24.1	87	0.0150	0.06		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.56"
0.4	35	0.0100	1.50		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
2.5	214	0.0050	1.44		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
0.2	30	0.0330	2.72		**Shallow Concentrated Flow, E-F** Grassed Waterway Kv= 15.0 fps
29.1	382	Total			

Summary for Subcatchment E-2: Pre DA #2

Runoff = 0.04 cfs @ 11.98 hrs, Volume= 0.002 af, Depth= 0.10"
Routed to Link E-Total : Pre Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	617	98	Impervious, HSG A
	12,245	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	12,862		Weighted Average
	12,245	39	95.20% Pervious Area
	617	98	4.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	54	0.0300	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.7	154	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
7.4	208	Total			

Summary for Subcatchment E-3: Pre DA #3

Runoff = 1.93 cfs @ 11.98 hrs, Volume= 0.110 af, Depth= 0.43"
Routed to Link E-Total : Pre Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	28,632	98	Impervious, HSG A
	104,945	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	133,577		Weighted Average
	104,945	39	78.57% Pervious Area
	28,632	98	21.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	266	0.0015	0.58		**Shallow Concentrated Flow, A-B** Grassed Waterway Kv= 15.0 fps

Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.15 cfs @ 11.95 hrs, Volume= 0.008 af, Depth= 0.68"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	2,026	98	Impervious, HSG A
	3,974	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	6,000		Weighted Average
	3,974	39	66.23% Pervious Area
	2,026	98	33.77% Impervious Area

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

Summary for Subcatchment P-1B: Post DA #1B

Runoff = 0.12 cfs @ 11.99 hrs, Volume= 0.007 af, Depth= 0.10"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	1,875	98	Impervious, HSG A
	36,052	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	37,927		Weighted Average
	36,052	39	95.06% Pervious Area
	1,875	98	4.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0400	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.2	124	0.0100	9.44	66.70	**Pipe Channel, C-D** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, bends & connections
0.7	300	0.0050	6.67	47.16	**Pipe Channel, D-E** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
1.4	690	0.0050	8.08	101.57	**Pipe Channel, E-F** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
8.5	1,344	Total			

Summary for Subcatchment P-1C: Post DA #1C (basin)

[47] Hint: Peak is 253% of capacity of segment #5

Runoff = 40.50 cfs @ 11.99 hrs, Volume= 2.344 af, Depth= 1.75"
Routed to Pond P-B1 : Proposed Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

Area (sf)	CN	Description
611,764	98	Paved parking, HSG A
88,341	39	>75% Grass cover, Good, HSG A
0	30	Woods, Good, HSG A
700,105		Weighted Average
88,341	39	12.62% Pervious Area
611,764	98	87.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	70	0.0400	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.8	111	0.0260	2.42		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.0	15	0.1000	5.09		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.9	290	0.0050	5.09	16.00	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
0.1	54	0.0050	7.39	71.14	**Pipe Channel, F-G** 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.013 Corrugated PE, smooth interior
0.1	25	0.0050	8.08	101.57	**Pipe Channel, G-H** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
8.2	590	Total			

Summary for Subcatchment P-1D: Post DA #1D

Runoff = 0.07 cfs @ 11.97 hrs, Volume= 0.004 af, Depth= 0.06"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	1,053	98	Impervious, HSG A
	33,013	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	34,066		Weighted Average
	33,013	39	96.91% Pervious Area
	1,053	98	3.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	85	0.0600	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"

Summary for Subcatchment P-2: Post DA #2

[40] Hint: Not Described (Area=0)

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link P-Total : Post Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	0	98	Impervious, HSG A
	0	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	0		Weighted Average

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

Summary for Subcatchment P-3: Post DA #3

Runoff = 0.36 cfs @ 11.95 hrs, Volume= 0.019 af, Depth= 0.43"
Routed to Link P-Total : Post Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 1-Year Rainfall=2.23"

	Area (sf)	CN	Description
*	4,863	98	Impervious, HSG A
	17,593	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	22,456		Weighted Average
	17,593	39	78.34% Pervious Area
	4,863	98	21.66% Impervious Area

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

Summary for Pond E-B1B: Existing Basin #1B

Inflow Area = 3.818 ac, 19.78% Impervious, Inflow Depth = 0.40" for 1-Year event
Inflow = 2.10 cfs @ 12.00 hrs, Volume= 0.126 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond E-B1C : Existing Basin #1C

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Peak Elev= 276.38' @ 24.56 hrs Surf.Area= 9,545 sf Storage= 5,487 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	54,829 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	739	0	0
276.00	4,833	2,786	2,786
277.00	17,376	11,105	13,891
278.00	20,000	18,688	32,579
279.00	24,500	22,250	54,829

Device	Routing	Invert	Outlet Devices
#1	Primary	278.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond E-B1C: Existing Basin #1C

Inflow Area = 4.596 ac, 18.79% Impervious, Inflow Depth = 0.05" for 1-Year event
Inflow = 0.24 cfs @ 12.09 hrs, Volume= 0.018 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link E-1 : Pre DA #1 Combined

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Peak Elev= 276.72' @ 25.00 hrs Surf.Area= 1,789 sf Storage= 787 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	276.00'	7,029 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
276.00	398	0	0
277.00	2,330	1,364	1,364
278.00	9,000	5,665	7,029

Device	Routing	Invert	Outlet Devices
#1	Primary	277.50'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=276.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P-B1: Proposed Basin #1

Inflow Area = 16.072 ac, 87.38% Impervious, Inflow Depth = 1.75" for 1-Year event
Inflow = 40.50 cfs @ 11.99 hrs, Volume= 2.344 af
Outflow = 2.03 cfs @ 13.05 hrs, Volume= 1.002 af, Atten= 95%, Lag= 63.4 min
Primary = 2.03 cfs @ 13.05 hrs, Volume= 1.002 af
Routed to Link P-1 : Post DA #1 Combined

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 272.69' @ 13.05 hrs Surf.Area= 26,338 sf Storage= 70,324 cf

Plug-Flow detention time= 404.9 min calculated for 1.001 af (43% of inflow)
Center-of-Mass det. time= 271.8 min (1,034.8 - 763.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	269.00'	5,268 cf	**157.46'W x 167.27'L x 10.00'H Field A** 263,382 cf Overall - 250,213 cf Embedded = 13,169 cf x 40.0% Voids
#2A	269.50'	205,509 cf	**StormTrap ST2 DoubleTrap 8-6**x 170 Inside #1 Inside= 101.7"W x 102.0"H => 66.71 sf x 15.40'L = 1,027.0 cf Outside= 101.7"W x 114.0"H => 80.55 sf x 15.40'L = 1,240.2 cf 170 Chambers in 17 Rows 144.15' x 153.96' Core + 6.66' Border = 157.46' x 167.27' System
		210,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.10'	**24.0" Round Culvert** L= 188.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.10' / 268.34' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	272.20'	**30.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	274.70'	**35.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.03 cfs @ 13.05 hrs HW=272.69' (Free Discharge)
└**1=Culvert** (Inlet Controls 2.03 cfs @ 2.62 fps)
  ├**2=Orifice/Grate** (Passes 2.03 cfs of 2.76 cfs potential flow)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link E-1: Pre DA #1 Combined

Inflow Area = 15.016 ac, 12.03% Impervious, Inflow Depth = 0.23" for 1-Year event
Inflow = 3.33 cfs @ 12.05 hrs, Volume= 0.286 af
Primary = 3.33 cfs @ 12.05 hrs, Volume= 0.286 af, Atten= 0%, Lag= 0.0 min
Routed to Link E-Total : Pre Total

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link E-Total: Pre Total

Inflow Area = 18.378 ac, 13.48% Impervious, Inflow Depth = 0.26" for 1-Year event
Inflow = 4.99 cfs @ 12.02 hrs, Volume= 0.398 af
Primary = 4.99 cfs @ 12.02 hrs, Volume= 0.398 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link P-1: Post DA #1 Combined

Inflow Area = 17.863 ac, 79.26% Impervious, Inflow Depth = 0.69" for 1-Year event
Inflow = 2.05 cfs @ 13.04 hrs, Volume= 1.021 af
Primary = 2.05 cfs @ 13.04 hrs, Volume= 1.021 af, Atten= 0%, Lag= 0.0 min
Routed to Link P-Total : Post Total

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link P-Total: Post Total

Inflow Area = 18.378 ac, 77.64% Impervious, Inflow Depth = 0.68" for 1-Year event
Inflow = 2.07 cfs @ 13.03 hrs, Volume= 1.039 af
Primary = 2.07 cfs @ 13.03 hrs, Volume= 1.039 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Subcatchment E-1A: Pre DA #1A

Runoff = 7.64 cfs @ 12.03 hrs, Volume= 0.433 af, Depth= 0.73"
Routed to Link E-1 : Pre DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	3,498	98	Impervious, HSG A
	42,019	39	>75% Grass cover, Good, HSG A
	147,551	30	Woods, Good, HSG A
*	116,586	77	Woods, Good, HSG D
	309,654		Weighted Average
	306,156	49	98.87% Pervious Area
	3,498	98	1.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	62	0.0900	0.25		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.9	141	0.0070	1.25		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
3.6	399	0.0150	1.84		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
0.2	79	0.0100	6.91	386.68	**Channel Flow, D-E** Area= 56.0 sf Perim= 27.0' r= 2.07' n= 0.035 Earth, dense weeds
0.3	85	0.0056	4.45	55.90	**Pipe Channel, E-F** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.025 Corrugated metal
0.5	358	0.0100	11.68	2,453.64	**Channel Flow, F-G** Area= 210.0 sf Perim= 46.0' r= 4.57' n= 0.035 Earth, dense weeds
10.6	1,124	Total			

Summary for Subcatchment E-1B: Pre DA #1B

Runoff = 3.83 cfs @ 12.00 hrs, Volume= 0.244 af, Depth= 0.77"
Routed to Pond E-B1B : Existing Basin #1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	32,895	98	Impervious, HSG A
	80,185	39	>75% Grass cover, Good, HSG A
	53,251	30	Woods, Good, HSG A
	166,331		Weighted Average
	133,436	35	80.22% Pervious Area
	32,895	98	19.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	92	0.0480	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.9	173	0.0480	3.29		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
1.2	58	0.0260	0.81		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
9.3	323	Total			

Summary for Subcatchment E-1C: Pre DA #1C

Runoff = 0.43 cfs @ 12.08 hrs, Volume= 0.035 af, Depth= 0.55"
Routed to Pond E-B1C : Existing Basin #1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	4,719	98	Impervious, HSG A
	16,364	39	>75% Grass cover, Good, HSG A
	12,788	30	Woods, Good, HSG A
	33,871		Weighted Average
	29,152	35	86.07% Pervious Area
	4,719	98	13.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	150	0.0150	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.1	23	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.1	12	0.0600	1.71		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
17.2	185	Total			

Summary for Subcatchment E-1D: Pre DA #1D

Runoff = 2.60 cfs @ 12.22 hrs, Volume= 0.279 af, Depth= 1.01"
Routed to Link E-1 : Pre DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	37,564	98	Impervious, HSG A
	98,672	39	>75% Grass cover, Good, HSG A
	8,023	30	Woods, Good, HSG A
	144,259		Weighted Average
	106,695	38	73.96% Pervious Area
	37,564	98	26.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	16	0.3100	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.56"
24.1	87	0.0150	0.06		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.56"
0.4	35	0.0100	1.50		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
2.5	214	0.0050	1.44		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
0.2	30	0.0330	2.72		**Shallow Concentrated Flow, E-F** Grassed Waterway Kv= 15.0 fps
29.1	382	Total			

Summary for Subcatchment E-2: Pre DA #2

Runoff = 0.08 cfs @ 11.98 hrs, Volume= 0.006 af, Depth= 0.22"
Routed to Link E-Total : Pre Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	617	98	Impervious, HSG A
	12,245	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	12,862		Weighted Average
	12,245	39	95.20% Pervious Area
	617	98	4.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	54	0.0300	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.7	154	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
7.4	208	Total			

Summary for Subcatchment E-3: Pre DA #3

Runoff = 3.52 cfs @ 11.98 hrs, Volume= 0.215 af, Depth= 0.84"
Routed to Link E-Total : Pre Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	28,632	98	Impervious, HSG A
	104,945	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	133,577		Weighted Average
	104,945	39	78.57% Pervious Area
	28,632	98	21.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	266	0.0015	0.58		**Shallow Concentrated Flow, A-B** Grassed Waterway Kv= 15.0 fps

Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.27 cfs @ 11.95 hrs, Volume= 0.015 af, Depth= 1.30"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	2,026	98	Impervious, HSG A
	3,974	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	6,000		Weighted Average
	3,974	39	66.23% Pervious Area
	2,026	98	33.77% Impervious Area

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

Summary for Subcatchment P-1B: Post DA #1B

Runoff = 0.22 cfs @ 11.99 hrs, Volume= 0.017 af, Depth= 0.23"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	1,875	98	Impervious, HSG A
	36,052	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	37,927		Weighted Average
	36,052	39	95.06% Pervious Area
	1,875	98	4.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0400	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.2	124	0.0100	9.44	66.70	**Pipe Channel, C-D** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, bends & connections
0.7	300	0.0050	6.67	47.16	**Pipe Channel, D-E** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
1.4	690	0.0050	8.08	101.57	**Pipe Channel, E-F** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
8.5	1,344	Total			

Summary for Subcatchment P-1C: Post DA #1C (basin)

[47] Hint: Peak is 461% of capacity of segment #5
[47] Hint: Peak is 104% of capacity of segment #6

Runoff = 73.81 cfs @ 11.99 hrs, Volume= 4.414 af, Depth= 3.30"
Routed to Pond P-B1 : Proposed Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

Area (sf)	CN	Description
611,764	98	Paved parking, HSG A
88,341	39	>75% Grass cover, Good, HSG A
0	30	Woods, Good, HSG A
700,105		Weighted Average
88,341	39	12.62% Pervious Area
611,764	98	87.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	70	0.0400	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.8	111	0.0260	2.42		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.0	15	0.1000	5.09		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.9	290	0.0050	5.09	16.00	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
0.1	54	0.0050	7.39	71.14	**Pipe Channel, F-G** 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.013 Corrugated PE, smooth interior
0.1	25	0.0050	8.08	101.57	**Pipe Channel, G-H** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
8.2	590	Total			

Summary for Subcatchment P-1D: Post DA #1D

Runoff = 0.13 cfs @ 11.97 hrs, Volume= 0.010 af, Depth= 0.16"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	1,053	98	Impervious, HSG A
	33,013	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	34,066		Weighted Average
	33,013	39	96.91% Pervious Area
	1,053	98	3.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	85	0.0600	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"

Summary for Subcatchment P-2: Post DA #2

[40] Hint: Not Described (Area=0)

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link P-Total : Post Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	0	98	Impervious, HSG A
	0	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	0		Weighted Average

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

Summary for Subcatchment P-3: Post DA #3

Runoff = 0.65 cfs @ 11.95 hrs, Volume= 0.037 af, Depth= 0.85"
Routed to Link P-Total : Post Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 10-Year Rainfall=4.00"

	Area (sf)	CN	Description
*	4,863	98	Impervious, HSG A
	17,593	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	22,456		Weighted Average
	17,593	39	78.34% Pervious Area
	4,863	98	21.66% Impervious Area

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

Summary for Pond E-B1B: Existing Basin #1B

Inflow Area = 3.818 ac, 19.78% Impervious, Inflow Depth = 0.77" for 10-Year event
Inflow = 3.83 cfs @ 12.00 hrs, Volume= 0.244 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond E-B1C : Existing Basin #1C

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Peak Elev= 276.80' @ 24.56 hrs Surf.Area= 14,835 sf Storage= 10,628 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	54,829 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	739	0	0
276.00	4,833	2,786	2,786
277.00	17,376	11,105	13,891
278.00	20,000	18,688	32,579
279.00	24,500	22,250	54,829

Device	Routing	Invert	Outlet Devices
#1	Primary	278.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond E-B1C: Existing Basin #1C

Inflow Area = 4.596 ac, 18.79% Impervious, Inflow Depth = 0.09" for 10-Year event
Inflow = 0.43 cfs @ 12.08 hrs, Volume= 0.035 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Link E-1 : Pre DA #1 Combined

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Peak Elev= 277.07' @ 25.00 hrs Surf.Area= 2,796 sf Storage= 1,543 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	276.00'	7,029 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
276.00	398	0	0
277.00	2,330	1,364	1,364
278.00	9,000	5,665	7,029

Device	Routing	Invert	Outlet Devices
#1	Primary	277.50'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=276.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond P-B1: Proposed Basin #1

Inflow Area = 16.072 ac, 87.38% Impervious, Inflow Depth = 3.30" for 10-Year event
Inflow = 73.81 cfs @ 11.99 hrs, Volume= 4.414 af
Outflow = 8.98 cfs @ 12.34 hrs, Volume= 3.072 af, Atten= 88%, Lag= 20.7 min
Primary = 8.98 cfs @ 12.34 hrs, Volume= 3.072 af
Routed to Link P-1 : Post DA #1 Combined

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 274.68' @ 12.34 hrs Surf.Area= 26,338 sf Storage= 118,336 cf

Plug-Flow detention time= 281.5 min calculated for 3.071 af (70% of inflow)
Center-of-Mass det. time= 183.9 min (934.6 - 750.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	269.00'	5,268 cf	**157.46'W x 167.27'L x 10.00'H Field A** 263,382 cf Overall - 250,213 cf Embedded = 13,169 cf x 40.0% Voids
#2A	269.50'	205,509 cf	**StormTrap ST2 DoubleTrap 8-6** x 170 Inside #1 Inside= 101.7"W x 102.0"H => 66.71 sf x 15.40'L = 1,027.0 cf Outside= 101.7"W x 114.0"H => 80.55 sf x 15.40'L = 1,240.2 cf 170 Chambers in 17 Rows 144.15' x 153.96' Core + 6.66' Border = 157.46' x 167.27' System
		210,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.10'	**24.0" Round Culvert** L= 188.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.10' / 268.34' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	272.20'	**30.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	274.70'	**35.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=8.97 cfs @ 12.34 hrs HW=274.68' (Free Discharge)
↑└─**1=Culvert** (Passes 8.97 cfs of 18.99 cfs potential flow)
↑ ├─**2=Orifice/Grate** (Orifice Controls 8.97 cfs @ 7.18 fps)
 ├─**3=Orifice/Grate** (Controls 0.00 cfs)
 └─**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link E-1: Pre DA #1 Combined

Inflow Area = 15.016 ac, 12.03% Impervious, Inflow Depth = 0.57" for 10-Year event
Inflow = 9.30 cfs @ 12.04 hrs, Volume= 0.712 af
Primary = 9.30 cfs @ 12.04 hrs, Volume= 0.712 af, Atten= 0%, Lag= 0.0 min
Routed to Link E-Total : Pre Total

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link E-Total: Pre Total

Inflow Area = 18.378 ac, 13.48% Impervious, Inflow Depth = 0.61" for 10-Year event
Inflow = 12.47 cfs @ 12.02 hrs, Volume= 0.933 af
Primary = 12.47 cfs @ 12.02 hrs, Volume= 0.933 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link P-1: Post DA #1 Combined

Inflow Area = 17.863 ac, 79.26% Impervious, Inflow Depth = 2.09" for 10-Year event
Inflow = 9.05 cfs @ 12.31 hrs, Volume= 3.114 af
Primary = 9.05 cfs @ 12.31 hrs, Volume= 3.114 af, Atten= 0%, Lag= 0.0 min
Routed to Link P-Total : Post Total

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link P-Total: Post Total

Inflow Area = 18.378 ac, 77.64% Impervious, Inflow Depth = 2.06" for 10-Year event
Inflow = 9.11 cfs @ 12.30 hrs, Volume= 3.151 af
Primary = 9.11 cfs @ 12.30 hrs, Volume= 3.151 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Subcatchment E-1A: Pre DA #1A

Runoff = 17.14 cfs @ 12.02 hrs, Volume= 1.043 af, Depth= 1.76"
Routed to Link E-1 : Pre DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	3,498	98	Impervious, HSG A
	42,019	39	>75% Grass cover, Good, HSG A
	147,551	30	Woods, Good, HSG A
*	116,586	77	Woods, Good, HSG D
	309,654		Weighted Average
	306,156	49	98.87% Pervious Area
	3,498	98	1.13% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.1	62	0.0900	0.25		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.9	141	0.0070	1.25		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
3.6	399	0.0150	1.84		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
0.2	79	0.0100	6.91	386.68	**Channel Flow, D-E** Area= 56.0 sf Perim= 27.0' r= 2.07' n= 0.035 Earth, dense weeds
0.3	85	0.0056	4.45	55.90	**Pipe Channel, E-F** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.025 Corrugated metal
0.5	358	0.0100	11.68	2,453.64	**Channel Flow, F-G** Area= 210.0 sf Perim= 46.0' r= 4.57' n= 0.035 Earth, dense weeds
10.6	1,124	Total			

Summary for Subcatchment E-1B: Pre DA #1B

Runoff = 7.23 cfs @ 12.01 hrs, Volume= 0.519 af, Depth= 1.63"
Routed to Pond E-B1B : Existing Basin #1B

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	32,895	98	Impervious, HSG A
	80,185	39	>75% Grass cover, Good, HSG A
	53,251	30	Woods, Good, HSG A
	166,331		Weighted Average
	133,436	35	80.22% Pervious Area
	32,895	98	19.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	92	0.0480	0.21		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.9	173	0.0480	3.29		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
1.2	58	0.0260	0.81		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
9.3	323	Total			

Summary for Subcatchment E-1C: Pre DA #1C

Runoff = 0.85 cfs @ 12.10 hrs, Volume= 0.082 af, Depth= 1.26"
Routed to Pond E-B1C : Existing Basin #1C

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	4,719	98	Impervious, HSG A
	16,364	39	>75% Grass cover, Good, HSG A
	12,788	30	Woods, Good, HSG A
	33,871		Weighted Average
	29,152	35	86.07% Pervious Area
	4,719	98	13.93% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.0	150	0.0150	0.15		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.1	23	0.0200	2.87		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.1	12	0.0600	1.71		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
17.2	185	Total			

Summary for Subcatchment E-1D: Pre DA #1D

Runoff = 4.85 cfs @ 12.23 hrs, Volume= 0.585 af, Depth= 2.12"
Routed to Link E-1 : Pre DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	37,564	98	Impervious, HSG A
	98,672	39	>75% Grass cover, Good, HSG A
	8,023	30	Woods, Good, HSG A
	144,259		Weighted Average
	106,695	38	73.96% Pervious Area
	37,564	98	26.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	16	0.3100	0.14		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.56"
24.1	87	0.0150	0.06		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.56"
0.4	35	0.0100	1.50		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
2.5	214	0.0050	1.44		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
0.2	30	0.0330	2.72		**Shallow Concentrated Flow, E-F** Grassed Waterway Kv= 15.0 fps
29.1	382	Total			

Summary for Subcatchment E-2: Pre DA #2

Runoff = 0.29 cfs @ 12.01 hrs, Volume= 0.023 af, Depth= 0.92"
Routed to Link E-Total : Pre Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	617	98	Impervious, HSG A
	12,245	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	12,862		Weighted Average
	12,245	39	95.20% Pervious Area
	617	98	4.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	54	0.0300	0.16		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.7	154	0.0100	1.50		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
7.4	208	Total			

Summary for Subcatchment E-3: Pre DA #3

Runoff = 7.14 cfs @ 12.00 hrs, Volume= 0.481 af, Depth= 1.88"
Routed to Link E-Total : Pre Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	28,632	98	Impervious, HSG A
	104,945	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	133,577		Weighted Average
	104,945	39	78.57% Pervious Area
	28,632	98	21.43% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.6	266	0.0015	0.58		**Shallow Concentrated Flow, A-B** Grassed Waterway Kv= 15.0 fps

Summary for Subcatchment P-1A: Post DA #1A

Runoff = 0.50 cfs @ 11.96 hrs, Volume= 0.030 af, Depth= 2.59"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	2,026	98	Impervious, HSG A
	3,974	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	6,000		Weighted Average
	3,974	39	66.23% Pervious Area
	2,026	98	33.77% Impervious Area

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

Summary for Subcatchment P-1B: Post DA #1B

Runoff = 0.83 cfs @ 12.03 hrs, Volume= 0.068 af, Depth= 0.93"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	1,875	98	Impervious, HSG A
	36,052	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	37,927		Weighted Average
	36,052	39	95.06% Pervious Area
	1,875	98	4.94% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	50	0.0400	0.17		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
1.4	180	0.0200	2.12		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.2	124	0.0100	9.44	66.70	**Pipe Channel, C-D** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013 Concrete pipe, bends & connections
0.7	300	0.0050	6.67	47.16	**Pipe Channel, D-E** 36.0" Round Area= 7.1 sf Perim= 9.4' r= 0.75' n= 0.013
1.4	690	0.0050	8.08	101.57	**Pipe Channel, E-F** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013
8.5	1,344	Total			

Summary for Subcatchment P-1C: Post DA #1C (basin)

[47] Hint: Peak is 777% of capacity of segment #5
[47] Hint: Peak is 175% of capacity of segment #6
[47] Hint: Peak is 122% of capacity of segment #7

Runoff = 124.28 cfs @ 11.99 hrs, Volume= 7.613 af, Depth= 5.68"
Routed to Pond P-B1 : Proposed Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

Area (sf)	CN	Description
611,764	98	Paved parking, HSG A
88,341	39	>75% Grass cover, Good, HSG A
0	30	Woods, Good, HSG A
700,105		Weighted Average
88,341	39	12.62% Pervious Area
611,764	98	87.38% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	70	0.0400	0.19		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"
0.8	111	0.0260	2.42		**Shallow Concentrated Flow, B-C** Grassed Waterway Kv= 15.0 fps
0.1	25	0.0200	2.87		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.0	15	0.1000	5.09		**Shallow Concentrated Flow, D-E** Unpaved Kv= 16.1 fps
0.9	290	0.0050	5.09	16.00	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
0.1	54	0.0050	7.39	71.14	**Pipe Channel, F-G** 42.0" Round Area= 9.6 sf Perim= 11.0' r= 0.88' n= 0.013 Corrugated PE, smooth interior
0.1	25	0.0050	8.08	101.57	**Pipe Channel, G-H** 48.0" Round Area= 12.6 sf Perim= 12.6' r= 1.00' n= 0.013 Corrugated PE, smooth interior
8.2	590	Total			

Summary for Subcatchment P-1D: Post DA #1D

Runoff = 0.72 cfs @ 12.00 hrs, Volume= 0.054 af, Depth= 0.83"
Routed to Link P-1 : Post DA #1 Combined

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	1,053	98	Impervious, HSG A
	33,013	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	34,066		Weighted Average
	33,013	39	96.91% Pervious Area
	1,053	98	3.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	85	0.0600	0.23		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.56"

Summary for Subcatchment P-2: Post DA #2

[40] Hint: Not Described (Area=0)

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"
Routed to Link P-Total : Post Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	0	98	Impervious, HSG A
	0	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	0		Weighted Average

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

Summary for Subcatchment P-3: Post DA #3

Runoff = 1.32 cfs @ 11.97 hrs, Volume= 0.081 af, Depth= 1.90"
Routed to Link P-Total : Post Total

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Type II 24-hr 100-Year Rainfall=6.65"

	Area (sf)	CN	Description
*	4,863	98	Impervious, HSG A
	17,593	39	>75% Grass cover, Good, HSG A
	0	30	Woods, Good, HSG A
	22,456		Weighted Average
	17,593	39	78.34% Pervious Area
	4,863	98	21.66% Impervious Area

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

Summary for Pond E-B1B: Existing Basin #1B

Inflow Area = 3.818 ac, 19.78% Impervious, Inflow Depth = 1.63" for 100-Year event
Inflow = 7.23 cfs @ 12.01 hrs, Volume= 0.519 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond E-B1C : Existing Basin #1C

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Peak Elev= 277.48' @ 24.56 hrs Surf.Area= 18,643 sf Storage= 22,589 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	275.00'	54,829 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
275.00	739	0	0
276.00	4,833	2,786	2,786
277.00	17,376	11,105	13,891
278.00	20,000	18,688	32,579
279.00	24,500	22,250	54,829

Device	Routing	Invert	Outlet Devices
#1	Primary	278.00'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=275.00' (Free Discharge)
1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Summary for Pond E-B1C: Existing Basin #1C

Inflow Area = 4.596 ac, 18.79% Impervious, Inflow Depth = 0.21" for 100-Year event
Inflow = 0.85 cfs @ 12.10 hrs, Volume= 0.082 af
Outflow = 0.02 cfs @ 24.10 hrs, Volume= 0.005 af, Atten= 98%, Lag= 720.0 min
Primary = 0.02 cfs @ 24.10 hrs, Volume= 0.005 af
Routed to Link E-1 : Pre DA #1 Combined

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs
Peak Elev= 277.51' @ 24.10 hrs Surf.Area= 5,744 sf Storage= 3,430 cf

Plug-Flow detention time= 1,121.4 min calculated for 0.005 af (6% of inflow)
Center-of-Mass det. time= 617.7 min (1,432.2 - 814.5)

Volume	Invert	Avail.Storage	Storage Description
#1	276.00'	7,029 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
276.00	398	0	0
277.00	2,330	1,364	1,364
278.00	9,000	5,665	7,029

Device	Routing	Invert	Outlet Devices
#1	Primary	277.50'	**5.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.02 cfs @ 24.10 hrs HW=277.51' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.25 fps)

Summary for Pond P-B1: Proposed Basin #1

Inflow Area = 16.072 ac, 87.38% Impervious, Inflow Depth = 5.68" for 100-Year event
Inflow = 124.28 cfs @ 11.99 hrs, Volume= 7.613 af
Outflow = 19.36 cfs @ 12.25 hrs, Volume= 6.270 af, Atten= 84%, Lag= 15.8 min
Primary = 19.36 cfs @ 12.25 hrs, Volume= 6.270 af
Routed to Link P-1 : Post DA #1 Combined

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs / 2
Peak Elev= 277.54' @ 12.25 hrs Surf.Area= 26,338 sf Storage= 187,501 cf

Plug-Flow detention time= 242.8 min calculated for 6.268 af (82% of inflow)
Center-of-Mass det. time= 166.2 min (910.6 - 744.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	269.00'	5,268 cf	**157.46'W x 167.27'L x 10.00'H Field A** 263,382 cf Overall - 250,213 cf Embedded = 13,169 cf x 40.0% Voids
#2A	269.50'	205,509 cf	**StormTrap ST2 DoubleTrap 8-6**x 170 Inside #1 Inside= 101.7"W x 102.0"H => 66.71 sf x 15.40'L = 1,027.0 cf Outside= 101.7"W x 114.0"H => 80.55 sf x 15.40'L = 1,240.2 cf 170 Chambers in 17 Rows 144.15' x 153.96' Core + 6.66' Border = 157.46' x 167.27' System
		210,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	272.10'	**24.0" Round Culvert** L= 188.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 272.10' / 268.34' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	272.20'	**30.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	274.70'	**35.0" W x 3.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	278.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=19.35 cfs @ 12.25 hrs HW=277.53' (Free Discharge)
└**1=Culvert** (Passes 19.35 cfs of 31.86 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 13.57 cfs @ 10.86 fps)
  ├**3=Orifice/Grate** (Orifice Controls 5.78 cfs @ 7.93 fps)
  └**4=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Link E-1: Pre DA #1 Combined

Inflow Area = 15.016 ac, 12.03% Impervious, Inflow Depth = 1.30" for 100-Year event
Inflow = 19.95 cfs @ 12.03 hrs, Volume= 1.633 af
Primary = 19.95 cfs @ 12.03 hrs, Volume= 1.633 af, Atten= 0%, Lag= 0.0 min
Routed to Link E-Total : Pre Total

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link E-Total: Pre Total

Inflow Area = 18.378 ac, 13.48% Impervious, Inflow Depth = 1.40" for 100-Year event
Inflow = 26.94 cfs @ 12.02 hrs, Volume= 2.137 af
Primary = 26.94 cfs @ 12.02 hrs, Volume= 2.137 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link P-1: Post DA #1 Combined

Inflow Area = 17.863 ac, 79.26% Impervious, Inflow Depth = 4.31" for 100-Year event
Inflow = 19.84 cfs @ 12.21 hrs, Volume= 6.422 af
Primary = 19.84 cfs @ 12.21 hrs, Volume= 6.422 af, Atten= 0%, Lag= 0.0 min
Routed to Link P-Total : Post Total

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Summary for Link P-Total: Post Total

Inflow Area = 18.378 ac, 77.64% Impervious, Inflow Depth = 4.25" for 100-Year event
Inflow = 20.05 cfs @ 12.19 hrs, Volume= 6.503 af
Primary = 20.05 cfs @ 12.19 hrs, Volume= 6.503 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-96.00 hrs, dt= 0.04 hrs

Hydrograph for Pond P-B1: Proposed Basin #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	269.00	0.00
2.00	0.02	6	269.00	0.00
4.00	0.18	743	269.07	0.00
6.00	0.35	2,661	269.25	0.00
8.00	0.53	5,843	270.02	0.00
10.00	1.04	11,354	270.25	0.00
12.00	**40.26**	**49,575**	**271.83**	**0.00**
14.00	1.24	**69,159**	**272.64**	**1.74**
16.00	0.75	66,258	272.52	1.08
18.00	0.57	64,510	272.45	0.76
20.00	0.42	63,354	272.40	0.56
22.00	0.38	62,561	272.37	0.46
24.00	0.35	62,089	272.35	0.40
26.00	0.00	60,234	272.27	0.18
28.00	0.00	59,304	272.24	0.09
30.00	0.00	58,861	272.22	0.04
32.00	0.00	58,650	272.21	0.02
34.00	0.00	58,550	272.20	0.01
36.00	0.00	58,502	272.20	0.00
38.00	0.00	58,479	272.20	0.00
40.00	0.00	58,468	272.20	0.00
42.00	0.00	58,463	272.20	0.00
44.00	0.00	58,460	272.20	0.00
46.00	0.00	58,459	272.20	0.00
48.00	0.00	58,459	272.20	0.00
50.00	0.00	58,458	272.20	0.00
52.00	0.00	58,458	272.20	0.00
54.00	0.00	58,458	272.20	0.00
56.00	0.00	58,458	272.20	0.00
58.00	0.00	58,458	272.20	0.00
60.00	0.00	58,458	272.20	0.00
62.00	0.00	58,458	272.20	0.00
64.00	0.00	58,458	272.20	0.00
66.00	0.00	58,458	272.20	0.00
68.00	0.00	58,458	272.20	0.00
70.00	0.00	58,458	272.20	0.00
72.00	0.00	58,458	272.20	0.00
74.00	0.00	58,458	272.20	0.00
76.00	0.00	58,458	272.20	0.00
78.00	0.00	58,458	272.20	0.00
80.00	0.00	58,458	272.20	0.00
82.00	0.00	58,458	272.20	0.00
84.00	0.00	58,458	272.20	0.00
86.00	0.00	58,458	272.20	0.00
88.00	0.00	58,458	272.20	0.00
90.00	0.00	58,458	272.20	0.00
92.00	0.00	58,458	272.20	0.00
94.00	0.00	58,458	272.20	0.00
96.00	0.00	58,458	272.20	0.00

Stage-Area-Storage for Pond P-B1: Proposed Basin #1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
269.00	0	274.20	106,813
269.10	1,054	274.30	109,231
269.20	2,107	274.40	111,649
269.30	3,161	274.50	114,066
269.40	4,214	274.60	116,484
269.50	5,268	274.70	118,902
269.60	5,268	274.80	121,320
269.70	5,268	274.90	123,737
269.80	5,268	275.00	126,155
269.90	5,268	275.10	128,573
270.00	5,268	275.20	130,991
270.10	7,685	275.30	133,408
270.20	10,103	275.40	135,826
270.30	12,521	275.50	138,244
270.40	14,939	275.60	140,662
270.50	17,356	275.70	143,079
270.60	19,774	275.80	145,497
270.70	22,192	275.90	147,915
270.80	24,610	276.00	150,333
270.90	27,027	276.10	152,751
271.00	29,445	276.20	155,168
271.10	31,863	276.30	157,586
271.20	34,281	276.40	160,004
271.30	36,698	276.50	162,422
271.40	39,116	276.60	164,839
271.50	41,534	276.70	167,257
271.60	43,952	276.80	169,675
271.70	46,369	276.90	172,093
271.80	48,787	277.00	174,510
271.90	51,205	277.10	176,928
272.00	53,623	277.20	179,346
272.10	56,040	277.30	181,764
272.20	58,458	277.40	184,181
272.30	60,876	277.50	186,599
272.40	63,294	277.60	189,017
272.50	65,711	277.70	191,435
272.60	68,129	277.80	193,852
272.70	70,547	277.90	196,270
272.80	72,965	278.00	198,688
272.90	75,382	278.10	201,106
273.00	77,800	278.20	203,523
273.10	80,218	278.30	205,941
273.20	82,636	278.40	208,359
273.30	85,053	278.50	**210,777**
273.40	87,471	278.60	210,777
273.50	89,889	278.70	210,777
273.60	92,307	278.80	210,777
273.70	94,724	278.90	210,777
273.80	97,142	279.00	210,777
273.90	99,560		
274.00	101,978		
274.10	104,395		

Hydrograph for Pond P-B1: Proposed Basin #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	269.00	0.00
2.00	0.21	353	269.03	0.00
4.00	0.52	3,042	269.29	0.00
6.00	0.82	7,845	270.11	0.00
8.00	1.10	14,780	270.39	0.00
10.00	2.03	25,871	270.85	0.00
12.00	**73.33**	**94,685**	**273.70**	**6.71**
14.00	2.24	**94,027**	**273.67**	**6.64**
16.00	1.36	72,604	272.79	2.69
18.00	1.04	67,728	272.58	1.39
20.00	0.76	65,796	272.50	0.98
22.00	0.69	64,700	272.46	0.79
24.00	0.63	64,145	272.44	0.70
26.00	0.00	61,127	272.31	0.28
28.00	0.00	59,729	272.25	0.13
30.00	0.00	59,064	272.23	0.06
32.00	0.00	58,747	272.21	0.03
34.00	0.00	58,596	272.21	0.01
36.00	0.00	58,524	272.20	0.01
38.00	0.00	58,489	272.20	0.00
40.00	0.00	58,473	272.20	0.00
42.00	0.00	58,465	272.20	0.00
44.00	0.00	58,462	272.20	0.00
46.00	0.00	58,460	272.20	0.00
48.00	0.00	58,459	272.20	0.00
50.00	0.00	58,459	272.20	0.00
52.00	0.00	58,458	272.20	0.00
54.00	0.00	58,458	272.20	0.00
56.00	0.00	58,458	272.20	0.00
58.00	0.00	58,458	272.20	0.00
60.00	0.00	58,458	272.20	0.00
62.00	0.00	58,458	272.20	0.00
64.00	0.00	58,458	272.20	0.00
66.00	0.00	58,458	272.20	0.00
68.00	0.00	58,458	272.20	0.00
70.00	0.00	58,458	272.20	0.00
72.00	0.00	58,458	272.20	0.00
74.00	0.00	58,458	272.20	0.00
76.00	0.00	58,458	272.20	0.00
78.00	0.00	58,458	272.20	0.00
80.00	0.00	58,458	272.20	0.00
82.00	0.00	58,458	272.20	0.00
84.00	0.00	58,458	272.20	0.00
86.00	0.00	58,458	272.20	0.00
88.00	0.00	58,458	272.20	0.00
90.00	0.00	58,458	272.20	0.00
92.00	0.00	58,458	272.20	0.00
94.00	0.00	58,458	272.20	0.00
96.00	0.00	58,458	272.20	0.00

Stage-Area-Storage for Pond P-B1: Proposed Basin #1

Elevation (feet)	Storage (cubic-feet)
269.00	0
269.10	1,054
269.20	2,107
269.30	3,161
269.40	4,214
269.50	5,268
269.60	5,268
269.70	5,268
269.80	5,268
269.90	5,268
270.00	5,268
270.10	7,685
270.20	10,103
270.30	12,521
270.40	14,939
270.50	17,356
270.60	19,774
270.70	22,192
270.80	24,610
270.90	27,027
271.00	29,445
271.10	31,863
271.20	34,281
271.30	36,698
271.40	39,116
271.50	41,534
271.60	43,952
271.70	46,369
271.80	48,787
271.90	51,205
272.00	53,623
272.10	56,040
272.20	58,458
272.30	60,876
272.40	63,294
272.50	65,711
272.60	68,129
272.70	70,547
272.80	72,965
272.90	75,382
273.00	77,800
273.10	80,218
273.20	82,636
273.30	85,053
273.40	87,471
273.50	89,889
273.60	92,307
273.70	94,724
273.80	97,142
273.90	99,560
274.00	101,978
274.10	104,395
274.20	106,813
274.30	109,231
274.40	111,649
274.50	114,066
274.60	116,484
274.70	118,902
274.80	121,320
274.90	123,737
275.00	126,155
275.10	128,573
275.20	130,991
275.30	133,408
275.40	135,826
275.50	138,244
275.60	140,662
275.70	143,079
275.80	145,497
275.90	147,915
276.00	150,333
276.10	152,751
276.20	155,168
276.30	157,586
276.40	160,004
276.50	162,422
276.60	164,839
276.70	167,257
276.80	169,675
276.90	172,093
277.00	174,510
277.10	176,928
277.20	179,346
277.30	181,764
277.40	184,181
277.50	186,599
277.60	189,017
277.70	191,435
277.80	193,852
277.90	196,270
278.00	198,688
278.10	201,106
278.20	203,523
278.30	205,941
278.40	208,359
278.50	**210,777**
278.60	210,777
278.70	210,777
278.80	210,777
278.90	210,777
279.00	210,777

Hydrograph for Pond P-B1: Proposed Basin #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	269.00	0.00
2.00	0.60	1,552	269.15	0.00
4.00	1.06	7,701	270.10	0.00
6.00	1.52	16,992	270.48	0.00
8.00	1.95	29,511	271.00	0.00
10.00	3.49	48,805	271.80	0.00
12.00	**123.57**	**151,828**	**276.06**	**15.34**
14.00	3.85	**130,694**	**275.19**	**12.06**
16.00	2.34	92,143	273.59	6.42
18.00	1.80	73,215	272.81	2.87
20.00	1.31	68,931	272.63	1.68
22.00	1.19	67,357	272.57	1.31
24.00	1.09	66,671	272.54	1.17
26.00	0.00	62,075	272.35	0.40
28.00	0.00	60,157	272.27	0.17
30.00	0.00	59,267	272.23	0.08
32.00	0.00	58,844	272.22	0.04
34.00	0.00	58,642	272.21	0.02
36.00	0.00	58,546	272.20	0.01
38.00	0.00	58,500	272.20	0.00
40.00	0.00	58,478	272.20	0.00
42.00	0.00	58,468	272.20	0.00
44.00	0.00	58,463	272.20	0.00
46.00	0.00	58,460	272.20	0.00
48.00	0.00	58,459	272.20	0.00
50.00	0.00	58,459	272.20	0.00
52.00	0.00	58,458	272.20	0.00
54.00	0.00	58,458	272.20	0.00
56.00	0.00	58,458	272.20	0.00
58.00	0.00	58,458	272.20	0.00
60.00	0.00	58,458	272.20	0.00
62.00	0.00	58,458	272.20	0.00
64.00	0.00	58,458	272.20	0.00
66.00	0.00	58,458	272.20	0.00
68.00	0.00	58,458	272.20	0.00
70.00	0.00	58,458	272.20	0.00
72.00	0.00	58,458	272.20	0.00
74.00	0.00	58,458	272.20	0.00
76.00	0.00	58,458	272.20	0.00
78.00	0.00	58,458	272.20	0.00
80.00	0.00	58,458	272.20	0.00
82.00	0.00	58,458	272.20	0.00
84.00	0.00	58,458	272.20	0.00
86.00	0.00	58,458	272.20	0.00
88.00	0.00	58,458	272.20	0.00
90.00	0.00	58,458	272.20	0.00
92.00	0.00	58,458	272.20	0.00
94.00	0.00	58,458	272.20	0.00
96.00	0.00	58,458	272.20	0.00

Stage-Area-Storage for Pond P-B1: Proposed Basin #1

Elevation (feet)	Storage (cubic-feet)
269.00	0
269.10	1,054
269.20	2,107
269.30	3,161
269.40	4,214
269.50	5,268
269.60	5,268
269.70	5,268
269.80	5,268
269.90	5,268
270.00	5,268
270.10	7,685
270.20	10,103
270.30	12,521
270.40	14,939
270.50	17,356
270.60	19,774
270.70	22,192
270.80	24,610
270.90	27,027
271.00	29,445
271.10	31,863
271.20	34,281
271.30	36,698
271.40	39,116
271.50	41,534
271.60	43,952
271.70	46,369
271.80	48,787
271.90	51,205
272.00	53,623
272.10	56,040
272.20	58,458
272.30	60,876
272.40	63,294
272.50	65,711
272.60	68,129
272.70	70,547
272.80	72,965
272.90	75,382
273.00	77,800
273.10	80,218
273.20	82,636
273.30	85,053
273.40	87,471
273.50	89,889
273.60	92,307
273.70	94,724
273.80	97,142
273.90	99,560
274.00	101,978
274.10	104,395
274.20	106,813
274.30	109,231
274.40	111,649
274.50	114,066
274.60	116,484
274.70	118,902
274.80	121,320
274.90	123,737
275.00	126,155
275.10	128,573
275.20	130,991
275.30	133,408
275.40	135,826
275.50	138,244
275.60	140,662
275.70	143,079
275.80	145,497
275.90	147,915
276.00	150,333
276.10	152,751
276.20	155,168
276.30	157,586
276.40	160,004
276.50	162,422
276.60	164,839
276.70	167,257
276.80	169,675
276.90	172,093
277.00	174,510
277.10	176,928
277.20	179,346
277.30	181,764
277.40	184,181
277.50	186,599
277.60	189,017
277.70	191,435
277.80	193,852
277.90	196,270
278.00	198,688
278.10	201,106
278.20	203,523
278.30	205,941
278.40	208,359
278.50	**210,777**
278.60	210,777
278.70	210,777
278.80	210,777
278.90	210,777
279.00	210,777

APPENDIX 5

STORM SEWER CALCULATIONS

MASER CONSULTING P.A.

Project: Albany Costco Sheet: 1 of 1

Project #: 13001204A Scale:

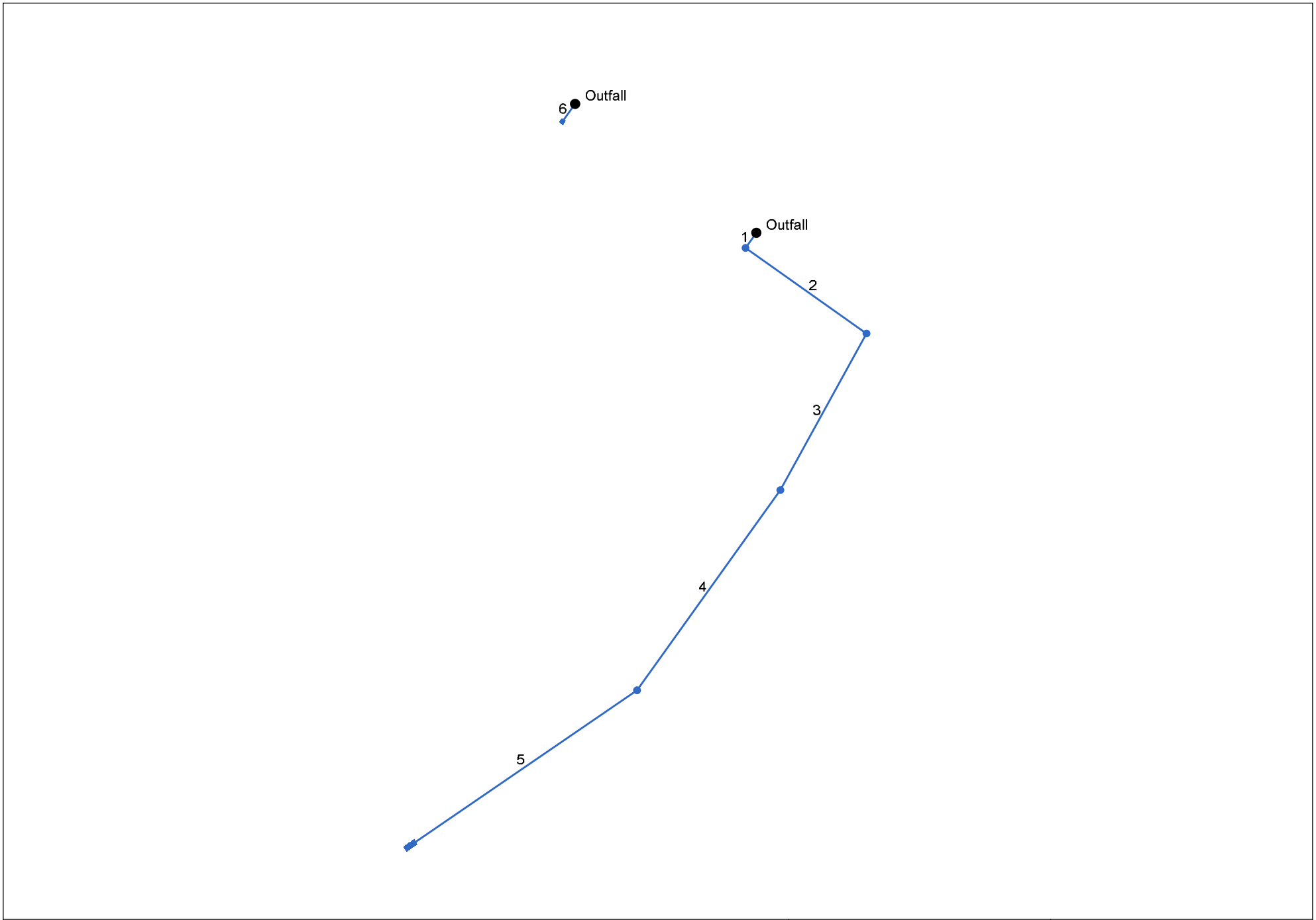
Calculated By: SVD Date: 2/28/2023 Checked By: Date:

Office Submitted by: Date:

Engineers | Planners | Surveyors | Landscape Architects | Environmental Scientists

INLET NUMBER	AREA		LAWN (C=0.60)		IMPERVIOUS (C=0.95)		Cw
	S.F.	Acres	S.F.	Acres	S.F.	Acres	
202	41,189	0.946	3,127	0.072	38,062	0.874	0.92
203	5,319	0.122	0	0.000	5,319	0.122	0.95
~~203A~~	~~9,009~~	~~0.207~~	~~371~~	~~0.009~~	~~8,638~~	~~0.198~~	~~0.94~~
~~203C~~	~~8,269~~	~~0.190~~	~~0~~	~~0.000~~	~~8,269~~	~~0.190~~	~~0.95~~
204	4,877	0.112	1,616	0.037	3,261	0.075	0.83
~~205~~	~~5,870~~	~~0.135~~	~~0~~	~~0.000~~	~~5,870~~	~~0.135~~	~~0.95~~
~~205A~~	~~9,380~~	~~0.215~~	~~0~~	~~0.000~~	~~9,380~~	~~0.215~~	~~0.95~~
~~205B~~	~~8,745~~	~~0.201~~	~~0~~	~~0.000~~	~~8,745~~	~~0.201~~	~~0.95~~
~~206A~~	~~9,732~~	~~0.223~~	~~0~~	~~0.000~~	~~9,732~~	~~0.223~~	~~0.95~~
~~206B~~	~~9,025~~	~~0.207~~	~~0~~	~~0.000~~	~~9,025~~	~~0.207~~	~~0.95~~
~~206D~~	~~8,106~~	~~0.186~~	~~0~~	~~0.000~~	~~8,106~~	~~0.186~~	~~0.95~~
207	23,564	0.541	4,971	0.114	18,593	0.427	0.88
208	25,186	0.578	3,484	0.080	21,702	0.498	0.90
209	44,029	1.011	21,663	0.497	22,366	0.513	0.78
209A	6,638	0.152	3,314	0.076	3,324	0.076	0.78
209B	18,628	0.428	905	0.021	17,723	0.407	0.93
210	15,788	0.362	1,582	0.036	14,206	0.326	0.91
211	24,629	0.565	14,581	0.335	10,048	0.231	0.74
212	25,690	0.590	4,463	0.102	21,227	0.487	0.89
213	14,070	0.323	748	0.017	13,322	0.306	0.93
203A	17,278	0.397	371	0.009	16,907	0.388	0.94
205	23,995	0.551	0	0.000	23,995	0.551	0.95
206	26,863	0.617	0	0.000	26,863	0.617	0.95
111	11,000	0.253	11,000	0.253	0	0.000	0.60
TOTALS	396,879	9.111	72,196	1.657	324,683	7.454	

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 5B - Storm (Run 100).stm	Number of lines: 6	Date: 3/9/2023

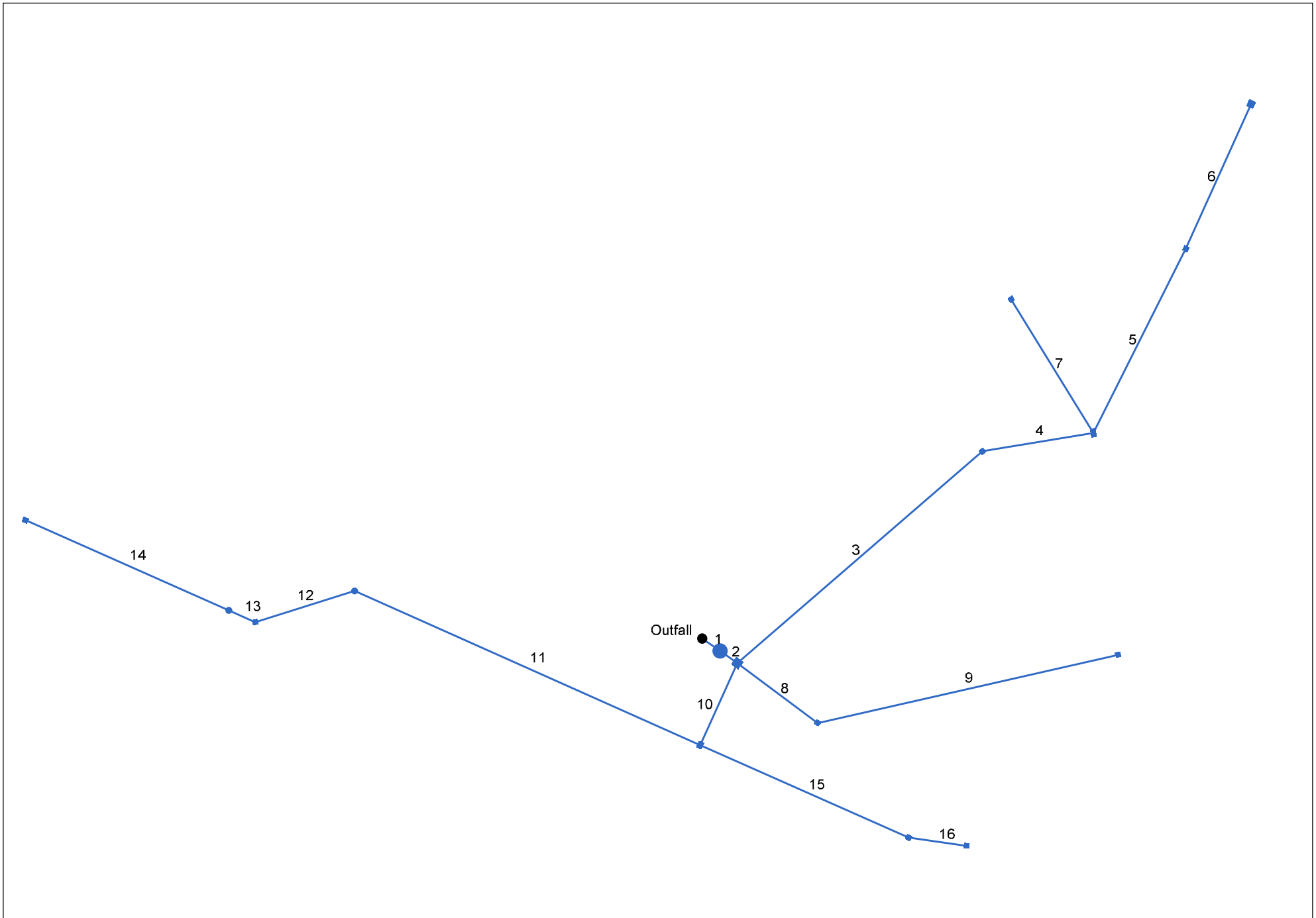
MC Report

Line No.	Line ID	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Tc (min)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Type	n-val Pipe	Line Size (in)	Line Slope (%)	Line Length (ft)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
1	P-101	S-101	0.00	0.00	7.1	0.00	30.49	6.51	Cir	0.012	30	0.47	13	265.98	265.92	279.73	278.57	267.49	267.39	11.25	10.15
2	P-102	S-102	0.00	0.00	6.7	0.00	31.54	5.30	Cir	0.012	30	0.50	101	266.59	266.08	277.49	279.73	268.10	268.40	8.40	11.15
3	P-103	S-103	0.00	0.00	6.2	0.00	31.39	5.30	Cir	0.012	30	0.50	122	267.30	266.69	280.00	277.49	268.81	269.01	10.20	8.30
4	P-104	S-104	0.00	0.00	5.5	0.00	31.38	5.30	Cir	0.012	30	0.50	168	268.24	267.40	282.57	280.00	269.75	269.72	11.83	10.10
5	P-105	S-105	0.00	0.00	5.0	0.00	34.68	6.86	Cir	0.012	24	2.00	188	272.10	268.34	280.75	282.57	273.70 j	270.66	6.65	12.23
6	P-111	S-111	0.25	0.60	5.0	1.48	7.02	3.96	Cir	0.012	15	1.01	15	276.85	276.70	280.75	282.57	277.33	277.09	2.65	4.62

Project File: 5B - Storm (Run 100).stm | Number of lines: 6 | Date: 3/9/2023

NOTES: i Inlet control; ** Critical depth

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 5C - Storm (Run 200).stm	Number of lines: 16	Date: 3/9/2023

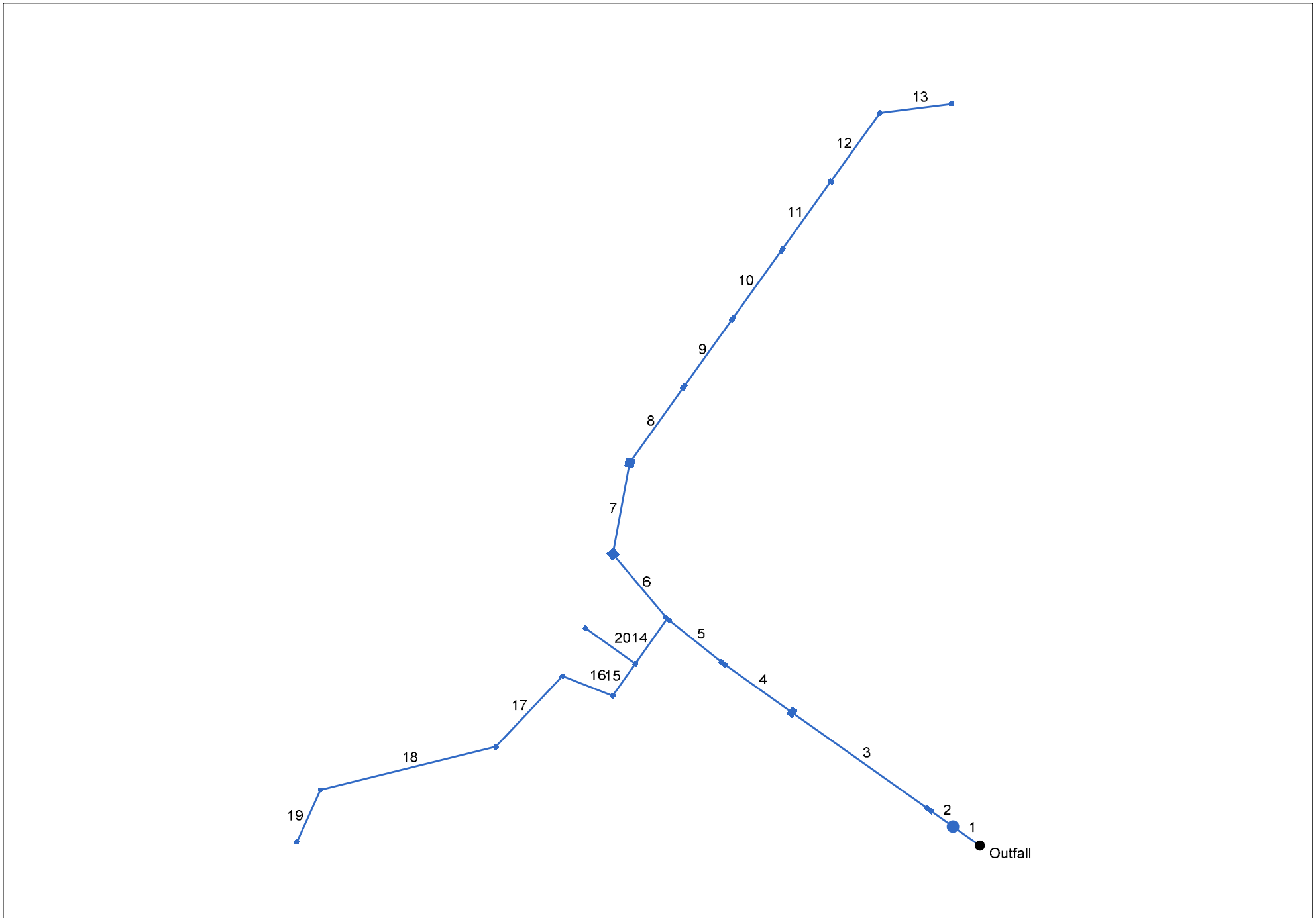
MC Report

Line No.	Line ID	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Tc (min)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Type	n-val Pipe	Line Size (in)	Line Slope (%)	Line Length (ft)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
1	P-201	S-201	0.00	1.00	9.3	41.13	113.74	3.27	Cir	0.012	48	0.53	13	270.72	270.65	279.52	279.65	278.01	278.00	4.80	5.00
2	P-202	S-202	0.95	0.92	9.3	41.26	115.45	3.28	Cir	0.012	48	0.55	13	270.89	270.82	279.40	279.52	278.04	278.03	4.51	4.70
3	P-203	S-203	0.06	0.95	7.7	6.29	17.27	2.00	Cir	0.012	24	0.50	195	271.96	270.99	280.23	279.40	278.53	278.40	6.27	6.41
4	P-204	S-204	0.11	0.83	7.2	6.03	17.37	1.92	Cir	0.012	24	0.50	68	272.40	272.06	280.68	280.23	278.63	278.58	6.28	6.17
5	P-205	S-205	0.07	0.95	6.1	2.24	4.94	1.83	Cir	0.012	15	0.50	125	274.57	273.95	281.59	280.68	278.84	278.72	5.77	5.48
6	P-206	S-206	0.19	0.95	5.0	1.78	7.00	1.45	Cir	0.012	15	1.00	96	275.63	274.67	279.97	281.59	278.95	278.89	3.09	5.67
7	P-203A	S-203A	0.40	0.94	5.0	3.71	7.01	3.03	Cir	0.012	15	1.00	95	273.45	272.50	279.33	280.68	278.98	278.71	4.63	6.93
8	P-207	S-207	0.54	0.88	6.1	9.09	17.55	2.89	Cir	0.012	24	0.51	60	272.91	272.60	278.74	279.40	278.41	278.33	3.83	4.80
9	P-208	S-208	0.58	0.90	5.0	5.15	11.36	2.92	Cir	0.012	18	1.00	185	274.86	273.01	279.11	278.74	278.95	278.57	2.75	4.23
10	P-209	S-209	1.01	0.78	7.1	24.41	76.73	2.54	Cir	0.012	42	0.50	54	272.62	272.35	279.67	279.40	278.39	278.36	3.55	3.55
11	P-210	S-210	0.36	0.91	6.3	14.12	18.22	4.49	Cir	0.012	24	0.55	228	276.68	275.42	282.09	279.67	279.29	278.54	3.41	2.25
12	P-211	S-211	0.57	0.74	6.0	11.40	17.50	3.63	Cir	0.012	24	0.51	63	277.10	276.78	281.35	282.09	279.87	279.74	2.25	3.31
13	P-212	S-212	0.59	0.89	5.9	7.56	22.75	6.41	Cir	0.012	15	10.58	17	279.69	277.85	283.29	281.35	280.78	280.09	2.35	2.25
14	P-213	S-213	0.32	0.93	5.0	2.94	9.02	3.32	Cir	0.012	15	1.66	134	282.02	279.79	285.52	283.29	282.71 j	282.03	2.25	2.25
15	P-209A	S-209A	0.15	0.78	5.5	4.92	17.24	1.57	Cir	0.012	24	0.50	137	273.40	272.72	279.19	279.67	278.65	278.60	3.79	4.95
16	P-209B	S-209B	0.43	0.93	5.0	3.95	24.48	1.26	Cir	0.012	24	1.00	35	273.85	273.50	278.10	279.19	278.70	278.69	2.25	3.69

Project File: 5C - Storm (Run 200).stm | Number of lines: 16 | Date: 3/9/2023

NOTES: i Inlet control; ** Critical depth

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan



Project File: 5D - Storm (Run 300).stm	Number of lines: 20	Date: 3/9/2023

MC Report

Line No.	Line ID	Inlet ID	Drng Area (ac)	Runoff Coeff (C)	Tc (min)	Total Runoff (cfs)	Capac Full (cfs)	Vel Ave (ft/s)	Line Type	n-val Pipe	Line Size (in)	Line Slope (%)	Line Length (ft)	Invert Up (ft)	Invert Dn (ft)	Gnd/Rim El Up (ft)	Gnd/Rim El Dn (ft)	HGL Up (ft)	HGL Dn (ft)	Cover Up (ft)	Cover Dn (ft)
1	P-301	S-301	0.00	1.00	8.3	64.16	112.23	5.11	Cir	0.012	48	0.52	25	270.29	270.16	281.99	281.95	278.04	278.00	7.70	7.79
2	P-302	S-302	0.51	0.95	8.2	64.45	110.03	5.13	Cir	0.012	48	0.50	22	270.50	270.39	281.75	281.99	278.14	278.10	7.25	7.60
3	P-303	S-303	0.71	0.94	7.7	62.26	110.04	4.96	Cir	0.012	48	0.50	128	271.24	270.60	281.80	281.75	278.58	278.37	6.56	7.15
4	P-304	S-304	0.52	0.93	7.5	57.69	110.04	4.59	Cir	0.012	48	0.50	64	271.66	271.34	281.80	281.80	278.91	278.82	6.14	6.46
5	P-305	S-305	0.21	0.87	7.3	54.46	109.61	4.33	Cir	0.012	48	0.50	54	272.03	271.76	282.00	281.80	279.18	279.11	5.97	6.04
6	P-306	S-306	0.13	0.86	7.0	43.15	76.97	4.49	Cir	0.012	42	0.50	64	272.45	272.13	282.15	282.00	279.72	279.62	6.20	6.37
7	P-307	S-307	0.75	0.93	6.8	42.96	77.79	4.47	Cir	0.012	42	0.51	71	272.91	272.55	281.85	282.15	280.21	280.10	5.44	6.10
8	P-308	S-308	0.44	0.92	6.5	37.68	77.61	3.92	Cir	0.012	42	0.51	71	273.37	273.01	281.85	281.85	280.59	280.50	4.98	5.34
9	P-309	S-309	0.85	0.94	6.2	34.81	77.07	3.62	Cir	0.012	42	0.50	64	273.79	273.47	281.85	281.85	280.81	280.74	4.56	4.88
10	P-310	S-310	1.09	0.94	5.9	28.13	51.09	3.98	Cir	0.012	36	0.50	64	274.21	273.89	281.85	281.85	281.00	280.91	4.64	4.96
11	P-311	S-311	0.75	0.94	5.6	19.06	31.42	3.88	Cir	0.012	30	0.50	64	274.63	274.31	281.85	281.85	281.26	281.14	4.72	5.04
12	P-312	S-312	0.83	0.93	5.2	12.83	31.42	2.61	Cir	0.012	30	0.50	64	275.05	274.73	281.85	281.85	281.56	281.50	4.30	4.62
13	P-313	S-313	0.59	0.93	5.0	5.42	7.03	4.41	Cir	0.012	15	1.01	55	275.70	275.15	282.60	281.85	282.01	281.68	5.65	5.45
14	P-321	S-321	0.05	0.82	6.5	10.99	14.60	6.70	Cir	0.012	18	1.65	42	278.94	278.25	282.79	282.00	280.21 j	279.62	2.35	2.25
15	P-322	S-322	0.19	0.84	6.4	9.19	12.85	5.20	Cir	0.012	18	1.28	30	279.42	279.04	283.27	282.79	281.69	281.50	2.35	2.25
16	P-323	S-323	0.39	0.84	6.3	7.86	12.58	4.45	Cir	0.012	18	1.22	41	280.02	279.52	283.77	283.27	282.61	282.42	2.25	2.25
17	P-324	S-324	0.13	0.93	6.0	5.02	6.15	4.09	Cir	0.012	15	0.77	74	280.69	280.12	284.97	283.77	283.47	283.09	3.03	2.40
18	P-325	S-325	0.13	0.85	5.3	4.12	4.93	3.36	Cir	0.012	15	0.50	137	281.47	280.79	285.51	284.97	284.27	283.79	2.79	2.93
19	P-326	S-326	0.34	0.93	5.0	3.12	7.03	2.54	Cir	0.012	15	1.01	44	282.01	281.57	285.51	285.51	284.65	284.56	2.25	2.69
20	P-321A	S-321A	0.19	0.89	5.0	1.67	9.77	1.36	Cir	0.012	15	1.95	47	280.20	279.29	283.70	282.79	281.52	281.50	2.25	2.25

Project File: 5D - Storm (Run 300).stm | Number of lines: 20 | Date: 3/9/2023

NOTES: i Inlet control; ** Critical depth

APPENDIX 6

SPDES GENERAL PERMIT GP- 0-20-001

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES

From

CONSTRUCTION ACTIVITY

Permit No. GP- 0-20-001

Issued Pursuant to Article 17, Titles 7, 8 and Article 70

of the Environmental Conservation Law

Effective Date: January 29, 2020 Expiration Date: January 28, 2025

John J. Ferguson

Chief Permit Administrator

1-23-20

Authorized Signature Date

Address: NYS DEC
Division of Environmental Permits
625 Broadway, 4th Floor
Albany, N.Y. 12233-1750

PREFACE

Pursuant to Section 402 of the Clean Water Act ("CWA"), stormwater *discharges* from certain *construction activities* are unlawful unless they are authorized by a *National Pollutant Discharge Elimination System ("NPDES")* permit or by a state permit program. New York administers the approved State Pollutant Discharge Elimination System (SPDES) program with permits issued in accordance with the New York State Environmental Conservation Law (ECL) Article 17, Titles 7, 8 and Article 70.

An *owner or operator* of a *construction activity* that is eligible for coverage under this permit must obtain coverage prior to the *commencement of construction activity*. Activities that fit the definition of "*construction activity*", as defined under 40 CFR 122.26(b)(14)(x), (15)(i), and (15)(ii), constitute construction of a *point source* and therefore, pursuant to ECL section 17-0505 and 17-0701, the *owner or operator* must have coverage under a SPDES permit prior to *commencing construction activity*. The *owner or operator* cannot wait until there is an actual *discharge* from the *construction site* to obtain permit coverage.

***Note: The italicized words/phrases within this permit are defined in Appendix A.**

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITIES

Table of Contents

Part 1. PERMIT COVERAGE AND LIMITATIONS 1
- A. Permit Application 1
- B. Effluent Limitations Applicable to Discharges from Construction Activities 1
- C. Post-construction Stormwater Management Practice Requirements 4
- D. Maintaining Water Quality 8
- E. Eligibility Under This General Permit 9
- F. Activities Which Are Ineligible for Coverage Under This General Permit 9

Part II. PERMIT COVERAGE 12
- A. How to Obtain Coverage 12
- B. Notice of Intent (NOI) Submittal 13
- C. Permit Authorization 13
- D. General Requirements For Owners or Operators With Permit Coverage 15
- E. Permit Coverage for Discharges Authorized Under GP-0-15-002 17
- F. Change of Owner or Operator 17

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP) 18
- A. General SWPPP Requirements 18
- B. Required SWPPP Contents 20
- C. Required SWPPP Components by Project Type 24

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS 24
- A. General Construction Site Inspection and Maintenance Requirements 24
- B. Contractor Maintenance Inspection Requirements 24
- C. Qualified Inspector Inspection Requirements 25

Part V. TERMINATION OF PERMIT COVERAGE 29
- A. Termination of Permit Coverage 29

Part VI. REPORTING AND RETENTION RECORDS 31
- A. Record Retention 31
- B. Addresses 31

Part VII. STANDARD PERMIT CONDITIONS 31
- A. Duty to Comply 31
- B. Continuation of the Expired General Permit 32
- C. Enforcement 32
- D. Need to Halt or Reduce Activity Not a Defense 32
- E. Duty to Mitigate 33
- F. Duty to Provide Information 33
- G. Other Information 33
- H. Signatory Requirements 33
- I. Property Rights 35
- J. Severability 35

K. Requirement to Obtain Coverage Under an Alternative Permit....35
L. Proper Operation and Maintenance....36
M. Inspection and Entry....36
N. Permit Actions....37
O. Definitions....37
P. Re-Opener Clause....37
Q. Penalties for Falsification of Forms and Reports....37
R. Other Permits....38
APPENDIX A – Acronyms and Definitions....39
Acronyms....39
Definitions....40
APPENDIX B – Required SWPPP Components by Project Type....48
Table 1....48
Table 2....50
APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal....52
APPENDIX D – Watersheds with Lower Disturbance Threshold....58
APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)....59
APPENDIX F – List of NYS DEC Regional Offices....65

Part 1. PERMIT COVERAGE AND LIMITATIONS

A. Permit Application

This permit authorizes stormwater *discharges* to *surface waters of the State* from the following *construction activities* identified within 40 CFR Parts 122.26(b)(14)(x), 122.26(b)(15)(i) and 122.26(b)(15)(ii), provided all of the eligibility provisions of this permit are met:

1. *Construction activities* involving soil disturbances of one (1) or more acres; including disturbances of less than one acre that are part of a *larger common plan of development or sale* that will ultimately disturb one or more acres of land; excluding *routine maintenance activity* that is performed to maintain the original line and grade, hydraulic capacity or original purpose of a facility;

2. *Construction activities* involving soil disturbances of less than one (1) acre where the Department has determined that a *SPDES* permit is required for stormwater *discharges* based on the potential for contribution to a violation of a *water quality standard* or for significant contribution of *pollutants* to *surface waters of the State.*

3. *Construction activities* located in the watershed(s) identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

B. Effluent Limitations Applicable to Discharges from Construction Activities

*Discharge*s authorized by this permit must achieve, at a minimum, the effluent limitations in Part I.B.1. (a) – (f) of this permit. These limitations represent the degree of effluent reduction attainable by the application of best practicable technology currently available.

1. Erosion and Sediment Control Requirements - The *owner or operator* must select, design, install, implement and maintain control measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. The selection, design, installation, implementation, and maintenance of these control measures must meet the non-numeric effluent limitations in Part I.B.1.(a) – (f) of this permit and be in accordance with the New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, using sound engineering judgment. Where control measures are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must include in the *Stormwater Pollution Prevention Plan* (“SWPPP”) the reason(s) for the

deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

a. **Erosion and Sediment Controls.** Design, install and maintain effective erosion and sediment controls to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such controls must be designed, installed and maintained to:

   (i) *Minimize* soil erosion through application of runoff control and soil stabilization control measure to *minimize pollutant discharge*s;

   (ii) Control stormwater *discharge*s, including both peak flowrates and total stormwater volume, to *minimize* channel and *streambank* erosion and scour in the immediate vicinity of the *discharge* points;

   (iii) *Minimize* the amount of soil exposed during *construction activity*;

   (iv) *Minimize* the disturbance of *steep slopes*;

   (v) *Minimize* sediment *discharge*s from the site;

   (vi) Provide and maintain *natural buffer*s around surface waters, direct stormwater to vegetated areas and maximize stormwater infiltration to reduce *pollutant discharge*s, unless *infeasible*;

   (vii) *Minimize* soil compaction. Minimizing soil compaction is not required where the intended function of a specific area of the site dictates that it be compacted;

   (viii) Unless *infeasible*, preserve a sufficient amount of topsoil to complete soil restoration and establish a uniform, dense vegetative cover; and

   (ix) *Minimize* dust. On areas of exposed soil, *minimize* dust through the appropriate application of water or other dust suppression techniques to control the generation of pollutants that could be discharged from the site.

b. **Soil Stabilization**. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within fourteen (14) days from the date the current soil disturbance activity ceased. For construction sites that *directly discharge* to one of the 303(d) segments

listed in Appendix E or is located in one of the watersheds listed in Appendix C, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. See Appendix A for definition of *Temporarily Ceased*.

c. **Dewatering**. *Discharge*s from *dewatering* activities, including *discharge*s from *dewatering* of trenches and excavations, must be managed by appropriate control measures.

d. **Pollution Prevention Measures**. Design, install, implement, and maintain effective pollution prevention measures to *minimize* the *discharge* of *pollutants* and prevent a violation of the *water quality standards*. At a minimum, such measures must be designed, installed, implemented and maintained to:

(i) *Minimize* the *discharge* of *pollutants* from equipment and vehicle washing, wheel wash water, and other wash waters. This applies to washing operations that use clean water only. Soaps, detergents and solvents cannot be used;

(ii) *Minimize* the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, hazardous and toxic waste, and other materials present on the site to precipitation and to stormwater. Minimization of exposure is not required in cases where the exposure to precipitation and to stormwater will not result in a *discharge* of *pollutants*, or where exposure of a specific material or product poses little risk of stormwater contamination (such as final products and materials intended for outdoor use) ; and

(iii) Prevent the *discharge* of *pollutants* from spills and leaks and implement chemical spill and leak prevention and response procedures.

e. **Prohibited *Discharge*s.** The following *discharge*s are prohibited:

(i) Wastewater from washout of concrete;

(ii) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;

(iii) Fuels, oils, or other *pollutants* used in vehicle and equipment operation and maintenance;

(iv) Soaps or solvents used in vehicle and equipment washing; and

(v) Toxic or hazardous substances from a spill or other release.

f. Surface Outlets. When discharging from basins and impoundments, the outlets shall be designed, constructed and maintained in such a manner that sediment does not leave the basin or impoundment and that erosion at or below the outlet does not occur.

C. Post-construction Stormwater Management Practice Requirements

1. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must select, design, install, and maintain the practices to meet the *performance criteria* in the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015, using sound engineering judgment. Where post-construction stormwater management practices ("SMPs") are not designed in conformance with the *performance criteria* in the Design Manual, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. The *owner or operator* of a *construction activity* that requires post-construction stormwater management practices pursuant to Part III.C. of this permit must design the practices to meet the applicable *sizing criteria* in Part I.C.2.a., b., c. or d. of this permit.

a. Sizing Criteria for New Development

(i) Runoff Reduction Volume ("RRv"): Reduce the total Water Quality Volume ("WQv") by application of RR techniques and standard SMPs with RRv capacity. The total WQv shall be calculated in accordance with the criteria in Section 4.2 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: Construction activities that cannot meet the criteria in Part I.C.2.a.(i) of this permit due to site limitations shall direct runoff from all newly constructed impervious areas to a RR technique or standard SMP with RRv capacity unless infeasible. The specific site limitations that prevent the reduction of 100% of the WQv shall be documented in the SWPPP.

For each impervious area that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered infeasible.

In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the Minimum RRv as calculated using the criteria in Section 4.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume ("Cpv"): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site discharges directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria ("Qp"): Requires storage to attenuate the post-development 10-year, 24-hour peak discharge rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria ("Qf"): Requires storage to attenuate the post-development 100-year, 24-hour peak discharge rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site discharges directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

b. *Sizing Criteria* for *New Development* in Enhanced Phosphorus Removal Watershed

(i) Runoff Reduction Volume (RRv): Reduce the total Water Quality Volume (WQv) by application of RR techniques and standard SMPs with RRv capacity. The total WQv is the runoff volume from the 1-year, 24 hour design storm over the post-developed watershed and shall be

calculated in accordance with the criteria in Section 10.3 of the Design Manual.

(ii) Minimum RRv and Treatment of Remaining Total WQv: *Construction activities* that cannot meet the criteria in Part I.C.2.b.(i) of this permit due to *site limitations* shall direct runoff from all newly constructed *impervious areas* to a RR technique or standard SMP with RRv capacity unless *infeasible*. The specific *site limitations* that prevent the reduction of 100% of the WQv shall be documented in the SWPPP. For each *impervious area* that is not directed to a RR technique or standard SMP with RRv capacity, the SWPPP must include documentation which demonstrates that all options were considered and for each option explains why it is considered *infeasible.*

In no case shall the runoff reduction achieved from the newly constructed *impervious areas* be less than the Minimum RRv as calculated using the criteria in Section 10.3 of the Design Manual. The remaining portion of the total WQv that cannot be reduced shall be treated by application of standard SMPs.

(iii) Channel Protection Volume (Cpv): Provide 24 hour extended detention of the post-developed 1-year, 24-hour storm event; remaining after runoff reduction. The Cpv requirement does not apply when:
(1) Reduction of the entire Cpv is achieved by application of runoff reduction techniques or infiltration systems, or
(2) The site *discharge*s directly to tidal waters, or fifth order or larger streams.

(iv) *Overbank* Flood Control Criteria (Qp): Requires storage to attenuate the post-development 10-year, 24-hour peak *discharge* rate (Qp) to predevelopment rates. The Qp requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

(v) Extreme Flood Control Criteria (Qf): Requires storage to attenuate the post-development 100-year, 24-hour peak *discharge* rate (Qf) to predevelopment rates. The Qf requirement does not apply when:
(1) the site *discharge*s directly to tidal waters or fifth order or larger streams, or
(2) A downstream analysis reveals that *overbank* control is not required.

c. Sizing Criteria for Redevelopment Activity

(i) Water Quality Volume (WQv): The WQv treatment objective for *redevelopment activity* shall be addressed by one of the following options. *Redevelopment activities* located in an Enhanced Phosphorus Removal Watershed (see Part III.B.3. and Appendix C of this permit) shall calculate the WQv in accordance with Section 10.3 of the Design Manual. All other *redevelopment activities* shall calculate the WQv in accordance with Section 4.2 of the Design Manual.

(1) Reduce the existing *impervious cover* by a minimum of 25% of the total disturbed, *impervious area*. The Soil Restoration criteria in Section 5.1.6 of the Design Manual must be applied to all newly created pervious areas, or

(2) Capture and treat a minimum of 25% of the WQv from the disturbed, *impervious area* by the application of standard SMPs; or reduce 25% of the WQv from the disturbed, *impervious area* by the application of RR techniques or standard SMPs with RRv capacity., or

(3) Capture and treat a minimum of 75% of the WQv from the disturbed, *impervious area* as well as any additional runoff from tributary areas by application of the alternative practices discussed in Sections 9.3 and 9.4 of the Design Manual., or

(4) Application of a combination of 1, 2 and 3 above that provide a weighted average of at least two of the above methods. Application of this method shall be in accordance with the criteria in Section 9.2.1(B) (IV) of the Design Manual.

If there is an existing post-construction stormwater management practice located on the site that captures and treats runoff from the *impervious area* that is being disturbed, the WQv treatment option selected must, at a minimum, provide treatment equal to the treatment that was being provided by the existing practice(s) if that treatment is greater than the treatment required by options 1 – 4 above.

(ii) Channel Protection Volume (Cpv): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iii) *Overbank* Flood Control Criteria (Qp): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site.

(iv) Extreme Flood Control Criteria (Qf): Not required if there are no changes to hydrology that increase the *discharge* rate from the project site

d. Sizing Criteria for Combination of Redevelopment Activity and New Development

Construction projects that include both New Development and Redevelopment Activity shall provide post-construction stormwater management controls that meet the sizing criteria calculated as an aggregate of the Sizing Criteria in Part I.C.2.a. or b. of this permit for the New Development portion of the project and Part I.C.2.c of this permit for Redevelopment Activity portion of the project.

D. Maintaining Water Quality

The Department expects that compliance with the conditions of this permit will control *discharge*s necessary to meet applicable *water quality standards*. It shall be a violation of the *ECL* for any discharge to either cause or contribute to a violation of *water quality standards* as contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York, such as:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;

2. There shall be no increase in suspended, colloidal or settleable solids that will cause deposition or impair the waters for their best usages; and

3. There shall be no residue from oil and floating substances, nor visible oil film, nor globules of grease.

If there is evidence indicating that the stormwater *discharge*s authorized by this permit are causing, have the reasonable potential to cause, or are contributing to a violation of the *water quality standards*; the *owner or operator* must take appropriate corrective action in accordance with Part IV.C.5. of this general permit and document in accordance with Part IV.C.4. of this general permit. To address the *water quality standard* violation the *owner or operator* may need to provide additional information, include and implement appropriate controls in the SWPPP to correct the problem, or obtain an individual SPDES permit.

If there is evidence indicating that despite compliance with the terms and conditions of this general permit it is demonstrated that the stormwater *discharge*s authorized by this permit are causing or contributing to a violation of *water quality standards*, or if the Department determines that a modification of the permit is necessary to prevent a violation of *water quality standards*, the authorized *discharge*s will no longer be eligible for coverage under this permit. The Department may require the *owner or operator* to obtain an individual SPDES permit to continue discharging.

E. Eligibility Under This General Permit

1. This permit may authorize all *discharges* of stormwater from *construction activity* to *surface waters of the State* and *groundwaters* except for ineligible *discharges* identified under subparagraph F. of this Part.

2. Except for non-stormwater *discharges* explicitly listed in the next paragraph, this permit only authorizes stormwater *discharge*s; including stormwater runoff, snowmelt runoff, and surface runoff and drainage, from *construction activities*.

3. Notwithstanding paragraphs E.1 and E.2 above, the following non-stormwater discharges are authorized by this permit: those listed in 6 NYCRR 750-1.2(a)(29)(vi), with the following exception: "Discharges from firefighting activities are authorized only when the firefighting activities are emergencies/unplanned"; waters to which other components have not been added that are used to control dust in accordance with the SWPPP; and uncontaminated *discharge*s from *construction site* de-watering operations. All non-stormwater discharges must be identified in the SWPPP. Under all circumstances, the *owner or operator* must still comply with *water quality standards* in Part I.D of this permit.

4. The *owner or operator* must maintain permit eligibility to *discharge* under this permit. Any *discharges* that are not compliant with the eligibility conditions of this permit are not authorized by the permit and the *owner or operator* must either apply for a separate permit to cover those ineligible *discharges* or take steps necessary to make the *discharge* eligible for coverage.

F. Activities Which Are Ineligible for Coverage Under This General Permit

All of the following are **not** authorized by this permit:

1. *Discharge*s after *construction activities* have been completed and the site has undergone *final stabilization*;

2. *Discharge*s that are mixed with sources of non-stormwater other than those expressly authorized under subsection E.3. of this Part and identified in the SWPPP required by this permit;

3. *Discharges* that are required to obtain an individual SPDES permit or another SPDES general permit pursuant to Part VII.K. of this permit;

4. *Construction activities* or *discharges* from *construction activities* that may adversely affect an *endangered or threatened species* unless the *owner or*

operator has obtained a permit issued pursuant to 6 NYCRR Part 182 for the project or the Department has issued a letter of non-jurisdiction for the project. All documentation necessary to demonstrate eligibility shall be maintained on site in accordance with Part II.D.2 of this permit;

5. *Discharges* which either cause or contribute to a violation of *water quality standards* adopted pursuant to the *ECL* and its accompanying regulations;

6. *Construction activities* for residential, commercial and institutional projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb one (1) or more acres of land designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

7. *Construction activities* for linear transportation projects and linear utility projects:

   a. Where the *discharge*s from the *construction activities* are tributary to waters of the state classified as AA or AA-s; and

   b. Which are undertaken on land with no existing *impervious cover*; and

   c. Which disturb two (2) or more acres of land designated on the current USDA Soil Survey as Soil Slope Phase "D" (provided the map unit name is inclusive of slopes greater than 25%), or Soil Slope Phase "E" or "F" (regardless of the map unit name), or a combination of the three designations.

8. *Construction activities* that have the potential to affect an *historic property*, unless there is documentation that such impacts have been resolved. The following documentation necessary to demonstrate eligibility with this requirement shall be maintained on site in accordance with Part II.D.2 of this permit and made available to the Department in accordance with Part VII.F of this permit:

   a. Documentation that the *construction activity* is not within an archeologically sensitive area indicated on the sensitivity map, and that the *construction activity* is not located on or immediately adjacent to a property listed or determined to be eligible for listing on the National or State Registers of Historic Places, and that there is no new permanent building on the *construction site* within the following distances from a building, structure, or object that is more than 50 years old, or if there is such a new permanent building on the *construction site* within those parameters that NYS Office of Parks, Recreation and Historic Preservation (OPRHP), a Historic Preservation Commission of a Certified Local Government, or a qualified preservation professional has determined that the building, structure, or object more than 50 years old is not historically/archeologically significant.

      - 1-5 acres of disturbance - 20 feet
      - 5-20 acres of disturbance - 50 feet
      - 20+ acres of disturbance - 100 feet, or

   b. DEC consultation form sent to OPRHP, and copied to the NYS DEC Agency Historic Preservation Officer (APO), and
      (i) the State Environmental Quality Review (SEQR) Environmental Assessment Form (EAF) with a negative declaration or the Findings Statement, with documentation of OPRHP's agreement with the resolution; or
      (ii) documentation from OPRHP that the *construction activity* will result in No Impact; or
      (iii) documentation from OPRHP providing a determination of No Adverse Impact; or
      (iv) a Letter of Resolution signed by the owner/operator, OPRHP and the DEC APO which allows for this *construction activity* to be eligible for coverage under the general permit in terms of the State Historic Preservation Act (SHPA); or

   c. Documentation of satisfactory compliance with Section 106 of the National Historic Preservation Act for a coterminous project area:

(i) No Affect
(ii) No Adverse Affect
(iii) Executed Memorandum of Agreement, or

d. Documentation that:

(i) SHPA Section 14.09 has been completed by NYS DEC or another state agency.

9. *Discharge*s from *construction activities* that are subject to an existing SPDES individual or general permit where a SPDES permit for *construction activity* has been terminated or denied; or where the *owner or operator* has failed to renew an expired individual permit.

Part II. PERMIT COVERAGE

A. How to Obtain Coverage

1. An *owner or operator* of a *construction activity* that is not subject to the requirements of a regulated, traditional land use control MS4 must first prepare a SWPPP in accordance with all applicable requirements of this permit and then submit a completed Notice of Intent (NOI) to the Department to be authorized to discharge under this permit.

2. An *owner or operator* of a *construction activity* that is subject to the requirements of a *regulated, traditional land use control MS4* must first prepare a SWPPP in accordance with all applicable requirements of this permit and then have the SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department. The *owner or operator* shall have the “MS4 SWPPP Acceptance” form signed in accordance with Part VII.H., and then submit that form along with a completed NOI to the Department.

3. The requirement for an *owner or operator* to have its SWPPP reviewed and accepted by the *regulated, traditional land use control MS4* prior to submitting the NOI to the Department does not apply to an *owner or operator* that is obtaining permit coverage in accordance with the requirements in Part II.F. (Change of *Owner or Operator*) or where the *owner or operator* of the *construction activity* is the *regulated, traditional land use control MS4* . This exemption does not apply to *construction activities* subject to the New York City Administrative Code.

B. Notice of Intent (NOI) Submittal

1. Prior to December 21, 2020, an owner or operator shall use either the electronic (eNOI) or paper version of the NOI that the Department prepared. Both versions of the NOI are located on the Department's website (http://www.dec.ny.gov/). The paper version of the NOI shall be signed in accordance with Part VII.H. of this permit and submitted to the following address:

   NOTICE OF INTENT
   NYS DEC, Bureau of Water Permits
   625 Broadway, 4th Floor
   Albany, New York 12233-3505

2. Beginning December 21, 2020 and in accordance with EPA's 2015 NPDES Electronic Reporting Rule (40 CFR Part 127), the *owner or operator* must submit the NOI electronically using the *Department's* online NOI.

3. The *owner or operator* shall have the SWPPP preparer sign the "SWPPP Preparer Certification" statement on the NOI prior to submitting the form to the Department.

4. As of the date the NOI is submitted to the Department, the *owner or operator* shall make the NOI and SWPPP available for review and copying in accordance with the requirements in Part VII.F. of this permit.

C. Permit Authorization

1. An *owner or operator* shall not *commence construction activity* until their authorization to *discharge* under this permit goes into effect.

2. Authorization to *discharge* under this permit will be effective when the *owner or operator* has satisfied all of the following criteria:

   a. project review pursuant to the State Environmental Quality Review Act ("SEQRA") have been satisfied, when SEQRA is applicable. See the Department's website (http://www.dec.ny.gov/) for more information,

   b. where required, all necessary Department permits subject to the *Uniform Procedures Act ("UPA")* (see 6 NYCRR Part 621), or the equivalent from another New York State agency, have been obtained, unless otherwise notified by the Department pursuant to 6 NYCRR 621.3(a)(4). *Owners or operators* of *construction activities* that are required to obtain *UPA* permits

must submit a preliminary SWPPP to the appropriate DEC Permit Administrator at the Regional Office listed in Appendix F at the time all other necessary *UPA* permit applications are submitted. The preliminary SWPPP must include sufficient information to demonstrate that the *construction activity* qualifies for authorization under this permit,

c. the final SWPPP has been prepared, and

d. a complete NOI has been submitted to the Department in accordance with the requirements of this permit.

3. An *owner or operator* that has satisfied the requirements of Part II.C.2 above will be authorized to *discharge* stormwater from their *construction activity* in accordance with the following schedule:

   a. For *construction activities* that are <u>not</u> subject to the requirements of a *regulated, traditional land use control MS4*:

      (i) Five (5) business days from the date the Department receives a complete electronic version of the NOI (eNOI) for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.; or

      (ii) Sixty (60) business days from the date the Department receives a complete NOI (electronic or paper version) for *construction activities* with a SWPPP that has <u>not</u> been prepared in conformance with the design criteria in technical standard referenced in Part III.B.1. or, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C., the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, or;

      (iii) Ten (10) business days from the date the Department receives a complete paper version of the NOI for *construction activities* with a SWPPP that has been prepared in conformance with the design criteria in the technical standard referenced in Part III.B.1 and the *performance criteria* in the technical standard referenced in Parts III.B., 2 or 3, for *construction activities* that require post-construction stormwater management practices pursuant to Part III.C.

b. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*:

(i) Five (5) business days from the date the Department receives both a complete electronic version of the NOI (eNOI) and signed "*MS4* SWPPP Acceptance" form, or

(ii) Ten (10) business days from the date the Department receives both a complete paper version of the NOI and signed "MS4 SWPPP Acceptance" form.

4. Coverage under this permit authorizes stormwater *discharges* from only those areas of disturbance that are identified in the NOI. If an *owner or operator* wishes to have stormwater *discharges* from future or additional areas of disturbance authorized, they must submit a new NOI that addresses that phase of the development, unless otherwise notified by the Department. The *owner or operator* shall not *commence construction activity* on the future or additional areas until their authorization to *discharge* under this permit goes into effect in accordance with Part II.C. of this permit.

D. General Requirements For Owners or Operators With Permit Coverage

1. The *owner or operator* shall ensure that the provisions of the SWPPP are implemented from the *commencement of construction activity* until all areas of disturbance have achieved *final stabilization* and the Notice of Termination ("NOT") has been submitted to the Department in accordance with Part V. of this permit. This includes any changes made to the SWPPP pursuant to Part III.A.4. of this permit.

2. The *owner or operator* shall maintain a copy of the General Permit (GP-0-20-001), NOI, *NOI Acknowledgment Letter*, SWPPP, MS4 SWPPP Acceptance form, inspection reports, responsible contractor's or subcontractor's certification statement (see Part III.A.6.), and all documentation necessary to demonstrate eligibility with this permit at the *construction site* until all disturbed areas have achieved *final stabilization* and the NOT has been submitted to the Department. The documents must be maintained in a secure location, such as a job trailer, on-site construction office, or mailbox with lock. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

3. The *owner or operator* of a *construction activity* shall not disturb greater than five (5) acres of soil at any one time without prior written authorization from the Department or, in areas under the jurisdiction of a *regulated, traditional land*

use control MS4, the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*). At a minimum, the *owner or operator* must comply with the following requirements in order to be authorized to disturb greater than five (5) acres of soil at any one time:

a. The *owner or operator* shall have a *qualified inspector* conduct **at least** two (2) site inspections in accordance with Part IV.C. of this permit every seven (7) calendar days, for as long as greater than five (5) acres of soil remain disturbed. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

b. In areas where soil disturbance activity has temporarily or permanently ceased, the application of soil stabilization measures must be initiated by the end of the next business day and completed within seven (7) days from the date the current soil disturbance activity ceased. The soil stabilization measures selected shall be in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016.

c. The *owner or operator* shall prepare a phasing plan that defines maximum disturbed area per phase and shows required cuts and fills.

d. The *owner or operator* shall install any additional site-specific practices needed to protect water quality.

e. The *owner or operator* shall include the requirements above in their SWPPP.

4. In accordance with statute, regulations, and the terms and conditions of this permit, the Department may suspend or revoke an *owner's or operator's* coverage under this permit at any time if the Department determines that the SWPPP does not meet the permit requirements or consistent with Part VII.K..

5. Upon a finding of significant non-compliance with the practices described in the SWPPP or violation of this permit, the Department may order an immediate stop to all activity at the site until the non-compliance is remedied. The stop work order shall be in writing, describe the non-compliance in detail, and be sent to the *owner or operator*.

6. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4*, the *owner or operator* shall notify the

regulated, traditional land use control MS4 in writing of any planned amendments or modifications to the post-construction stormwater management practice component of the SWPPP required by Part III.A. 4. and 5. of this permit. Unless otherwise notified by the *regulated, traditional land use control MS4*, the *owner or operator* shall have the SWPPP amendments or modifications reviewed and accepted by the *regulated, traditional land use control MS4* prior to commencing construction of the post-construction stormwater management practice.

E. Permit Coverage for Discharges Authorized Under GP-0-15-002

1. Upon renewal of SPDES General Permit for Stormwater Discharges from *Construction Activity* (Permit No. GP-0-15-002), an *owner or operator* of *a construction activity* with coverage under GP-0-15-002, as of the effective date of GP- 0-20-001, shall be authorized to *discharge* in accordance with GP- 0-20-001, unless otherwise notified by the Department.

   An *owner or operator* may continue to implement the technical/design components of the post-construction stormwater management controls provided that such design was done in conformance with the technical standards in place at the time of initial project authorization. However, they must comply with the other, non-design provisions of GP-0-20-001.

F. Change of Owner or Operator

1. When property ownership changes or when there is a change in operational control over the construction plans and specifications, the original *owner or operator* must notify the new *owner or operator*, in writing, of the requirement to obtain permit coverage by submitting a NOI with the Department. For *construction activities* subject to the requirements of a *regulated, traditional land use control MS4,* the original *owner or operator* must also notify the MS4, in writing, of the change in ownership at least 30 calendar days prior to the change in ownership.

2. Once the new *owner or operator* obtains permit coverage, the original *owner or operator* shall then submit a completed NOT with the name and permit identification number of the new *owner or operator* to the Department at the address in Part II.B.1. of this permit. If the original *owner or operator* maintains ownership of a portion of the *construction activity* and will disturb soil, they must maintain their coverage under the permit.

3. Permit coverage for the new *owner or operator* will be effective as of the date the Department receives a complete NOI, provided the original *owner or*

operator was not subject to a sixty (60) business day authorization period that has not expired as of the date the Department receives the NOI from the new *owner or operator*.

Part III. STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

A. General SWPPP Requirements

1. A SWPPP shall be prepared and implemented by the *owner or operator* of each *construction activity* covered by this permit. The SWPPP must document the selection, design, installation, implementation and maintenance of the control measures and practices that will be used to meet the effluent limitations in Part I.B. of this permit and where applicable, the post-construction stormwater management practice requirements in Part I.C. of this permit. The SWPPP shall be prepared prior to the submittal of the NOI. The NOI shall be submitted to the Department prior to the *commencement of construction activity*. A copy of the completed, final NOI shall be included in the SWPPP.

2. The SWPPP shall describe the erosion and sediment control practices and where required, post-construction stormwater management practices that will be used and/or constructed to reduce the *pollutants* in stormwater *discharges* and to assure compliance with the terms and conditions of this permit. In addition, the SWPPP shall identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater *discharges*.

3. All SWPPPs that require the post-construction stormwater management practice component shall be prepared by a *qualified professional* that is knowledgeable in the principles and practices of stormwater management and treatment.

4. The *owner or operator* must keep the SWPPP current so that it at all times accurately documents the erosion and sediment controls practices that are being used or will be used during construction, and all post-construction stormwater management practices that will be constructed on the site. At a minimum, the *owner or operator* shall amend the SWPPP, including construction drawings:

    a. whenever the current provisions prove to be ineffective in minimizing *pollutants* in stormwater *discharges* from the site;

b. whenever there is a change in design, construction, or operation at the *construction site* that has or could have an effect on the *discharge* of *pollutants*;

c. to address issues or deficiencies identified during an inspection by the *qualified inspector,* the Department or other regulatory authority; and

d. to document the final construction conditions.

5. The Department may notify the *owner or operator* at any time that the SWPPP does not meet one or more of the minimum requirements of this permit. The notification shall be in writing and identify the provisions of the SWPPP that require modification. Within fourteen (14) calendar days of such notification, or as otherwise indicated by the Department, the *owner or operator* shall make the required changes to the SWPPP and submit written notification to the Department that the changes have been made. If the *owner or operator* does not respond to the Department's comments in the specified time frame, the Department may suspend the *owner's or operator's* coverage under this permit or require the *owner or operator* to obtain coverage under an individual SPDES permit in accordance with Part II.D.4. of this permit.

6. Prior to the *commencement of construction activity*, the *owner or operator* must identify the contractor(s) and subcontractor(s) that will be responsible for installing, constructing, repairing, replacing, inspecting and maintaining the erosion and sediment control practices included in the SWPPP; and the contractor(s) and subcontractor(s) that will be responsible for constructing the post-construction stormwater management practices included in the SWPPP. The *owner or operator* shall have each of the contractors and subcontractors identify at least one person from their company that will be responsible for implementation of the SWPPP. This person shall be known as the *trained contractor.* The *owner or operator* shall ensure that at least one *trained contractor* is on site on a daily basis when soil disturbance activities are being performed.

   The *owner or operator* shall have each of the contractors and subcontractors identified above sign a copy of the following certification statement below before they commence any *construction activity*:

   "I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the *qualified inspector* during a site inspection. I also understand that the *owner or operator* must comply with

the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater *discharge*s from *construction activities* and that it is unlawful for any person to cause or contribute to a violation of *water quality standards*. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations"

In addition to providing the certification statement above, the certification page must also identify the specific elements of the SWPPP that each contractor and subcontractor will be responsible for and include the name and title of the person providing the signature; the name and title of the *trained contractor* responsible for SWPPP implementation; the name, address and telephone number of the contracting firm; the address (or other identifying description) of the site; and the date the certification statement is signed. The *owner or operator* shall attach the certification statement(s) to the copy of the SWPPP that is maintained at the *construction site*. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has commenced, they must also sign the certification statement and provide the information listed above.

7. For projects where the Department requests a copy of the SWPPP or inspection reports, the *owner or operator* shall submit the documents in both electronic (PDF only) and paper format within five (5) business days, unless otherwise notified by the Department.

B. Required SWPPP Contents

1. Erosion and sediment control component - All SWPPPs prepared pursuant to this permit shall include erosion and sediment control practices designed in conformance with the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Where erosion and sediment control practices are not designed in conformance with the design criteria included in the technical standard, the *owner or operator* must demonstrate *equivalence* to the technical standard. At a minimum, the erosion and sediment control component of the SWPPP shall include the following:

    a. Background information about the scope of the project, including the location, type and size of project

b. A site map/construction drawing(s) for the project, including a general location map. At a minimum, the site map shall show the total site area; all improvements; areas of disturbance; areas that will not be disturbed; existing vegetation; on-site and adjacent off-site surface water(s); floodplain/floodway boundaries; wetlands and drainage patterns that could be affected by the *construction activity*; existing and final contours ; locations of different soil types with boundaries; material, waste, borrow or equipment storage areas located on adjacent properties; and location(s) of the stormwater *discharge*(s);

c. A description of the soil(s) present at the site, including an identification of the Hydrologic Soil Group (HSG);

d. A construction phasing plan and sequence of operations describing the intended order of *construction activities*, including clearing and grubbing, excavation and grading, utility and infrastructure installation and any other activity at the site that results in soil disturbance;

e. A description of the minimum erosion and sediment control practices to be installed or implemented for each *construction activity* that will result in soil disturbance. Include a schedule that identifies the timing of initial placement or implementation of each erosion and sediment control practice and the minimum time frames that each practice should remain in place or be implemented;

f. A temporary and permanent soil stabilization plan that meets the requirements of this general permit and the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016, for each stage of the project, including initial land clearing and grubbing to project completion and achievement of *final stabilization*;

g. A site map/construction drawing(s) showing the specific location(s), size(s), and length(s) of each erosion and sediment control practice;

h. The dimensions, material specifications, installation details, and operation and maintenance requirements for all erosion and sediment control practices. Include the location and sizing of any temporary sediment basins and structural practices that will be used to divert flows from exposed soils;

i. A maintenance inspection schedule for the contractor(s) identified in Part III.A.6. of this permit, to ensure continuous and effective operation of the erosion and sediment control practices. The maintenance inspection

schedule shall be in accordance with the requirements in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016;

j. A description of the pollution prevention measures that will be used to control litter, construction chemicals and construction debris from becoming a *pollutant* source in the stormwater *discharges*;

k. A description and location of any stormwater *discharges* associated with industrial activity other than construction at the site, including, but not limited to, stormwater *discharges* from asphalt plants and concrete plants located on the *construction site*; and

l. Identification of any elements of the design that are not in conformance with the design criteria in the technical standard, New York State Standards and Specifications for Erosion and Sediment Control, dated November 2016. Include the reason for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

2. Post-construction stormwater management practice component – The *owner or operator* of any construction project identified in Table 2 of Appendix B as needing post-construction stormwater management practices shall prepare a SWPPP that includes practices designed in conformance with the applicable *sizing criteria* in Part I.C.2.a., c. or d. of this permit and the *performance criteria* in the technical standard, New York State Stormwater Management Design Manual dated January 2015

   Where post-construction stormwater management practices are not designed in conformance with the *performance criteria* in the technical standard, the *owner or operator* must include in the SWPPP the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the technical standard.

   The post-construction stormwater management practice component of the SWPPP shall include the following:

   a. Identification of all post-construction stormwater management practices to be constructed as part of the project. Include the dimensions, material specifications and installation details for each post-construction stormwater management practice;

b. A site map/construction drawing(s) showing the specific location and size of each post-construction stormwater management practice;

c. A Stormwater Modeling and Analysis Report that includes:
   (i) Map(s) showing pre-development conditions, including watershed/subcatchments boundaries, flow paths/routing, and design points;

   (ii) Map(s) showing post-development conditions, including watershed/subcatchments boundaries, flow paths/routing, design points and post-construction stormwater management practices;

   (iii) Results of stormwater modeling (i.e. hydrology and hydraulic analysis) for the required storm events. Include supporting calculations (model runs), methodology, and a summary table that compares pre and post-development runoff rates and volumes for the different storm events;

   (iv) Summary table, with supporting calculations, which demonstrates that each post-construction stormwater management practice has been designed in conformance with the *sizing criteria* included in the Design Manual;

   (v) Identification of any *sizing criteria* that is not required based on the requirements included in Part I.C. of this permit; and

   (vi) Identification of any elements of the design that are not in conformance with the *performance criteria* in the Design Manual. Include the reason(s) for the deviation or alternative design and provide information which demonstrates that the deviation or alternative design is *equivalent* to the Design Manual;

d. Soil testing results and locations (test pits, borings);

e. Infiltration test results, when required; and

f. An operations and maintenance plan that includes inspection and maintenance schedules and actions to ensure continuous and effective operation of each post-construction stormwater management practice. The plan shall identify the entity that will be responsible for the long term operation and maintenance of each practice.

3. Enhanced Phosphorus Removal Standards - All construction projects identified in Table 2 of Appendix B that are located in the watersheds identified in Appendix C shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the applicable *sizing criteria* in Part I.C.2. b., c. or d. of this permit and the *performance criteria,* Enhanced Phosphorus Removal Standards included in the Design Manual. At a minimum, the post-construction stormwater management practice component of the SWPPP shall include items 2.a - 2.f. above.

C. Required SWPPP Components by Project Type

Unless otherwise notified by the Department, *owners or operators* of *construction activities* identified in Table 1 of Appendix B are required to prepare a SWPPP that only includes erosion and sediment control practices designed in conformance with Part III.B.1 of this permit. *Owners or operators* of the *construction activities* identified in Table 2 of Appendix B shall prepare a SWPPP that also includes post-construction stormwater management practices designed in conformance with Part III.B.2 or 3 of this permit.

Part IV. INSPECTION AND MAINTENANCE REQUIREMENTS

A. General Construction Site Inspection and Maintenance Requirements

1. The *owner or operator* must ensure that all erosion and sediment control practices (including pollution prevention measures) and all post-construction stormwater management practices identified in the SWPPP are inspected and maintained in accordance with Part IV.B. and C. of this permit.

2. The terms of this permit shall not be construed to prohibit the State of New York from exercising any authority pursuant to the ECL, common law or federal law, or prohibit New York State from taking any measures, whether civil or criminal, to prevent violations of the laws of the State of New York or protect the public health and safety and/or the environment.

B. Contractor Maintenance Inspection Requirements

1. The *owner or operator* of each *construction activity* identified in Tables 1 and 2 of Appendix B shall have a *trained contractor* inspect the erosion and sediment control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition at all times. If deficiencies are identified, the contractor shall

begin implementing corrective actions within one business day and shall complete the corrective actions in a reasonable time frame.

2. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *trained contractor* can stop conducting the maintenance inspections. The *trained contractor* shall begin conducting the maintenance inspections in accordance with Part IV.B.1. of this permit as soon as soil disturbance activities resume.

3. For construction sites where soil disturbance activities have been shut down with partial project completion, the *trained contractor* can stop conducting the maintenance inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational.

C. Qualified Inspector Inspection Requirements

The *owner or operator* shall have a *qualified inspector* conduct site inspections in conformance with the following requirements:

[Note: The *trained contractor* identified in Part III.A.6. and IV.B. of this permit **cannot** conduct the *qualified inspector* site inspections unless they meet the *qualified inspector* qualifications included in Appendix A. In order to perform these inspections, the *trained contractor* would have to be a:

- licensed Professional Engineer,
- Certified Professional in Erosion and Sediment Control (CPESC),
- New York State Erosion and Sediment Control Certificate Program holder
- Registered Landscape Architect, or
- someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity].

1. A *qualified inspector* shall conduct site inspections for all *construction activities* identified in Tables 1 and 2 of Appendix B, with the exception of:

   a. the construction of a single family residential subdivision with 25% or less *impervious cover* at total site build-out that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located

in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

b. the construction of a single family home that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres and is not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E;

c. construction on agricultural property that involves a soil disturbance of one (1) or more acres of land but less than five (5) acres; and

d. *construction activities* located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

2. Unless otherwise notified by the Department, the *qualified inspector* shall conduct site inspections in accordance with the following timetable:

a. For construction sites where soil disturbance activities are on-going, the *qualified inspector* shall conduct a site inspection at least once every seven (7) calendar days.

b. For construction sites where soil disturbance activities are on-going and the *owner or operator* has received authorization in accordance with Part II.D.3 to disturb greater than five (5) acres of soil at any one time, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

c. For construction sites where soil disturbance activities have been temporarily suspended (e.g. winter shutdown) and *temporary stabilization* measures have been applied to all disturbed areas, the *qualified inspector* shall conduct a site inspection at least once every thirty (30) calendar days. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to reducing the frequency of inspections.

d. For construction sites where soil disturbance activities have been shut down with partial project completion, the *qualified inspector* can stop conducting inspections if all areas disturbed as of the project shutdown date have achieved *final stabilization* and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational. The *owner or operator* shall notify the DOW Water (SPDES) Program contact at the Regional Office (see contact information in Appendix F) or, in areas under the jurisdiction of a *regulated, traditional land use control MS4,* the *regulated, traditional land use control MS4* (provided the *regulated, traditional land use control MS4* is not the *owner or operator* of the *construction activity*) in writing prior to the shutdown. If soil disturbance activities are not resumed within 2 years from the date of shutdown, the *owner or operator* shall have the *qualified inspector* perform a final inspection and certify that all disturbed areas have achieved *final stabilization,* and all temporary, structural erosion and sediment control measures have been removed*;* and that all post-construction stormwater management practices have been constructed in conformance with the SWPPP by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice" certification statements on the NOT. The *owner or operator* shall then submit the completed NOT form to the address in Part II.B.1 of this permit.

e. For construction sites that directly *discharge* to one of the 303(d) segments listed in Appendix E or is located in one of the watersheds listed in Appendix C, the *qualified inspector* shall conduct at least two (2) site inspections every seven (7) calendar days. The two (2) inspections shall be separated by a minimum of two (2) full calendar days.

3. At a minimum, the *qualified inspector* shall inspect all erosion and sediment control practices and pollution prevention measures to ensure integrity and effectiveness, all post-construction stormwater management practices under construction to ensure that they are constructed in conformance with the SWPPP, all areas of disturbance that have not achieved *final stabilization,* all points of *discharge* to natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site*, and all points of *discharge* from the *construction site*.

4. The *qualified inspector* shall prepare an inspection report subsequent to each and every inspection. At a minimum, the inspection report shall include and/or address the following:

a. Date and time of inspection;

b. Name and title of person(s) performing inspection;

c. A description of the weather and soil conditions (e.g. dry, wet, saturated) at the time of the inspection;

d. A description of the condition of the runoff at all points of *discharge* from the *construction site*. This shall include identification of any *discharges* of sediment from the *construction site*. Include *discharges* from conveyance systems (i.e. pipes, culverts, ditches, etc.) and overland flow;

e. A description of the condition of all natural surface waterbodies located within, or immediately adjacent to, the property boundaries of the *construction site* which receive runoff from disturbed areas. This shall include identification of any *discharges* of sediment to the surface waterbody;

f. Identification of all erosion and sediment control practices and pollution prevention measures that need repair or maintenance;

g. Identification of all erosion and sediment control practices and pollution prevention measures that were not installed properly or are not functioning as designed and need to be reinstalled or replaced;

h. Description and sketch of areas with active soil disturbance activity, areas that have been disturbed but are inactive at the time of the inspection, and areas that have been stabilized (temporary and/or final) since the last inspection;

i. Current phase of construction of all post-construction stormwater management practices and identification of all construction that is not in conformance with the SWPPP and technical standards;

j. Corrective action(s) that must be taken to install, repair, replace or maintain erosion and sediment control practices and pollution prevention measures; and to correct deficiencies identified with the construction of the post-construction stormwater management practice(s);

k. Identification and status of all corrective actions that were required by previous inspection; and

l. Digital photographs, with date stamp, that clearly show the condition of all practices that have been identified as needing corrective actions. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report being maintained onsite within seven (7) calendar days of the date of the inspection. The *qualified inspector* shall also take digital photographs, with date stamp, that clearly show the condition of the practice(s) after the corrective action has been completed. The *qualified inspector* shall attach paper color copies of the digital photographs to the inspection report that documents the completion of the corrective action work within seven (7) calendar days of that inspection.

5. Within one business day of the completion of an inspection, the *qualified inspector* shall notify the *owner or operator* and appropriate contractor or subcontractor identified in Part III.A.6. of this permit of any corrective actions that need to be taken. The contractor or subcontractor shall begin implementing the corrective actions within one business day of this notification and shall complete the corrective actions in a reasonable time frame.

6. All inspection reports shall be signed by the *qualified inspector.* Pursuant to Part II.D.2. of this permit, the inspection reports shall be maintained on site with the SWPPP.

Part V. TERMINATION OF PERMIT COVERAGE

A. Termination of Permit Coverage

1. An *owner or operator* that is eligible to terminate coverage under this permit must submit a completed NOT form to the address in Part II.B.1 of this permit. The NOT form shall be one which is associated with this permit, signed in accordance with Part VII.H of this permit.

2. An *owner or operator* may terminate coverage when one or more the following conditions have been met:

   a. Total project completion - All *construction activity* identified in the SWPPP has been completed; and all areas of disturbance have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices have been constructed in conformance with the SWPPP and are operational;

b. Planned shutdown with partial project completion - All soil disturbance activities have ceased; and all areas disturbed as of the project shutdown date have achieved *final stabilization*; and all temporary, structural erosion and sediment control measures have been removed; and all post-construction stormwater management practices required for the completed portion of the project have been constructed in conformance with the SWPPP and are operational;

c. A new *owner or operator* has obtained coverage under this permit in accordance with Part II.F. of this permit.

d. The *owner or operator* obtains coverage under an alternative SPDES general permit or an individual SPDES permit.

3. For *construction activities* meeting subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *qualified inspector* perform a final site inspection prior to submitting the NOT. The *qualified inspector* shall, by signing the "*Final Stabilization*" and "Post-Construction Stormwater Management Practice certification statements on the NOT, certify that all the requirements in Part V.A.2.a. or b. of this permit have been achieved.

4. For *construction activities* that are subject to the requirements of a *regulated, traditional land use control MS4* and meet subdivision 2a. or 2b. of this Part, the *owner or operator* shall have the *regulated, traditional land use control MS4* sign the "MS4 Acceptance" statement on the NOT in accordance with the requirements in Part VII.H. of this permit. The *regulated, traditional land use control MS4* official, by signing this statement, has determined that it is acceptable for the *owner or operator* to submit the NOT in accordance with the requirements of this Part. The *regulated, traditional land use control MS4* can make this determination by performing a final site inspection themselves or by accepting the *qualified inspector*'s final site inspection certification(s) required in Part V.A.3. of this permit.

5. For *construction activities* that require post-construction stormwater management practices and meet subdivision 2a. of this Part, the *owner or operator* must, prior to submitting the NOT, ensure one of the following:

a. the post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain such practice(s) have been deeded to the municipality in which the practice(s) is located,

b. an executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s),

c. for post-construction stormwater management practices that are privately owned, the *owner or operator* has a mechanism in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the *owner or operator's* deed of record,

d. for post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university, hospital), government agency or authority, or public utility; the *owner or operator* has policy and procedures in place that ensures operation and maintenance of the practices in accordance with the operation and maintenance plan.

Part VI. REPORTING AND RETENTION RECORDS

A. Record Retention

The *owner or operator* shall retain a copy of the NOI, NOI Acknowledgment Letter, SWPPP, MS4 SWPPP Acceptance form and any inspection reports that were prepared in conjunction with this permit for a period of at least five (5) years from the date that the Department receives a complete NOT submitted in accordance with Part V. of this general permit.

B. Addresses

With the exception of the NOI, NOT, and MS4 SWPPP Acceptance form (which must be submitted to the address referenced in Part II.B.1 of this permit), all written correspondence requested by the Department, including individual permit applications, shall be sent to the address of the appropriate DOW Water (SPDES) Program contact at the Regional Office listed in Appendix F.

Part VII. STANDARD PERMIT CONDITIONS

A. Duty to Comply

The *owner or operator* must comply with all conditions of this permit. All contractors and subcontractors associated with the project must comply with the terms of the SWPPP. Any non-compliance with this permit constitutes a violation of the Clean Water

Act (CWA) and the ECL and is grounds for an enforcement action against the *owner or operator* and/or the contractor/subcontractor; permit revocation, suspension or modification; or denial of a permit renewal application. Upon a finding of significant non-compliance with this permit or the applicable SWPPP, the Department may order an immediate stop to all *construction activity* at the site until the non-compliance is remedied. The stop work order shall be in writing, shall describe the non-compliance in detail, and shall be sent to the *owner or operator*.

If any human remains or archaeological remains are encountered during excavation, the *owner or operator* must immediately cease, or cause to cease, all *construction activity* in the area of the remains and notify the appropriate Regional Water Engineer (RWE). *Construction activity* shall not resume until written permission to do so has been received from the RWE.

B. Continuation of the Expired General Permit

This permit expires five (5) years from the effective date. If a new general permit is not issued prior to the expiration of this general permit, an *owner or operator* with coverage under this permit may continue to operate and *discharge* in accordance with the terms and conditions of this general permit, if it is extended pursuant to the State Administrative Procedure Act and 6 NYCRR Part 621, until a new general permit is issued.

C. Enforcement

Failure of the *owner or operator,* its contractors, subcontractors, agents and/or assigns to strictly adhere to any of the permit requirements contained herein shall constitute a violation of this permit. There are substantial criminal, civil, and administrative penalties associated with violating the provisions of this permit. Fines of up to $37,500 per day for each violation and imprisonment for up to fifteen (15) years may be assessed depending upon the nature and degree of the offense.

D. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for an *owner or operator* in an enforcement action that it would have been necessary to halt or reduce the *construction activity* in order to maintain compliance with the conditions of this permit.

E. Duty to Mitigate

The *owner or operator* and its contractors and subcontractors shall take all reasonable steps to *minimize* or prevent any *discharge* in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

F. Duty to Provide Information

The *owner or operator* shall furnish to the Department, within a reasonable specified time period of a written request, all documentation necessary to demonstrate eligibility and any information to determine compliance with this permit or to determine whether cause exists for modifying or revoking this permit, or suspending or denying coverage under this permit, in accordance with the terms and conditions of this permit. The NOI, SWPPP and inspection reports required by this permit are public documents that the *owner or operator* must make available for review and copying by any person within five (5) business days of the *owner or operator* receiving a written request by any such person to review these documents. Copying of documents will be done at the requester's expense.

G. Other Information

When the *owner or operator* becomes aware that they failed to submit any relevant facts, or submitted incorrect information in the NOI or in any of the documents required by this permit , or have made substantive revisions to the SWPPP (e.g. the scope of the project changes significantly, the type of post-construction stormwater management practice(s) changes, there is a reduction in the sizing of the post-construction stormwater management practice, or there is an increase in the disturbance area or *impervious area*), which were not reflected in the original NOI submitted to the Department, they shall promptly submit such facts or information to the Department using the contact information in Part II.A. of this permit. Failure of the *owner or operator* to correct or supplement any relevant facts within five (5) business days of becoming aware of the deficiency shall constitute a violation of this permit.

H. Signatory Requirements

1. All NOIs and NOTs shall be signed as follows:

    a. For a corporation these forms shall be signed by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

(i) a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation; or

(ii) the manager of one or more manufacturing, production or operating facilities, provided the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship these forms shall be signed by a general partner or the proprietor, respectively; or

c. For a municipality, State, Federal, or other public agency these forms shall be signed by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a Federal agency includes:

(i) the chief executive officer of the agency, or

(ii) a senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., Regional Administrators of EPA).

2. The SWPPP and other information requested by the Department shall be signed by a person described in Part VII.H.1. of this permit or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part VII.H.1. of this permit;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field,

superintendent, position of *equivalent* responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position) and,

c. The written authorization shall include the name, title and signature of the authorized representative and be attached to the SWPPP.

3. All inspection reports shall be signed by the *qualified inspector* that performs the inspection.

4. The MS4 SWPPP Acceptance form shall be signed by the principal executive officer or ranking elected official from the *regulated, traditional land use control MS4,* or by a duly authorized representative of that person.

   It shall constitute a permit violation if an incorrect and/or improper signatory authorizes any required forms, SWPPP and/or inspection reports.

I. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges, nor does it authorize any injury to private property nor any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations. *Owners or operators* must obtain any applicable conveyances, easements, licenses and/or access to real property prior to *commencing construction activity*.

J. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit shall not be affected thereby.

K. Requirement to Obtain Coverage Under an Alternative Permit

1. The Department may require any owner or operator authorized by this permit to apply for and/or obtain either an individual SPDES permit or another SPDES general permit. When the Department requires any discharger authorized by a general permit to apply for an individual SPDES permit, it shall notify the discharger in writing that a permit application is required. This notice shall

include a brief statement of the reasons for this decision, an application form, a statement setting a time frame for the owner or operator to file the application for an individual SPDES permit, and a deadline, not sooner than 180 days from owner or operator receipt of the notification letter, whereby the authorization to discharge under this general permit shall be terminated. Applications must be submitted to the appropriate Permit Administrator at the Regional Office. The Department may grant additional time upon demonstration, to the satisfaction of the Department, that additional time to apply for an alternative authorization is necessary or where the Department has not provided a permit determination in accordance with Part 621 of this Title.

2. When an individual SPDES permit is issued to a discharger authorized to *discharge* under a general SPDES permit for the same *discharge*(s), the general permit authorization for outfalls authorized under the individual SPDES permit is automatically terminated on the effective date of the individual permit unless termination is earlier in accordance with 6 NYCRR Part 750.

L. Proper Operation and Maintenance

The *owner or operator* shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the *owner or operator* to achieve compliance with the conditions of this permit and with the requirements of the SWPPP.

M. Inspection and Entry

The *owner or operator* shall allow an authorized representative of the Department, EPA, applicable county health department, or, in the case of a *construction site* which *discharges* through an *MS4*, an authorized representative of the *MS4* receiving the discharge, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the owner’s or operator's premises where a regulated facility or activity is located or conducted or where records must be kept under the conditions of this permit;

2. Have access to and copy at reasonable times, any records that must be kept under the conditions of this permit; and

3. Inspect at reasonable times any facilities or equipment (including monitoring and control equipment), practices or operations regulated or required by this permit.

4. Sample or monitor at reasonable times, for purposes of assuring permit compliance or as otherwise authorized by the Act or ECL, any substances or parameters at any location.

N. Permit Actions

This permit may, at any time, be modified, suspended, revoked, or renewed by the Department in accordance with 6 NYCRR Part 621. The filing of a request by the *owner or operator* for a permit modification, revocation and reissuance, termination, a notification of planned changes or anticipated noncompliance does not limit, diminish and/or stay compliance with any terms of this permit.

O. Definitions

Definitions of key terms are included in Appendix A of this permit.

P. Re-Opener Clause

1. If there is evidence indicating potential or realized impacts on water quality due to any stormwater discharge associated with construction activity covered by this permit, the owner or operator of such discharge may be required to obtain an individual permit or alternative general permit in accordance with Part VII.K. of this permit or the permit may be modified to include different limitations and/or requirements.

2. Any Department initiated permit modification, suspension or revocation will be conducted in accordance with 6 NYCRR Part 621, 6 NYCRR 750-1.18, and 6 NYCRR 750-1.20.

Q. Penalties for Falsification of Forms and Reports

In accordance with 6NYCRR Part 750-2.4 and 750-2.5, any person who knowingly makes any false material statement, representation, or certification in any application, record, report or other document filed or required to be maintained under this permit, including reports of compliance or noncompliance shall, upon conviction, be punished in accordance with ECL §71-1933 and or Articles 175 and 210 of the New York State Penal Law.

R. Other Permits

Nothing in this permit relieves the *owner or operator* from a requirement to obtain any other permits required by law.

APPENDIX A – Acronyms and Definitions

Acronyms

APO – Agency Preservation Officer
BMP – Best Management Practice
CPESC – Certified Professional in Erosion and Sediment Control
Cpv – Channel Protection Volume
CWA – Clean Water Act (or the Federal Water Pollution Control Act, 33 U.S.C. §1251 et seq)
DOW – Division of Water
EAF – Environmental Assessment Form
ECL - Environmental Conservation Law
EPA – U. S. Environmental Protection Agency
HSG – Hydrologic Soil Group
MS4 – Municipal Separate Storm Sewer System
NOI – Notice of Intent
NOT – Notice of Termination
NPDES – National Pollutant Discharge Elimination System
OPRHP – Office of Parks, Recreation and Historic Places
Qf – Extreme Flood
Qp – Overbank Flood
RRv – Runoff Reduction Volume
RWE – Regional Water Engineer
SEQR – State Environmental Quality Review
SEQRA - State Environmental Quality Review Act
SHPA – State Historic Preservation Act
SPDES – State Pollutant Discharge Elimination System
SWPPP – Stormwater Pollution Prevention Plan
TMDL – Total Maximum Daily Load
UPA – Uniform Procedures Act
USDA – United States Department of Agriculture
WQv – Water Quality Volume

Definitions

All definitions in this section are solely for the purposes of this permit.

Agricultural Building – a structure designed and constructed to house farm implements, hay, grain, poultry, livestock or other horticultural products; excluding any structure designed, constructed or used, in whole or in part, for human habitation, as a place of employment where agricultural products are processed, treated or packaged, or as a place used by the public.

Agricultural Property –means the land for construction of a barn, *agricultural building*, silo, stockyard, pen or other structural practices identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State" prepared by the Department in cooperation with agencies of New York Nonpoint Source Coordinating Committee (dated June 2007).

Alter Hydrology from Pre to Post-Development Conditions - means the post-development peak flow rate(s) has increased by more than 5% of the pre-developed condition for the design storm of interest (e.g. 10 yr and 100 yr).

Combined Sewer - means a sewer that is designed to collect and convey both "sewage" and "stormwater".

Commence (Commencement of) Construction Activities - means the initial disturbance of soils associated with clearing, grading or excavation activities; or other construction related activities that disturb or expose soils such as demolition, stockpiling of fill material, and the initial installation of erosion and sediment control practices required in the SWPPP. See definition for "*Construction Activity(ies)*" also.

Construction Activity(ies) - means any clearing, grading, excavation, filling, demolition or stockpiling activities that result in soil disturbance. Clearing activities can include, but are not limited to, logging equipment operation, the cutting and skidding of trees, stump removal and/or brush root removal. Construction activity does not include routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility.

Construction Site – means the land area where *construction activity(ies)* will occur. See definition for "*Commence (Commencement of) Construction Activities"* and "*Larger Common Plan of Development or Sale" also.*

Dewatering – means the act of draining rainwater and/or groundwater from building foundations, vaults or excavations/trenches.

Direct Discharge (to a specific surface waterbody) - means that runoff flows from a *construction site* by overland flow and the first point of discharge is the specific surface waterbody, or runoff flows from a *construction site* to a separate storm sewer system

and the first point of discharge from the separate storm sewer system is the specific surface waterbody.

Discharge(s) - means any addition of any pollutant to waters of the State through an outlet or *point source*.

Embankment –means an earthen or rock slope that supports a road/highway.

Endangered or Threatened Species – see 6 NYCRR Part 182 of the Department's rules and regulations for definition of terms and requirements.

Environmental Conservation Law (ECL) - means chapter 43-B of the Consolidated Laws of the State of New York, entitled the Environmental Conservation Law.

Equivalent (Equivalence) – means that the practice or measure meets all the performance, longevity, maintenance, and safety objectives of the technical standard and will provide an equal or greater degree of water quality protection.

Final Stabilization - means that all soil disturbance activities have ceased and a uniform, perennial vegetative cover with a density of eighty (80) percent over the entire pervious surface has been established; or other equivalent stabilization measures, such as permanent landscape mulches, rock rip-rap or washed/crushed stone have been applied on all disturbed areas that are not covered by permanent structures, concrete or pavement.

General SPDES permit - means a SPDES permit issued pursuant to 6 NYCRR Part 750-1.21 and Section 70-0117 of the ECL authorizing a category of discharges.

Groundwater(s) - means waters in the saturated zone. The saturated zone is a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere. Although the zone may contain gas-filled interstices or interstices filled with fluids other than water, it is still considered saturated.

Historic Property – means any building, structure, site, object or district that is listed on the State or National Registers of Historic Places or is determined to be eligible for listing on the State or National Registers of Historic Places.

Impervious Area (Cover) - means all impermeable surfaces that cannot effectively infiltrate rainfall. This includes paved, concrete and gravel surfaces (i.e. parking lots, driveways, roads, runways and sidewalks); building rooftops and miscellaneous impermeable structures such as patios, pools, and sheds.

Infeasible – means not technologically possible, or not economically practicable and achievable in light of best industry practices.

Larger Common Plan of Development or Sale - means a contiguous area where multiple separate and distinct *construction activities* are occurring, or will occur, under one plan. The term "plan" in "larger common plan of development or sale" is broadly defined as any announcement or piece of documentation (including a sign, public notice or hearing, marketing plan, advertisement, drawing, permit application, State Environmental Quality Review Act (SEQRA) environmental assessment form or other documents, zoning request, computer design, etc.) or physical demarcation (including boundary signs, lot stakes, surveyor markings, etc.) indicating that *construction activities* may occur on a specific plot.

For discrete construction projects that are located within a larger common plan of development or sale that are at least 1/4 mile apart, each project can be treated as a separate plan of development or sale provided any interconnecting road, pipeline or utility project that is part of the same "common plan" is not concurrently being disturbed.

Minimize – means reduce and/or eliminate to the extent achievable using control measures (including best management practices) that are technologically available and economically practicable and achievable in light of best industry practices.

Municipal Separate Storm Sewer (MS4) - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters of the State*;*
(ii) Designed or used for collecting or conveying stormwater;
(iii) Which is not a *combined sewer*; and
(iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

National Pollutant Discharge Elimination System (NPDES) - means the national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

Natural Buffer –means an undisturbed area with natural cover running along a surface water (e.g. wetland, stream, river, lake, etc.).

New Development – means any land disturbance that does not meet the definition of Redevelopment Activity included in this appendix.

New York State Erosion and Sediment Control Certificate Program – a certificate program that establishes and maintains a process to identify and recognize individuals who are capable of developing, designing, inspecting and maintaining erosion and sediment control plans on projects that disturb soils in New York State. The certificate program is administered by the New York State Conservation District Employees Association.

NOI Acknowledgment Letter - means the letter that the Department sends to an owner or operator to acknowledge the Department's receipt and acceptance of a complete Notice of Intent. This letter documents the owner's or operator's authorization to discharge in accordance with the general permit for stormwater discharges from *construction activity*.

Nonpoint Source - means any source of water pollution or pollutants which is not a discrete conveyance or *point source* permitted pursuant to Title 7 or 8 of Article 17 of the Environmental Conservation Law (see ECL Section 17-1403).

Overbank –means flow events that exceed the capacity of the stream channel and spill out into the adjacent floodplain.

Owner or Operator - means the person, persons or legal entity which owns or leases the property on which the *construction activity* is occurring; an entity that has operational control over the construction plans and specifications, including the ability to make modifications to the plans and specifications; and/or an entity that has day-to-day operational control of those activities at a project that are necessary to ensure compliance with the permit conditions.

Performance Criteria – means the design criteria listed under the "Required Elements" sections in Chapters 5, 6 and 10 of the technical standard, New York State Stormwater Management Design Manual, dated January 2015. It does not include the Sizing Criteria (i.e. WQv, RRv, Cpv, Qp and Qf) in Part I.C.2. of the permit.

Point Source - means any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel or other floating craft, or landfill leachate collection system from which *pollutants* are or may be discharged.

Pollutant - means dredged spoil, filter backwash, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand and industrial, municipal, agricultural waste and ballast discharged into water; which may cause or might reasonably be expected to cause pollution of the waters of the state in contravention of the standards or guidance values adopted as provided in 6 NYCRR Parts 700 et seq .

Qualified Inspector - means a person that is knowledgeable in the principles and practices of erosion and sediment control, such as a licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder or other Department endorsed individual(s).

It can also mean someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided that person has training in the principles and practices of erosion and sediment control. Training in the principles and practices of erosion and sediment control means that the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect has received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the individual working under the direct supervision of the licensed Professional Engineer or Registered Landscape Architect shall receive four (4) hours of training every three (3) years.

It can also mean a person that meets the *Qualified Professional* qualifications in addition to the *Qualified Inspector* qualifications.

Note: Inspections of any post-construction stormwater management practices that include structural components, such as a dam for an impoundment, shall be performed by a licensed Professional Engineer.

Qualified Professional - means a person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, Registered Landscape Architect or other Department endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and, in many cases, the principles of hydraulics. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law (see Article 145), shall be prepared by, or under the direct supervision of, a professional engineer licensed to practice in the State of New York.

Redevelopment Activity(ies) – means the disturbance and reconstruction of existing impervious area, including impervious areas that were removed from a project site within five (5) years of preliminary project plan submission to the local government (i.e. site plan, subdivision, etc.).

Regulated, Traditional Land Use Control MS4 - means a city, town or village with land use control authority that is authorized to discharge under New York State DEC's

SPDES General Permit For Stormwater Discharges from Municipal Separate Stormwater Sewer Systems (MS4s) or the City of New York's Individual SPDES Permit for their Municipal Separate Storm Sewer Systems (NY-0287890).

Routine Maintenance Activity - means *construction activity* that is performed to maintain the original line and grade, hydraulic capacity, or original purpose of a facility, including, but not limited to:

- Re-grading of gravel roads or parking lots,
- Cleaning and shaping of existing roadside ditches and culverts that maintains the approximate original line and grade, and hydraulic capacity of the ditch,
- Cleaning and shaping of existing roadside ditches that does not maintain the approximate original grade, hydraulic capacity and purpose of the ditch if the changes to the line and grade, hydraulic capacity or purpose of the ditch are installed to improve water quality and quantity controls (e.g. installing grass lined ditch),
- Placement of aggregate shoulder backing that stabilizes the transition between the road shoulder and the ditch or *embankment*,
- Full depth milling and filling of existing asphalt pavements, replacement of concrete pavement slabs, and similar work that does not expose soil or disturb the bottom six (6) inches of subbase material,
- Long-term use of equipment storage areas at or near highway maintenance facilities,
- Removal of sediment from the edge of the highway to restore a previously existing sheet-flow drainage connection from the highway surface to the highway ditch or *embankment*,
- Existing use of Canal Corp owned upland disposal sites for the canal, and
- Replacement of curbs, gutters, sidewalks and guide rail posts.

Site limitations – means site conditions that prevent the use of an infiltration technique and or infiltration of the total WQv. Typical site limitations include: seasonal high groundwater, shallow depth to bedrock, and soils with an infiltration rate less than 0.5 inches/hour. The existence of site limitations shall be confirmed and documented using actual field testing (i.e. test pits, soil borings, and infiltration test) or using information from the most current United States Department of Agriculture (USDA) Soil Survey for the County where the project is located.

Sizing Criteria – means the criteria included in Part I.C.2 of the permit that are used to size post-construction stormwater management control practices. The criteria include; Water Quality Volume (WQv), Runoff Reduction Volume (RRv), Channel Protection Volume (Cpv), *Overbank* Flood (Qp), and Extreme Flood (Qf).

State Pollutant Discharge Elimination System (SPDES) - means the system established pursuant to Article 17 of the ECL and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

Steep Slope – means land area designated on the current United States Department of Agriculture ("USDA") Soil Survey as Soil Slope Phase "D", (provided the map unit name is inclusive of slopes greater than 25%) , or Soil Slope Phase E or F, (regardless of the map unit name), or a combination of the three designations.

Streambank – as used in this permit, means the terrain alongside the bed of a creek or stream. The bank consists of the sides of the channel, between which the flow is confined.

Stormwater Pollution Prevention Plan (SWPPP) – means a project specific report, including construction drawings, that among other things: describes the construction activity(ies), identifies the potential sources of pollution at the *construction site*; describes and shows the stormwater controls that will be used to control the pollutants (i.e. erosion and sediment controls; for many projects, includes post-construction stormwater management controls); and identifies procedures the *owner or operator* will implement to comply with the terms and conditions of the permit. See Part III of the permit for a complete description of the information that must be included in the SWPPP.

Surface Waters of the State - shall be construed to include lakes, bays, sounds, ponds, impounding reservoirs, springs, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Atlantic ocean within the territorial seas of the state of New York and all other bodies of surface water, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters that do not combine or effect a junction with natural surface waters), which are wholly or partially within or bordering the state or within its jurisdiction. Waters of the state are further defined in 6 NYCRR Parts 800 to 941.

Temporarily Ceased – means that an existing disturbed area will not be disturbed again within 14 calendar days of the previous soil disturbance.

Temporary Stabilization - means that exposed soil has been covered with material(s) as set forth in the technical standard, New York Standards and Specifications for Erosion and Sediment Control, to prevent the exposed soil from eroding. The materials can include, but are not limited to, mulch, seed and mulch, and erosion control mats (e.g. jute twisted yarn, excelsior wood fiber mats).

Total Maximum Daily Loads (TMDLs) - A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and *nonpoint source*s. It is a calculation of the maximum amount of a pollutant that a waterbody can receive on a daily basis and still meet *water quality standards*, and an allocation of that amount to the pollutant's sources. A TMDL stipulates wasteload allocations (WLAs) for *point source* discharges, load allocations (LAs) for *nonpoint source*s, and a margin of safety (MOS).

Trained Contractor - means an employee from the contracting (construction) company, identified in Part III.A.6., that has received four (4) hours of Department endorsed

training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity. After receiving the initial training, the *trained contractor* shall receive four (4) hours of training every three (3) years.

It can also mean an employee from the contracting (construction) company, identified in Part III.A.6., that meets the *qualified inspector* qualifications (e.g. licensed Professional Engineer, Certified Professional in Erosion and Sediment Control (CPESC), Registered Landscape Architect, New York State Erosion and Sediment Control Certificate Program holder, or someone working under the direct supervision of, and at the same company as, the licensed Professional Engineer or Registered Landscape Architect, provided they have received four (4) hours of Department endorsed training in proper erosion and sediment control principles from a Soil and Water Conservation District, or other Department endorsed entity).

The *trained contractor* is responsible for the day to day implementation of the SWPPP.

Uniform Procedures Act (UPA) Permit - means a permit required under 6 NYCRR Part 621 of the Environmental Conservation Law (ECL), Article 70.

Water Quality Standard - means such measures of purity or quality for any waters in relation to their reasonable and necessary use as promulgated in 6 NYCRR Part 700 et seq.

APPENDIX B – Required SWPPP Components by Project Type

Table 1
Construction Activities that Require the Preparation of a SWPPP That Only Includes Erosion and Sediment Controls

The following construction activities that involve soil disturbances of one (1) or more acres of land, but less than five (5) acres:

- Single family home not located in one of the watersheds listed in Appendix C or not *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions with 25% or less impervious cover at total site build-out and not located in one of the watersheds listed in Appendix C and not directly discharging to one of the 303(d) segments listed in Appendix E
- Construction of a barn or other *agricultural building*, silo, stock yard or pen.

The following construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land:

All construction activities located in the watersheds identified in Appendix D that involve soil disturbances between five thousand (5,000) square feet and one (1) acre of land.

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Installation of underground, linear utilities; such as gas lines, fiber-optic cable, cable TV, electric, telephone, sewer mains, and water mains
- Environmental enhancement projects, such as wetland mitigation projects, stormwater retrofits and stream restoration projects
- Pond construction
- Linear bike paths running through areas with vegetative cover, including bike paths surfaced with an impervious cover
- Cross-country ski trails and walking/hiking trails
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are not part of residential, commercial or institutional development;
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that include incidental shoulder or curb work along an existing highway to support construction of the sidewalk, bike path or walking path.
- Slope stabilization projects
- Slope flattening that changes the grade of the site, but does not significantly change the runoff characteristics

Table 1 (Continued) CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT ONLY INCLUDES EROSION AND SEDIMENT CONTROLS

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Spoil areas that will be covered with vegetation
- Vegetated open space projects (i.e. recreational parks, lawns, meadows, fields, downhill ski trails) excluding projects that *alter hydrology from pre to post development* conditions,
- Athletic fields (natural grass) that do not include the construction or reconstruction of *impervious area* and do not *alter hydrology from pre to post development* conditions
- Demolition project where vegetation will be established, and no redevelopment is planned
- Overhead electric transmission line project that does not include the construction of permanent access roads or parking areas surfaced with *impervious cover*
- Structural practices as identified in Table II in the "Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State", excluding projects that involve soil disturbances of greater than five acres and construction activities that include the construction or reconstruction of impervious area
- Temporary access roads, median crossovers, detour roads, lanes, or other temporary impervious areas that will be restored to pre-construction conditions once the construction activity is complete

Table 2

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Single family home located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family home that disturbs five (5) or more acres of land
- Single family residential subdivisions located in one of the watersheds listed in Appendix C or *directly discharging* to one of the 303(d) segments listed in Appendix E
- Single family residential subdivisions that involve soil disturbances of between one (1) and five (5) acres of land with greater than 25% impervious cover at total site build-out
- Single family residential subdivisions that involve soil disturbances of five (5) or more acres of land, and single family residential subdivisions that involve soil disturbances of less than five (5) acres that are part of a larger common plan of development or sale that will ultimately disturb five or more acres of land
- Multi-family residential developments; includes duplexes, townhomes, condominiums, senior housing complexes, apartment complexes, and mobile home parks
- Airports
- Amusement parks
- Breweries, cideries, and wineries, including establishments constructed on agricultural land
- Campgrounds
- Cemeteries that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Commercial developments
- Churches and other places of worship
- Construction of a barn or other *agricultural building* (e.g. silo) and structural practices as identified in Table II in the “Agricultural Management Practices Catalog for Nonpoint Source Pollution in New York State” that include the construction or reconstruction of *impervious area*, excluding projects that involve soil disturbances of less than five acres.
- Golf courses
- Institutional development; includes hospitals, prisons, schools and colleges
- Industrial facilities; includes industrial parks
- Landfills
- Municipal facilities; includes highway garages, transfer stations, office buildings, POTW’s, water treatment plants, and water storage tanks
- Office complexes
- Playgrounds that include the construction or reconstruction of impervious area
- Sports complexes
- Racetracks; includes racetracks with earthen (dirt) surface
- Road construction or reconstruction, including roads constructed as part of the construction activities listed in Table 1

Table 2 (Continued)

CONSTRUCTION ACTIVITIES THAT REQUIRE THE PREPARATION OF A SWPPP THAT INCLUDES POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES

The following construction activities that involve soil disturbances of one (1) or more acres of land:

- Parking lot construction or reconstruction, including parking lots constructed as part of the construction activities listed in Table 1
- Athletic fields (natural grass) that include the construction or reconstruction of impervious area (>5% of disturbed area) or *alter the hydrology from pre to post development* conditions
- Athletic fields with artificial turf
- Permanent access roads, parking areas, substations, compressor stations and well drilling pads, surfaced with *impervious cover,* and constructed as part of an over-head electric transmission line project, wind-power project, cell tower project, oil or gas well drilling project, sewer or water main project or other linear utility project
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a residential, commercial or institutional development
- Sidewalk, bike path or walking path projects, surfaced with an impervious cover, that are part of a highway construction or reconstruction project
- All other construction activities that include the construction or reconstruction of *impervious area* or *alter the hydrology from pre to post development* conditions, and are not listed in Table 1

APPENDIX C – Watersheds Requiring Enhanced Phosphorus Removal

Watersheds where *owners or operators* of construction activities identified in Table 2 of Appendix B must prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the Enhanced Phosphorus Removal Standards included in the technical standard, New York State Stormwater Management Design Manual ("Design Manual").

- Entire New York City Watershed located east of the Hudson River **-** Figure 1
- Onondaga Lake Watershed **-** Figure 2
- Greenwood Lake Watershed **-**Figure 3
- Oscawana Lake Watershed – Figure 4
- Kinderhook Lake Watershed – Figure 5

Figure 1 - New York City Watershed East of the Hudson

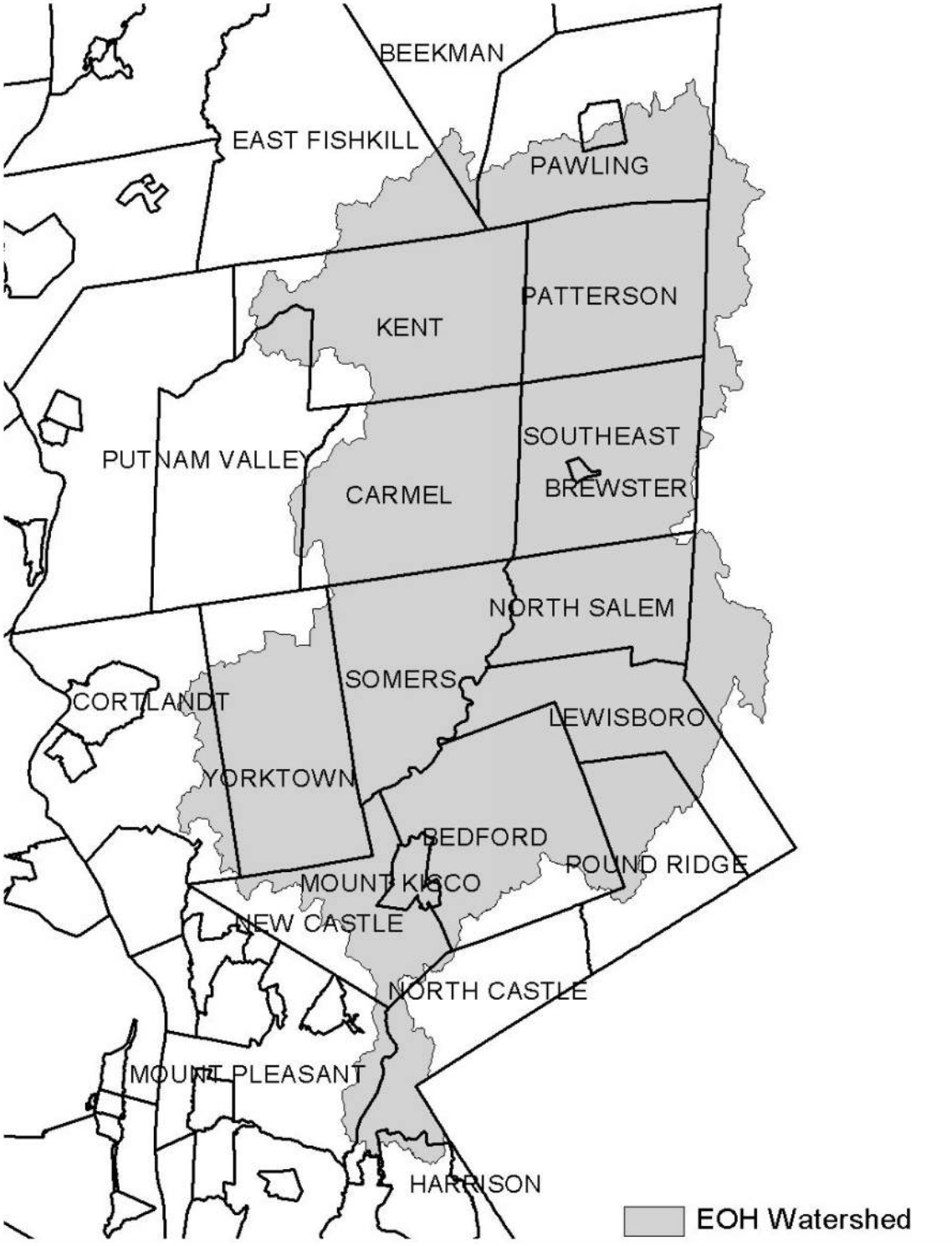


Figure 2 - Onondaga Lake Watershed



Figure 3 - Greenwood Lake Watershed

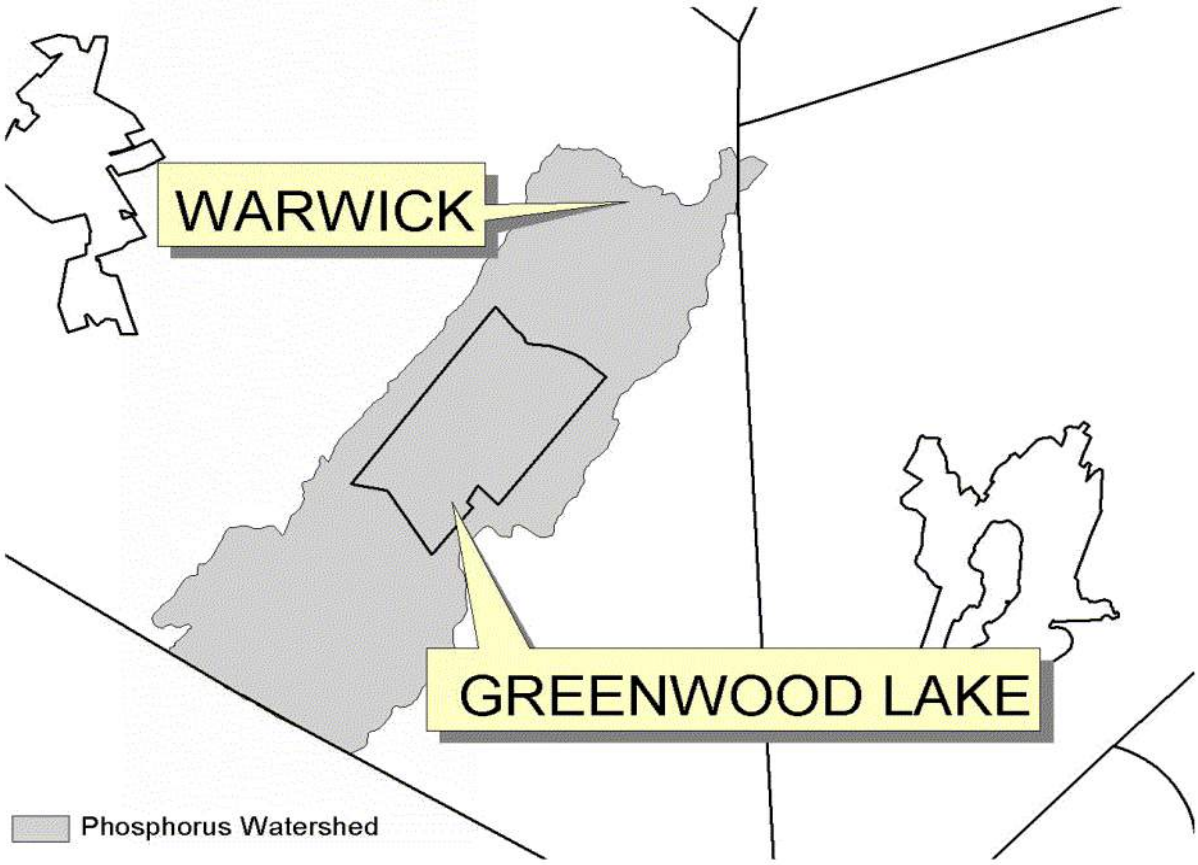


Figure 4 - Oscawana Lake Watershed

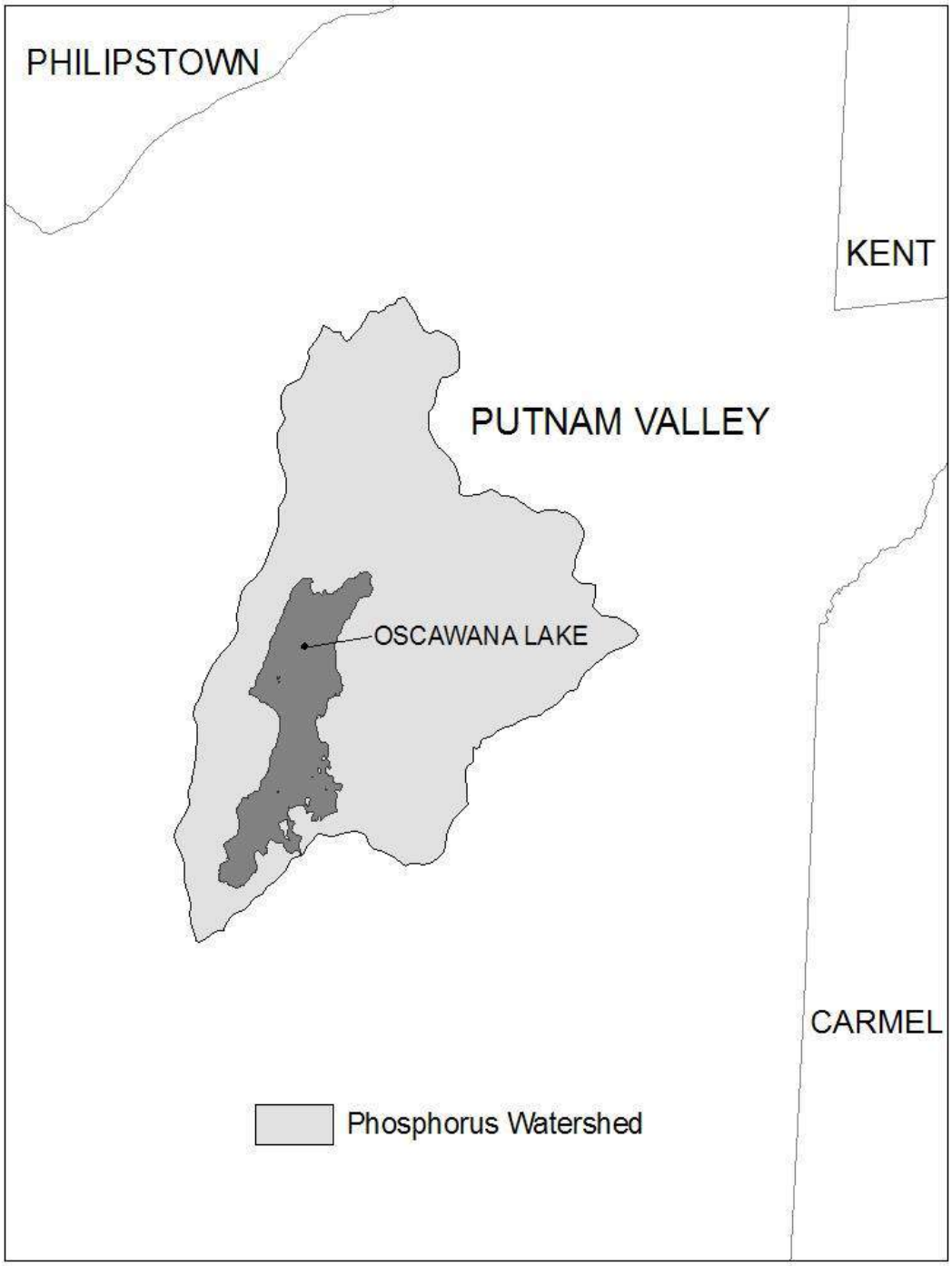
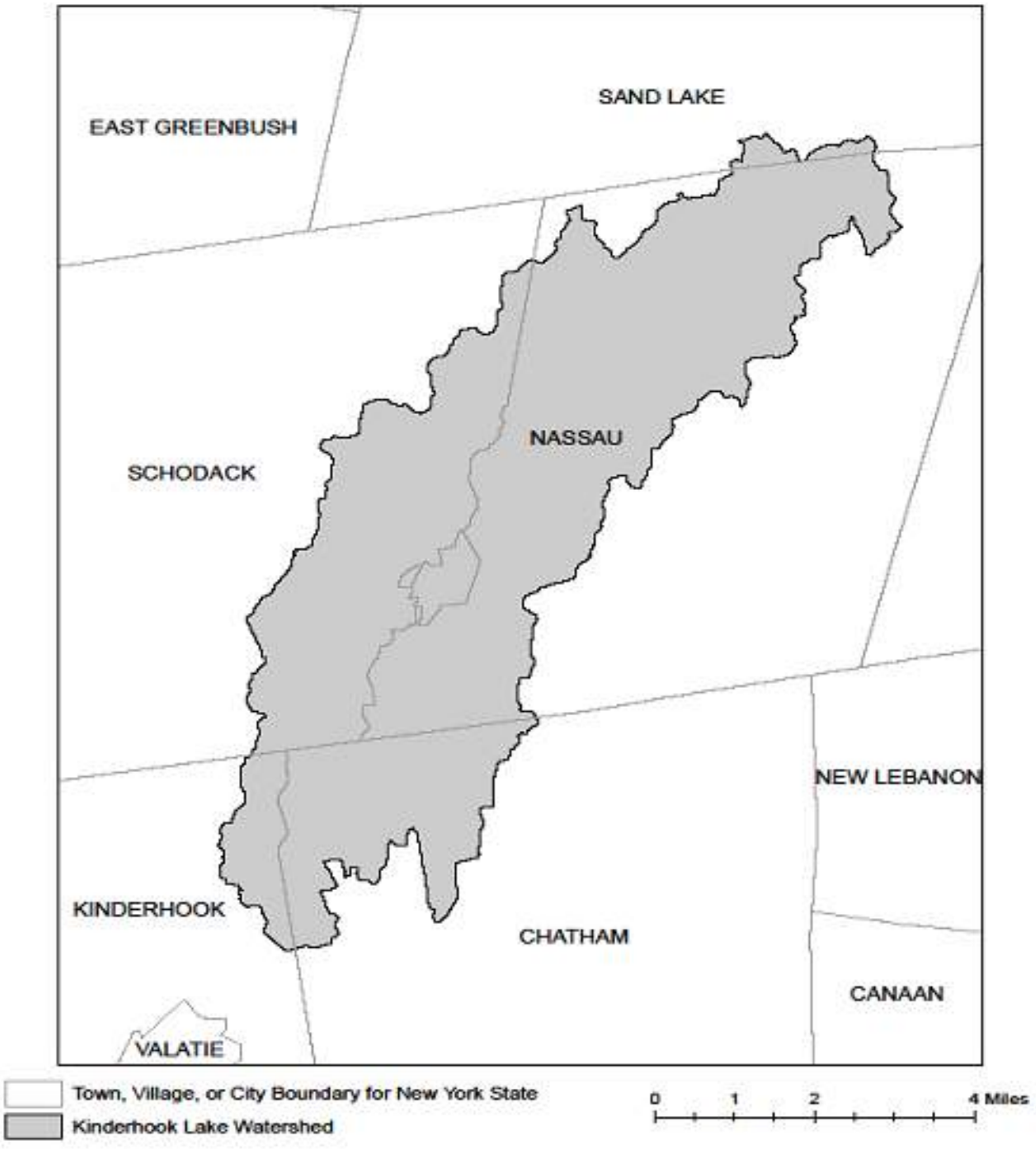


Figure 5 - Kinderhook Lake Watershed



APPENDIX D – Watersheds with Lower Disturbance Threshold

Watersheds where *owners or operators* of construction activities that involve soil disturbances between five thousand (5000) square feet and one (1) acre of land must obtain coverage under this permit.

Entire New York City Watershed that is located east of the Hudson River **-** See Figure 1 in Appendix C

APPENDIX E – 303(d) Segments Impaired by Construction Related Pollutant(s)

List of 303(d) segments impaired by pollutants related to *construction activity* (e.g. silt, sediment or nutrients). The list was developed using "The Final New York State 2016 Section 303(d) List of Impaired Waters Requiring a TMDL/Other Strategy" dated November 2016. *Owners or operators* of single family home and single family residential subdivisions with 25% or less total impervious cover at total site build-out that involve soil disturbances of one or more acres of land, but less than 5 acres, and *directly discharge* to one of the listed segments below shall prepare a SWPPP that includes post-construction stormwater management practices designed in conformance with the New York State Stormwater Management Design Manual ("Design Manual"), dated January 2015.

COUNTY	WATERBODY	POLLUTANT
Albany	Ann Lee (Shakers) Pond, Stump Pond	Nutrients
Albany	Basic Creek Reservoir	Nutrients
Allegany	Amity Lake, Saunders Pond	Nutrients
Bronx	Long Island Sound, Bronx	Nutrients
Bronx	Van Cortlandt Lake	Nutrients
Broome	Fly Pond, Deer Lake, Sky Lake	Nutrients
Broome	Minor Tribs to Lower Susquehanna (north)	Nutrients
Broome	Whitney Point Lake/Reservoir	Nutrients
Cattaraugus	Allegheny River/Reservoir	Nutrients
Cattaraugus	Beaver (Alma) Lake	Nutrients
Cattaraugus	Case Lake	Nutrients
Cattaraugus	Linlyco/Club Pond	Nutrients
Cayuga	Duck Lake	Nutrients
Cayuga	Little Sodus Bay	Nutrients
Chautauqua	Bear Lake	Nutrients
Chautauqua	Chadakoin River and tribs	Nutrients
Chautauqua	Chautauqua Lake, North	Nutrients
Chautauqua	Chautauqua Lake, South	Nutrients
Chautauqua	Findley Lake	Nutrients
Chautauqua	Hulburt/Clymer Pond	Nutrients
Clinton	Great Chazy River, Lower, Main Stem	Silt/Sediment
Clinton	Lake Champlain, Main Lake, Middle	Nutrients
Clinton	Lake Champlain, Main Lake, North	Nutrients
Columbia	Kinderhook Lake	Nutrients
Columbia	Robinson Pond	Nutrients
Cortland	Dean Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Dutchess	Fall Kill and tribs	Nutrients
Dutchess	Hillside Lake	Nutrients
Dutchess	Wappingers Lake	Nutrients
Dutchess	Wappingers Lake	Silt/Sediment
Erie	Beeman Creek and tribs	Nutrients
Erie	Ellicott Creek, Lower, and tribs	Silt/Sediment
Erie	Ellicott Creek, Lower, and tribs	Nutrients
Erie	Green Lake	Nutrients
Erie	Little Sister Creek, Lower, and tribs	Nutrients
Erie	Murder Creek, Lower, and tribs	Nutrients
Erie	Rush Creek and tribs	Nutrients
Erie	Scajaquada Creek, Lower, and tribs	Nutrients
Erie	Scajaquada Creek, Middle, and tribs	Nutrients
Erie	Scajaquada Creek, Upper, and tribs	Nutrients
Erie	South Branch Smoke Cr, Lower, and tribs	Silt/Sediment
Erie	South Branch Smoke Cr, Lower, and tribs	Nutrients
Essex	Lake Champlain, Main Lake, South	Nutrients
Essex	Lake Champlain, South Lake	Nutrients
Essex	Willsboro Bay	Nutrients
Genesee	Bigelow Creek and tribs	Nutrients
Genesee	Black Creek, Middle, and minor tribs	Nutrients
Genesee	Black Creek, Upper, and minor tribs	Nutrients
Genesee	Bowen Brook and tribs	Nutrients
Genesee	LeRoy Reservoir	Nutrients
Genesee	Oak Orchard Cr, Upper, and tribs	Nutrients
Genesee	Tonawanda Creek, Middle, Main Stem	Nutrients
Greene	Schoharie Reservoir	Silt/Sediment
Greene	Sleepy Hollow Lake	Silt/Sediment
Herkimer	Steele Creek tribs	Silt/Sediment
Herkimer	Steele Creek tribs	Nutrients
Jefferson	Moon Lake	Nutrients
Kings	Hendrix Creek	Nutrients
Kings	Prospect Park Lake	Nutrients
Lewis	Mill Creek/South Branch, and tribs	Nutrients
Livingston	Christie Creek and tribs	Nutrients
Livingston	Conesus Lake	Nutrients
Livingston	Mill Creek and minor tribs	Silt/Sediment
Monroe	Black Creek, Lower, and minor tribs	Nutrients
Monroe	Buck Pond	Nutrients
Monroe	Cranberry Pond	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Monroe	Lake Ontario Shoreline, Western	Nutrients
Monroe	Long Pond	Nutrients
Monroe	Mill Creek and tribs	Nutrients
Monroe	Mill Creek/Blue Pond Outlet and tribs	Nutrients
Monroe	Minor Tribs to Irondequoit Bay	Nutrients
Monroe	Rochester Embayment - East	Nutrients
Monroe	Rochester Embayment - West	Nutrients
Monroe	Shipbuilders Creek and tribs	Nutrients
Monroe	Thomas Creek/White Brook and tribs	Nutrients
Nassau	Beaver Lake	Nutrients
Nassau	Camaans Pond	Nutrients
Nassau	East Meadow Brook, Upper, and tribs	Silt/Sediment
Nassau	East Rockaway Channel	Nutrients
Nassau	Grant Park Pond	Nutrients
Nassau	Hempstead Bay	Nutrients
Nassau	Hempstead Lake	Nutrients
Nassau	Hewlett Bay	Nutrients
Nassau	Hog Island Channel	Nutrients
Nassau	Long Island Sound, Nassau County Waters	Nutrients
Nassau	Massapequa Creek and tribs	Nutrients
Nassau	Milburn/Parsonage Creeks, Upp, and tribs	Nutrients
Nassau	Reynolds Channel, west	Nutrients
Nassau	Tidal Tribs to Hempstead Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Nutrients
Nassau	Tribs (fresh) to East Bay	Silt/Sediment
Nassau	Tribs to Smith/Halls Ponds	Nutrients
Nassau	Woodmere Channel	Nutrients
New York	Harlem Meer	Nutrients
New York	The Lake in Central Park	Nutrients
Niagara	Bergholtz Creek and tribs	Nutrients
Niagara	Hyde Park Lake	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Niagara	Lake Ontario Shoreline, Western	Nutrients
Oneida	Ballou, Nail Creeks and tribs	Nutrients
Onondaga	Harbor Brook, Lower, and tribs	Nutrients
Onondaga	Ley Creek and tribs	Nutrients
Onondaga	Minor Tribs to Onondaga Lake	Nutrients
Onondaga	Ninemile Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Lower, and tribs	Nutrients
Onondaga	Onondaga Creek, Middle, and tribs	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Onondaga	Onondaga Lake, northern end	Nutrients
Onondaga	Onondaga Lake, southern end	Nutrients
Ontario	Great Brook and minor tribs	Silt/Sediment
Ontario	Great Brook and minor tribs	Nutrients
Ontario	Hemlock Lake Outlet and minor tribs	Nutrients
Ontario	Honeoye Lake	Nutrients
Orange	Greenwood Lake	Nutrients
Orange	Monhagen Brook and tribs	Nutrients
Orange	Orange Lake	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Orleans	Lake Ontario Shoreline, Western	Nutrients
Oswego	Lake Neatahwanta	Nutrients
Oswego	Pleasant Lake	Nutrients
Putnam	Bog Brook Reservoir	Nutrients
Putnam	Boyd Corners Reservoir	Nutrients
Putnam	Croton Falls Reservoir	Nutrients
Putnam	Diverting Reservoir	Nutrients
Putnam	East Branch Reservoir	Nutrients
Putnam	Lake Carmel	Nutrients
Putnam	Middle Branch Reservoir	Nutrients
Putnam	Oscawana Lake	Nutrients
Putnam	Palmer Lake	Nutrients
Putnam	West Branch Reservoir	Nutrients
Queens	Bergen Basin	Nutrients
Queens	Flushing Creek/Bay	Nutrients
Queens	Jamaica Bay, Eastern, and tribs (Queens)	Nutrients
Queens	Kissena Lake	Nutrients
Queens	Meadow Lake	Nutrients
Queens	Willow Lake	Nutrients
Rensselaer	Nassau Lake	Nutrients
Rensselaer	Snyders Lake	Nutrients
Richmond	Grasmere Lake/Bradys Pond	Nutrients
Rockland	Congers Lake, Swartout Lake	Nutrients
Rockland	Rockland Lake	Nutrients
Saratoga	Ballston Lake	Nutrients
Saratoga	Dwaas Kill and tribs	Silt/Sediment
Saratoga	Dwaas Kill and tribs	Nutrients
Saratoga	Lake Lonely	Nutrients
Saratoga	Round Lake	Nutrients
Saratoga	Tribs to Lake Lonely	Nutrients

303(d) Segments Impaired by Construction Related Pollutant(s)

Schenectady	Collins Lake	Nutrients
Schenectady	Duane Lake	Nutrients
Schenectady	Mariaville Lake	Nutrients
Schoharie	Engleville Pond	Nutrients
Schoharie	Summit Lake	Nutrients
Seneca	Reeder Creek and tribs	Nutrients
St.Lawrence	Black Lake Outlet/Black Lake	Nutrients
St.Lawrence	Fish Creek and minor tribs	Nutrients
Steuben	Smith Pond	Nutrients
Suffolk	Agawam Lake	Nutrients
Suffolk	Big/Little Fresh Ponds	Nutrients
Suffolk	Canaan Lake	Silt/Sediment
Suffolk	Canaan Lake	Nutrients
Suffolk	Flanders Bay, West/Lower Sawmill Creek	Nutrients
Suffolk	Fresh Pond	Nutrients
Suffolk	Great South Bay, East	Nutrients
Suffolk	Great South Bay, Middle	Nutrients
Suffolk	Great South Bay, West	Nutrients
Suffolk	Lake Ronkonkoma	Nutrients
Suffolk	Long Island Sound, Suffolk County, West	Nutrients
Suffolk	Mattituck (Marratooka) Pond	Nutrients
Suffolk	Meetinghouse/Terrys Creeks and tribs	Nutrients
Suffolk	Mill and Seven Ponds	Nutrients
Suffolk	Millers Pond	Nutrients
Suffolk	Moriches Bay, East	Nutrients
Suffolk	Moriches Bay, West	Nutrients
Suffolk	Peconic River, Lower, and tidal tribs	Nutrients
Suffolk	Quantuck Bay	Nutrients
Suffolk	Shinnecock Bay and Inlet	Nutrients
Suffolk	Tidal tribs to West Moriches Bay	Nutrients
Sullivan	Bodine, Montgomery Lakes	Nutrients
Sullivan	Davies Lake	Nutrients
Sullivan	Evens Lake	Nutrients
Sullivan	Pleasure Lake	Nutrients
Tompkins	Cayuga Lake, Southern End	Nutrients
Tompkins	Cayuga Lake, Southern End	Silt/Sediment
Tompkins	Owasco Inlet, Upper, and tribs	Nutrients
Ulster	Ashokan Reservoir	Silt/Sediment
Ulster	Esopus Creek, Upper, and minor tribs	Silt/Sediment
Warren	Hague Brook and tribs	Silt/Sediment

303(d) Segments Impaired by Construction Related Pollutant(s)

Warren	Huddle/Finkle Brooks and tribs	Silt/Sediment
Warren	Indian Brook and tribs	Silt/Sediment
Warren	Lake George	Silt/Sediment
Warren	Tribs to L.George, Village of L George	Silt/Sediment
Washington	Cossayuna Lake	Nutrients
Washington	Lake Champlain, South Bay	Nutrients
Washington	Tribs to L.George, East Shore	Silt/Sediment
Washington	Wood Cr/Champlain Canal and minor tribs	Nutrients
Wayne	Port Bay	Nutrients
Westchester	Amawalk Reservoir	Nutrients
Westchester	Blind Brook, Upper, and tribs	Silt/Sediment
Westchester	Cross River Reservoir	Nutrients
Westchester	Lake Katonah	Nutrients
Westchester	Lake Lincolndale	Nutrients
Westchester	Lake Meahagh	Nutrients
Westchester	Lake Mohegan	Nutrients
Westchester	Lake Shenorock	Nutrients
Westchester	Long Island Sound, Westchester (East)	Nutrients
Westchester	Mamaroneck River, Lower	Silt/Sediment
Westchester	Mamaroneck River, Upper, and minor tribs	Silt/Sediment
Westchester	Muscoot/Upper New Croton Reservoir	Nutrients
Westchester	New Croton Reservoir	Nutrients
Westchester	Peach Lake	Nutrients
Westchester	Reservoir No.1 (Lake Isle)	Nutrients
Westchester	Saw Mill River, Lower, and tribs	Nutrients
Westchester	Saw Mill River, Middle, and tribs	Nutrients
Westchester	Sheldrake River and tribs	Silt/Sediment
Westchester	Sheldrake River and tribs	Nutrients
Westchester	Silver Lake	Nutrients
Westchester	Teatown Lake	Nutrients
Westchester	Titicus Reservoir	Nutrients
Westchester	Truesdale Lake	Nutrients
Westchester	Wallace Pond	Nutrients
Wyoming	Java Lake	Nutrients
Wyoming	Silver Lake	Nutrients

APPENDIX F – List of NYS DEC Regional Offices

Region	Covering the following counties:	DIVISION OF ENVIRONMENTAL PERMITS (DEP) Permit Administrators	DIVISION OF WATER (DOW) Water (SPDES) Program
1	Nassau and Suffolk	50 Circle Road Stony Brook, NY 11790 Tel. (631) 444-0365	50 Circle Road Stony Brook, NY 11790-3409 Tel. (631) 444-0405
2	Bronx, Kings, New York, Queens and Richmond	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4997	1 Hunters Point Plaza, 47-40 21st St. Long Island City, NY 11101-5407 Tel. (718) 482-4933
3	Dutchess, Orange, Putnam, Rockland, Sullivan, Ulster and Westchester	21 South Putt Corners Road New Paltz, NY 12561-1696 Tel. (845) 256-3059	100 Hillside Avenue, Suite 1W White Plains, NY 10603 Tel. (914) 428 - 2505
4	Albany, Columbia, Delaware, Greene, Montgomery, Otsego, Rensselaer, Schenectady and Schoharie	1150 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2069	1130 North Westcott Road Schenectady, NY 12306-2014 Tel. (518) 357-2045
5	Clinton, Essex, Franklin, Fulton, Hamilton, Saratoga, Warren and Washington	1115 State Route 86, Po Box 296 Ray Brook, NY 12977-0296 Tel. (518) 897-1234	232 Golf Course Road Warrensburg, NY 12885-1172 Tel. (518) 623-1200
6	HERKIMER, JEFFERSON, LEWIS, ONEIDA AND ST. LAWRENCE	STATE OFFICE BUILDING 317 WASHINGTON STREET WATERTOWN, NY 13601-3787 TEL. (315) 785-2245	STATE OFFICE BUILDING 207 GENESEE STREET UTICA, NY 13501-2885 TEL. (315) 793-2554
7	BROOME, CAYUGA, CHENANGO, CORTLAND, MADISON, ONONDAGA, OSWEGO, TIOGA AND TOMPKINS	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7438	615 ERIE BLVD. WEST SYRACUSE, NY 13204-2400 TEL. (315) 426-7500
8	CHEMUNG, GENESEE, LIVINGSTON, MONROE, ONTARIO, ORLEANS, SCHUYLER, SENECA, STEUBEN, WAYNE AND YATES	6274 EAST AVON-LIMA ROADAVON, NY 14414-9519 TEL. (585) 226-2466	6274 EAST AVON-LIMA RD. AVON, NY 14414-9519 TEL. (585) 226-2466
9	ALLEGANY, CATTARAUGUS, CHAUTAUQUA, ERIE, NIAGARA AND WYOMING	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7165	270 MICHIGAN AVENUE BUFFALO, NY 14203-2999 TEL. (716) 851-7070

APPENDIX 7

DRAFT MS4 STORMWATER POLLUTION PREVENTION PLAN (SWPPP) ACCEPTANCE FORM

NYS Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

MS4 Stormwater Pollution Prevention Plan (SWPPP) Acceptance Form

for

Construction Activities Seeking Authorization Under SPDES General Permit

*(NOTE: Attach Completed Form to Notice Of Intent and Submit to Address Above)

I. Project Owner/Operator Information
1. Owner/Operator Name:
2. Contact Person:
3. Street Address:
4. City/State/Zip:
II. Project Site Information
5. Project/Site Name:
6. Street Address:
7. City/State/Zip:
III. Stormwater Pollution Prevention Plan (SWPPP) Review and Acceptance Information
8. SWPPP Reviewed by:
9. Title/Position:
10. Date Final SWPPP Reviewed and Accepted:
IV. Regulated MS4 Information
11. Name of MS4:
12. MS4 SPDES Permit Identification Number: NYR20A
13. Contact Person:
14. Street Address:
15. City/State/Zip:
16. Telephone Number:

MS4 SWPPP Acceptance Form - continued

V. Certification Statement - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative

I hereby certify that the final Stormwater Pollution Prevention Plan (SWPPP) for the construction project identified in question 5 has been reviewed and meets the substantive requirements in the SPDES General Permit For Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). Note: The MS4, through the acceptance of the SWPPP, assumes no responsibility for the accuracy and adequacy of the design included in the SWPPP. In addition, review and acceptance of the SWPPP by the MS4 does not relieve the owner/operator or their SWPPP preparer of responsibility or liability for errors or omissions in the plan.

Printed Name:

Title/Position:

Signature:

Date:

VI. Additional Information

(NYS DEC - MS4 SWPPP Acceptance Form - January 2015)

APPENDIX 8

DRAFT NOTICE OF INTENT (NOI)

0644089821

NOTICE OF INTENT

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505

NYR _____ (for DEC use only)

Stormwater Discharges Associated with Construction Activity Under State Pollutant Discharge Elimination System (SPDES) General Permit # GP-0-20-001

All sections must be completed unless otherwise noted. Failure to complete all items may result in this form being returned to you, thereby delaying your coverage under this General Permit. Applicants must read and understand the conditions of the permit and prepare a Stormwater Pollution Prevention Plan prior to submitting this NOI. Applicants are responsible for identifying and obtaining other DEC permits that may be required.

-IMPORTANT-
RETURN THIS FORM TO THE ADDRESS ABOVE

OWNER/OPERATOR MUST SIGN FORM

Owner/Operator Information

Owner/Operator (Company Name/Private Owner Name/Municipality Name)
Costco Wholesale Corporation

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Jewell

Owner/Operator Contact Person First Name
Heidi

Owner/Operator Mailing Address
45940 Horseshoe Drive, Suite 150

City
Sterling

State: VA
Zip: 20166 -

Phone (Owner/Operator): 703 - 406 - 6842
Fax (Owner/Operator): - -

Email (Owner/Operator)
heidijewell@costco.com

FED TAX ID
91 - 1223280 (not required for individuals)

Project Site Information

Project/Site Name
Costco - Albany

Street Address (NOT P.O. BOX)
Crossgates Mall Road at Western Avenue

Side of Street
● **North** ○ **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Town of Guilderland

State: NY
Zip: 12203-
County: Albany
DEC Region: 4

Name of Nearest Cross Street
Rapp Road and Western Avenue

Distance to Nearest Cross Street (Feet)
64

Project In Relation to Cross Street
○ **North** ○ **South** ● **East** ○ **West**

Tax Map Numbers
Section-Block-Parcel
52.10

Tax Map Numbers
52.14
52.01

1. Provide the Geographic Coordinates for the project site. To do this, go to the NYSDEC Stormwater Interactive Map on the DEC website at:

https://gisservices.dec.ny.gov/gis/stormwater/

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located the centroid of your project site, go to the bottom right hand corner of the map for the X, Y coordinates. Enter the coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)
-73.857
Ex. -73.749

Y Coordinates (Northing)
42.689
Ex. 42.652

2. What is the nature of this construction project?

○ **New Construction**

● **Redevelopment with increase in impervious area**

○ **Redevelopment with no increase in impervious area**

3. Select the predominant land use for both pre and post development conditions.
SELECT ONLY ONE CHOICE FOR EACH

Pre-Development Existing Land Use	Post-Development Future Land Use
○ FOREST	○ SINGLE FAMILY HOME
○ PASTURE/OPEN LAND	○ SINGLE FAMILY SUBDIVISION
○ CULTIVATED LAND	○ TOWN HOME RESIDENTIAL
○ SINGLE FAMILY HOME	○ MULTIFAMILY RESIDENTIAL
● SINGLE FAMILY SUBDIVISION	○ INSTITUTIONAL/SCHOOL
○ TOWN HOME RESIDENTIAL	○ INDUSTRIAL
○ MULTIFAMILY RESIDENTIAL	● COMMERCIAL
○ INSTITUTIONAL/SCHOOL	○ MUNICIPAL
○ INDUSTRIAL	○ ROAD/HIGHWAY
○ COMMERCIAL	○ RECREATIONAL/SPORTS FIELD
○ ROAD/HIGHWAY	○ BIKE PATH/TRAIL
○ RECREATIONAL/SPORTS FIELD	○ LINEAR UTILITY (water, sewer, gas, etc.)
○ BIKE PATH/TRAIL	○ PARKING LOT
○ LINEAR UTILITY	○ CLEARING/GRADING ONLY
○ PARKING LOT	○ DEMOLITION, NO REDEVELOPMENT
○ OTHER	○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
	○ OTHER

Number of Lots:

***Note**: for gas well drilling, non-high volume hydraulic fractured wells only

4. In accordance with the larger common plan of development or sale, enter the total project site area; the total area to be disturbed; existing impervious area to be disturbed (for redevelopment activities); and the future impervious area constructed within the disturbed area. (Round to the nearest tenth of an acre.)

Total Site Area	Total Area To Be Disturbed	Existing Impervious Area To Be Disturbed	Future Impervious Area Within Disturbed Area
16.9	16.9	1.9	13.7

5. Do you plan to disturb more than 5 acres of soil at any one time? ● **Yes** ○ **No**

6. Indicate the percentage of each Hydrologic Soil Group(HSG) at the site.

A	B	C	D
84 %	0 %	0 %	16 %

7. Is this a phased project? ● **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date 04/01/2024 - **End Date** 10/01/2024

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Krum Kill

9a. Type of waterbody identified in Question 9?

- ○ Wetland / State Jurisdiction On Site (Answer 9b)
- ○ Wetland / State Jurisdiction Off Site
- ○ Wetland / Federal Jurisdiction On Site (Answer 9b)
- ○ Wetland / Federal Jurisdiction Off Site
- ○ Stream / Creek On Site
- ● Stream / Creek Off Site
- ○ River On Site
- ○ River Off Site
- ○ Lake On Site
- ○ Lake Off Site
- ○ Other Type On Site
- ○ Other Type Off Site

9b. How was the wetland identified?

- ○ Regulatory Map
- ○ Delineated by Consultant
- ○ Delineated by Army Corps of Engineers
- ○ Other (identify) N / A

10. Has the surface waterbody(ies) in question 9 been identified as a 303(d) segment in Appendix E of GP-0-20-001? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-20-001? ○ **Yes** ● **No**

12. Is the project located in one of the watershed areas associated with AA and AA-S classified waters? ○ **Yes** ● **No**
If no, skip question 13.

13. Does this construction activity disturb land with no existing impervious cover and where the Soil Slope Phase is identified as an E or F on the USDA Soil Survey? ○ **Yes** ○ **No**
If Yes, what is the acreage to be disturbed?

14. Will the project disturb soils within a State regulated wetland or the protected 100 foot adjacent area? ○ **Yes** ● **No**

15. Does the site runoff enter a separate storm sewer system (including roadside drains, swales, ditches, culverts, etc)? ◉ **Yes** ○ **No** ○ **Unknown**

16. What is the name of the municipality/entity that owns the separate storm sewer system?

Town of Guilderland

17. Does any runoff from the site enter a sewer classified as a Combined Sewer? ○ **Yes** ◉ **No** ○ **Unknown**

18. Will future use of this site be an agricultural property as defined by the NYS Agriculture and Markets Law? ○ **Yes** ◉ **No**

19. Is this property owned by a state authority, state agency, federal government or local government? ○ **Yes** ◉ **No**

20. Is this a remediation project being done under a Department approved work plan? (i.e. CERCLA, RCRA, Voluntary Cleanup Agreement, etc.) ○ **Yes** ◉ **No**

21. Has the required Erosion and Sediment Control component of the SWPPP been developed in conformance with the current NYS Standards and Specifications for Erosion and Sediment Control (aka Blue Book)? ◉ **Yes** ○ **No**

22. Does this construction activity require the development of a SWPPP that includes the post-construction stormwater management practice component (i.e. Runoff Reduction, Water Quality and Quantity Control practices/techniques)? ◉ **Yes** ○ **No**
If No, skip questions 23 and 27-39.

23. Has the post-construction stormwater management practice component of the SWPPP been developed in conformance with the current NYS Stormwater Management Design Manual? ◉ **Yes** ○ **No**

24. The Stormwater Pollution Prevention Plan (SWPPP) was prepared by:

- ● **Professional Engineer (P.E.)**
- ○ **Soil and Water Conservation District (SWCD)**
- ○ **Registered Landscape Architect (R.L.A)**
- ○ **Certified Professional in Erosion and Sediment Control (CPESC)**
- ○ **Owner/Operator**
- ○ **Other**

SWPPP Preparer

COLLIERS ENGINEERING & DESIGN

Contact Name (Last, Space, First)

McFall, , Russell

Mailing Address

410 Eagleview Boulevard, Suite 104

City

Exton

State PA Zip 19341-

Phone 610-254-9140

Fax 610-254-9141

Email

russell.mcfall@colliersengg.com

SWPPP Preparer Certification

I hereby certify that the Stormwater Pollution Prevention Plan (SWPPP) for this project has been prepared in accordance with the terms and conditions of the GP-0-20-001. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of this permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

First Name Russell **MI** T

Last Name McFall, II

Signature

Date / /

25. Has a construction sequence schedule for the planned management practices been prepared? ○ Yes ○ No

26. Select **all** of the erosion and sediment control practices that will be employed on the project site:

Temporary Structural

- ○ Check Dams
- ● Construction Road Stabilization
- ● Dust Control
- ○ Earth Dike
- ○ Level Spreader
- ○ Perimeter Dike/Swale
- ○ Pipe Slope Drain
- ○ Portable Sediment Tank
- ○ Rock Dam
- ○ Sediment Basin
- ○ Sediment Traps
- ○ Silt Fence
- ● Stabilized Construction Entrance
- ● Storm Drain Inlet Protection
- ○ Straw/Hay Bale Dike
- ○ Temporary Access Waterway Crossing
- ○ Temporary Stormdrain Diversion
- ● Temporary Swale
- ○ Turbidity Curtain
- ○ Water bars

Biotechnical

- ○ Brush Matting
- ○ Wattling

Vegetative Measures

- ○ Brush Matting
- ○ Dune Stabilization
- ○ Grassed Waterway
- ● Mulching
- ○ Protecting Vegetation
- ○ Recreation Area Improvement
- ● Seeding
- ○ Sodding
- ○ Straw/Hay Bale Dike
- ○ Streambank Protection
- ○ Temporary Swale
- ● Topsoiling
- ○ Vegetating Waterways

Permanent Structural

- ○ Debris Basin
- ○ Diversion
- ○ Grade Stabilization Structure
- ● Land Grading
- ○ Lined Waterway (Rock)
- ○ Paved Channel (Concrete)
- ○ Paved Flume
- ○ Retaining Wall
- ○ Riprap Slope Protection
- ○ Rock Outlet Protection
- ○ Streambank Protection

Other

Compost filter sock, concrete washout

Erosion matting

Post-construction Stormwater Management Practice (SMP) Requirements

Important: Completion of Questions 27-39 is not required if response to Question 22 is No.

27. Identify all site planning practices that were used to prepare the final site plan/layout for the project.

- ○ **Preservation of Undisturbed Areas**
- ○ **Preservation of Buffers**
- ○ **Reduction of Clearing and Grading**
- ○ **Locating Development in Less Sensitive Areas**
- ○ **Roadway Reduction**
- ○ **Sidewalk Reduction**
- ○ **Driveway Reduction**
- ○ **Cul-de-sac Reduction**
- ○ **Building Footprint Reduction**
- ○ **Parking Reduction**

27a. Indicate which of the following soil restoration criteria was used to address the requirements in Section 5.1.6("Soil Restoration") of the Design Manual (2010 version).

- ● All disturbed areas will be restored in accordance with the Soil Restoration requirements in Table 5.3 of the Design Manual (see page 5-22).
- ○ Compacted areas were considered as impervious cover when calculating the **WQv Required**, and the compacted areas were assigned a post-construction Hydrologic Soil Group (HSG) designation that is one level less permeable than existing conditions for the hydrology analysis.

28. Provide the total Water Quality Volume (WQv) required for this project (based on final site plan/layout).

Total WQv Required

		1	.	3	4	1

acre-feet

29. Identify the RR techniques (Area Reduction), RR techniques(Volume Reduction) and Standard SMPs with RRv Capacity in Table 1 (See Page 9) that were used to reduce the Total WQv Required(#28).

Also, provide in Table 1 the total impervious area that contributes runoff to each technique/practice selected. For the Area Reduction Techniques, provide the total contributing area (includes pervious area) and, if applicable, the total impervious area that contributes runoff to the technique/practice.

Note: Redevelopment projects shall use Tables 1 and 2 to identify the SMPs used to treat and/or reduce the WQv required. If runoff reduction techniques will not be used to reduce the required WQv, skip to question 33a after identifying the SMPs.

Table 1 - Runoff Reduction (RR) Techniques and Standard Stormwater Management Practices (SMPs)

	Total Contributing Area (acres)		Total Contributing Impervious Area (acres)
RR Techniques (Area Reduction)			
○ Conservation of Natural Areas (RR-1)		and/or	
○ Sheetflow to Riparian Buffers/Filters Strips (RR-2)		and/or	
○ Tree Planting/Tree Pit (RR-3)		and/or	
○ Disconnection of Rooftop Runoff (RR-4)		and/or	
RR Techniques (Volume Reduction)			
○ Vegetated Swale (RR-5)			
○ Rain Garden (RR-6)			
○ Stormwater Planter (RR-7)			
○ Rain Barrel/Cistern (RR-8)			
○ Porous Pavement (RR-9)			
○ Green Roof (RR-10)			
Standard SMPs with RRv Capacity			
○ Infiltration Trench (I-1)			
○ Infiltration Basin (I-2)			
○ Dry Well (I-3)			
● Underground Infiltration System (I-4)	14		04
○ Bioretention (F-5)			
○ Dry Swale (O-1)			
Standard SMPs			
○ Micropool Extended Detention (P-1)			
○ Wet Pond (P-2)			
○ Wet Extended Detention (P-3)			
○ Multiple Pond System (P-4)			
○ Pocket Pond (P-5)			
○ Surface Sand Filter (F-1)			
○ Underground Sand Filter (F-2)			
○ Perimeter Sand Filter (F-3)			
○ Organic Filter (F-4)			
○ Shallow Wetland (W-1)			
○ Extended Detention Wetland (W-2)			
○ Pond/Wetland System (W-3)			
○ Pocket Wetland (W-4)			
○ Wet Swale (O-2)			

Table 2 - Alternative SMPs
(DO NOT INCLUDE PRACTICES BEING USED FOR PRETREATMENT ONLY)

Alternative SMP	Total Contributing Impervious Area(acres)
○ **Hydrodynamic**	
○ **Wet Vault**	
○ **Media Filter**	
○ **Other**	

Provide the name and manufacturer of the Alternative SMPs (i.e. proprietary practice(s)) being used for WQv treatment.

Name

Manufacturer

Note: Redevelopment projects which do not use RR techniques, shall use questions 28, 29, 33 and 33a to provide SMPs used, total WQv required and total WQv provided for the project.

30. Indicate the Total RRv provided by the RR techniques (Area/Volume Reduction) and Standard SMPs with RRv capacity identified in question 29.

Total RRv provided

1.342 **acre-feet**

31. Is the Total RRv provided (#30) greater than or equal to the total WQv required (#28).

● **Yes** ○ **No**

If Yes, go to question 36.
If No, go to question 32.

32. Provide the Minimum RRv required based on HSG.
[Minimum RRv Required = (P)(0.95)(Ai)/12, Ai=(S)(Aic)]

Minimum RRv Required

. **acre-feet**

32a. Is the Total RRv provided (#30) greater than or equal to the Minimum RRv Required (#32)?

○ **Yes** ○ **No**

If Yes, go to question 33.
Note: Use the space provided in question #39 to summarize the specific site limitations and justification for not reducing 100% of WQv required (#28). A detailed evaluation of the specific site limitations and justification for not reducing 100% of the WQv required (#28) must also be included in the SWPPP.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

33. Identify the Standard SMPs in Table 1 and, if applicable, the Alternative SMPs in Table 2 that were used to treat the remaining total WQv(=Total WQv Required in 28 - Total RRv Provided in 30).

Also, provide in Table 1 and 2 the total impervious area that contributes runoff to each practice selected.

Note: Use Tables 1 and 2 to identify the SMPs used on Redevelopment projects.

33a. Indicate the Total WQv provided (i.e. WQv treated) by the SMPs identified in question #33 and Standard SMPs with RRv Capacity identified in question 29.

WQv Provided

1.342 **acre-feet**

Note: For the standard SMPs with RRv capacity, the WQv provided by each practice = the WQv calculated using the contributing drainage area to the practice - RRv provided by the practice. (See Table 3.5 in Design Manual)

34. Provide the sum of the Total RRv provided (#30) and the WQv provided (#33a). 1.342

35. Is the sum of the RRv provided (#30) and the WQv provided (#33a) greater than or equal to the total WQv required (#28)? ◉ **Yes** ○ **No**

If Yes, go to question 36.
If No, sizing criteria has not been met, so NOI can not be processed. SWPPP preparer must modify design to meet sizing criteria.

36. Provide the total Channel Protection Storage Volume (CPv) required and provided or select waiver (36a), if applicable.

CPv Required

1.72 **acre-feet**

CPv Provided

2.72 **acre-feet**

36a. The need to provide channel protection has been waived because:

○ Site discharges directly to tidal waters or a fifth order or larger stream.

○ Reduction of the total CPv is achieved on site through runoff reduction techniques or infiltration systems.

37. Provide the Overbank Flood (Qp) and Extreme Flood (Qf) control criteria or select waiver (37a), if applicable.

Total Overbank Flood Control Criteria (Qp)

Pre-Development

12.90 **CFS**

Post-development

9.70 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

27.38 **CFS**

Post-development

21.16 **CFS**

37a. The need to meet the Qp and Qf criteria has been waived because:

- ○ Site discharges directly to tidal waters or a fifth order or larger stream.
- ○ Downstream analysis reveals that the Qp and Qf controls are not required

38. Has a long term Operation and Maintenance Plan for the post-construction stormwater management practice(s) been developed? ● **Yes** ○ **No**

If Yes, Identify the entity responsible for the long term Operation and Maintenance

Costco Wholesale Corporation

39. Use this space to summarize the specific site limitations and justification for not reducing 100% of WQv required(#28). (See question 32a) This space can also be used for other pertinent project information.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ● Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP N Y R
- ○ Other
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ● **Yes** ○ **No**
If Yes, Indicate Size of Impact. 0.1

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ● **Yes** ○ **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ● **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. N Y R

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name: Heidi

MI:

Print Last Name: Jewell

Owner/Operator Signature:

Date: / /

APPENDIX 9

DRAFT NOTICE OF TERMINATION (NOT)

New York State Department of Environmental Conservation
Division of Water
625 Broadway, 4th Floor
Albany, New York 12233-3505
(NOTE: Submit completed form to address above)

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity

Please indicate your permit identification number: NYR ___ ___ ___ ___ ___ ___

I. Owner or Operator Information

1. Owner/Operator Name:

2. Street Address:

3. City/State/Zip:

4. Contact Person: | 4a.Telephone:

4b. Contact Person E-Mail:

II. Project Site Information

5. Project/Site Name:

6. Street Address:

7. City/Zip:

8. County:

III. Reason for Termination

9a. □ All disturbed areas have achieved final stabilization in accordance with the general permit and SWPPP. ***Date final stabilization completed** (month/year): _____

9b. □ Permit coverage has been transferred to new owner/operator. Indicate new owner/operator's permit identification number: NYR ___ ___ ___ ___ ___ ___
(Note: Permit coverage can not be terminated by owner identified in I.1. above until new owner/operator obtains coverage under the general permit)

9c. □ Other (Explain on Page 2)

IV. Final Site Information:

10a. Did this construction activity require the development of a SWPPP that includes post-construction stormwater management practices? □ yes □ no (If no, go to question 10f.)

10b. Have all post-construction stormwater management practices included in the final SWPPP been constructed? □ yes □ no (If no, explain on Page 2)

10c. Identify the entity responsible for long-term operation and maintenance of practice(s)?

_____

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

10d. Has the entity responsible for long-term operation and maintenance been given a copy of the operation and maintenance plan required by the general permit? □ yes □ no

10e. Indicate the method used to ensure long-term operation and maintenance of the post-construction stormwater management practice(s):

□ Post-construction stormwater management practice(s) and any right-of-way(s) needed to maintain practice(s) have been deeded to the municipality.

□ Executed maintenance agreement is in place with the municipality that will maintain the post-construction stormwater management practice(s).

□ For post-construction stormwater management practices that are privately owned, a mechanism is in place that requires operation and maintenance of the practice(s) in accordance with the operation and maintenance plan, such as a deed covenant in the owner or operator's deed of record.

□ For post-construction stormwater management practices that are owned by a public or private institution (e.g. school, university or hospital), government agency or authority, or public utility; policy and procedures are in place that ensures operation and maintenance of the practice(s) in accordance with the operation and maintenance plan.

10f. Provide the total area of impervious surface (i.e. roof, pavement, concrete, gravel, etc.) constructed within the disturbance area? _____ (acres)

11. Is this project subject to the requirements of a regulated, traditional land use control MS4? □ yes □ no

(If Yes, complete section VI - "MS4 Acceptance" statement

V. Additional Information/Explanation:

(Use this section to answer questions 9c. and 10b., if applicable)

VI. MS4 Acceptance - MS4 Official (principal executive officer or ranking elected official) or Duly Authorized Representative (Note: Not required when 9b. is checked -transfer of coverage)

I have determined that it is acceptable for the owner or operator of the construction project identified in question 5 to submit the Notice of Termination at this time.

Printed Name:

Title/Position:

Signature:	Date:

NOTICE OF TERMINATION for Storm Water Discharges Authorized under the SPDES General Permit for Construction Activity - continued

VII. Qualified Inspector Certification - Final Stabilization:

I hereby certify that all disturbed areas have achieved final stabilization as defined in the current version of the general permit, and that all temporary, structural erosion and sediment control measures have been removed. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

VIII. Qualified Inspector Certification - Post-construction Stormwater Management Practice(s):

I hereby certify that all post-construction stormwater management practices have been constructed in conformance with the SWPPP. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

IX. Owner or Operator Certification

I hereby certify that this document was prepared by me or under my direction or supervision. My determination, based upon my inquiry of the person(s) who managed the construction activity, or those persons directly responsible for gathering the information, is that the information provided in this document is true, accurate and complete. Furthermore, I understand that certifying false, incorrect or inaccurate information is a violation of the referenced permit and the laws of the State of New York and could subject me to criminal, civil and/or administrative proceedings.

Printed Name:	
Title/Position:	
Signature:	Date:

(NYS DEC Notice of Termination - January 2015)

APPENDIX 10

DRAFT CONTRACTOR CERTIFICATION FORM

CONR 5
(9/17)

Contractor / Subcontractor SPDES Permit Certification

Contract No.: _____ PIN: _____

Description: _____

Town, Village, City: _____

County: _____

Check Applicable Box: ☐ Prime Contractor ☐ Subcontractor

Name of Contractor/
Subcontractor: _____

Address: _____

City: _____ State: _____ ZIP: _____

Phone: _____ Fax: _____

Core Pay Item Groups for which the Contractor/Subcontractor will be responsible (e.g. 203, 207, 209, etc.): _____ _____ _____ _____ _____ _____ _____ _____

Mandatory Certification: The SPDES General Permit for Stormwater Discharges from Construction Activities requires the Prime Contractor and subcontractors to certify they understand the Stormwater Pollution Prevention Plan (SWPPP), the General Permit conditions, and their responsibilities for compliance. The certification must be signed prior to performing any contract work. The certification shall be signed by an Owner, Principal, President, Secretary or Treasurer of the firm in accordance with the signature requirements of 102-05 *Proposal Submission* of the Standard Specifications.

"I hereby certify under penalty of law that I understand and agree to comply with the terms and conditions of the SWPPP and agree to implement any corrective actions identified by the qualified inspector during a site inspection. I also understand that the owner or operator must comply with the terms and conditions of the most current version of the New York State Pollutant Discharge Elimination System ("SPDES") general permit for stormwater discharges from construction activities and that it is unlawful for any person to cause or contribute to a violation of water quality standards. Furthermore, I am aware that there are significant penalties for submitting false information, that I do not believe to be true, including the possibility of fine and imprisonment for knowing violations."

Signature: _____ Date: _____

Name: _____ Title: _____

Required Training: Effective April 30, 2010, the SPDES General Permit also requires the Prime Contractor and all subcontractors ***performing earthwork or soil-disturbing activities*** to identify at least one trained individual ***from each company*** who will be responsible for implementing the SWPPP and who shall be on-site on a daily basis when the company is performing soil disturbance activities. These activities include clearing, grubbing, grading, filling, excavation, stockpiling, demolition, landscaping, and installation and maintenance of Erosion & Sediment Control practices. Training must consist of 4 hours of NYSDEC-endorsed Erosion & Sediment Control Training every 3 years. (Training is not required if the individual is a licensed Professional Engineer, registered licensed Landscape Architect, or CPESC.) Provide the information below for trained individuals who will be on-site and responsible for SWPPP implementation on this Contract (attach a separate sheet if needed for additional Trained Individuals):

Trained Individual Name/Title : _____

Name of Training Course: _____

Trainee Number: _____ Date of Training: _____

Trained Individual Name/Title : _____

Name of Training Course: _____

Trainee Number: _____ Date of Training: _____

APPENDIX 11

NEW YORK STANDARDS AND SPECS FOR EROSION AND SEDIMENT CONTROL APPENDIX F: CONSTRUCITON SITE LOG BOOK

APPENDIX F
CONSTRUCTION SITE INSPECTION AND MAINTENANCE LOG BOOK

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM FOR CONSTRUCTION ACTIVITIES

SAMPLE CONSTRUCTION SITE LOG BOOK

Table of Contents

I. Pre-Construction Meeting Documents
   a. Preamble to Site Assessment and Inspections
   b. Pre-Construction Site Assessment Checklist

II. Construction Duration Inspections
   a. Directions
   b. Modification to the SWPPP

I. **PRE-CONSTRUCTION MEETING DOCUMENTS**

Project Name _____

Permit No. _____ **Date of Authorization** _____

Name of Operator _____

Prime Contractor _____

a. **Preamble to Site Assessment and Inspections**

The Following Information To Be Read By All Person's Involved in The Construction of Stormwater Related Activities:

The Operator agrees to have a qualified inspector[1] conduct an assessment of the site prior to the commencement of construction[2] and certify in this inspection report that the appropriate erosion and sediment controls described in the SWPPP have been adequately installed or implemented to ensure overall preparedness of the site for the commencement of construction.

Prior to the commencement of construction, the Operator shall certify in this site logbook that the SWPPP has been prepared in accordance with the State's standards and meets all Federal, State and local erosion and sediment control requirements. A preconstruction meeting should be held to review all of the SWPPP requirements with construction personnel.

When construction starts, site inspections shall be conducted by the qualified inspector at least every 7 calendar days. The Operator shall maintain a record of all inspection reports in this site logbook. The site logbook shall be maintained on site and be made available to the permitting authorities upon request.

Prior to filing the Notice of Termination or the end of permit term, the Operator shall have a qualified inspector perform a final site inspection. The qualified inspector shall certify that the site has undergone final stabilization[3] using either vegetative or structural stabilization methods and that all temporary erosion and sediment controls (such as silt fencing) not needed for long-term erosion control have been removed. In addition, the Operator must identify and certify that all permanent structures described in the SWPPP have been constructed and provide the owner(s) with an operation and maintenance plan that ensures the structure(s) continuously functions as designed.

1 Refer to "Qualified Inspector" inspection requirements in the current SPDES General Permit for Stormwater Discharges from Construction Activity for complete list of inspection requirements.
2 "Commencement of construction" means the initial removal of vegetation and disturbance of soils associated with clearing, grading or excavating activities or other construction activities.
3 "Final stabilization" means that all soil-disturbing activities at the site have been completed and a uniform, perennial vegetative cover with a density of eighty (80) percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on all unpaved areas and areas not covered by permanent structures.

b. Pre-construction Site Assessment Checklist
(NOTE: Provide comments below as necessary)

1. Notice of Intent, SWPPP, and Contractors Certification:

Yes No NA

[ ] [ ] [ ] Has a Notice of Intent been filed with the NYS Department of Conservation?
[ ] [ ] [ ] Is the SWPPP on-site? Where?_____
[ ] [ ] [ ] Is the Plan current? What is the latest revision date?_____
[ ] [ ] [ ] Is a copy of the NOI (with brief description) onsite? Where?_____
[ ] [ ] [ ] Have all contractors involved with stormwater related activities signed a contractor's certification?

2. Resource Protection

Yes No NA

[ ] [ ] [ ] Are construction limits clearly flagged or fenced?
[ ] [ ] [ ] Important trees and associated rooting zones, on-site septic system absorption fields, existing vegetated areas suitable for filter strips, especially in perimeter areas, have been flagged for protection.
[ ] [ ] [ ] Creek crossings installed prior to land-disturbing activity, including clearing and blasting.

3. Surface Water Protection

Yes No NA

[ ] [ ] [ ] Clean stormwater runoff has been diverted from areas to be disturbed.
[ ] [ ] [ ] Bodies of water located either on site or in the vicinity of the site have been identified and protected.
[ ] [ ] [ ] Appropriate practices to protect on-site or downstream surface water are installed.
[ ] [ ] [ ] Are clearing and grading operations divided into areas <5 acres?

4. Stabilized Construction Access

Yes No NA

[ ] [ ] [ ] A temporary construction entrance to capture mud and debris from construction vehicles before they enter the public highway has been installed.
[ ] [ ] [ ] Other access areas (entrances, construction routes, equipment parking areas) are stabilized immediately as work takes place with gravel or other cover.
[ ] [ ] [ ] Sediment tracked onto public streets is removed or cleaned on a regular basis.

5. Sediment Controls

Yes No NA

[ ] [ ] [ ] Silt fence material and installation comply with the standard drawing and specifications.
[ ] [ ] [ ] Silt fences are installed at appropriate spacing intervals
[ ] [ ] [ ] Sediment/detention basin was installed as first land disturbing activity.
[ ] [ ] [ ] Sediment traps and barriers are installed.

6. Pollution Prevention for Waste and Hazardous Materials

Yes No NA

[ ] [ ] [ ] The Operator or designated representative has been assigned to implement the spill prevention avoidance and response plan.
[ ] [ ] [ ] The plan is contained in the SWPPP on page _____
[ ] [ ] [ ] Appropriate materials to control spills are onsite. Where? _____

II. CONSTRUCTION DURATION INSPECTIONS

a. Directions:

Inspection Forms will be filled out during the entire construction phase of the project.

Required Elements:

1) On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period;

2) Indicate on a site map all areas of the site that have undergone temporary or permanent stabilization;

3) Indicate all disturbed site areas that have not undergone active site work during the previous 14-day period;

4) Inspect all sediment control practices and record the approximate degree of sediment accumulation as a percentage of sediment storage volume (for example, 10 percent, 20 percent, 50 percent);

5) Inspect all erosion and sediment control practices and record all maintenance requirements such as verifying the integrity of barrier or diversion systems (earthen berms or silt fencing) and containment systems (sediment basins and sediment traps). Identify any evidence of rill or gully erosion occurring on slopes and any loss of stabilizing vegetation or seeding/mulching. Document any excessive deposition of sediment or ponding water along barrier or diversion systems. Record the depth of sediment within containment structures, any erosion near outlet and overflow structures, and verify the ability of rock filters around perforated riser pipes to pass water; and

6) Immediately report to the Operator any deficiencies that are identified with the implementation of the SWPPP.

SITE PLAN/SKETCH

Inspector (print name)	**Date of Inspection**
Qualified Inspector (print name)	**Qualified Inspector Signature**

The above signed acknowledges that, to the best of his/her knowledge, all information provided on the forms is accurate and complete.

Maintaining Water Quality

Yes No NA

[ ] [ ] [ ] Is there an increase in turbidity causing a substantial visible contrast to natural conditions at the outfalls?
[ ] [ ] [ ] Is there residue from oil and floating substances, visible oil film, or globules or grease at the outfalls?
[ ] [ ] [ ] All disturbance is within the limits of the approved plans.
[ ] [ ] [ ] Have receiving lake/bay, stream, and/or wetland been impacted by silt from project?

Housekeeping

1. General Site Conditions

Yes No NA

[ ] [ ] [ ] Is construction site litter, debris and spoils appropriately managed?
[ ] [ ] [ ] Are facilities and equipment necessary for implementation of erosion and sediment control in working order and/or properly maintained?
[ ] [ ] [ ] Is construction impacting the adjacent property?
[ ] [ ] [ ] Is dust adequately controlled?

2. Temporary Stream Crossing

Yes No NA

[ ] [ ] [ ] Maximum diameter pipes necessary to span creek without dredging are installed.
[ ] [ ] [ ] Installed non-woven geotextile fabric beneath approaches.
[ ] [ ] [ ] Is fill composed of aggregate (no earth or soil)?
[ ] [ ] [ ] Rock on approaches is clean enough to remove mud from vehicles & prevent sediment from entering stream during high flow.

3. Stabilized Construction Access

Yes No NA

[ ] [ ] [ ] Stone is clean enough to effectively remove mud from vehicles.
[ ] [ ] [ ] Installed per standards and specifications?
[ ] [ ] [ ] Does all traffic use the stabilized entrance to enter and leave site?
[ ] [ ] [ ] Is adequate drainage provided to prevent ponding at entrance?

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

[ ] [ ] [ ] Upstream and downstream berms (sandbags, inflatable dams, etc.) are installed per plan.
[ ] [ ] [ ] Clean water from upstream pool is being pumped to the downstream pool.
[ ] [ ] [ ] Sediment laden water from work area is being discharged to a silt-trapping device.
[ ] [ ] [ ] Constructed upstream berm with one-foot minimum freeboard.

Runoff Control Practices (continued)

2. Flow Spreader

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Constructed on undisturbed soil, not on fill, receiving only clear, non-sediment laden flow.
[ ] [ ] [ ] Flow sheets out of level spreader without erosion on downstream edge.

3. Interceptor Dikes and Swales

Yes No NA

[ ] [ ] [ ] Installed per plan with minimum side slopes 2H:1V or flatter.
[ ] [ ] [ ] Stabilized by geotextile fabric, seed, or mulch with no erosion occurring.
[ ] [ ] [ ] Sediment-laden runoff directed to sediment trapping structure

4. Stone Check Dam

Yes No NA

[ ] [ ] [ ] Is channel stable? (flow is not eroding soil underneath or around the structure).
[ ] [ ] [ ] Check is in good condition (rocks in place and no permanent pools behind the structure).
[ ] [ ] [ ] Has accumulated sediment been removed?.

5. Rock Outlet Protection

Yes No NA

[ ] [ ] [ ] Installed per plan.
[ ] [ ] [ ] Installed concurrently with pipe installation.

Soil Stabilization

1. Topsoil and Spoil Stockpiles

Yes No NA

[ ] [ ] [ ] Stockpiles are stabilized with vegetation and/or mulch.
[ ] [ ] [ ] Sediment control is installed at the toe of the slope.

2. Revegetation

Yes No NA

[ ] [ ] [ ] Temporary seedings and mulch have been applied to idle areas.
[ ] [ ] [ ] 4 inches minimum of topsoil has been applied under permanent seedings

Sediment Control Practices

1. Silt Fence and Linear Barriers

Yes No NA

[ ] [ ] [ ] Installed on Contour, 10 feet from toe of slope (not across conveyance channels).
[ ] [ ] [ ] Joints constructed by wrapping the two ends together for continuous support.
[ ] [ ] [ ] Fabric buried 6 inches minimum.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
Sediment accumulation is ___% of design capacity.

Sediment Control Practices (continued)

2. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated; Filter Sock or Manufactured practices)

Yes No NA

[ ] [ ] [ ] Installed concrete blocks lengthwise so open ends face outward, not upward.
[ ] [ ] [ ] Placed wire screen between No. 3 crushed stone and concrete blocks.
[ ] [ ] [ ] Drainage area is 1acre or less.
[ ] [ ] [ ] Excavated area is 900 cubic feet.
[ ] [ ] [ ] Excavated side slopes should be 2:1.
[ ] [ ] [ ] 2" x 4" frame is constructed and structurally sound.
[ ] [ ] [ ] Posts 3-foot maximum spacing between posts.
[ ] [ ] [ ] Fabric is embedded 1 to 1.5 feet below ground and secured to frame/posts with staples at max 8-inch spacing.
[ ] [ ] [ ] Posts are stable, fabric is tight and without rips or frayed areas.
[ ] [ ] [ ] Manufactured insert fabric is free of tears and punctures.
[ ] [ ] [ ] Filter Sock is not torn or flattened and fill material is contained within the mesh sock.

Sediment accumulation ___% of design capacity.

3. Temporary Sediment Trap

Yes No NA

[ ] [ ] [ ] Outlet structure is constructed per the approved plan or drawing.
[ ] [ ] [ ] Geotextile fabric has been placed beneath rock fill.
[ ] [ ] [ ] Sediment trap slopes and disturbed areas are stabilized.

Sediment accumulation is ___% of design capacity.

4. Temporary Sediment Basin

Yes No NA

[ ] [ ] [ ] Basin and outlet structure constructed per the approved plan.
[ ] [ ] [ ] Basin side slopes are stabilized with seed/mulch.
[ ] [ ] [ ] Drainage structure flushed and basin surface restored upon removal of sediment basin facility.
[ ] [ ] [ ] Sediment basin dewatering pool is dewatering at appropriate rate.

Sediment accumulation is ___% of design capacity.

Note: Not all erosion and sediment control practices are included in this listing. Add additional pages to this list as required by site specific design. All practices shall be maintained in accordance with their respective standards.

Construction inspection checklists for post-development stormwater management practices can be found in Appendix F of the New York Stormwater Management Design Manual.

CONSTRUCTION DURATION INSPECTIONS

b. Modifications to the SWPPP (To be completed as described below)

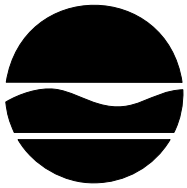
The Operator shall amend the SWPPP whenever:

1. There is a significant change in design, construction, operation, or maintenance which may have a significant effect on the potential for the discharge of pollutants to the waters of the United States and which has not otherwise been addressed in the SWPPP; or
2. The SWPPP proves to be ineffective in:
   a. Eliminating or significantly minimizing pollutants from sources identified in the SWPPP and as required by this permit; or
   b. Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity; and
3. Additionally, the SWPPP shall be amended to identify any new contractor or subcontractor that will implement any measure of the SWPPP.

Modification & Reason:

APPENDIX 12

NYSDEC CONSTRUCTION STORMWATER INSPECTION MANUAL



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Construction Stormwater Inspection Manual

Primarily for Government Inspectors Evaluating Compliance with Construction Stormwater Control Requirements

New York State
Department of Environmental Conservation

TABLE OF CONTENTS

Version 1.05 (8/27/07)

Section		Content	Page
1.0		**INTRODUCTION AND PURPOSE**	1
	1.1	Compliance Inspections	1
	1.2	Self-inspections	2
2.0		**PRE-INSPECTION ACTIVITIES**	3
	2.1	Regulatory Oversight Authorities	3
	2.2	Permittee's Self-inspector	5
3.0		**ON-SITE INSPECTION ACTIVITIES**	5
	3.1	Compliance Inspections	5
	3.2	Non-permitted Site Inspections	9
	3.3	Self-inspections	9
4.0		**POST-INSPECTION ACTIVITIES**	10
	4.1	Regulatory Oversight Authorities	10
	4.2	Permittee's Self-inspections	11

ATTACHMENTS

Attachment 1 - Compliance Inspection Form 12

Attachment 2 - Unpermitted Site Notice 14

Attachment 3 - Example Inspection Letter 15

1.0 INTRODUCTION AND PURPOSE

The New York State Department of Environmental Conservation Division of Water (DOW) considers there to be two types of inspections germane to construction stormwater; compliance inspections and self-inspections.

This manual is for use by DOW and other regulatory oversight construction stormwater inspectors in performing compliance inspections, as well as for site operators in performing self inspections. The manual should be used in conjunction with the *New York State Standards and Specifications for Erosion and Sediment Control,* August 2005.

1.1 Compliance Inspections

Regulatory compliance inspections are performed by regulatory oversight authorities such as DOW staff, or representatives of DOW and local municipal construction stormwater inspectors. These inspections are intended to determine compliance with the state or local requirements for control of construction stormwater through erosion and sediment control and post construction practices. Compliance inspections focus on determinations of compliance with legal and water quality standards. Typically, compliance inspections can be further sub-categorized to include comprehensive inspections, and follow-up or reconnaissance inspections.

Compliance inspectors will focus on determining whether:

- the project is causing water quality standard violations;
- the required Stormwater Pollution Prevention Plan (SWPPP) includes appropriate erosion and sediment controls and, to some extent, post construction controls;
- the owner/operator is complying with the SWPPP;
- where required, self-inspections are being properly performed; and
- where self-inspections are required, the owner/operator responds appropriately to the self-inspector's reports.

1.1.1 Comprehensive Inspection

Comprehensive inspections are designed to verify permittee compliance with all applicable regulatory requirements, effluent controls, and compliance schedules. This inspection involves records reviews, visual observations, and evaluations of management practices, effluents, and receiving waters.

Comprehensive inspections should be conducted according to a neutral or random inspection scheme, or in accordance with established priorities. A neutral monitoring scheme provides some objective basis for scheduling inspections and sampling visits by establishing a system (whether complex factor-based, alphabetic, or geographic) for setting prioritiesto ensure that a particular facility is not unfairly selected for inspection or sampling. The selection of which

facility to inspect must be made without bias to ensure that the regulatory oversight authority, if challenged for being arbitrary and capricious manner, can reasonably defend itself.

A neutral inspection scheme should set the criteria the inspector uses to choose which facilities to inspect, but the schedule for the actual inspection should remain confidential, and may be kept separate from the neutral plan.

A routine comprehensive compliance inspection is most effective when it is unannounced or conducted with very little advance warning.

1.1.2 Reconnaissance Inspection

A reconnaissance inspection is performed in lieu of, or following a comprehensive inspection to obtain a preliminary overview of an owner/operator's compliance program, to respond to a citizen complaint, or to assess a non-permitted site. The inspector performs a brief (generally about an hour) visual inspection of the site, discharges and receiving waters. A reconnaissance inspection uses the inspector's experience and judgement to summarize potential compliance problems, without conducting a full comprehensive inspection. The objective of a reconnaissance inspection is to expand inspection coverage without increasing inspection resource expenditures. The reconnaissance inspection is the shortest and least resource intensive of all inspections.

Reconnaissance inspections may be initiated in response to known or suspected violations, a public complaint, a violation of regulatory requirements, or as follow-up to verify that necessary actions were taken in response to a previous inspection.

1.2 Self-inspections

For some projects, the site owner/operator is required by their State Pollutant Discharge Elimination System (SPDES) Permit and/or local requirements to have a qualified professional[1] perform a "self-inspection" at the site. In self-inspections, the qualified professional determines whether the site is being managed in accordance with the SWPPP, and whether the SWPPP's recommended erosion and sediment controls are effective. If activities are not in accordance with the SWPPP, or if the SWPPP erosion and sediment controls are not effective, the qualified professional inspecting the site recommends corrections to the owner/operator.

[1] A "Qualified professional" is a person knowledgeable in the principles and practice of erosion and sediment controls, such as a licensed professional engineer, Certified Professional in Erosion and Sediment Control (CPESC), licensed landscape architect or soil scientist.

2.0 PRE-INSPECTION ACTIVITIES

2.1 Regulatory Oversight Authorities

This section is intended for inspectors with regulatory oversight authority such as agents of the DOW or a local municipality, or others acting on their behalf, such as county Soil and Water Conservation District staff. Examples of other regulatory oversight authorities include: the United States Environmental Protection Agency (EPA); New York City Department of Environmental Protection (DEP), Adirondack Park Agency (APA); the Lake George Park Commission (LGPC), and the Skaneateles Lake Watershed Authority (SLWA). Before arriving on-site to conduct the inspection, considerations concerning communication, documentation and equipment must be made.

Regulatory oversight authority is granted by state or local law to government agencies or, depending upon the particular law, an authorized representative of state or local government. SPDES rules 6 NYCRR 750-2.3 and Environmental Conservation Law 17-0303(6) and 17-0829(a) all allow for authorized representatives of the (NYSDEC) commissioner to perform all the duties of an inspector.

2.1.1 Communication

Coordination with Other Entities

Where appropriate, prior to selecting sites for inspection, compliance inspectors should communicate with other regulatory oversight authorities to avoid unnecessary duplication or to coordinate follow-up to inspections performed by other regulatory oversight authorities.

Announced vs. Unannounced Inspection

Inspections may be announced or unannounced. Each method has its own advantages and disadvantages. Unannounced inspections are preferred, however many job sites are not continuously manned, or not always staffed by someone who is familiar with the SWPPP, thus necessitating an announced inspection. As an alternative, when an announced inspection is necessary, inspectors should try to give as little advanced warning as possible (24 hours is suggested).

Itinerary

For obvious safety reasons, inspectors should be sure to inform someone in their office which site or sites they will be visiting prior to leaving the to perform inspections.

2.1.2 Documentation

Data Review

The inspector should review any available information such as:

- Notice of Intent
- Stormwater Pollution Prevention Plan
- Past inspection records
- Phasing plan

- Construction sequence
- Inspection and Maintenance schedules
- Site specific issues
- Consent Orders
- Access agreements

Inspection Form

The inspector should have copies of, and be familiar with, the inspection form used by their regulatory oversight authority (example in Attachment 1) before leaving the office. Static information such as name, location and permit number can be entered onto the inspection form prior to arriving at the inspection site.

Credentials

Inspectors should always carry proper identification to prove that they are employed by an entity with jurisdictional authority. Failure to display proper credentials may be legal grounds for denial of entry to a site.

2.1.3 Equipment

Personal Protective Equipment

DOW employees must conform to the DOW Health and Safety policy as it relates to personal protective equipment. Other regulatory oversight authorities should have their own safety policies or, if not, may wish to consult the OSHA health and safety tool at: www.osha.gov/dep/etools/ehasp/ to develop a health and safety plan.

The following is a list of some of the most common health and safety gear that may be needed:

- Hard hat (Class G, Type1 or better)
- Safety toe shoes
- Reflective vest
- Hearing protection (to achieve 85 dBA - 8 hr TWA)
- Safety glasses with side shields

If the construction is on an industrial site or a hazardous waste site, special training may be required prior to entering the site. The inspector should consult with OSHA or NYSDEC prior to entering such a site.

Monitoring Equipment

The following is a list of some equipment that may be helpful to document facts and verify compliance:

- Digital Camera
- Measuring tape or wheel
- Hand level or clinometer
- Turbidity meter (in limited circumstances)

2.2 Permittee's Self-inspection

This section is intended for qualified professionals who conduct site self-inspections on behalf of owner/operators. Self-inspectors are responsible for performing inspections in accordance with permit requirements and reporting to site owners and operators the results and any recommendations resulting from the inspection.

Prior to conducting inspections, qualified professionals should ensure familiarity with the Stormwater Pollution Prevention Plan and previous inspection reports.

3.0 ON-SITE INSPECTION PROCESS

3.1 Compliance Inspections

3.1.1 Professionalism

Don't Pretend to Possess Knowledge

Unless the inspector has experience with a particular management practice, do not pretend to possess knowledge. Inspectors cannot be expert in all areas; their job is to collect information, not to demonstrate superior wisdom. Site operators are often willing to talk to someone who is inquisitive and interested. Within reason, asking questions to obtain new information about a management practice, construction technique or piece of equipment is one of the inspector's main roles in an inspection.

Don't Recommend Solutions

The inspector should not recommend solutions or endorse products. The solution to a compliance problem may appear obvious based on the inspector's experience. However, the responsibility should be placed on the site owner to implement a workable solution to a compliance problem that meets NYSDEC standards. The inspector should refer the site operator to the New York Standards and Specifications for Erosion and Sediment Control (the Blue Book) or the New York State Stormwater Management Design Manual (the Design Manual).

Key advice must be offered carefully. One experienced stormwater inspector suggests saying: "I can't direct you or make recommendations, but what we've seen work in other situations is ..."

The way inspectors present themselves is important to the effectiveness of the inspection. An inspector cannot be overly familiar, but will be more effective if able to establish a minimum level of communication.

3.1.2 Safety

DOW employees must conform to Division health and safety policies when on a construction site. Other regulatory oversight authorities should have their own safety policies or, if not, may

wish to consult the OSHA health and safety tool at:

www.osha.gov/dep/etools/ehasp to develop a health and safety plan.

Some general protections for construction sites are:

- Beware of heavy equipment, avoid operator blind spots and make sure of operator eye contact around heavy equipment.
- Avoid walking on rock rip-rap if possible. Loose rock presents a slip hazard.
- Stay out of confined spaces like tanks, trenches and foundation holes.
- Avoid lightning danger. Monitor weather conditions, get out of water, avoid open areas and high points, do not huddle in groups or near trees.
- Protect yourself from sun and heat exposure. Use sun screen or shading clothing. Remain hydrated by drinking water, watching for signs of heat cramps, exhaustion (fatigue, nausea, dizziness, headache, cool or moist skin), or stroke (high body temperature; red, hot and dry skin)
- Protect yourself from cold weather. Wear multiple layers of thin clothing. Wear a warm hat. Drink warm fluids or eat hot foods, and keep dry.
- Avoid scaffolding in excess of 4 feet above grade.
- Beware of ticks, stinging insects, snakes and poison ivy or sumac.

3.1.3 Legal access

DOW has general powers, set forth under ECL 17-0303, subparagraph 6, to enter premises for inspections. In addition, ECL 3-0301.2 conveys general statutory authority granting the DOW the power to access private property to fulfill DOW obligations under the law.

ECL 15-0305 gives the DOW the authority to enter at all times in or upon any property, public or private, for the purpose of inspecting or investigating conditions affecting the construction of improvements to or developments of water resources for the public health, safety or welfare.

ECL 17-0829 allows an authorized DOW representative, upon presentation of their credentials, to enter upon any premises where any effluent source is located, or in which records are required to be maintained. The representative may at reasonable times have access to, and sample discharges/pollutants to the waters or to publicly owned treatment plants where the effluent source is located. This subparagraph provides DOW representatives performing their duties authority to enter a site to pursue administrative violations. Pursuing criminal violations may require a warrant or the owner's permission to enter the site.

For sites that are permitted, DOW has authority under the permit to enter the site.

If the owner/operator's representatives onsite deny access, the inspector *should not* physically force entry. Under these circumstances the attorney representing the inspector should be immediately notified and consideration should be given to soliciting the aid of a law officer to obtain entry.

DOW staff have the right to enter at any reasonable time. If no one is available, and the site is fenced or posted, DOW staff should make all reasonable efforts to identify, contact and notify the owner that the DOW is entering the site. If the inspector has made all reasonable efforts to contact site owners, but was unable to do so, the site can then be accessed. All efforts should be taken not to cause any damage to the facility.

Other regulatory oversight authorities should seek advice on their legal authorities to enter a job site. Municipalities that have adopted Article 6 of the New York State Sample Local Law for Stormwater Management and Erosion and Sediment Control (NYSDEC, 2004, updated 2006) will have legal authority to enter sites in accordance with that chapter and any other existing municipal authority .

Agents of DOW have authority similar DOW staff authority to enter sites. However, DOW staff enjoy significant personal liability protections as state employees. That liability protection may not be the same for authorized representatives of DOW. For authorized representatives of DOW (or other regulatory oversight authorities), it is prudent to obtain permission to enter the site. If such permission is denied, the authorized representatives should inform the appropriate DOW contact, usually the regional water manager.

3.1.4 Find the Legally Responsible Party (Construction Manager, Self-inspector)

The first action a compliance inspector should take upon entering a construction site is to find the construction trailer or the construction or project manager if they are available. The inspector should present appropriate identification to the site's responsible party and state the reason for the inspection; construction stormwater complaint response or neutral construction stormwater inspection. If the inspection is initiated as a response to a complaint, frequently the responsible party will ask who made the complaint. DOW keeps private individual complainants confidential. If the complainant is another regulatory oversight authority, DOW tends to make that known to the site's responsible party.

3.1.5 On-site records review (NOI, SWPPP, Self-inspection Reports, Permit)

Generally, the compliance inspector should next review the on-site records. Verify that a copy of the construction stormwater permit and NOI are on-site. Verify that the acreage, site conditions, and receiving water listed on the NOI are accurate. Compare the on-site documentation with documentation already submitted to, or obtained by the compliance inspector.

If the SWPPP has not been reviewed in the office, verify that it exists and contains the minimum required components (16 for a basic plan and 22 for a full plan). On-site review of the SWPPP should determine if: there is an appropriate phasing plan; the acreage disturbed in each phase, construction sequence for each phase; proposed implementation of erosion and sediment control measures; and, where required, post construction controls. For each of the erosion and sediment control practices, the SWPPP must show design details in accordance with the NYS Standards for Erosion and Sediment Controls. The SWPPP must also include provisions for maintenance of practices during construction. On-site review of post construction controls is generally limited to verification that the proposed stormwater management practices are shown on the site plan.

Where self-inspections are required, self-inspection reports are a significant tool for the compliance inspector to determine the performance history of the site. The self-inspection reports should be done with the required frequency . Self-inspection reports must include all the details required by the permit. Generally, it is desirable for permit information to be shown on a site plan. The compliance inspector should become familiar with the report and use that familiarity to judge whether the self-inspections are being performed correctly and that the site operator is correcting deficiencies noted in the report.

3.1.6 Walk the Site

During wet weather conditions, it may be advantageous to observe the receiving waters prior to walking the rest of the site. At some point during the inspection, the receiving water conditions must be observed and noted. It is critical to note if there is a substantial visible contrast to natural conditions, or evidence of deposition, streambank erosion, construction debris or waste materials (e.g. concrete washdown) in the receiving stream.

Each inspector should evaluate actual implementation and maintenance of practices on-site compared to how implementation and maintenance is detailed in the SWPPP. At a minimum, the compliance inspector should observe all areas of active construction. Observing equipment or materials storage, recently stabilized areas, or stockpile areas is also appropriate to evaluate the effectiveness of management practices.

3.1.7 Taking Photographs

Evidence of poor receiving water conditions and poor or ineffective practices should be documented with digital photographs. Those photographs should be logged date stamped and stored on media that cannot be edited (e.g. write only CDs). Photos should also be appended to the site inspector's report.

It is also beneficial to take photographs of good practices for educational and technology transfer reasons.

3.1.8 Exit Interview

Clearly communicate expectations and consequences. If it is clear from the inspection that the owner/operator must modify the SWPPP, or modify management practices within an assigned period (e.g. 24 hours, 48 hours, one week, two weeks), then that finding should be communicated at the time of the exit interview. The inspector should assign the period based on factors such as how long it would reasonably take to complete such modifications and the level of risk to water quality associated with failure to make such modifications.

The inspector should make clear that NYSDEC reserves rights to future enforcement actions. If the inspector's supervisor or enforcement coordinator determines additional enforcement actions are necessary, the inspector *should not* reassure the owner/operator that the current situation is acceptable.

3.2 Non-permitted Site Inspections

For sites not authorized in accordance with state or local laws, the process will be abbreviated. First verify the need for authorization and observe receiving waters to detect water quality standard violations. If there is a violation, notify the owner of the violation or other compliance actions in response to their illicit activity. For DOW staff, Attachment 2 or a similar notice can be used to notify the site owner/operator that stormwater authorization is required.

3.3 Self-inspections

The role of the self-inspector is to verify that the site is complying with stormwater requirements. In particular, the self-inspector verifies that the SWPPP is being properly implemented. The self-inspector also documents SWPPP implementation so regulatory agencies can review implementation activities.

It is <u>not</u> the role of the self-inspector to report directly to regulatory authorities.

Appendix H of *The New York Standards and Specifications for Erosion and Sediment Control* - August 2005 (the Blue Book) includes a Construction Duration Inspection checklist that can be used by the owner/operators qualified professional for self-inspections. The Blue Book is available on the NYSDEC website.

3.3.1 Purpose

The self inspector should ensure that the project's SWPPP is being properly implemented. This includes ensuring that the erosion and sediment control practices are properly installed and being maintained in accordance with the SWPPP/Blue Book.

The project must be properly phased to limit the disturbance to less than five acres, and the construction sequence for each phase must be followed. The SWPPP must also be modified to address evolving circumstances. Finally, and most importantly, receiving waters must be protected.

If a soil disturbance will be greater than five acres at any given time, the site operator must obtain written permission from the DOW regional office.

3.3.2 Pre-construction Conference

The parties responsible for various aspects of stormwater compliance should be identified at the pre-construction conference. Responsible parties may include, but are not limited to, owner's engineer, owner/operator/permittee, contractors, and subcontractors.

Typical responsibilities include: installation of erosion and sediment control (E & SC) practices; maintenance of E & SC practices, inspection of E&SC practices, installation of post construction stormwater management practices (SMPs), inspection of post construction SMPs, SWPPP revisions, and contractor direction.

All parties should clearly know what is expected of them. Responsible parties should complete the Pre-construction Site Assessment Checklist provided in Appendix H of the Blue Book.

3.3.3 Inspection Preparation

The inspector should review the project's SWPPP (including the phasing plan, construction sequence and site specific issues) and the last few inspection reports (if the inspector has them available).

3.3.4 Self-inspection Components

Inspect installation, performance and maintenance of all E&SC practices

The self inspector should inspect all areas that are under active construction or disturbance and areas that are vulnerable to erosion. The self-inspector should also inspect areas that will be disturbed prior to the next inspection for measures required prior to construction (e.g. silt barriers, stabilized construction entrance, diversions). Finally, self-inspectors should inspect post-construction controls during and after installation.

Identify site deficiencies and corrective measures

The self-inspector's reports must be maintained in a log book on site and the log book must be made available to the regulatory authorities. Although the legal responsibility for filing a Notice of Termination lies with the owner/operator, the self-inspector may also be called upon to perform a final site inspection, including post construction SMPs, prior to filing the Notice of Termination.

4.0 POST-INSPECTION ACTIVITIES

4.1 Regulatory Oversight Authorities

This section is intended for inspectors with regulatory oversight authority such as agents of the DOW or a local municipality, or others acting on their behalf (such as County Soil and Water Conservation District staff.) Upon completion of an inspection, inspection results should be documented for the record.

4.1.1 Written Notification

The inspector should inform the permittee or the on-site representative of their inspection results in writing by sending the permittee a complete, signed copy of the inspection report. The inspection report should be transmitted under a cover letter which elaborates on any deficiencies noted in the inspection report. It is not a good idea to commend exceptional efforts by the owner/operator in a letter, because such letters tend to undermine enforcement efforts when compliance status at a site degrades.

The inspector should consider providing a copy of the cover letter and inspection report to other parties with including:

- Permittee
- Contractor(s)
- Other regulatory oversight authorities
- Other parties present during the inspection (e.g. SWPPP preparer, permittee's self-inspector, etc.)

For DOW staff, an example of the inspection cover letter is included as Attachment 3.

4.1.2 Inspection Tracking

DOW staff must enter their inspection results into the electronic *Water Compliance System*.

Local municipalities and other regulatory oversight authorities are encouraged to develop an electronic tracking system in which to record their inspections.

4.2 Permittee's Self-inspections

This section is intended for qualified professionals who conduct site inspections for permittees in accordance with a SPDES permit or local requirements.

4.2.1 Written Records

Inspection Reports
The inspector shall prepare a written report summarizing inspection results. The inspection report is then provided to the permittee, or the permittee's duly authorized representative, and to the contractor responsible for implementing stormwater controls on-site in order to correct deficiencies noted in the inspection report. Finally, the inspection report must be added to the site log book that is required to be maintained on-site, and be available to regulatory oversight authorities for review.

4.2.2 Stormwater Pollution Prevention Plan Revisions

The inspector must inform the permittee of his/her duty to amend the Stormwater Pollution Prevention Plan (SWPPP) whenever an inspection proves the SWPPP to be ineffective in:

- Eliminating or significantly minimizing pollutants from on-site sources
- Achieving the general objectives of controlling pollutants in stormwater discharges from permitted construction activity
- Eliminating discharges that cause a substantial visible contrast to natural conditions

ATTACHMENT 1

Construction Stormwater Compliance Inspection Report

Project Name and Location: Municipality: County:	Date:	Page 1 of 2
	Permit # (if any): **NYR**	
	Entry Time:	Exit Time:
On-site Representative(s) and contact information:	Weather Conditions:	
Name and Address of SPDES Permittee/Title/Phone/Fax Numbers: Contacted: Yes ☐ No ☐		

INSPECTION CHECKLIST

SPDES Authority

	Yes	No	N/A		Law, rule or permit citation
1.	☐	☐	☐	Is a copy of the NOI posted at the construction site for public viewing?	
2.	☐	☐	☐	Is an up-to-date copy of the signed SWPPP retained at the construction site?	
3.	☐	☐	☐	Is a copy of the SPDES General Permit retained at the construction site?	

SWPPP Content

	Yes	No	N/A		Law, rule or permit citation
4.	☐	☐	☐	Does the SWPPP describe and identify the erosion & sediment control measures to be employed?	
5.	☐	☐	☐	Does the SWPPP provide a maintenance schedule for the erosion & sediment control measures?	
6.	☐	☐	☐	Does the SWPPP describe and identify the post-construction SW control measures to be employed?	
7.	☐	☐	☐	Does the SWPPP identify the contractor(s) and subcontractor(s) responsible for each measure?	
8.	☐	☐	☐	Does the SWPPP include all the necessary 'CONTRACTOR CERTIFICATION' statements?	
9.	☐	☐	☐	Is the SWPPP signed/certified by the permittee?	

Recordkeeping

	Yes	No	N/A		Law, rule or permit citation
10.	☐	☐	☐	Are inspections performed as required by the permit (every 7 days and after ½" rain event)?	
11.	☐	☐	☐	Are the site inspections performed by a qualified professional?	
12.	☐	☐	☐	Are all required reports properly signed/certified?	
13.	☐	☐	☐	Does the SWPPP include copies of the monthly/quarterly written summaries of compliance status?	

Visual Observations

	Yes	No	N/A		Law, rule or permit citation
14.	☐	☐	☐	Are all erosion and sediment control measures installed/constructed?	
15.	☐	☐	☐	Are all erosion and sediment control measures maintained properly?	
16.	☐	☐	☐	Have all disturbances of 5 acres or more been approved prior to the disturbance?	
17.	☐	☐	☐	Are stabilization measures initiated in inactive areas?	
18.	☐	☐	☐	Are permanent stormwater control measures implemented?	
19.	☐	☐	☐	Was there a discharge into the receiving water on the day of inspection?	
20.	☐	☐	☐	Are receiving waters free of there evidence of turbidity, sedimentation, or oil ? (If no , complete Page 2)	

Overall Inspection Rating: ❑ Satisfactory ❑ Marginal ❑ Unsatisfactory	
Name/Agency of Lead Inspector:	**Signature of Lead Inspector:**
Names/Agencies of Other Inspectors:	

Water Quality Observations

Describe the discharge(s) [source(s), impact on receiving water(s), etc.] _____

_____

_____

_____

_____

Describe the quality of the receiving water(s) both upstream and downstream of the discharge_____

_____

_____

_____

_____

Describe any other water quality standards or permit violations _____

_____

_____

Additional Comments:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

☐ Photographs attached

ATTACHMENT 2

**** NOTICE ****

On March 10, 2003, provisions of the Federal Clean Water Act went into effect that apply to many construction operations.

If your construction operations result in the disturbance of one acre or greater and stormwater runoff from your site reaches surface waters (i.e., lake, stream, road side ditch, swale, storm sewer system, etc.), the stormwater runoff from your site must be covered by a State Pollutant Discharge Elimination System (SPDES) Permit issued by the New York State Department of Environmental Conservation (NYSDEC).

To facilitate your compliance with the law, NYSDEC has issued a General Permit which may be applicable to your project. To obtain coverage under this General Permit, you need to prepare a Stormwater Pollution Prevention Plan (SWPPP) and then file a Notice of Intent (NOI) to the NYSDEC headquarters in Albany. The NOI form is available on the DEC website. You may also obtain a copy of the NOI form at the nearest NYSDEC regional offices.

When you file your NOI you are certifying that you have developed a SWPPP and that it will be implemented prior to commencing construction. When you submit the NOI you need to indicate if your SWPPP is in conformance with published NYSDEC technical standards; if it is, your SPDES permit coverage will be effective in as few as five business days. If your SWPPP does not conform to the DEC technical standards, coverage will not be available for at least 60 business days.

Failure to have the required permit can result in legal actions which include Stop Work Orders and/or monetary penalties of up to $37,500/day

If your construction operations are already in progress and you are not covered by an appropriate NYSDEC permit contact the NYSDEC Regional Water Engineer as soon as possible. If your construction field operations have not yet commenced, review the NOI and the General Permit on the DEC's website or at the DEC regional office for your area. When you are comfortable that you understand and comply with the requirements, file your NOI.

The requirement to file an NOI does not replace any local requirements. Developers/Contractors are directed to contact the Local Code Enforcement Officer or Stormwater Management Officer for local requirements.

ATTACHMENT 3

<< Date >>

Mr. John Smith
123 Main Street
Ferracane, NY 12345

Re: Stormwater Inspection
SPDES Permit Identification No. NYR10Z000 (through SPDES No. GP-02-01)
Blowing Leaves Subdivision
Gasper (T), Eaton (Co.)

Dear Mr. Smith:

On the afternoon of << date >> I conducted an inspection of the construction activities associated with the Blowing Leaves Subdivision located on County Route 1 in the town of Gasper, Eaton County. The inspection was conducted in the presence of you and Mr. Samuel Siltfence of Acme Excavating Co., Inc. The purpose of the inspection was to verify compliance with the *State Pollutant Discharge Elimination System (SPDES) General Permit for Storm Water Discharges from Construction Activity* ("the general permit").

The overall rating for the project at the time of the inspection was ***unsatisfactory***. A copy of my inspection report is attached for your information. In addition to the report, I would like to elaborate on the following:

SPDES Authority

- In accordance with subdivision 750-2.1 (a) of Title 6 of the Official Compilation of Codes, Rules, and Regulations of the State of New York (6 NYCRR), a copy of your permit must be retained at the construction site. You did not have a copy of the general permit at the site. **Your failure to retain a copy of the general permit at the construction site is a violation of 6 NYCRR Part 750-2.1 (a).** Please retain a copy of the general permit at the site from this point forward.

SWPPP Content

- In accordance with Part III.E.2. of the general permit, contractors and subcontractors must certify that they understand the terms and conditions of the general permit and the SWPPP before undertaking any construction activity at the site. Your SWPPP does not include a certification statement from Acme Excavating Co., Inc. **The failure of your contractor to sign this certification before undertaking construction activity at the site is a violation of Part III.E.2. of the general permit.** Please obtain copies of all necessary certifications and provide copies of them to each party who holds a copy of your SWPPP.

- In accordance with Part V.H.2. of the general permit, SWPPP's must be certified by the permittee. Your SWPPP was not certified by you. **Your failure to certify your SWPPP is a**

violation of Part V.H.2. of the general permit. Please certify your SWPPP.

Recordkeeping

- In accordance with Parts III.D.3.a. and III.D.3.b. of the general permit, permittees must have a qualified professional conduct site inspections within 24 hours of the end of 0.5" or greater rain events and at least once per week. A review of your records revealed that your "self-inspections" are only being conducted about two or three times per month. **Your failure to have a qualified professional conduct inspections at the required frequency is a violation of Part III.D.3.b. of the general permit.** Please immediately direct your qualified professional to conduct your site inspections at the required frequency.

- Although the frequency of self-inspections does not meet rquirements, the quality of them is very good. Your qualified professional has accurately noted the same SWPPP deficiencies and necessary maintenance activities that I also observed, and prepared thorough sketches on the self-inspection site maps.

- In accordance with Part V.H.2. of the general permit, the permittee must certify all reports required by the permit. A review of your records showed that your self-inspection reports were not certified. **Your failure to certify your self-inspection reports is a violation of Part V.H.2. of the general permit.** Please sign and certify any and all existing and future self-inspection reports.

Visual Observations

- In accordance with Parts III.A.2. and III.A.3. of the general permit, all erosion and sediment controls (E&SC) measures must be installed (as detailed in the SWPPP) prior to the initiation of construction. During the inspection, I noted all of your E&SC measures have been correctly installed at the right times and locations.

- In accordance with Part V.L. of the general permit, all of the E&SC measures at your site must be maintained properly. While on site I observed that, among other things, the section of silt fence in place parallel to County Route 1 is in various stages of disrepair. **The failure of your contractor to adequately maintain the E&SC measures currently in place at your site is a violation of Part V.L of the general permit.** Please direct your contractor to repair this silt fence immediately and to diligently maintain all of the other required E&SC measures as they are brought to his attention by your qualified professional.

- This inspection was conducted during a rain event which resulted in a stormwater discharge to the municipal separate storm sewer system (MS4) being operated by the Eaton County Department of Public Works. Your discharge was visibly turbid whereas upstream water MS4 was clear. As a result, the discharge from the MS4 outfall into Karimipour Creek was causing

Mr. John Smith << Date >>
Re: SPDES Inspection
Blowing Leaves Subdivision
Gasper (T), Eaton (Co.)

slight turbidity. Please be advised that the narrative water quality standard for turbidity in Karimipour Creek is “no increase that will cause a substantial visible contrast to natural conditions.” I attribute the lack of maintenance of your E&SC measures to be the primary cause of the turbid discharge. Please be reminded that the general permit does not authorize you cause or contribute to a condition in contravention of any water quality standards.

If you have any questions or comments, please feel free to contact me at (999) 456-5432.

Sincerely,

Hector D. Inspector, CPESC
Environmental Program Specialist 2

HDI:ms
Attachment

cc w/att.: Chester Checkdam, (T) Gasper Code Enforcement Officer
Samuel Siltfence, Acme Excavating Co., Inc.

APPENDIX 13

NRCS SOILS REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Albany County, New York

Costco Albany



March 9, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface..... 2
Soil Map..... 5
Soil Map.....6
Legend.....7
Map Unit Legend..... 8
Map Unit Descriptions..... 8
Albany County, New York.....10
CoC—Colonie loamy fine sand, rolling.....10
CoD—Colonie loamy fine sand, hilly..... 11
EnA—Elnora loamy fine sand, 0 to 3 percent slopes.....12
Gr—Granby loamy fine sand.....13
St—Stafford loamy fine sand.....15

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:3,460 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Albany County, New York
Survey Area Data: Version 20, Sep 10, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 15, 2021—Nov 8, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CoC	Colonie loamy fine sand, rolling	5.1	21.8%
CoD	Colonie loamy fine sand, hilly	1.8	7.5%
EnA	Elnora loamy fine sand, 0 to 3 percent slopes	10.4	44.6%
Gr	Granby loamy fine sand	5.4	22.9%
St	Stafford loamy fine sand	0.8	3.2%
Totals for Area of Interest		**23.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate

pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Albany County, New York

CoC—Colonie loamy fine sand, rolling

Map Unit Setting

National map unit symbol: 9pff
Elevation: 150 to 1,000 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Colonie, rolling, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colonie, Rolling

Setting

Landform: Deltas, beach ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or eolian deposits

Typical profile

H1 - 0 to 7 inches: loamy fine sand
H2 - 7 to 68 inches: loamy fine sand
H3 - 68 to 74 inches: loamy fine sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Ecological site: F101XY005NY - Dry Outwash
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 9 percent

Claverack

Percent of map unit: 5 percent
Hydric soil rating: No

Granby

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

CoD—Colonie loamy fine sand, hilly

Map Unit Setting

National map unit symbol: 9pfg
Elevation: 150 to 1,000 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Colonie, hilly, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Colonie, Hilly

Setting

Landform: Deltas, beach ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy glaciofluvial or eolian deposits

Typical profile

H1 - 0 to 7 inches: loamy fine sand
H2 - 7 to 68 inches: loamy fine sand
H3 - 68 to 74 inches: loamy fine sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F101XY005NY - Dry Outwash
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 5 percent

Elnora

Percent of map unit: 5 percent
Hydric soil rating: No

Unadilla

Percent of map unit: 5 percent
Hydric soil rating: No

Stafford

Percent of map unit: 3 percent
Hydric soil rating: No

Hudson

Percent of map unit: 2 percent
Hydric soil rating: No

EnA—Elnora loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 9pfn
Elevation: 50 to 430 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Elnora and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Elnora

Setting

Landform: Deltas, beach ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Convex

Parent material: Sandy glaciofluvial, eolian, or deltaic deposits

Typical profile

H1 - 0 to 11 inches: loamy fine sand
H2 - 11 to 27 inches: fine sand
H3 - 27 to 65 inches: loamy fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 18 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A/D
Ecological site: F101XY006NY - Moist Outwash
Hydric soil rating: No

Minor Components

Stafford

Percent of map unit: 5 percent
Hydric soil rating: No

Colonie

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed soils

Percent of map unit: 4 percent

Granby

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Gr—Granby loamy fine sand

Map Unit Setting

National map unit symbol: 9pfx
Elevation: 600 to 1,000 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Granby and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Granby

Setting

Landform: Depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial deposits or sandy glaciolacustrine deposits

Typical profile

H1 - 0 to 11 inches: loamy fine sand
H2 - 11 to 25 inches: fine sand
H3 - 25 to 60 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum content: 15 percent
Available water supply, 0 to 60 inches: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: F101XY010NY - Wet Lake Plain Depression
Hydric soil rating: Yes

Minor Components

Adrian

Percent of map unit: 5 percent
Landform: Marshes, swamps
Hydric soil rating: Yes

Unnamed soils

Percent of map unit: 3 percent

Stafford

Percent of map unit: 3 percent
Hydric soil rating: No

Medihemists

Percent of map unit: 3 percent
Landform: Swamps, marshes
Hydric soil rating: Yes

Hydraquents

Percent of map unit: 2 percent
Landform: Marshes
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Fluvaquents

Percent of map unit: 2 percent
Landform: Flood plains
Hydric soil rating: Yes

Elnora

Percent of map unit: 2 percent
Hydric soil rating: No

St—Stafford loamy fine sand

Map Unit Setting

National map unit symbol: 9phr
Elevation: 130 to 430 feet
Mean annual precipitation: 36 to 41 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 170 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Stafford and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stafford

Setting

Landform: Beach ridges, deltas
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandy glaciofluvial or glaciolacustrine deposits

Typical profile

H1 - 0 to 12 inches: loamy fine sand
H2 - 12 to 30 inches: loamy fine sand
H3 - 30 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches

Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (1.98 to 19.98 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: A/D
Ecological site: F101XY006NY - Moist Outwash
Hydric soil rating: No

Minor Components

Elnora

Percent of map unit: 5 percent
Hydric soil rating: No

Granby

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

Unnamed soils

Percent of map unit: 5 percent

Colonie

Percent of map unit: 5 percent
Hydric soil rating: No

APPENDIX 14

GEOTECHNICAL REPORT AND INFILTRATION TEST RESULTS

MASER CONSULTING P. A.

Engineers Planners Surveyors Landscape Architects Environmental Scientists

Report of Geotechnical Exploration

FOR

Proposed COSCTO Wholesale
City of Albany
Albany County, New York

March 2, 2018

Prepared For

Heidi Macomber
COSTCO Wholesale
45940 Horseshoe Drive
Suite 150
Sterling, VA 20166

Prepared By

Maser Consulting P.A.
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
610.254.9140

_____
John C. Walton, P.E.
Principal Associate

Lic. 85339

MC Project No. 13001204A

Engineers
Planners
Surveyors
Landscape Architects
Environmental Scientists

410 Eagleview Blvd., Suite 104
Exton, PA 19341
T: 610.254.9140
F: 610.254.9141
www.maserconsulting.com

March 2, 2018

Ms. Heidi Macomber
COSTCO Wholesale
45940 Horseshoe Drive
Suite 150
Sterling, VA 20166

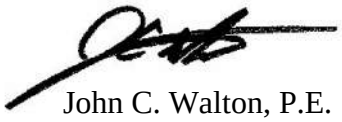
Re: Report of Geotechnical Exploration
Proposed COSTCO Wholesale
Crossgates Mall Road
City of Albany, Albany County, New York
Maser File: 13001204A

Dear Ms. Macomber:

Maser Consulting, P.A. is pleased to present the results of a geotechnical exploration performed for the referenced project. The exploration program was performed in accordance with our Agreement dated February 1, 2018, as well as COSTCO Wholesale Development Requirements Version 2016, dated September 19, 2016. The scope of this program included 46 subsurface explorations, laboratory testing, engineering evaluation, and preparation of this report. The findings of the field and laboratory testing, as well as our geotechnical recommendations for design and construction of the project are included in this report.

Maser appreciates the opportunity to assist you with this project. Please contact this office should you have questions regarding this report.

Sincerely,
MASER CONSULTING P.A.



John C. Walton, P.E.
Principal Associate



Matthew J. Church
Associate

MJC/jcw
Attachments
Cc: Russell T. McFall, II, P.E. (Maser)

TABLE OF CONTENTS

LIST OF APPENDICES
EXECUTIVE SUMMARY 1
INTRODUCTION 3
SITE CONDITIONS 4
Location and Surface Features 4
Geology 4
PROPOSED CONSTRUCTION 5
EXPLORATION AND TESTING 6
Subsurface Exploration Program 6
Subsurface Conditions 7
Groundwater 7
Laboratory Testing 9
CONCLUSIONS AND RECOMMENDATIONS 10
Site Developer Considerations 10
General 11
Demolition 11
Earthwork 12
Fill and Backfill Materials 13
Site Settlements 15
Surface Water and Groundwater Control 15
Frost Considerations 16
Subsurface Utilities 17
Stream/Drainage Ditch 17
Corrosion Potential 17
Foundations 18
Floor Slab 19
Foundation/Building Support Options 20
Seismic Considerations 26
Lateral Earth Pressure Parameters 26
Pavements 28
Fuel Facility 29
Environmental Considerations 31
Geophysical Considerations 32
LIMITATIONS 32

LIST OF APPENDICES

APPENDIX A – FIGURES

Figure 1 - Site Location Map

Figure 2 - Exploration Location Plan

Figure 3 – Subsurface Profile A-A'

Figure 4 – Subsurface Profile B-B'

Figure 5 – Subsurface Profile C-C'

APPENDIX B – EXPLORATION LOGS

Boring Logs (B-1 through B-33)

Test Pit Logs (TP-1 through TP-13)

APPENDIX C – LABORATORY DATA

Summary of Laboratory Test Results

Particle Size Distribution

Moisture-Density Relationship

California Bearing Ratio

Analytical Corrosion Test Results

Topsoil Test Results

APPENDIX D – PAVEMENT DESIGN DATA

Flexible Asphalt Pavement – Standard Duty

Flexible Asphalt Pavement – Heavy Duty

Rigid Concrete Pavement – Heavy Duty

EXECUTIVE SUMMARY

Introduction

- This report presents the results of a geotechnical exploration performed for a proposed COSTCO Wholesale store with fuel facility considered for construction at a site in the City of Albany, Albany County, New York. The property is generally located in the southeast quadrant of the intersection formed by Rapp Road and Crossgates Mall Road.
- The subject property is bounded to the west by Rapp Road, to the south by Western Avenue (SR 20), to the southeast by multiple residential and commercial properties, to the east by several residential properties as well as Gabriel Terrace, and to the north by Crossgates Mall Road. At the time of this study, the western portion of the COSTCO parcel was occupied by wooded areas encompassing an abandoned roadway and existing stream, and the eastern portion of the site was occupied by an existing residential development.
- A conceptual site plan and preliminary survey plan prepared by Maser Consulting were used as the basis for this study. The plans indicate the proposed construction will include a 148K prototype COSTCO store with Liquor in the northeastern portion of the site and a fuel facility in the southwest corner of the site, with parking and landscaped areas throughout the remainder of the site. The fuel facility will consist of 3 underground fuel storage tanks (USTs), and 3 fuel dispenser islands with an overhead canopy structure.
- Finished floor of the building is assumed to be established at EL ±288 feet, nominal mass cuts and mass fills ranging up to ±8 feet on average throughout the majority of the site. Isolated fills ranging up to ±20 feet in the area of the stream/drainage ditch in the northwestern portion of the site are anticipated. It should be noted that a retaining wall may be required in the northwestern corner of the site, which may be as high ±10 feet.

Exploration and Testing

- This study included 33 borings and 13 test pits performed throughout the proposed COSTCO parcel, extending to depths ranging from ±6.5 to ±25 feet below the ground surface (BGS). Laboratory testing was performed on representative samples obtained from the explorations.
- A surficial layer of topsoil was encountered at the ground surface of the explorations and averaged ±5.8 inches thick.
- Soil identified as existing fill was encountered below the surficial layers of topsoil in 6 of the 46 explorations (B-24, TP-2, TP-6, TP-7, TP-10, and TP-12) and extended to depths ranging from ±1.3 to ±4.5 feet BGS. The existing fill primarily consisted of sand with variable, but generally minor, quantities of silt and gravel.
- Evidence of groundwater was encountered in 23 of the 46 explorations performed for this program at depths ranging from ±2.5 feet to ±18.0 feet BGS, averaging ±14.3 feet BGS. Long-term (>24 Hr.) groundwater readings were obtained at borings B-13 and B-22, and were recorded at ±14.2 feet and ±12.3 feet, respectively.

Conclusions and Recommendations

- It is our understanding that this project will likely be constructed through cooperation with COSTCO Wholesale and a Site Developer. The Site Developer is responsible for following and implementing the recommendations contained herein to satisfy the final Site Development

Agreement (SDA) and the relevant version of the COSTCO Wholesale Development Requirements upon which the SDA is based.

- Based on the results of this study, construction of the proposed COSTCO is feasible; however, geotechnical issues have been identified that will impact site development costs:
    - The need to demolish the existing structures and associated site features.
    - The presence of loose sandy site soils and anticipated grading will dictate building support options and construction sequencing.
    - Currently proposed grading allows construction of conventional spread footings after site settlements have mobilized; however,
    - If proposed grading is reduced or minimized, ground improvement will need to be considered for building and fuel facility support, as there is risk for excessive settlements.
    - The potential to encounter groundwater in utility excavations.
    - Loose natural soils below the UST field may impact installation sequencing of the USTs.
    - The stream/drainage ditch area is estimated to receive fills ranging up to ±20 feet, which will induce settlements of any structure used to carry the current flow. Ground improvement may be required at this location.
- The existing trees and vegetation not to remain should be cleared and topsoil should be stripped from the proposed building and pavement areas and stockpiled on-site. Topsoil will require amendment for reuse on-site.
- The project should be designed assuming a Seismic Site Class D – Stiff Soil profile.
- Based on groundwater levels encountered and the anticipated mass fill, it is expected that groundwater should not be a significant problem during mass earthwork activities in most areas of the site. The UST design may require tie-downs.
- It is our opinion the proposed building and fuel canopy can be supported by conventional shallow spread footings established in improved natural soils or new compacted structural fill. foundations can be designed for a maximum allowable net bearing pressure of 3,000 psf for improved ground and 2,000 psf for unimproved ground.
- Standard thickness pavement sections are acceptable for this project, provided the earthwork recommendations herein are followed.

This executive summary is provided as an abbreviated general discussion of the geotechnical considerations that will impact development of the subject project, and should not be relied upon without reading the report in its entirety. The following sections of the report present a detailed discussion of the findings of this study and our recommendations for design and construction of the subject project.

INTRODUCTION

This report presents the results of a geotechnical exploration program performed for a proposed COSTCO Wholesale store with fuel facility considered for construction at a site in the City of Albany, Albany County, New York. The subject property is generally located in the southeastern quadrant of the intersection formed by Rapp Road and Crossgates Mall Road. Please refer to Figure 1 - Site Location Map included in Appendix A.

The following information was provided and used as the basis for the subsurface exploration program and preparation of this report:

- Site plan entitled "Concept Plan SK-2 Revised COSTCO Wholesale, Crossgates Mall, Albany, New York" prepared by Maser Consulting P.A. dated November 1, 2017.
- A preliminary survey plan entitled "ALTA/NSPS Land Title Survey for COSTCO, Inc; Albany Crossgates Mall," prepared by Maser Consulting P.A. dated January 5, 2018.

The plan(s) indicate the property boundaries, existing site features, existing topography, and conceptual site layout.

The scope of this exploration program included the following services:

- Develop and execute a subsurface exploration program consisting of 33 borings and 13 test pits.
- Perform laboratory testing of representative soil samples obtained from the explorations to characterize engineering properties of the subsurface materials.
- Prepare this report, which includes our findings and recommendations regarding:
    - Earthwork
    - Suitability of excavated materials for reuse as fill and backfill, including compaction requirements
    - Foundation and floor slab support, including bearing capacity and settlements
    - Lateral earth pressure parameters
    - Groundwater control
    - Seismic considerations
    - Pavement design parameters

SITE CONDITIONS

Location and Surface Features

The subject property is bounded to the west by Rapp Road, to the south by Western Avenue (SR 20), to the east by commercial properties, and to the north by Crossgates Mall Road. At the time of this exploration program, the eastern portion of the COSTCO parcel was occupied by an existing residential development which included eleven one to two story homes located along Lawton Terrace, Rielton Court, Gabriel Terrace, and Tiernan Court. The western portion of the COSTCO parcel was heavily wooded including a stream/drainage ditch. An abandoned roadway is located near the western boundary of the site, parallel with Rapp Road, and includes asphalt pavement, guardrails, traffic signs, and mapped utility easements. The existing stream/drainage ditch bisects the northwestern portion of the property and includes three culverts: one below the abandoned roadway and two located at the stream's endpoints, crossing Rapp Road and Crossgates Mall Road, respectively.

Based on the referenced plans, the ground surface throughout the developed eastern portion of the COSTCO parcel is relatively flat with surface grades generally sloping gently downward from south to north ranging from elevation (EL) ±276 feet to EL ±282 feet. Surface grades within the western wooded areas of the property are somewhat undulating with surface grades generally sloping downward from southeast to northwest, toward the existing stream/drainage ditch, ranging from EL ±275 feet to EL ±287 feet. Surface grades in the northwest corner of the site abruptly slope downward from northwest to southeast, toward the stream/drainage ditch, ranging from EL ±267.5 feet to EL ±303 feet. Additionally, an existing berm is located along the northern boundary of the COSTCO parcel, between the residential development and Crossgates Mall Road, ranging from EL ±280 feet to EL ±291 feet at its highest point.

Geology

The National Resource Conservation Service (NRCS) Soil Survey indicates approximately 43% of near-surface overburden soils at the site are classified as *Elnora loamy fine sand (EnA)* which is generally described as "loamy fine sand". Approximately 30% of the near-surface soils are classified as *Granby loamy find sand (Gr)*, which is general described as loamy fine sand, which transitions from loamy fine sand to sand with depth. Approximately 23% of the near-surface soils are classified as *Colonie Loamy find sand, rolling (CoC)*, which is generally described as loamy fine

sand. A small portion of the project site (approximately 4%), in the the southwest corner, is mapped as *Stafford loamy fine sand (St)*, which is generally described as loamy fine sand to fine sand.

According to the *Geologic Map of New York (1970)* the project site is situated within the Hudson-Mohawk Lowland physiographic province and underlain by the Middle Ordovician Age Normanskill Shale (On), which is predominantly sedimentary rock consisting of clastic mudstone shale; and minor clastic mudstone & sandstone.

PROPOSED CONSTRUCTION

The proposed construction will include a 148k prototype COSTCO Wholesale store with a Liquor Pod located in the northeastern portion of the site. A truck loading dock will be provided at the northwestern corner of the store, and the trash compactor slab will be located along the northern building wall. Based on similar projects, we anticipate that the Point of Service (POS) freezer will be located within the northeastern portion of the building. A fuel facility will be located in the southwest corner of the site, which will consist of three (3) underground storage tanks (USTs), an additive tank, and three (3) fuel dispenser islands with an overhead canopy structure. At-grade parking areas, drive lanes, and landscaped islands will be provided throughout the remainder of the site. The referenced plans indicate that ingress/egress to the site is proposed from four (4) locations: two locations along Rapp Road and two locations along Gabriel Terrace.

The proposed building construction will consist of a steel frame with exterior CMU and/or metal panel walls. Typical design loads include maximum column and wall loads of 150 kips and 4.5 kips per lineal foot, respectively, total (dead and live) floor slab loads of 500 psf, and fuel canopy column loads of 50 kips.

It should be noted that proposed grading was actively being evaluated by the design team at the time of this report. Based on the referenced site plans and conversations with the design team, the site grades will generally be graded away from the proposed building which will have an estimated finished floor elevation (FFE) of EL ±288.0 feet. As such, we anticipate nominal mass cuts and mass fills ranging up ±8 feet on average throughout the majority of the site. Isolated fills ranging up to ±20 feet in the area of the stream/drainage ditch in the northwestern portion of the site are anticipated. It should be noted that a retaining wall may be required in the northwestern corner

of the site, which may be as high as ±10 feet. We anticipate confined excavations ranging up to ±4 feet below finished grade (BFG) to construct footings at the building, up to ±10 feet BFG to construct footings at the loading dock, and excavations up to ±20 feet BFG for installation of the USTs. We anticipate that utility excavations will generally extend up to ±5 feet BFG; however, due to lack of proposed utility information excavations could be deeper.

EXPLORATION AND TESTING

Subsurface Exploration Program

The subsurface exploration program included 33 Standard Penetration Test (SPT) borings (B-1 through B-33) and 13 test pit excavations (TP-1 through TP-13). ATV-mounted CME-550X drilling equipment was used to perform the borings, and the test pits were performed using a CAT 312E trackhoe and a CAT PC78 mini-trackhoe. Borings B-1 through B-21 were located within the proposed building footprint, B-22 and B-23 were located within the proposed UST field, B-24 and B-25 were located at the proposed fuel facility canopy, and B-26 through B-33 were located within proposed parking areas and drive lanes. Test Pits TP-1, TP-2, TP-3, and TP-4 were located at or near the proposed building walls, TP-5 was located near the proposed Point of Service (POS) freezer, TP-6 was located at the proposed loading dock, TP-7 was completed in the proposed fuel facility stacking lanes, and TP-8 through TP-13 were located in proposed parking areas. It should be noted that some exploration locations were offset from their planned location due to existing utility conflicts and property access constraints. The borings extended to depths ranging from ±10 to ±25 feet BGS and the test pit depths ranged from ±6.5 to ±15 feet BGS.

Maser selected the exploration locations and used hand-held GPS equipment and/or measured from existing site features using conventional taping methods to field locate each exploration. Laboratory tests were performed on representative soil samples obtained from the explorations as discussed in the *Laboratory Testing* section of this report.

The approximate locations of the explorations performed for this program are shown on Figure 2 - Exploration Location Plan in Appendix A. Example interpretations of subsurface profiles are presented on Figures 3, 4, & 5 in Appendix A. Detailed logs of the individual explorations are included in Appendix B. The descriptions provided on the logs are based on visual-manual classification of the soil samples supplemented by laboratory test data results as indicated herein.

The ground surface elevations reported on the logs were estimated from topographic contours shown on the referenced survey plan and should be considered approximate.

Subsurface Conditions

A layer of topsoil was encountered at the ground surface in 45 of the 46 explorations performed for this program, ranging in thickness from ±2 inches to ±10 inches, averaging ±5.8 inches. A layer of coarse alluvial soil (stream bed), approximately 6 inches thick, was encountered at the ground surface of TP-8.

Soil identified as existing fill was encountered below the surficial layers of topsoil in 6 of the 46 explorations (B-24, TP-2, TP-6, TP-7, TP-10, and TP-12) performed for this program and extended to depths ranging from ±1.3 to ±4.5 feet BGS. The existing fill primarily consisted of sand with variable, but generally minor, quantities of silt and gravel. The soils appear to have originated from on-site or local sources during previous site development; however, the presence of occasional debris as well as variations in color, composition, and density suggest these materials were not placed by natural processes.

Natural soils were encountered below the topsoil or existing fill and extended to the completion depths of the explorations performed for this program. The natural soils consisted of predominantly sand with minor quantities of silt. Based on SPT 'N' values, the natural soils have in-situ densities ranging from 'very loose' to 'medium dense,' averaging 'loose.'

Groundwater

Evidence of groundwater was encountered in 23 of the 46 explorations performed for this program at depths ranging from ±2.5 feet to ±18.0 feet BGS. Temporary groundwater observation pipes were installed in B-13 and B-22 to obtain long-term (>24 Hr.) groundwater readings, which were recorded at ±14.2 feet and ±12.3 feet BGS, respectively. It should be noted that fluctuations in groundwater levels can occur due to several factors, including variations in precipitation, seasonal changes, and site development activities. A summary of the groundwater depths encountered during this exploration program is presented in the following table:

GROUNDWATER SUMMARY

Exploration	Approximate G.S. Elev.	Depth to Groundwater	Groundwater Elev.
B-1	280.5	18.0	262.5
B-2	280.5	18.0	262.5
B-3	279.6	NE	NE
B-4	279.0	NE	NE
B-5	279.4	NE	NE
B-6	279.4	18.0	261.4
B-7	280.0	18.0	262.0
B-8	280.5	NE	NE
B-9	280.5	18.0	262.5
B-10	279.5	14.3	265.2
B-11	281.0	18.0	263.0
B-12	278.0	18.0	260.0
B-13	276.4	14.2	262.2
B-14	276.7	15.0	261.7
B-15	278.0	14.0	264.0
B-16	275.3	13.0	262.3
B-17	276.7	15.0	261.7
B-18	279.0	15.0	264.0
B-19	279.3	13.0	266.3
B-20	279.5	13.0	266.5
B-21	278.8	13.0	265.8
B-22	280.0	12.3	267.7
B-23	280.8	13.0	267.8
B-24	281.7	13.0	268.7
B-25	281.8	14.0	267.8
B-26	278.1	NE	NE
B-27	277.0	9.5	267.5
B-28	277.3	NE	NE
B-29	277.0	NE	NE
B-30	276.8	NE	NE
B-31	285.3	NE	NE
B-32	274.6	NE	NE
B-33	281.7	NE	NE
TP-01	281.2	NE	NE
TP-02	280.7	NE	NE
TP-03	278.5	NE	NE
TP-04	280.3	NE	NE
TP-05	279.1	NE	NE
TP-06	276.7	NE	NE
TP-07	279.0	NE	NE
TP-08	267.5	2.5	265.0
TP-09	280.0	NE	NE

Exploration	Approximate G.S. Elev.	Depth to Groundwater	Groundwater Elev.
TP-10	281.6	NE	NE
TP-11	281.8	NE	NE
TP-12	302.5	NE	NE
TP-13	299.9	NE	NE

*Notes: NE=Not Encountered. All depth and elevation units are in feet and values are approximate.

Laboratory Testing

Representative soil samples obtained from the explorations were subjected to laboratory testing to supplement the visual classification of the soils. The testing performed for this geotechnical exploration included natural moisture contents, particle size analyses, Atterberg (liquid and plastic) limits, moisture-density (M-D) relationship, California Bearing Ratio (CBR), and topsoil testing. The following table presents a summary of the laboratory testing performed for this program, and detailed test results are included in Appendix C.

LABORATORY TESTING SUMMARY

Exploration	Approx. G.S. Elev.	Sample Depth (Elev.)	General Soil Description	Moisture Content (%)	Particle Size (% passing #200 Sieve)
B-1	280.5'	4.0' (276.5')	mf(+) SAND, trace Silt/Clay	4.6	2.2
B-3	279.6'	4.0' (275.6')	mf(+) SAND, trace Silt/Clay	2.6	2.9
B-12	278.0'	4.0' (274.0')	mf(+) SAND, trace Silt/Clay	7.0	7.7
B-13	276.4'	4.0' (272.4')	mf(+) SAND, little(-) Silt/Clay	13.6	10.2
B-18	279.0'	2.0' (277.0')	f SAND, trace Silt/Clay	9.1	7.3
B-22	280.0'	4.0' (276.0')	mf(+) SAND, trace Silt/Clay	7.1	3.4
Bulk	-	2.0' to 6.0' (N/A)	mf(+) SAND, trace Silt/Clay	3.5	9.1

A composite soil sample of near-surface soils was subjected to a M-D relationship test and a CBR test. A summary of the M-D and CBR test results are presented in the following table and detailed test results are included in Appendix C.

MOISTURE-DENSITY AND CBR SUMMARY

Sample	Maximum Dry Density (ASTM D-1557)	Optimum Moisture Content (%) (ASTM D-1557)	CBR Value (@95%MDD)
Bulk	105.3	13.2	10

A composite of near-surface soil samples was subjected to Sulfate, Sulfide, Chloride, pH, and Redox Potential testing to evaluate corrosion potential for buried concrete and steel. Electrical Resistivity testing was not performed due to the predominantly coarse-grained texture of the site soils. A summary of the corrosion test results are presented in the following table and detailed test results are included in Appendix C.

CORROSION TESTING SUMMARY

Sample	Sulfate (mg/kg)*	Sulfide (mg/kg)**	Chloride (mg/kg) ***	Redox Potential (mV)	pH	Resistivity (Ohm-cm)
Composite (B-6, B-15, B-18, B-20, B-24, B-25, B-29, B-33)	32.1	2.9	3.23	537	7.1	-

Note: *Reporting limit (RL) =6.31 mg/kg **RL=9.2 mg/kg ***RL=1.26 mg/kg

A composite sample of topsoil collected from the test pit explorations was subjected to analytical testing to evaluate organic content and essential nutrients and minerals. Detailed test results are included in Appendix C and a discussion of the test results and topsoil recommendations is presented in the *Earthwork* Section of this report.

CONCLUSIONS AND RECOMMENDATIONS

Site Developer Considerations

It is our understanding that this project will likely be constructed through cooperation with COSTCO Wholesale and a Site Developer. Typically, the Developer is responsible for performing all site work, including mass earthwork, utility installation, curbing, and pavements, as well as preparation of the building pad. It should be noted that the Developer is responsible for following and implementing the recommendations contained herein to satisfy the final Site Development

Agreement (SDA) and the relevant version of the COSTCO Wholesale Development Requirements upon which the SDA is based.

General

Based on the results of this geotechnical exploration, it is our opinion that construction of the proposed COSTCO as planned is feasible, provided the recommendations contained herein are followed and the standard level of care is maintained during construction. The following geotechnical considerations will likely impact site development costs associated with this project:

- The need to demolish the existing structures and associated site features.
- The presence of loose sandy site soils and anticipated grading will dictate building support options and construction sequencing.
    - Currently proposed grading allows construction of conventional spread footings after site settlements have mobilized; however,
    - If proposed grading is reduced or minimized, ground improvement will need to be considered for building and fuel facility support, as there is risk for excessive settlements.
- The potential to encounter groundwater in utility excavations.
- Loose natural soils below the UST field may impact installation sequencing of the USTs.
- The stream/drainage ditch area is estimated to receive fills ranging up to ±20 feet, which will induce settlements of any structure used to carry the current flow. Ground improvement may be required at this location.

The following sections of this report provide further discussion of these issues and present our recommendations for design and construction of the subject project.

Demolition

Demolition and off-site disposal of the existing buildings and site improvements not to remain, including their below-grade components, such as foundations, utilities, and storage tanks, will be required prior to new construction activities. Should excavations to remove existing site features extend below the proposed building and pavement subgrade levels, the excavations should be backfilled with structural fill, placed and compacted in accordance with the recommendations presented in the *Fill and Backfill Materials* Section of this report.

Existing durable below-grade structural elements, such as existing foundations, may remain in-place below proposed pavement areas provided the top of the elements remain at least 3 feet below the finished pavement surface and will not interfere with subsequent underground utility installation. Existing utilities to be abandoned below proposed pavements may also remain in-place, provided they remain at least 3 feet below the finished pavement surface and are permanently sealed, if structurally intact, or otherwise in-filled with grout or flowable fill.

Earthwork

Prior to mass earthwork, the existing trees and vegetation not to remain should be cleared and topsoil should be stripped from the proposed building and pavement areas and stockpiled on-site. The thickness of topsoil encountered during this exploration program ranged from ±2 inches to ±10 inches, averaging ±5.8 inches; however, it should be anticipated that the clearing and stripping operations could reduce the amount of topsoil available for reuse by as much as 50%. Based on the laboratory test results of a composite topsoil sample, the existing topsoil will need amendment to bring the topsoil properties to within COSTCO standards. The test results indicate that the topsoil has a pH of 6.50, which is in the optimal range of 6.20 – 6.80 for the growth of most ornamental shrubs and small trees that are non-acid loving. Additional calcitic limestone is not recommended for the soil. The organic matter of the tested topsoil is 2.3%; however, a minimum of 6% organic matter derived from vegetative compost is required. It is recommended that a minimum of 4 cubic feet of organic vegetative compost be blended with the topsoil for every 100 square feet of topsoil area. After the organic material has been blended into the topsoil, the pH of the topsoil should be retested to ensure the pH remains within the recommended optimal range. A 1-0-1 fertilizer, which represents the fertilizer's relative amounts of nitrogen (N), phosphorus as P_2O_2, and potassium as K_2O, should be mixed into the top 6 to 8 inches of topsoil.

We anticipate that nominal mass cuts less than 2 feet and mass fills ranging up to ±8 feet will be required to achieve proposed site grades in areas outside of the existing stream/drainage ditch. Fill within the existing stream/drainage ditch is anticipated to range up to ±20 feet. We also anticipate an isolated cut ranging up to ±10 feet in the northwestern corner of the site to facilitate the construction of a retaining wall which is discussed in the Retaining Wall section of this report. It should be noted that due to the loose natural soils, settlement will occur throughout the site as a result of the proposed fill, see the *Site Settlements* section of this report for detail.

Following demolition, clearing, and stripping operations, subgrade soils exposed in proposed areas to remain at-grade or receive fill should be compacted by several passes with a minimum 10-ton roller and proof-rolled with a loaded tandem-axle dump truck under the observation of the geotechnical engineer. Other proof-rolling methods may be deemed appropriate by the geotechnical engineer depending on the prevailing weather and subgrade conditions at the time earthwork is performed. Any subgrade areas that are observed to be soft, loose, or otherwise unstable during proof-rolling operations should be selectively excavated under the direct observation of the geotechnical engineer and replaced with structural fill, placed and compacted in accordance with the *Fill and Backfill Materials* Section of this report. To the extent possible, construction traffic should travel in designated areas to prevent widespread destabilization of the surface soils. In areas of heavy construction traffic, the use of 8 inches of crushed stone over a layer of geogrid and filter fabric may be prudent to protect the subgrade and provide a stabilized base for the transport of construction equipment. If possible, peak earthwork activities should be scheduled for the drier summer months, which will limit the amount of precipitation that the soils are exposed to and will provide better opportunity to air-dry soils which are too moist.

All construction excavations should be sloped or shored in compliance with current OSHA excavation regulations and any local governing safety codes. We anticipate that the site soils will be classified as "Type C" soils per OSHA criteria. However, excavation stability and corresponding side slopes and/or support requirements should be evaluated by a qualified professional at the time of construction and should take into consideration the adverse impacts of groundwater seepage, if encountered. Permanent slopes should be designed no steeper than 3H:1V (three horizontal to one vertical).

Fill and Backfill Materials

Due to the extensive fills required at this site, it is anticipated that minimal excavated site soils will be available for re-use as compacted structural fill. Of the soils that are excavated, the majority will consist primarily of granular soil and will be suitable for re-use as compacted structured fill, provided they are screened of any large and/or deleterious debris fragments. Although the site soils are predominantly granular, excavated soils left unprotected during precipitation events can become unsuitable for compaction. As such, depending on the prevailing weather conditions at the time earthwork is performed, moisture conditioning of the excavated soils

may be required prior to their reuse as fill or backfill. If air-drying of the soil is not possible due to precipitation and/or colder temperatures, or if the project schedule cannot accommodate the time required for air-drying of the soil, it should be anticipated that unsuitable soils will need to be exported from the site and suitable structural fill materials will need to be imported. Consideration should be given to placing tarps or similar protective cover over stockpiles prior to precipitation events to help reduce the amount of moisture conditioning and/or soil amendment that may be required prior to reuse.

If imported material is required for use as structural fill, the material should consist of well-graded predominantly granular material conforming to COSTCO specifications and be tested and approved by the geotechnical engineer prior to use. If open-graded stone is used for structural fill or backfill, the stone should be completely separated from surrounding soils with geotextile filter fabric to prevent particle migration. The maximum particle size of material used in structural fill should be limited to 6 inches for mass fills and 3 inches in the vicinity of utilities, wall backfill, and the upper 2 feet of the subgrade.

Fill materials supporting loads from buildings and pavements is considered structural fill and should be installed under the observation of the geotechnical engineer. Mass structural fill can be placed in lifts ranging up to 12 inches in loose thickness and compacted using a smooth drum roller. Backfill placed in confined areas, such as utility and foundation excavations, should be spread in thinner layers and compacted using the largest equipment possible without damaging the utilities or compromising the subgrade soils. Backfill placed within 3 feet of below-grade walls or retaining walls should be compacted with manually operated compaction equipment. Fill and backfill should be compacted to the following minimum requirements:

COMPACTION REQUIREMENTS

Location	Percent of Maximum Dry Density (ASTM D-1557)
Structural fill below foundations, floor slabs, and pavements	95%
Backfill for retaining walls, below-grade walls, and utility trenches	92%
General fill for landscaped and other non-structural areas	90%

The 2015 IBC requires that subgrades to receive fill should be evaluated for stability by the geotechnical engineer, and compactive effort for each lift of fill should be verified by in-place density testing prior to placement of subsequent lifts. Adjustments to the lift thickness and/or compaction equipment may be required, as directed by the geotechnical engineer, based on prevailing weather conditions at the time of fill placement and performance of the compacted soils.

Site Settlements

As previously stated, up to ±8 feet of structural fill is currently expected to achieve the proposed site grades; however, fills up to ±20 feet are expected in the stream/drainage ditch area, based on our conversations with the design team. It should be noted that grading is still in progress and the recommendations herein should be reevaluated if proposed grading deviates substantially from what is anticipated in this report. Based on preliminary calculations, total site settlements are estimated to range up to ±3 inches and settlements at the stream/drainage ditch area could range up to ±8 inches but is difficult to predict. The settlement that will occur will be immediate due to the coarse-grained nature of the site soils. As such, we do not anticipate a waiting period for site settlements to occur but we recommend that utility installation not commence until mass filling operations have been completed. It should be noted that we anticipate marginal settlements due to liquefaction.

Surface Water and Groundwater Control

Evidence of groundwater was encountered in 23 of the 48 explorations performed for this program. Groundwater was generally encountered at an average EL of ±264.2 feet and will be approximately 24 feet below finished grade (BFS). A test pit, TP-8, was performed near the referenced stream and encountered groundwater at EL ±265.0 feet. Groundwater encountered at the fuel facility ranged from EL ±267.7 feet to EL ±268.7 feet with a 24-hr reading measured at B-24 at EL ±267.7 feet. Since the building is anticipated to be established at EL ±288.0 feet, within structural fill, it is anticipated that perimeter foundation drains will not be required for the building.

Based on groundwater levels encountered and the anticipated mass fill, it is expected that groundwater should not be a significant problem during mass earthwork activities in most areas of the site. However, it should be anticipated that groundwater may impact structural fill placement in the stream/drainage ditch area. At this time, we anticipate that a concrete culvert will be utilized to

maintain the stream's current path, see *Stream/Drainage Ditch* section of this report for additional detail. It should also be anticipated that seepage could be encountered in excavations for the proposed USTs. Particularly following periods of precipitation or snowmelt, it is possible that seepage of water perched or trapped atop relatively impermeable soil layers, or emanating from within relatively porous zones, may occur in open excavations. It is expected that such seepage can be controlled by pumping from sumps located within the excavations. Sump pits should be lined with geotextile filter fabric and filled with minimum ¾-inch clean stone to prevent soil migration. Pumped water should be discharged away from the building pad and open excavations.

Surface grading should be maintained on a continual basis during construction to direct surface water runoff away from open excavations and prevent water from pooling on subgrade soils. Subgrade soils should be roller compacted daily to seal the ground surface and inhibit infiltration of rain water, which could otherwise result in significant destabilization of the subgrade. The contract documents should require the contractor to provide whatever means and methods are necessary to maintain stable excavations and subgrade conditions at all times during construction.

It is assumed that the fuel facility will be established at a similar grade as the proposed building (EL ±288.0 feet). UST excavations typically extend to depths ranging up to ±20 feet BFG and since groundwater was encountered at an average EL of ±268.0 feet in the proposed UST field, groundwater is not expected to be a significant issue. However, this is based on assumed grading and should be reevaluated after grading has been finalized. Depending on final site grades, the proposed UST excavation will be established at or near the observed groundwater level. As such, if less than 2 feet of water is present above the bottom of the UST field it can likely be controlled by sump pumps as described above. If greater than 2 feet of groundwater is present above the bottom of the proposed UST field, temporary dewatering measures may be required to install the USTs, which may include the use of high capacity pumps. The UST design should incorporate tie-down straps to account for buoyant uplift pressures on the tanks if final grading resets in tank invert EL below the observed groundwater levels. See the *Fuel Facility* section of this report for additional detail.

Frost Considerations

Due to the regional climate of the project site, we recommend the use of finger drains and pavement underdrains in accordance with COSTCO's cold climate standard details. Finger drains

should be installed on each side of catch basins in pavement areas and should consist of minimum 4-inch diameter perforated pipe surrounded by at least 6 inches of clean stone, and the stone should be wrapped in geotextile filter fabric. The finger drain pipes should penetrate the catch basin and extend a minimum of 15 feet from the catch basins. The finger drains should be located deep enough to allow construction of the full pavement section above, including the aggregate subbase layer. Pavement underdrains should be provided at the interface of flush asphalt and concrete flatwork. The underdrains should consist of pipe, stone, and fabric, similar to the finger drains; however, the underdrains should be a minimum of 2 feet wide and extend a minimum of 3 feet below finished surface grades.

Subsurface Utilities

The natural soils and new structural fill materials will be suitable for support of subsurface utilities. However, should unsuitable soils be encountered at the utility invert levels, the subgrade should be over-excavated a minimum depth of 6 inches and backfilled with well-graded granular material to provide uniform support. Utility excavations should be backfilled using structural fill, placed and compacted in accordance with the *Fill and Backfill Materials* section of this report. It should be noted that based on anticipated grades and associated site settlements, utility construction should not commence until site settlements are complete.

Stream/Drainage Ditch

As previously stated, the flow of water referenced stream/drainage ditch is expected to be carried with a concrete box in the culvert. The stream/drainage ditch is underlain by the same loose fine sand mentioned previously and this area will receive structural fill ranging up to ±20.0 feet to achieve site grades. Settlements within this area are estimated to range up to ±8.0 inches in magnitude due to the weight of the new fill. If it is not feasible to relocate the culvert to an area that will receive less fill, ground improvement prior to construction of the culvert should be anticipated. We recommend Rapid Impact Compaction along the proposed culvert as likely the most feasible and cost-effective option. Other methods were eliminated from further consideration due to cost and/or feasibility.

Corrosion Potential

Samples of the overburden soils were tested to evaluate the potential for corrosion of ductile iron, steel, or concrete that will be in direct contact with the soils. The samples were tested for pH,

Redox Potential, Chloride, Sulfides, and Sulfate. The test results indicate that the soils have low potential for corrosion to ductile iron and steel in accordance with AWWA C105 Appendix A. Based on the Sulfate test results and ACI 318, the risk for sulfate attack on concrete is negligible; as such, Type I Portland cement is recommended for mix design, per COSTCO specifications. A summary of the test results is presented in the *Laboratory Testing* section of this report and detailed test results are presented in Appendix C.

Foundations

Based on the results of this study and the anticipated grades, it is our opinion that the proposed building and fuel canopy can be supported by conventional shallow spread footings established in new compacted structural fill. Based on the design loads, and provided the earthwork recommendations contained herein are followed, foundations can be designed for a maximum allowable net bearing pressure of 3,000 psf.

It should be noted that should proposed grading deviate from the understandings stated in this report and the height of fill required to achieve the proposed site grades are reduced, alternate building support options may be required, such as reducing the bearing capacity or utilizing ground improvement techniques. We have detailed some of the potential alternate building support options in the *Foundation/Building Support Options* section of this report.

Subgrade soils exposed in foundation excavations should be evaluated by the geotechnical engineer prior to placement of structural fill, reinforcing steel, or concrete, to confirm stability of the subgrade materials and verify adequate bearing exists. The evaluation should consist of proof-rolling and compacting the subgrade soils with the largest practical equipment and observation or testing as deemed necessary by the geotechnical engineer. Any subgrade soils that are determined to be soft, loose, wet, or otherwise unstable should be selectively excavated and replaced with structural fill, placed and compacted in accordance with the recommendations presented in the *Fill and Backfill Materials* section of this report.

The bottom of exterior foundations should be established at least 48 inches below finished grade or deeper if required by the local building code, to provide protection from frost action.

Interior foundations in permanently heated portions of the building may be established at convenient depths below the floor slab that will not interfere with subsequent floor slab construction.

The minimum dimensions of continuous and isolated footings should be 24 inches and 36 inches, respectively, to prevent a punching-type shear failure regardless of the actual applied bearing pressure. Based on the structural loads, total settlements of less than 1 inch and differential settlements of less than ½ inch can be anticipated for footings established on new compacted structural fill.

Unless foundation construction proceeds within 24 hours of foundation subgrade preparation, including approval by the geotechnical engineer, subgrades should be protected from the elements to reduce exposure and potential weakening of the subgrade materials, particularly if precipitation or freezing temperatures are expected prior to foundation construction. Preventative measures such as placing a lean concrete "mud mat" on the subgrade or providing suitable cover for the excavations may be considered appropriate, depending on the prevailing weather conditions. Foundation excavations should be protected from frost and water infiltration until the foundations have been constructed and backfilled.

Floor Slab

It is our opinion that the proposed floor slab can be constructed as a slab-on-grade. Based on the anticipated finished floor level, it is anticipated that the floor slab will be supported by newly compacted structural fill. As such, we recommend the floor slab be designed assuming a Modulus of Subgrade Reaction of 150 pounds per cubic inch. Given that the floor slab will be supported by soil with a minimum allowable bearing pressure of 3,000 psf, steel reinforcement within the slab should not be required; however, the project structural engineer should provide specific reinforcement recommendations for the slab if necessary.

It should be noted that if proposed grading deviates from the understandings stated in this report and the height of fill required to achieve the proposed site grades are reduced, reinforcement of the floor slab may be required. Reinforcement will be dictated by the method of building support selected and is detailed in the *Foundation/Building Support Options* section of this report.

Areas of the floor slab to remain at grade or receive fill should be compacted and proof-rolled under the direct observation of the geotechnical engineer to evaluate stability. Any areas that are determined to be unstable should be selectively excavated and replaced. Fills required to achieve the proposed floor slab subgrade level should consist of structural fill that is placed and compacted in accordance with the *Fill and Backfill Materials* section of this report.

We recommend a minimum 6-inch thick bedding of free-draining aggregate be placed below the floor slab in accordance with COSTCO criteria to interrupt the rise of capillary moisture through the slab and allow for proper curing of the concrete. The floor slab may bear on footing projections; however, control joints should be provided at the slab and wall/column interfaces to reduce the potential for slab cracking, should the building settle differentially from the floor slab.

Foundation/Building Support Options

As previously discussed herein, if the height of structural fill is reduced to less than ±3 feet, the risk increases for excessive foundation settlement and slab cracking without taking preventative measures. The risk is due to the presence of the loose sands as they are susceptible to significant settlements from applied loads. Such measures should consist of either reducing the design bearing capacity or employing a ground improvement method.

Since reducing the bearing capacity will result in increased costs to standard construction, i.e. larger footings and reinforced slab, ground improvement should be considered. Ground improvement in general will densify the loose sands, minimize settlement risk, minimize liquefaction potential, and allow for standard construction methods.

As such, the following table summarizes the various ground improvement methods we considered, as well as conventional spread footings and slab-on-grade designed for a reduced bearing capacity. Again, these options are based on the potential scenario that proposed grading will result in fill heights of generally less than 3 feet.

BUILDING SUPPORT OPTIONS

Option	Feasible?	Risk	Pros	Cons
Spread Ftgs and Slab-on-grade on unimproved ground w/ lower bearing capacity	Yes	Moderate to High	-Least expensive initial cost	-Significant risk of excessive settlements -Additional costs associated with reinforced slab and larger footings. -Does not minimize liquefaction potential.
Spread Footings and Floor Slab on improved ground via surcharge	Yes	Low	-No specialty equipment / subcontractors required -Maintain conventional spread footing foundation approach -Minimizes liquefaction potential.	-Time impacts to schedule -Cost to import/export fill and instrumentation
Spread Footings and Floor Slab on improved ground via deep dynamic compaction (DDC) or Rapid Impact Compaction (RIC)	Yes	Low	-Densifies soils in place. -Predictable construction schedule. -Minimizes liquefaction potential.	-Vibrations near existing building & highway infrastructure -Limited depth of soil improvement
Conv. Ftgs on improved ground via Rammed Aggregate Piers (RAP) or vibrocompaction	Yes	Low	-Improved soil bearing capacity -Maintain spread footing approach -Fast installation time -Minimizes liquefaction potential.	-Vibrations near existing building & highway infrastructure

It should be noted that designing conventional spread footings with slab-on-grade is possible by reducing the design bearing capacity to minimize settlements but may not be a cost-effective option when compared to some of the ground improvement methods detailed herein. As such, it is our opinion that conventional spread footings on improved ground via DDC/RIC or surcharge are likely the most cost-effective options that introduce the least amount of risk, pending evaluation of costs associated with import/handling of surcharge soil.

The next most cost-effective ground improvement option would likely be RAPs or vibrocompaction. It is our opinion that RAPs or vibrocompaction are viable options but will likely be the most expensive options. It should be noted that other ground improvement techniques as well as deep foundations were eliminated from further consideration, as they will likely not be cost effective. As such, the following sections of this report detail the options for building as summarized in the preceding table.

Reduced Bearing Capacity Considerations

If reducing the soil bearing capacity is considered, we recommend designing for 2,000 psf for the footings at the building and fuel facility to control settlements. A reduction of the bearing capacity will generally result in larger footings, additional reinforcement of the foundations, additional concrete, and reinforcement of concrete slab-on-grade. It is our opinion that a reduction of the bearing capacity will control settlements to within tolerable limits of 1 inch total and ½-inch differential. Refer to the *Foundations* section of this report for additional detail if necessary.

The proposed concrete slab-on-grade can be constructed on unimproved ground on natural site soils; however, we recommend the floor slab be designed assuming a Modulus of Subgrade Reaction of 40 pounds per cubic inch (pci). Given that the floor slab will be supported by soil with an allowable bearing pressure of 2,000 psf, steel reinforcement within the slab will be required. The project structural engineer should provide specific reinforcement recommendations for the slab. Refer to the *Floor Slab* section of this report for additional detail if necessary.

Ground Improvement via DDC/RIC

DDC involves dropping a heavy weight from a crane repeatedly on the ground surface over a pre-determined grid pattern to densify the soils in-place. This method of ground improvement can be effective to depths ranging up to 30 feet BGS, depending on groundwater levels, soil type, and the weight and height of drop. The depth to groundwater at this site will minimize the effectiveness of the ground improvement.

The DDC program should consist of two (2) passes with drop points on a predetermined grid pattern. The second pass should be, centrally offset between the drop points of the first pass. A third and final "ironing" pass may be required depending on the performance of the first two passes. The ironing pass should consist of overlapping drop points to create a smooth surface. It should be noted

that the DDC program will result in a net lowered ground surface elevation, which could range up to 24 inches. Any material required to restore subgrade elevations during or after the DDC program should consist of previously approved granular structural fill. It should be noted that all aspects of the DDC program can be adjusted in the field at the time of construction based on performance of the soils, including number of drops, height of drops, and location of drop points. For preliminary planning purposes, we recommend designing spread footings supported by DDC improved ground for a maximum allowable net bearing pressure of 3,000 psf.

RIC consists of a similar procedure to DDC; however, RIC uses a smaller excavator-mounted compaction hammer dropped from a lower height at a higher frequency. The advantages of RIC include smaller, more mobile, equipment and lower ground vibrations than a DDC program. The disadvantages include a smaller grid pattern and lesser densification of the soils in-place.

Ground Improvement via Surcharge

Surcharging the building pad and fuel facility area will pre-load the loose natural soils and allow for construction of conventional shallow spread footings.

Settlement plates will need to be installed prior to construction of surcharge piles and monitored during and following placement of the surcharge to determine when removal of the surcharge can be coordinated.

It is expected the settlements will be elastic in nature and occur during or shortly after load application. The maximum surcharge time is estimated to be less than 30 days. As such, a phased approach could be considered to limit the volume of surcharge material required.

Surcharge piles should be constructed with structural fill compacted to a minimum of 95% of maximum dry density because portions of the surcharge will likely remain in-place to support the proposed floor slab depending on the final site grades. For preliminary planning purposes, we recommend designing spread

footings supported by surcharge improved ground for a maximum allowable net bearing pressure of 3,000 psf.

Ground Improvement via Vibrocompaction or RAPs

Vibrocompaction involves the use of a vibrator hung from a crane which is lowered into the soil under its own weight and vibrated into the ground in a pre-determined grid pattern. Penetration can be aided by water jets integrated within the vibrator. The vibrator is lowered to the target depth/bottom of the zone of treatment and raised and lowered in successive lifts. The ground surface will be lowered during the vibration process as the soils densify and structural fill can be added during the vibration process to maintain current grades if necessary. The treated soil will have improved density, friction angle, and overall stiffness.

Spacing can range from 6 feet to 14 feet on-center in square or triangular spacing. Zone of treatment is typically from 15 feet to 50 feet BGS. Design bearing pressures generally range from 5,000 to 10,000 psf, resulting in decreased footing sizes. For preliminary planning purposes, we recommend designing spread footings supported by vibrocompaction for a maximum allowable net bearing pressure of 5,000 psf.

RAPs consist of drilling or driving a 2 to 3 foot diameter hole in the ground and backfilling the hole with successive lifts of gravel that are compacted with a tapered down-hole ram. This ground improvement method creates stiffened columns and improves the overall soil mass by densifying the soils surrounding the columns. RAPs are generally feasible and cost effective to depths of 35 feet BGS. For this project, we estimate RAP depths of approximately 12 to 15 feet BGS.

There are two methods of RAP installation, including replacement and displacement. The replacement method consists of drilling the hole with an auger and replacing the excavated soil with compacted gravel. Shallow groundwater can be problematic for the replacement method as an open hole must be maintained after removal of the auger to allow placement of the gravel backfill. Additionally, a significant volume of spoil material can be generated depending on the total

number of RAPs installed. The displacement method provides a solution for both of these issues by driving a specially designed tamper foot and mandrel into the ground using static and dynamic energy. The tamper foot used to create the hole displaces the soils downward and laterally resulting in no spoils. Gravel is then transferred to the bottom of the hole through the hollow mandrel, eliminating the need to maintain an open hole. Considering the shallow groundwater at this site and cost implications of exporting spoil materials, the displacement method is considered the most cost-effective method of RAP installation for this site.

RAPs will bring total and differential settlements within tolerable levels across the site and will allow design of conventional shallow spread footings for bearing pressures ranging from 5,000 to 10,000 pounds per square foot (psf), resulting in decreased footing sizes. For preliminary planning purposes, we recommend designing spread footings supported by RAPs for a maximum allowable net bearing pressure of 5,000 psf.

RAPs can also be designed to resist uplift from seismic or wind loads acting on the canopy and pylon sign structures. Uplift resistance is achieved by installing anchors within the RAP element, which are then structurally connected to the footings. RAPs can support tensile loads of up to 75 kips; however, the RAP designer should establish uplift capacities for this project.

RAPs should be installed prior to installation of new subsurface utilities to prevent potential vibration induced damage from the RAP installation process.

A modulus test and uplift load test should be performed on at least one non-production RAP in general accordance with ASTM D-1143 and ASTM D-3689, respectively. Additionally, a representative number of RAPs designated by the designer should be subjected to bottom stabilization verification testing, and dynamic cone penetrometer testing (ASTM STP-399) within the upper 1/3 of the RAP shaft length. The geotechnical engineer should provide full-time observation and quality control testing during installation and load-testing of the

RAPs. The RAP system should be designed and installed by a qualified design-build contractor.

Seismic Considerations

New structures must be designed in accordance with the 2015 International Building Code Section 1613 - Earthquake Loads. The site classification for the seismic design is determined by the properties of the soil profile within a depth of 100 feet of the ground surface. Based on the results of this exploration program, information contained in the Code, and our local experience, we recommend that the building be designed assuming a Site Class D – Stiff Soil Profile. The following table presents corresponding seismic design parameters.

SEISMIC DESIGN PARAMETERS

Parameter	0.2-Second Period	1.0-Second Period
Mapped Spectral Response Acceleration (S_S/S_1)	0.183g	0.070g
Site Coefficient (F_a/F_v)	1.600	2.400
Maximum Considered Spectral Response Acceleration (S_{MS}/S_{M1})	0.293g	0.168g
Design Spectral Response Acceleration (S_{DS}/S_{D1})	0.195g	0.112g

Lateral Earth Pressure Parameters

The predominantly granular excavated site soils or imported well-graded granular soils are well-suited for backfill of below-grade walls. Imported fill materials containing elevated fine-grained (silt and clay) soil content is not well-suited as backfill of below-grade walls or within the reinforced zone of segmental block retaining walls and should be avoided. These soils will be sensitive to moisture-related compaction problems and their inherently poor drainage characteristics typically result in hydrostatic pressures exerted on the back-face of walls. The maximum particle size in wall backfill materials should be limited to 3 inches, and the backfill should be free of deleterious matter and debris. Retaining walls should be designed with a zone of free-draining material directly behind the back face of the wall to prevent the buildup of hydrostatic pressures, and include discharge channels, such as weep holes to direct drainage away from the wall. Walls constructed in cut areas should be designed with back drainage to intercept seepage that may occur from the excavated soil face. Recommended soil parameters for design of below-grade walls and retaining walls are presented in the following table.

LATERAL EARTH PRESSURE PARAMETERS

	Existing Fill	Natural Soil	Granular Structural Fill
In-Situ Moist Unit Weight (pcf)	115	100	n/a
Compacted Moist Unit Weight (pcf)	120	105	140
Angle of Internal Friction (Φ, degrees)	32	30	36
Coeff. of Friction at Base (Concrete on Soil)	0.3	0.3	0.8

*These values are based on industry standard empirical correlations w/ SPT N-values, soil parameters should be verified prior to final design of structures.

Walls restrained from lateral movement at the top of the wall and/or intermediate points should be designed using the at-rest earth pressure coefficient. Walls that are not restrained from lateral displacement (free to rotate) should be designed using active earth pressure coefficients. We recommend that passive earth pressures be omitted from the wall designs. Surcharge loads imposed by sloping backfill, pavements, terraced walls, material stockpiles, construction equipment, etc. must be considered in the wall designs. Retaining wall design should consider internal stability and external global stability at all critical stages during and following construction. Retaining walls should be designed assuming a maximum allowable net bearing pressure of 3,000 psf on improved ground and 2,000 psf on unimproved ground.

Light pole bases can be designed assuming a maximum allowable lateral soil pressure of 150 psf per foot of base depth below the ground surface in addition to a coefficient of lateral sliding resistance of 0.25 at the contact between the pole base and subgrade materials.

As previously stated, a retaining wall is likely required in the northwestern corner of the site. We understand that the wall may be up to ±10 feet in height and cut into the existing slope in that portion of the site. The predominately granular excavated natural soils will be suitable for reuse as backfill of retaining walls, provided they are screened of any large and/or deleterious materials.

At the time of this exploration program, the dimensions and type of retaining wall system had not been selected. Depending on final grades and site layout, a traditional reinforced segmented

block wall is possible; however, the disturbed area for the reinforced zone will impact the Rapp Road embankment at that location and needs to be considered in the design. A cast-in-place concrete wall or soldier pile wall may also be feasible and will have a smaller relative footprint area.

Pavements

Prior to new pavement construction, the pavement subgrade should be compacted with a minimum 10-ton vibratory compactor, and proof-rolled with a loaded tandem-axle dump truck under the observation of the geotechnical engineer to evaluate stability. Any subgrade materials that are observed to be soft, loose, wet, or otherwise unstable should be selectively excavated and replaced with compacted structural fill or granular subbase material. It should be noted that site settlements should be complete before pavement construction begins

Standard and heavy-duty pavement sections were designed based on the traffic loading criteria specified in the COSTCO Wholesale Development Requirements. As such, the design incorporates a 20-year service life, 30 five-axle trucks per day, and 6,600 cars per day. The CBR test results indicate a CBR value of ±10 when compacted to 95% of maximum dry density per ASTM D1557. Based on these design parameters, the following tables present recommended minimum sections for flexible and rigid pavements:

FLEXIBLE ASPHALT PAVEMENT

Material	Standard Duty (inches)	Heavy Duty (inches)
Wearing Course	2.0	2.0
Base Course	2.5	4.0
Aggregate Subbase	6.0	6.0

RIGID CONCRETE PAVEMENT

Material	Heavy-Duty (inches)
4,000 psi Reinforced Concrete	6.0
Aggregate Subbase	6.0

The flexible asphalt and rigid concrete pavement materials and construction procedures should meet the requirements of the COSTCO Master Specifications Section 321216 and 321313, respectively. The asphalt wearing and binder course mix designs and placement methods should conform to local and state (NYSDOT) regulations. Asphalt pavements with up to 20% RAP should

be constructed with Performance Grade Binder Oil with a rating of PG64-22. Asphalt pavements with between 20% and 30% RAP should be constructed with Performance Grade Binder Oil with a rating of PG58-28. The subbase material should meet the requirements of NYSDOT Construction and Materials Standard Specifications - Subbase Course. We recommend that rigid concrete pavements be reinforced with minimum No. 3 bars at 18 inches on-center, each way. These recommended pavement sections may be subject to municipal approval.

Fuel Facility

As previously stated, the fuel facility will be located in the southwest corner of the site, which will consist of three (3) USTs, an additive tank, and three (3) fuel dispenser islands with an overhead canopy structure. As stated in the *Foundations* section of this report, the proposed fuel canopy can be supported by conventional shallow spread footings established in new compacted structural fill. As such, the foundations at the proposed fuel canopy should be designed for a maximum allowable net bearing pressure of 3,000 psf on improved ground and 2,000 psf on unimproved ground.

The proposed canopy slab and UST slab should conform to the rigid concrete pavement section provided in the *Pavements* section of this report. The proposed canopy slab and UST slab can be constructed as a slabs-on-grade on structural fill and designed assuming a Modulus of Subgrade Reaction of 150 pci. The concrete slabs at the fuel facility are typically reinforced and should be evaluated by the structural engineer for the specific reinforcement schedule.

Underground Storage Tanks (USTs)

As previously stated, there will be three (3) USTs and an additive tank installed within the UST field. The UST field excavation typically extends up to ±20 feet BFG and is often 60 feet by 60 feet in size. As stated in the *Fill and Backfill Materials* section of this report, the natural soils excavated from the UST field will be suitable for reuse as structural fill.

The UST bedding and backfill should consist of 'pea gravel' or predominantly granular material with a maximum particle size of ½-inch and contain no more than 5% of material passing the No. 8 sieve, unless otherwise specified by the tank manufacturer. We recommend the UST bedding and backfill material be separated from surrounding soils with a geotextile filter fabric. The fabric will reduce the potential for particle migration, while maintaining subsurface drainage.

Particle migration could result in development of concentrated point loads on the tanks, loss of support below the tanks, and/or propagate upward resulting in loss of support for adjacent utility lines or the surficial concrete slabs.

Groundwater was encountered at the gas station at depths ranging from ±12.3 to ±14.0 feet BGS (EL ±267.7 feet to EL ±268.7 feet) with a 24-hr reading measured at B-24 at ±12.3 feet. It should be anticipated that seepage could be encountered in excavations for the proposed USTs. Depending on final site grades, it is likely that a portion of the proposed UST field may be established below the groundwater level. As such, if less than 2 feet of water is present above the bottom of the UST field it can likely be controlled by sump pumps as described above. If greater than 2 feet of groundwater is present above the proposed UST field, temporary dewatering measures may be required to install the USTs, which may include the use of high capacity pumps. The UST design will also require tie-down straps to account for buoyant uplift pressures on the tanks.

Particularly following periods of precipitation or snowmelt, it is possible that seepage of water perched or trapped atop relatively impermeable soil layers, or emanating from within relatively porous zones, may occur in the UST excavations. It is expected that such seepage can be controlled by pumping from sumps located within the excavations. Sump pits should be lined with geotextile filter fabric and filled with minimum ¾-inch clean stone to prevent soil migration. Pumped water should be discharged away from the canopy pad and open excavations.

Given the limited groundwater expected in the UST excavation, we recommend a dry-set. However, if wet-set construction methods will be utilized, some of the primary challenges associated with a wet-set installation are as follows:

- After excavation, it is difficult to confirm that a uniform subgrade level has been established below the groundwater level.
- The stability of the subgrade soils cannot be visually or physically evaluated.
- The excavation process will loosen the saturated granular subgrade soils, which will reconsolidate as the bedding stone, tanks, and backfill are placed, potentially causing the tanks to settle.
- The required overlap of the fabric that lines the excavation cannot be confirmed below the groundwater level.

- Compaction/consolidation of the bedding and backfill materials below the groundwater level cannot be performed using conventional compaction methods, nor can compaction levels be confirmed.

Most of these logistic challenges should be addressed by construction means and methods; however, if there are concerns, pre-loading the subgrade soils could be considered. Pre-loading the subgrade soils would entail installation of the temporary sheet piles, lining the excavation with fabric, and placing all of the pea-gravel intended for bedding and backfill of the USTs. Based on the volume differential without the tanks in the hole, we estimate this will allow the excavation to be filled with 12 to 14 feet of pea gravel. It should be noted that the entire excavation does not have to be filled to the top because the net differential loading between the excavated soils and the available pea gravel is accounted for by the lower unit weight of the tanks when filled with fuel.

Due to the granular soils below the UST excavation, it is expected that any reconsolidation settlements will be elastic and should occur effectively immediately upon placing the pea gravel. However, consideration should be given to installing at least one settlement plate prior to placing the pre-load pea gravel to monitor reconsolidation and establish when the pea gravel can be removed and installation of the tanks can begin.

After reconsolidation, the excess pea gravel can then be removed to the tank subgrade elevation and the deadmen and tanks can be set and the excavation backfilled. Care should be exercised when excavating the pea gravel to not disturb the liner fabric. Given that the manufacturer requires a minimum of 18 inches of pea gravel bedding for a wet-set, this should not be a significant logistic concern, but still to be cautious of nonetheless.

The benefits of pre-loading are that it will reconsolidate the disturbed subgrade soils, provide a more uniform bearing surface, and any net settlements expected from the proposed complete UST system will have occurred due to the weight of the pea gravel.

Environmental Considerations

We understand that an environmental due diligence process is being conducted by others. Environmental considerations have not been taken into account during this investigation.

Geophysical Considerations

At the time of this report, a geophysical study is planned to be completed at the site and will be conducted by this office and submitted under separate cover at a later date. This report will be reevaluated, as necessary, based on the results of that study.

LIMITATIONS

This geotechnical exploration has been performed in accordance with the COSTCO Wholesale Development Requirements Version 2016 dated September 19, 2016 and generally accepted engineering practice. This report and all supporting documentation have been prepared exclusively for the use of COSTCO Wholesale (COSTCO) pursuant to the Agreement between Maser Consulting P.A. (Maser) and COSTCO. All provisions set forth in the Agreement and the General Terms and Conditions attached thereto are incorporated herein by reference. No warranty, express or implied, is made herein.

The findings, conclusions, and recommendations contained in this report are based on data revealed by limited exploration and testing of the subsurface at the referenced project site. The explorations indicate subsurface conditions at the specific locations, depths, and times explored. Should deviations from the described subsurface conditions be encountered at any time prior to or during construction, Maser should be notified to determine whether the findings necessitate modification of our recommendations.

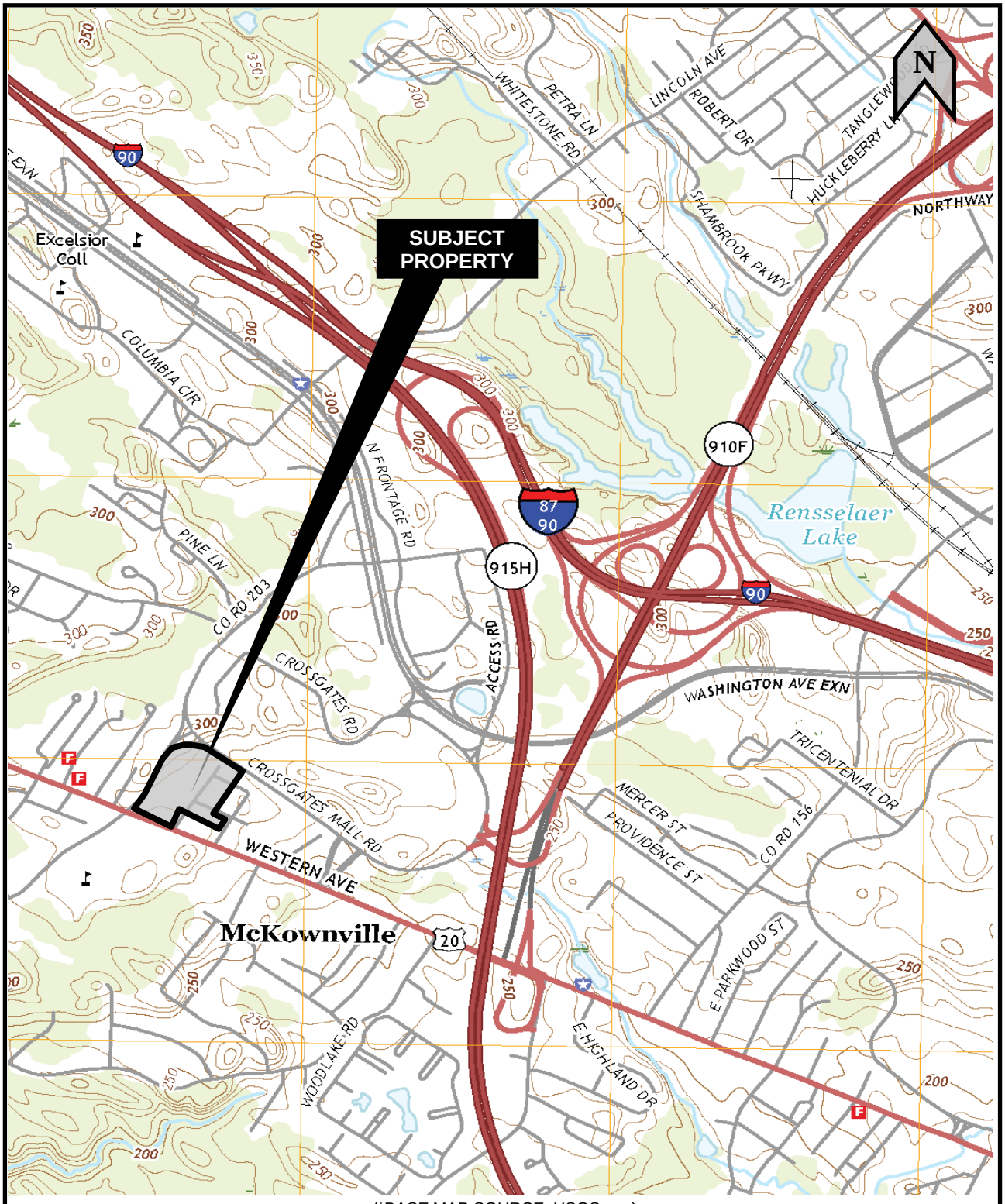
This report is applicable only to the contemplated site design described herein; any changes in the design should be brought to our attention so that we may evaluate whether our recommendations will be affected. Maser is not responsible for any claims, damages, or liability associated with interpretation of subsurface data or reuse of the subsurface data or engineering analysis without the expressed written authorization of Maser. As such, the conclusions and recommendations contained in this report are pending our review of final plans and specifications, and verification of subsurface conditions by direct observation at the time of construction.

This report and supporting documentation are instruments of service. The subject matter of this report is limited to the facts and matters stated herein.

The scope of this geotechnical exploration did not include investigation or evaluation of any environmental issues, such as wetlands, or hazardous or toxic materials on, below, or in the vicinity of the subject site. Any statements in this report or supporting documentation regarding odors or unusual or suspicious items or conditions observed are strictly for the information of our Client.

APPENDIX A

(FIGURES)



(*BASE MAP SOURCE: USGS.gov)

MASER CONSULTING P.A.

Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

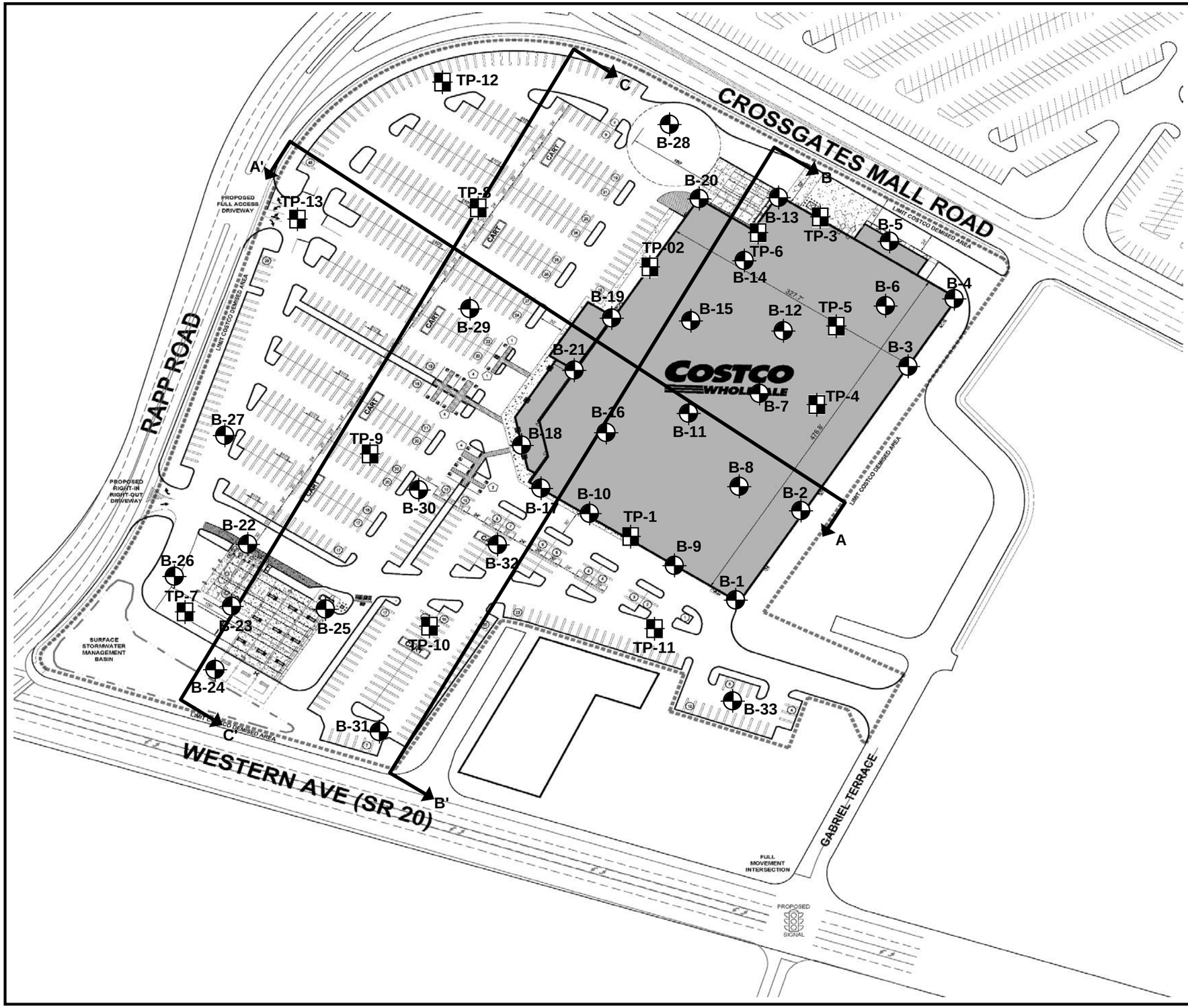
TITLE:

SITE LOCATION MAP

PROJECT:

PROPOSED COSTCO WHOLESALE
CITY OF ALBANY
ALBANY COUNTY, NEW YORK

DRAWN BY:	CHECKED BY:	PROJECT NO.:
*	JCW	13001204A
SCALE:	DATE:	FIGURE NO.:
N.T.S.	01/02/2018	1



N

PLAN NORTH

LEGEND:

B-1 INDICATES THE NUMBERS AND APPROXIMATE LOCATIONS OF TEST BORINGS PERFORMED FOR THIS EXPLORATION PROGRAM.

TP-1 INDICATES THE NUMBERS AND APPROXIMATE LOCATIONS OF TEST PITS PERFORMED FOR THIS EXPLORATION PROGRAM.

NOTES:

1.) *CONCEPT PLAN PREPARED BY MASER CONSULTING P.A. ENTITLED "CONCEPT PLAN SK-2 REVISED" DATED NOVEMBER 01, 2017.

2.) THIS DRAWING IS PART OF MASER'S GEOTECHNICAL REPORT (PROJECT NO. 13001204A) DATED FEBRUARY 2018 AND SHOULD ONLY BE USED IN CONJUNCTION WITH THE REPORT.

MASER CONSULTING P.A.

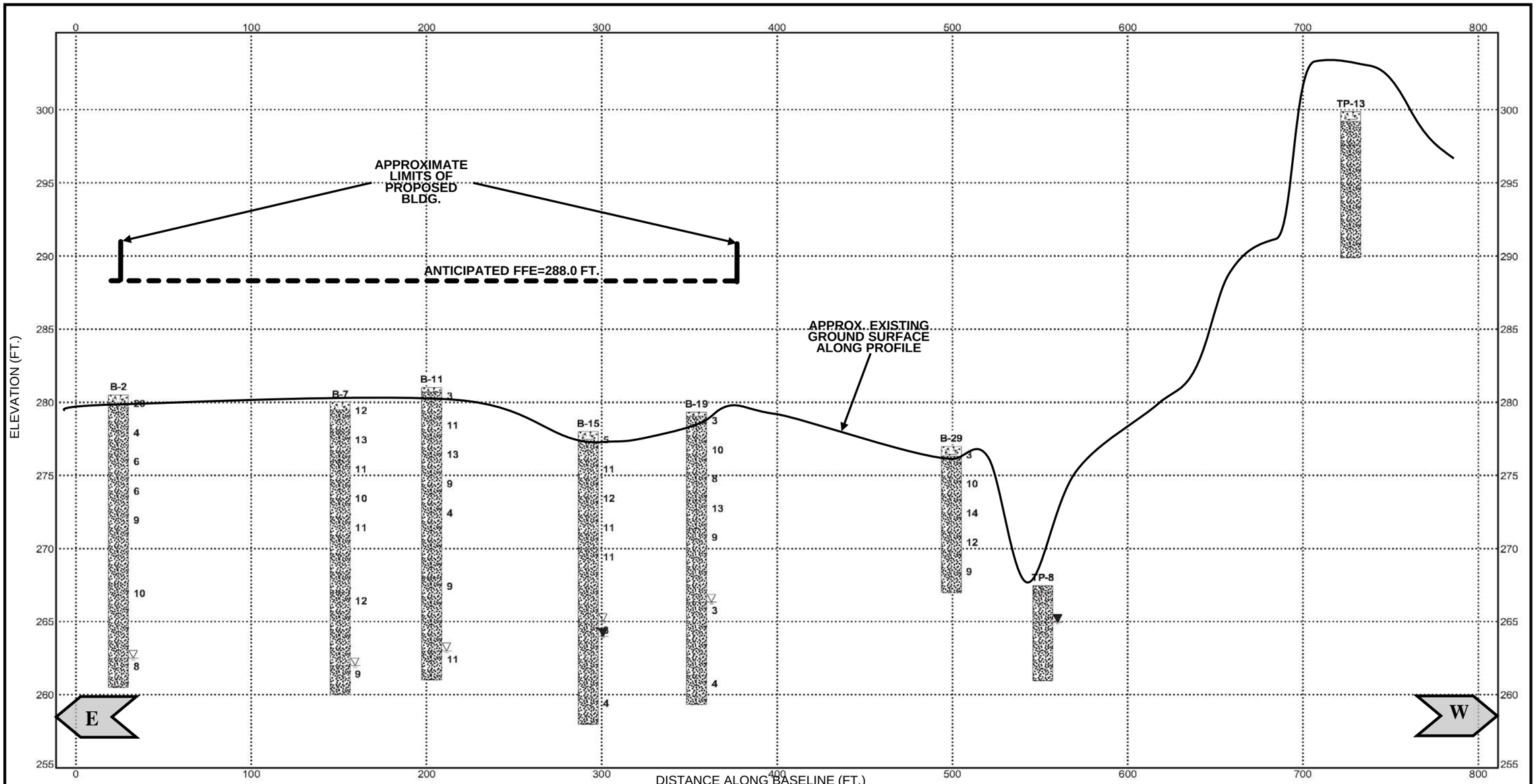
Consulting, Municipal & Environmental Engineers
Planners ■ Surveyors ■ Landscape Architects

TITLE: EXPLORATION LOCATION PLAN

PROJECT:

PROPOSED COSTCO WHOLESALE
CITY OF ALBANY
ALBANY COUNTY, NEW YORK

		DATE:
PROFESSIONAL ENGINEER: JOHN C. WALTON, P.E.		LICENSE NO.: 85339
DRAWN BY: *	CHECKED BY: JCW	PROJECT NO.: 13001204A
SCALE: N.T.S.	DATE: 01/02/2018	FIGURE NO.: 2



NOTES:

1.) THIS DRAWING IS PART OF MASER'S GEOTECHNICAL REPORT (PROJECT NO. 13001204A) DATED FEBUARY 2018 AND SHOULD ONLY BE USED IN CONJUNCTION WITH THE REPORT.

2.) STRATA LINES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND DO NOT NECESSARILY REPRESENT CONDITIONS BETWEEN EXPLORED LOCATIONS.

3.) ALL DEPTHS, ELEVATIONS, AND LOCATIONS ARE APPROXIMATE.

MASER CONSULTING P.A.

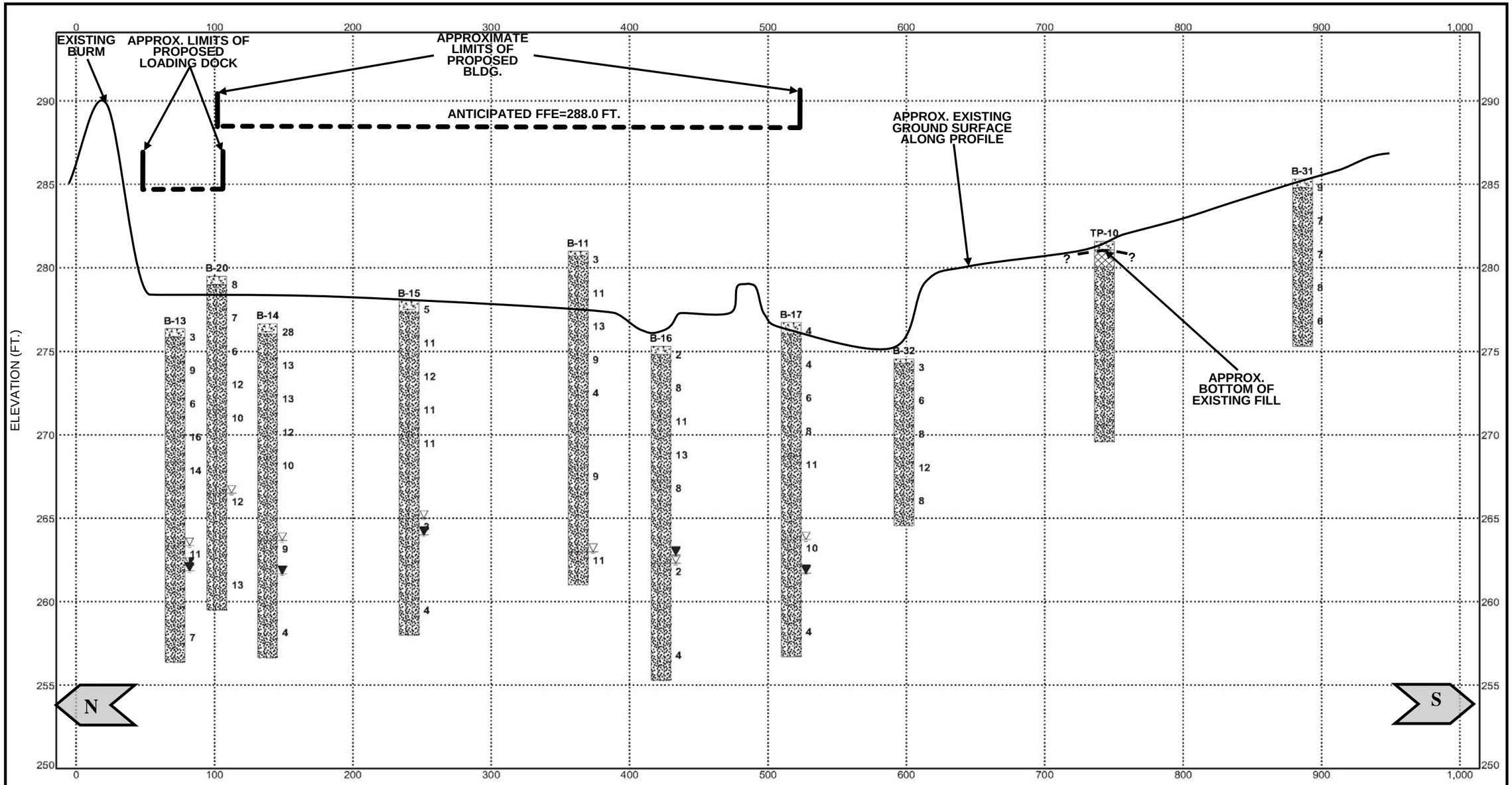
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Title: SUBSURFACE PROFILE A-A'

Project:

PROPOSED COSTCO WHOLESALE
CITY OF ALBANY
ALBANY COUNTY, NEW YORK

		DATE:
PROFESSIONAL ENGINEER: JOHN C. WALTON, P.E.		LICENSE NO.: 85339
DRAWN BY: NRC	CHECKED BY: JCW	PROJECT NO.: 13001204A
SCALE: AS SHOWN	DATE: 2/9/2018	FIGURE NO.: 3



NOTES:

1.) THIS DRAWING IS PART OF MASER'S GEOTECHNICAL REPORT (PROJECT NO. 13001204A) DATED FEBUARY 2018 AND SHOULD ONLY BE USED IN CONJUNCTION WITH THE REPORT.

2.) STRATA LINES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND DO NOT NECESSARILY REPRESENT CONDITIONS BETWEEN EXPLORED LOCATIONS.

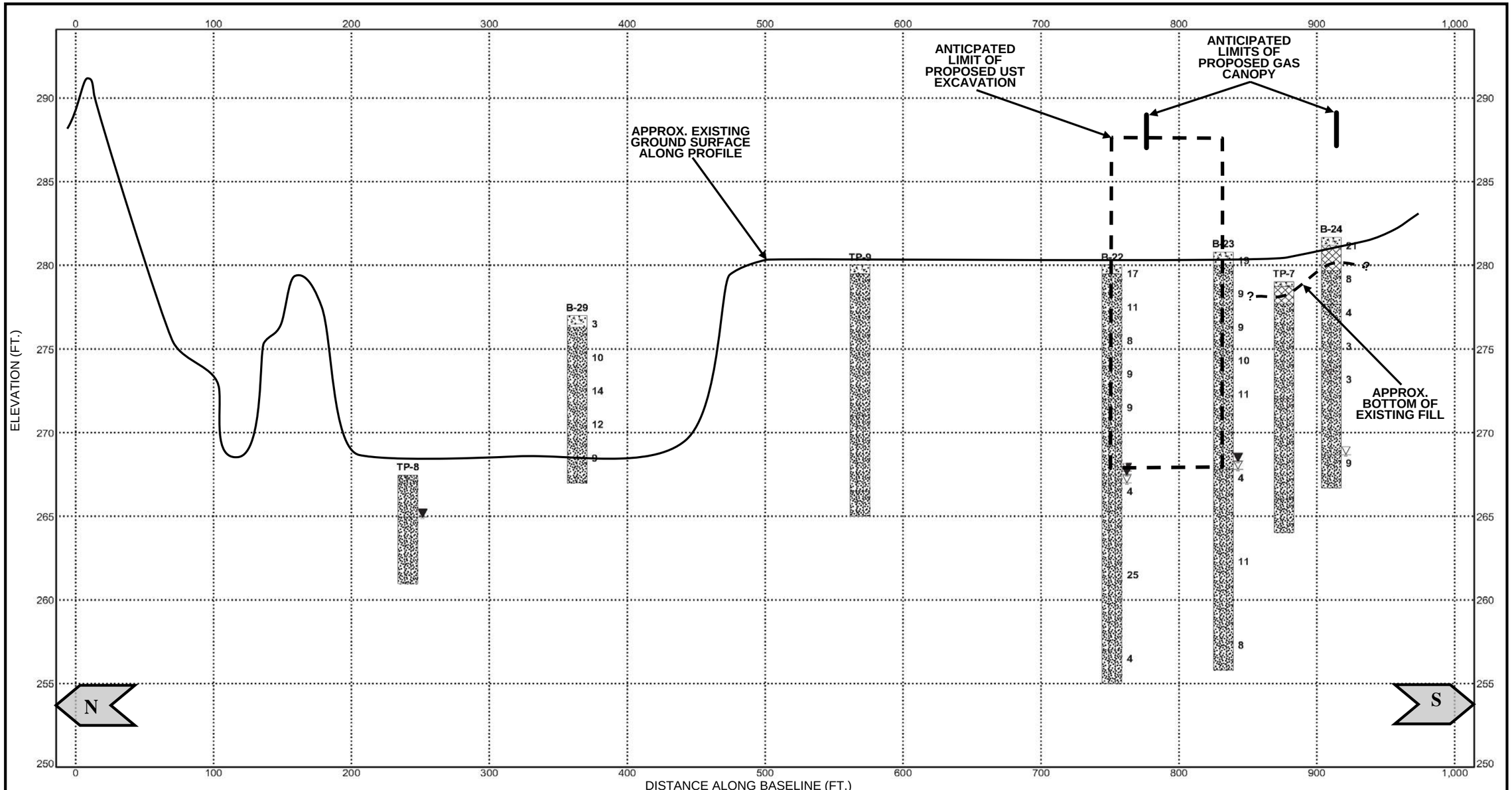
3.) ALL DEPTHS, ELEVATIONS, AND LOCATIONS ARE APPROXIMATE.

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Title: SUBSURFACE PROFILE B-B'

Project:
PROPOSED COSTCO WHOLESALE
CITY OF ALBANY
ALBANY COUNTY, NEW YORK

		DATE:
PROFESSIONAL ENGINEER: JOHN C. WALTON, P.E.		LICENSE NO.: 85339
DRAWN BY: NRC	CHECKED BY: JCW	PROJECT NO.: 13001204A
SCALE: AS SHOWN	DATE: 2/12/2018	FIGURE NO.: 4



NOTES:

1.) THIS DRAWING IS PART OF MASER'S GEOTECHNICAL REPORT (PROJECT NO. 13001204A) DATED FEBUARY 2018 AND SHOULD ONLY BE USED IN CONJUNCTION WITH THE REPORT.

2.) STRATA LINES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND DO NOT NECESSARILY REPRESENT CONDITIONS BETWEEN EXPLORED LOCATIONS.

3.) ALL DEPTHS, ELEVATIONS, AND LOCATIONS ARE APPROXIMATE.

MASER CONSULTING P.A.

Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Title: SUBSURFACE PROFILE C-C'

Project:

PROPOSED COSTCO WHOLESALE
CITY OF ALBANY
ALBANY COUNTY, NEW YORK

		DATE:
PROFESSIONAL ENGINEER: JOHN C. WALTON, P.E.		LICENSE NO.: 85339
DRAWN BY: NRC	CHECKED BY: JCW	PROJECT NO.: 13001204A
SCALE: AS SHOWN	DATE: 2/12/2018	FIGURE NO.: 5

APPENDIX B

(EXPLORATION LOGS)

BORING B-1

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/12/18**
Date Completed: **1/12/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **280.5**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	18	1/12/2018
End of Drilling (0 Hrs.) ▼	NR	1/12/2018
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	3 inches of Topsoil	0	280.5	S-01	13	7-4-2-1	6	
	0.2							
	Light brown, m(-)f SAND, trace Silt							
	2							
	Light brown, m(-)f SAND, trace Silt			S-02	16	0-0-0-1	0	
		5	275.5	S-03	9	1-1-1-2	2	
				S-04	15	4-4-5-6	9	
				S-05	9	4-5-6-6	11	
		10	270.5					
	13							
	Light brown, m(+)f SAND, trace Silt			S-06	13	4-5-5-4	10	
		15	265.5					
	18		▽					
	Gray, m(+)f SAND, trace Silt (wet)			S-07	10	1-2-2-5	4	
		20	260.5					

(Continued Next Page)

Logged By: NRC Checked By: MJC

Notes:

BORING B-1
PAGE 1 OF 2

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:03 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	Gray, m(+)f SAND, trace Silt (wet) *(continued)*							
				S-08	10	2-2-4-0/0"	6	
	24.5							
	Bottom of Boring at 24.5 Ft.							

Logged By: NRC Checked By: MJC

Notes:

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:03 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-2

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/17/18**	Ground Surface Elevation (ft.):	**280.5**
Date Completed:	**1/17/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered	**18 / 1/17/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.)	**NR / 1/17/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.)	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	280.5	S-01	17	19-14-6-4	20	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	22	4-2-2-4	4	
	4 Light brown, mf SAND, trace Silt (Dry)	5	275.5	S-03	20	2-2-4-2	6	
				S-04	20	2-2-4-2	6	
				S-05	19	4-4-5-5	9	
		10	270.5					
	13 Light brown with occasional orange-brown staining, mf SAND, trace Silt (Moist)			S-06	21	4-4-6-6	10	
		15	265.5					
	18 Brown, mf SAND, little Silt (Wet)			S-07	18	6-4-4-4	8	
	20	20	260.5					

Bottom of Boring at 20.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-2
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:05 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-3

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/17/18**	Ground Surface Elevation (ft.):	**279.59**
Date Completed:	**1/17/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered	**NE / 1/17/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.)	**NR / 1/17/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.)	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	279.6	S-01	19	1-1-2-4	3	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	15	5-5-6-5	11	
		5	274.6	S-03	20	4-4-5-5	9	
	6 Light brown, mf SAND, trace Silt (Dry)			S-04	20	5-4-5-5	9	
	8 Light brown with frequent orange-brown staining, mf SAND, trace Silt (Moist)	10	269.6	S-05	19	4-6-6-8	12	
	13 Gray with occasional orange-brown seam, mf SAND, trace Silt (Moist)			S-06	23	5-4-5-5	9	
		15	264.6					
				S-07	19	2-2-4-2	6	
	20 Bottom of Boring at 20.0 Ft.	20	259.6					

Logged By: NRC Checked By: MJC

Notes:

BORING B-3
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:07 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-4

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/17/18**
Date Completed: **1/17/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **279**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/17/2018
End of Drilling (0 Hrs.) ▼	NR	1/17/2018
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	8 inches of Topsoil	0	279.0	S-01	16	1-1-4-4	5	
	0.7 Brown, mf SAND, trace Silt (Moist)			S-02	20	5-2-2-2	4	
	4 Light brown/dark brown, mf SAND, trace Silt (Dry)	5	274.0	S-03	19	2-2-2-4	4	
	6 Light brown, mf(+) SAND, trace Silt (Dry)			S-04	18	2-2-5-7	7	
				S-05	19	5-6-7-7	13	
		10	269.0					
	13 Gray, mf SAND, trace Silt; occasional orange-brown seam (Moist)			S-06	19	4-5-6-6	11	
		15	264.0					
				S-07	18	4-5-7-8	12	
	20	20	259.0					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-4
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:07 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

BORING B-5

Date Started: **1/16/18**
Date Completed: **1/16/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **279.38**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/16/2018
End of Drilling (0 Hrs.) ▼	NR	1/16/2018
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	7 inches of Topsoil	0	279.4	S-01	20	17-10-5-4	15	
	0.6 Brown, mf SAND, trace Silt (Moist)			S-02	18	4-2-2-2	4	
	4 Brown/dark brown, mf SAND, trace Silt; occasional Roots (Moist)	5	274.4	S-03	16	2-2-2-2	4	
	6 Light brown, mf SAND, trace Silt (Dry)			S-04	19	1-4-6-7	10	
	8 Light brown, mf SAND, trace Silt, occasional orange-brown seam (Dry)	10	269.4	S-05	21	6-6-7-7	13	
	13 Gray, mf(+) SAND, little(-) Silt (Moist)	15	264.4	S-06	20	4-5-7-10	12	
	20	20	259.4	S-07	18	2-4-5-4	9	
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-5
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:08 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-6

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/16/18**
Date Completed:	**1/16/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**279.44**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**18**	**1/16/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/16/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	279.4	S-01	18	13-7-7-5	14	
	0.5							
	Light brown/dark brown, mf SAND, trace Silt (Moist)			S-02	20	7-5-4-4	9	
		5	274.4	S-03	20	4-2-2-2	4	
	6							
	Light brown, mf SAND, trace Silt (Moist)			S-04	21	2-4-4-6	8	
				S-05	18	4-7-6-7	13	
		10	269.4					
				S-06	19	2-4-5-5	9	
		15	264.4					
	18		▽					
	Gray, mf(+) SAND, little(-) Silt (Wet)			S-07	16	2-2-2-2	4	
	20	20	259.4					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-6
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:08 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

BORING B-7

Date Started: **1/17/18**
Date Completed: **1/17/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **280**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	18	1/17/2018
End of Drilling (0 Hrs.) ▼	NR	1/17/2018
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	280.0					
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-01	14	13-6-6-5	12	
	2 Light brown, dark brown, mf SAND, trace Silt; occasional Root (Moist)			S-02	5	4-6-7-6	13	
	4 Light brown, mf SAND, trace Silt (Dry)	5	275.0	S-03	12	7-6-5-5	11	
				S-04	13	4-5-5-6	10	
		10	270.0	S-05	19	5-4-7-6	11	
	13 Light brown with occasional orange-brown seams, mf(+) SAND, trace Silt (Moist)			S-06	18	4-6-6-6	12	
		15	265.0					
	18 Gray, mf(+) SAND, little Silt (Wet) ▽			S-07	19	5-5-4-5	9	
	20	20	260.0					

Bottom of Boring at 20.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-7
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:08 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-8

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/17/18**	Ground Surface Elevation (ft.):	**280.5**
Date Completed:	**1/17/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered ▽	**NE / 1/17/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.) ▼	**NR / 1/17/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.) ▼	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	4 inches of Topsoil	0	280.5	S-01	20	11-12-12-14	24	
	0.3							
	Light brown, mf SAND, trace Silt (Moist)							
	2							
	Light brown, mf SAND, trace Silt (Dry)			S-02	20	8-6-5-5	11	
		5	275.5	S-03	19	4-4-4-4	8	
				S-04	23	4-2-5-4	7	
	8							
	Light brown, mf SAND, trace Silt (Moist)			S-05	21	4-4-5-5	9	
		10	270.5					
	13							
	Light brown/dark brown, mf(+) SAND, little Silt (Moist)			S-06	19	4-5-5-6	10	
		15	265.5					
	18							
	Dark brown, mf(+) SAND, little Silt (Very Moist)			S-07	20	2-5-5-5	10	
	20	20	260.5					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-8
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:08 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-9

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/12/18**
Date Completed:	**1/12/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**280.5**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**18**	**1/12/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/12/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	280.5	S-01	15	7-8-8-10	16	
	0.5 Light brown, mf SAND, trace Silt (Dry)			S-02	9	10-7-6-6	13	
		5	275.5	S-03	16	2-5-4-5	9	
				S-04	12	4-4-5-4	9	
				S-05	16	4-4-5-4	9	
		10	270.5					
	13 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-06	12	5-5-6-6	11	
		15	265.5					
	18 Gray, mf SAND, trace Silt (Wet)		▽	S-07	15	1-1-2-4	3	
	20	20	260.5					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-9
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:08 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-10

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/12/18**
Date Completed:	**1/12/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**279.48**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**14.3**	**1/12/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/12/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	5 inches of Topsoil	0	279.5	S-01	12	2-2-4-5	6	
	0.4 Light brown, mf SAND, trace Silt (Moist)			S-02	12	7-10-12-16	22	
		5	274.5	S-03	18	6-10-8-8	18	
				S-04	20	6-6-5-5	11	
				S-05	20	2-5-6-7	11	
		10	269.5					
	14.3 Dark brown, mf SAND, trace Silt (Wet)		▽	S-06	16	2-4-5-2	9	
		15	264.5					
				S-07	18	2-5-5-4	10	
	20	20	259.5					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-10
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:03 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-11

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/12/18**
Date Completed: **1/12/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **281**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	18	1/12/2018
End of Drilling (0 Hrs.) ▼	NR	1/12/2018
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	3 inches of Topsoil	0	281.0	S-01	12	2-1-2-5	3	
	0.3							
	Light brown, mf SAND trace Silt (Moist)			S-02	20	5-5-6-5	11	
		5	276.0	S-03	16	4-6-7-5	13	
				S-04	16	5-4-5-5	9	
		10	271.0	S-05	14	2-2-2-2	4	
	13							
	Light brown, mf SAND trace Silt; occasional orange-brown seam (Moist to Very Moist)			S-06	16	4-4-5-4	9	
		15	266.0					
	18							
	Gray, mf SAND, trace Silt (Wet)			S-07	20	5-6-5-5	11	
	20	20	261.0					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-11
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:03 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-12

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/16/18**
Date Completed:	**1/16/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**278**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**18**	**1/16/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/16/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
		0	278.0					
	6 inches of Topsoil			S-01	22	11-5-4-4	9	
		0.5						
	Brown, mf SAND, trace Silt (Moist)							
		2						
	Light brown, mf SAND, trace Silt (Dry)			S-02	21	4-2-1-4	3	
				S-03	21	2-2-4-2	6	
		5	273.0					
				S-04	22	4-6-6-7	12	
		8						
	Light brown, mf SAND, trace Silt; occasional orange-brown seam (Moist)			S-05	13	4-5-6-5	11	
		10	268.0					
		13						
	Gray, mf SAND, little Silt (Moist)			S-06	19	2-2-4-4	6	
		15	263.0					
		18						
	Gray, mf SAND, little Silt (Wet)			S-07	20	1-4-6-8	10	
		20	258.0					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-12
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:03 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-13

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/16/18**
Date Completed:	**1/17/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.): **276.36**
Datum: **Topo**

Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**13**	**1/16/2018**
End of Drilling (0 Hrs.) ▼	**14.5**	**1/16/2018**
After Drilling (≥ 24 Hrs.) ▼	**14.2**	**1/17/2018**

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	276.4	S-01	19	1-1-2-4	3	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	20	4-4-5-5	9	
		5	271.4	S-03	19	2-2-4-4	6	
				S-04	19	5-6-10-11	16	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	13	4-7-7-6	14	
		10	266.4					
	13 Gray, mf SAND, trace Silt (Wet)			S-06	17	5-5-6-6	11	
		15	261.4					
				S-07	20	1-2-5-4	7	
	20	20	256.4					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-13
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:03 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-14

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/16/18**
Date Completed:	**1/16/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.): **276.66**
Datum: **Topo**

Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**13**	**1/16/2018**
End of Drilling (0 Hrs.) ▼	**15**	**1/16/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	7 inches of Topsoil	0	276.7	S-01	19	20-22-6-5	28	
	0.6 Light brown, mf SAND, trace Silt (Moist)			S-02	12	7-7-6-7	13	
		5	271.7	S-03	15	4-6-7-6	13	
				S-04	20	5-5-7-7	12	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	14	4-5-5-5	10	
		10	266.7					
	13 Gray, mf SAND, little Silt (Wet)		▽	S-06	14	2-4-5-5	9	
		15	▼261.7					
				S-07	22	1-2-2-5	4	
	20	20	256.7					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-14
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:04 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-15

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/15/18**
Date Completed:	**1/15/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.): **278**
Datum: **Topo**

Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**13**	**1/15/2018**
End of Drilling (0 Hrs.) ▼	**14**	**1/15/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	8 inches of Topsoil	0	278.0	S-01	16	1-1-4-5	5	
	0.7 Light brown, mf SAND, trace Silt (Moist)			S-02	20	5-5-6-7	11	
		5	273.0	S-03	18	5-6-6-8	12	
				S-04	19	6-5-6-10	11	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	15	4-6-5-6	11	
		10	268.0					
	13 Gray, mf SAND, little Silt (Wet)		▽ ▼	S-06	18	1-2-1-1	3	
		15	263.0					
				S-07	20	1-2-2-1	4	
	20	20	258.0					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-15
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:04 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-16

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/18/18**	Ground Surface Elevation (ft.):	**275.3**
Date Completed:	**1/18/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered	**13 / 1/18/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.)	**12.5 / 1/18/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.)	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	275.3	S-01	12	1-1-1-2	2	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	19	4-4-4-5	8	
		5	270.3	S-03	16	2-5-6-6	11	
				S-04	15	6-6-7-7	13	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Very Moist)			S-05	22	4-4-4-5	8	
		10	265.3					
	13 Gray, mf SAND, little Silt (Wet)			S-06	19	1-1-1-2	2	
		15	260.3					
				S-07	19	1-2-2-4	4	
	20	20	255.3					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-16
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:04 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-17

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/18/18**	Ground Surface Elevation (ft.):	**276.71**
Date Completed:	**1/18/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered	**13 / 1/18/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.)	**15 / 1/18/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.)	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	8 inches of Topsoil	0	276.7	S-01	20	1-2-2-2	4	
	0.7 Light brown, mf SAND, trace Silt (Moist)			S-02	19	1-2-2-4	4	
		5	271.7	S-03	18	4-4-2-4	6	
				S-04	20	2-2-6-7	8	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	17	6-6-5-5	11	
		10	266.7					
	13 Gray, mf SAND, little Silt (Wet)			S-06	17	4-5-5-6	10	
		15	261.7					
				S-07	16	1-2-2-4	4	
	20	20	256.7					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-17
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:04 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-18

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/18/18**
Date Completed:	**1/18/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.): **279**
Datum: **Topo**

Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**13**	**1/18/2018**
End of Drilling (0 Hrs.) ▼	**15**	**1/18/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	279.0	S-01	16	1-1-1-1	2	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	19	2-4-4-5	8	
		5	274.0	S-03	22	4-5-7-7	12	
				S-04	22	7-6-8-7	14	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	18	4-4-4-4	8	
		10	269.0					
	13 Gray, mf SAND, little Silt (Wet)		▽	S-06	18	1-2-1-4	3	
		15	▼264.0					
				S-07	19	2-2-2-4	4	
	20	20	259.0					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-18
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:04 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-19

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/12/18**
Date Completed:	**1/12/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.): **279.33**
Datum: **Topo**

Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**13**	**1/12/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/12/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	4 inches of Topsoil	0	279.3	S-01	16	1-1-2-5	3	
	0.3 Light brown, mf SAND, trace Silt (Moist)			S-02	14	6-5-5-4	10	
		5	274.3	S-03	13	4-4-4-5	8	
	6 Tan, mf(+) SAND, little Silt (Moist)			S-04	20	5-6-7-7	13	
	8 Light gray, mf SAND, little(+) Silt (Moist)	10	269.3	S-05	14	4-5-4-4	9	
	13 Gray with occasional orange-brown staining, mf(+) SAND, little Silt (Wet)			S-06	13	2-2-1-2	3	
		15	264.3					
	18 Gray, mf SAND, trace Silt (Wet)			S-07	18	2-2-2-2	4	
	20 Bottom of Boring at 20.0 Ft.	20	259.3					

Logged By: NRC Checked By: MJC

Notes:

BORING B-19
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:04 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-20

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/15/18**	Ground Surface Elevation (ft.):	**279.5**
Date Completed:	**1/15/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered ▽	**13 / 1/15/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.) ▼	**NR / 1/15/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.) ▼	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	279.5	S-01	16	7-4-4-5	8	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	12	6-5-2-4	7	
		5	274.5	S-03	18	4-2-4-5	6	
				S-04	20	5-5-7-7	12	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	18	4-5-5-6	10	
		10	269.5					
	13 Gray, mf SAND, little Silt (Wet) ▽			S-06	16	4-6-6-8	12	
		15	264.5					
				S-07	22	4-5-8-11	13	
	20	20	259.5					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-20
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:05 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-21

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/15/18**
Date Completed:	**1/15/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**278.82**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**13**	**1/15/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/15/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	278.8	S-01	14	1-1-2-4	3	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	12	4-4-4-4	8	
		5	273.8	S-03	18	2-4-4-5	8	
				S-04	18	6-7-10-12	17	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	16	4-5-6-6	11	
		10	268.8					
	13 Gray, mf SAND, little Silt (Wet) ▽			S-06	16	1-2-4-2	6	
		15	263.8					
				S-07	19	2-2-1-2	3	
	20	20	258.8					
	Bottom of Boring at 20.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-21
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:05 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-22

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/18/18**
Date Completed: **1/19/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **280**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	13	1/18/2018
End of Drilling (0 Hrs.) ▼	12.5	1/18/2018
After Drilling (≥ 24 Hrs.) ▼	12.3	1/19/2018

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	280.0	S-01	16	10-10-7-7	17	
	Light brown, mf SAND, trace Silt (Moist)	0.5		S-02	17	6-6-5-4	11	
		5	275.0	S-03	15	4-4-4-5	8	
	Light brown/orange brown, mf SAND, trace Silt (Moist)	6		S-04	15	4-5-4-5	9	
	Light gray, mf SAND, little Silt (Very Moist)	8		S-05	20	2-4-5-5	9	
		10	270.0					
	Light gray, mf SAND, little Silt (Wet)	13		S-06	18	1-2-2-4	4	
		15	265.0					
				S-07	12	4-11-14-18	25	
		20	260.0					

(Continued Next Page)

Logged By: NRC Checked By: MJC

Notes:

BORING B-22
PAGE 1 OF 2

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:05 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	Light gray, mf SAND, little Silt (Wet) *(continued)*							
	23							
	Light gray, mf(+) SAND, some(-) Silt (Wet)			S-08	8	1-2-2-4	4	
	25	25	255.0					
	Bottom of Boring at 25.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:05 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-23

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/19/18**	Ground Surface Elevation (ft.):	**280.8**
Date Completed:	**1/19/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered ▽	**13 / 1/19/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.) ▼	**12.5 / 1/19/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.) ▼	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	10 inches of Topsoil	0	280.8	S-01	13	7-12-7-6	19	
	0.8 Light brown, mf SAND, trace Silt (Moist)			S-02	18	6-5-4-4	9	
		5	275.8	S-03	15	4-4-5-5	9	
	6 Light brown/orange brown, mf SAND, trace Silt (Moist)			S-04	16	4-5-5-5	10	
		10	270.8	S-05	13	4-5-6-5	11	
	13 Light gray, mf(+) SAND, little Silt (Wet)			S-06	15	2-2-2-2	4	
		15	265.8	S-07	18	5-6-5-7	11	
		20	260.8					

(Continued Next Page)

Logged By: NRC Checked By: MJC

Notes:

BORING B-23
PAGE 1 OF 2

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:05 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	Light gray, mf(+) SAND, little Silt (Wet) *(continued)*							
				S-08	20	1-2-6-7	8	
	25	25	255.8					

Bottom of Boring at 25.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:05 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-24

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/19/18**
Date Completed:	**1/19/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**281.68**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**13**	**1/19/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/19/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	281.7	S-01	15	10-7-14-13	21	
	Gray, cmf SAND, some mf Gravel, trace Silt (Moist) (FILL)	0.5						
	Light brown, mf SAND, trace Silt (Dry)	2		S-02	12	7-2-6-4	8	
	Light brown/orange-brown, mf SAND, trace Silt (Dry)	4		S-03	6	4-2-2-2	4	
		5	276.7	S-04	0	2-1-2-2	3	
	Light brown, mf SAND, trace Silt (Moist)	8		S-05	12	2-2-1-2	3	
		10	271.7					
	Light gray, mf SAND, some(-) Silt (Wet)	13	▽	S-06	12	4-5-4-4	9	
		15	266.7					

Bottom of Boring at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-24
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:06 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/19/18**	Ground Surface Elevation (ft.):	**281.81**
Date Completed:	**1/19/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered ▽	**14 / 1/19/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.) ▼	**NR / 1/19/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.) ▼	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	281.8	S-01	15	12-14-7-11	21	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	16	4-5-4-4	9	
		5	276.8	S-03	12	2-4-5-4	9	
				S-04	18	2-5-5-4	10	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	18	5-5-7-7	12	
		10	271.8					
	13 Gray, mf(+) SAND, some Silt (Wet)			S-06	20	5-5-5-6	10	
	15	15	266.8					

Bottom of Boring at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-25
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:06 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-26

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/19/18**
Date Completed:	**1/19/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**278.13**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**NE**	**1/19/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/19/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	278.1	S-01	10	2-1-2-2	3	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	18	4-4-5-4	9	
		5	273.1	S-03	16	4-2-5-5	7	
				S-04	15	5-6-6-7	12	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	16	5-6-8-6	14	
	10	10	268.1					

Bottom of Boring at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-26
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:06 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-27

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/19/18**
Date Completed: **1/19/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **277**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered	9.5	1/19/2018
End of Drilling (0 Hrs.)	NR	1/19/2018
After Drilling (≥ 24 Hrs.)		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	277.0	S-01	15	1-1-4-6	5	
	0.3 Light brown, mf SAND, trace Silt (Moist)			S-02	0	6-8-10-12	18	
		5	272.0	S-03	10	4-6-7-6	13	
	6 Light brown, mf SAND, trace Silt (Very Moist)			S-04	12	5-5-5-6	10	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Very Moist)			S-05	18	5-4-4-2	8	
	9.5 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Wet)	10	267.0					
	10 Bottom of Boring at 10.0 Ft.							

Logged By: NRC Checked By: MJC

Notes:

BORING B-27
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:06 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

BORING B-28

Date Started: **1/18/18**
Date Completed: **1/18/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **277.3**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/18/2018
End of Drilling (0 Hrs.) ▼	NR	1/18/2018
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	277.3	S-01	18	14-6-5-5	11	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	17	4-5-5-7	10	
		5	272.3	S-03	23	5-7-8-10	15	
				S-04	24	6-8-6-6	14	
	8 Light brown, mf SAND, trace Silt; occasional orange-brown staining (Moist)			S-05	20	5-5-4-5	9	
	10	10	267.3					

Bottom of Boring at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-28
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:06 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-29

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/18/18**	Ground Surface Elevation (ft.):	**276.99**
Date Completed:	**1/18/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered	**NE / 1/18/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.)	**NR / 1/18/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.)	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	8 inches of Topsoil	0	277.0	S-01	16	2-1-2-4	3	
	0.7 Light brown, mf SAND, trace Silt (Moist)			S-02	18	5-5-5-6	10	
		5	272.0	S-03	20	6-7-7-8	14	
				S-04	23	6-6-6-7	12	
				S-05	22	7-4-5-5	9	
	10	10	267.0					

Bottom of Boring at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-29
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:06 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-30

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/19/18**
Date Completed:	**1/19/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**276.8**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**NE**	**1/19/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/19/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	276.8	S-01	15	1-1-2-1	3	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	13	1-1-2-1	3	
		5	271.8	S-03	12	4-6-4-6	10	
				S-04	18	5-6-6-8	12	
				S-05	14	5-6-6-4	12	
	10	10	266.8					

Bottom of Boring at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-30
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:07 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-31

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/18/18**	Ground Surface Elevation (ft.):	**285.31**
Date Completed:	**1/18/18**	Datum:	**Topo**
Drilling Contractor:	**QA/QC Labs**	**Groundwater:**	**Depth (ft.) / Date**
Driller:	**John**	First Encountered ▽	**NE / 1/18/2018**
Equipment:	**CME-550X - ATV Mounted**	End of Drilling (0 Hrs.) ▼	**NR / 1/18/2018**
Drilling Method:	**Hollow Stem Auger**	After Drilling (≥ 24 Hrs.) ▼	
Sampling Method:	**Split Spoon**		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	285.3					
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-01	19	6-5-4-4	9	
				S-02	18	4-5-2-2	7	
		5	280.3	S-03	17	2-2-5-5	7	
				S-04	17	5-4-4-4	8	
				S-05	20	4-2-4-4	6	
	10	10	275.3					

Bottom of Boring at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-31
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:07 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-32

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/19/18**
Date Completed: **1/19/18**
Drilling Contractor: **QA/QC Labs**
Driller: **John**
Equipment: **CME-550X - ATV Mounted**
Drilling Method: **Hollow Stem Auger**
Sampling Method: **Split Spoon**

Ground Surface Elevation (ft.): **274.55**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/19/2018
End of Drilling (0 Hrs.) ▼	NR	1/19/2018
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	4 inches of Topsoil	0	274.6					
	0.3							
	Light brown, mf SAND, trace Silt (Moist)			S-01	13	1-1-2-2	3	
				S-02	18	2-2-4-4	6	
		5	269.6	S-03	20	4-4-4-5	8	
				S-04	18	5-6-6-6	12	
				S-05	21	5-4-4-2	8	
	10	10	264.6					

Bottom of Boring at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-32
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:07 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

BORING B-33

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started:	**1/18/18**
Date Completed:	**1/18/18**
Drilling Contractor:	**QA/QC Labs**
Driller:	**John**
Equipment:	**CME-550X - ATV Mounted**
Drilling Method:	**Hollow Stem Auger**
Sampling Method:	**Split Spoon**

Ground Surface Elevation (ft.):	**281.66**	
Datum:	**Topo**	
Groundwater:	**Depth (ft.)**	**Date**
First Encountered ▽	**NE**	**1/18/2018**
End of Drilling (0 Hrs.) ▼	**NR**	**1/18/2018**
After Drilling (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	SAMPLE TYPE NUMBER	RECOVERY (in.)	BLOW COUNTS (per 6 in.)	N-VALUE	REMARKS
	6 inches of Topsoil	0	281.7	S-01	16	2-2-5-5	7	
	0.5 Light brown, mf SAND, trace Silt (Moist)			S-02	19	7-5-2-4	7	
		5	276.7	S-03	20	4-2-2-1	4	
				S-04	19	1-1-1-2	2	
				S-05	18	2-1-2-2	3	
	10	10	271.7					

Bottom of Boring at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

BORING B-33
PAGE 1 OF 1

MASER BORING - KZA DATA TEMPLATE.GDT - 3/2/18 19:07 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-1

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **281.16**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	281.2	
	4 inches of Topsoil			
		0.3		
	Light brown, mf SAND, trace mf Gravel, trace Silt (Moist)			Hand-probe= 6 inches @ 3.0 ft
		5	276.2	
		10	271.2	
		14.5		
	Brown, orange brown, mf SAND, little Silt (Moist)	15	266.2	
	Bottom of Test Pit at 15.0 Ft.			

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-1
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:10 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-2

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **280.65**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
	10 inches of Topsoil	0	280.7	
	0.8			
	Light brown, occasional orange brown, dark gray lenses, mf SAND, trace Silt, occasional Roots (Moist) (FILL)			
	2.8			
	Light brown, mf SAND, trace Silt, occasional Roots (Moist) (FILL)			
	4.2			
	Dark gray, mf(+) SAND, little Silt, occasional Roots	5	275.7	
	5.5			
	Light gray, mf(+) SAND, little Silt, occasional Roots			
	7			
	Light brown, mf SAND, trace Silt (Moist)	10	270.7	
	13			
	Dark gray, mf(+) SAND, little Silt (Moist)			
	15	15	265.7	

Bottom of Test Pit at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-2
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-3

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **278.5**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
	2 inches of Topsoil	0	278.5	
	0.2			
	Light brown, dark gray, mf SAND, trace mf Gravel, trace Silt, occasional Roots			
	1.7			
	Light brown, mf SAND, trace Silt, frequent dark gray seams			
	5	5	273.5	
	Light brown with frequent orange brown mottles, mf(+) SAND, little Silt			
	10	10	268.5	
	Gray, occasional light brown mottles, mf(+) SAND, little Silt			
	15	15	263.5	
	Bottom of Test Pit at 15.0 Ft.			

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-3
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-4

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/11/18**
Date Completed: **1/11/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **280.3**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/11/2018
At Completion (0 Hrs.) ▼	NE	1/11/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	280.3	
	4 inches of Topsoil with occasional roots			
		0.3		
	Light brown, mf SAND, trace Silt, frequent roots (Moist)			
		3		
	Brown, mf SAND, trace Silt (Moist)			
		5	275.3	
		10	270.3	
		11		
	Brown, mf SAND, trace Silt; frequent orange-brown and light gray layers (Moist)			
		15	265.3	

Bottom of Test Pit at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-4
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-5

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **279.09**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
	4 inches of Topsoil with Roots	0	279.1	
	0.3 Light brown, m(-)f SAND, trace Silt, frequent roots (Moist)			Hand-probe= 6 inches @ 3.0 ft
	5 Light brown, occasional lens of gray, m(-)f SAND, trace Silt, frequent roots (Moist)	5	274.1	
	7.5 Tan, mf(+) SAND, little(-) Silt (Moist)			Hard digging from 6.0 ft to 8.0 ft
		10	269.1	
	11 Tan, occasional orange brown mottles, mf(+) SAND, little(-) Silt (Moist)			
	15	15	264.1	

Bottom of Test Pit at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-5
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-6

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **276.7**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	276.7	
	3 inches of Topsoil	0.3		
	Light brown, mf SAND, trace Silt, frequent Roots (FILL)	1.4		
	Dark gray, mf SAND, trace Silt (Moist) (FILL)	2.1		
	Light brown, mf SAND (Moist)	4.2		
	Light brown, occasional orange brown mottles, mf SAND (Moist)	5	271.7	
		5.5		
	Tan, occasional orange brown and light gray mottles, mf(+) SAND, little Silt (Moist)	7		
	Gray, occasional orange brown mottles, mf(+) SAND, little Silt (Moist)	10	266.7	NE sidewall caving at 7.0 ft
		15	261.7	

Bottom of Test Pit at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-6
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:12 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-7

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **279.02**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	279.0	
	4 inches of Topsoil with Roots			
		0.3		
	Orange brown, red brown, mf SAND, trace mf Gravel (FILL)			
		1.3		Metal pipe at 0.7 ft
	Light brown with orange brown staining, mf SAND, trace Silt, occasional Roots (Moist)			
		5	274.0	
		7		
	Gray with orange brown staining, mf(+) SAND, little Silt (Moist)			
		10	269.0	
		13		
	Dark gray with orange brown mottles, cmf(+) SAND, some Silt (Moist)			
		15	264.0	

Bottom of Test Pit at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-7
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:12 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-8

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/11/18**
Date Completed: **1/11/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **267.46**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	2.5	1/11/2018
At Completion (0 Hrs.) ▼	2.5	1/11/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	267.5	
	Dark gray, cmf SAND and mf Gravel, trace Silt (Very Moist) (6 inch Stream Bed)			
		0.5		
	Light to dark brown, mf SAND, little Silt: occasional orange brown staining (Very Moist)			
		2.5		
	Light to dark brown, mf SAND, little Silt: frequent orange brown staining (Wet)			Heavy seepage and caving starrting at 2.5 feet
		5	262.5	
		6.5		
	Bottom of Test Pit at 6.5 Ft.			Test pit concluded at 6.5 ft due to caving

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-8
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:12 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-9

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/11/18**
Date Completed: **1/11/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **280**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/11/2018
At Completion (0 Hrs.) ▼	NE	1/11/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
	6 inches of Topsoil with Roots	0	280.0	
	0.5 Light brown, mf SAND, trace Silt (Moist)			
		5	275.0	Hand-probe= 6 inches @ 4.0 ft
	9 Light gray cm(+)f SAND, little Silt (Moist)	10	270.0	
	13.5 Light gray cm(+)f SAND, little Silt (Very Moist to Wet)			
	15	15	265.0	

Bottom of Test Pit at 15.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-9
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:12 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-10

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **281.58**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	281.6	
	6 inches of Topsoil			
		0.5		
	Light brown, mf SAND, little Silt, occasional Cobbles (Moist) (FILL)			
		1.5		
	Light brown, m(+)f SAND, trace Silt (Moist)(loose)			Sidewalls cavaing starting at 1.5 ft
				Hand-probe= 8 inches @ 3.0 ft
		5	276.6	
		10	271.6	
		11		
	Light brown, occasional light gray mottles, m(+)f SAND, trace Silt (Moist)(loose)			
		12		

Bottom of Test Pit at 12.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-10
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-11

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/10/18**
Date Completed: **1/10/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Trackhoe CAT 312E**

Ground Surface Elevation (ft.): **281.79**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/10/2018
At Completion (0 Hrs.) ▼	NE	1/10/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
	4 inches of Topsoil	0	281.8	
	0.3			
	Light brown, m(+)f SAND, little mf Gravel, trace Silt, occasional roots and cobbles (Moist)	5	276.8	
		10	271.8	
	13.5			
	Light brown, with orange brown, dark gray mottles, mf SAND, little Silt	15	266.8	
	Bottom of Test Pit at 15.0 Ft.			

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-11
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-12

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/25/18**
Date Completed: **1/25/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Mini-Trackhoe CAT PC78**

Ground Surface Elevation (ft.): **302.5**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/25/2018
At Completion (0 Hrs.) ▼	NE	1/25/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	302.5	
	6 inches of Topsoil; mf(+) SAND, little Silt			
	0.5			
	Light brown mf SAND, trace Silt; occasional Roots (Moist) (FILL)			
	1.8			
	Tan, mf SAND, trace Silt; occasional Roots (Dry) (FILL)			Hand-probe= 6 inches @ 2.0 ft
				Hand-probe= 12 inches @ 3.3 ft
	4.5			
	Dark Tan, mf SAND, little Silt (Moist)	5	297.5	
	10	10	292.5	

Bottom of Test Pit at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-12
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

TEST PIT TP-13

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners • Surveyors • Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**
Number: **13001204A**

Date Started: **1/25/18**
Date Completed: **1/25/18**

Contractor: **Rifenburg Contracting Corp.**
Operator: **PJ**
Equipment: **Mini-Trackhoe CAT PC78**

Ground Surface Elevation (ft.): **299.88**
Datum: **Topo**

Groundwater:	Depth (ft.)	Date
First Encountered ▽	NE	1/25/2018
At Completion (0 Hrs.) ▼	NE	1/25/2018
After Completion (≥ 24 Hrs.) ▼		

GRAPHIC LOG	MATERIAL DESCRIPTION	DEPTH (ft.)	ELEVATION (ft.)	REMARKS
		0	299.9	
	8 inches of Topsoil with Roots; Dark gray, mf SAND, little Silt	0.7		
	Light brown, mf SAND, trace Silt; frequent Roots (Moist)			Caving starting at 2.5 ft
		2.3		
	Light brown, mf SAND, trace Silt (Moist)			Hand-probe= 8 inches @ 3.0 ft
		5	294.9	
		10	289.9	

Bottom of Test Pit at 10.0 Ft.

Logged By: NRC Checked By: MJC

Notes:

TEST PIT TP-13
PAGE 1 OF 1

MASER TEST PIT - KZA DATA TEMPLATE.GDT - 3/2/18 19:11 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

APPENDIX C

(LABORATORY DATA)

Summary of Laboratory Test Results

Source	Sample I.D.	Depth (Ft.)	Moisture Content (%)	<#200 Sieve (%)	Liquid Limit	Plasticity Index	K-Class	Dry Density (pcf)	Optimum Moisture Content (%)	Void Ratio	Saturation (%)		
B-01	S-02	2.0	9.0										
B-01	S-03	4.0	4.6	2.2									
B-01	S-04	6.0	5.2										
B-01	S-05	8.0	6.1										
B-03	S-03	4.0	2.6	2.9									
B-12	S-03	4.0	7.0	7.7									
B-13	S-02	2.0	14.0										
B-13	S-03	4.0	13.6	10.2									
B-13	S-04	6.0	6.1										
B-13	S-05	8.0	4.5										
B-13	S-06	13.0	33.2										
B-13	S-07	18.0	33.3										
B-18	S-02	2.0	9.1	7.3									
B-22	S-02	2.0	6.7										
B-22	S-03	4.0	7.1	3.4									
B-22	S-04	6.0	9.1										
B-22	S-05	8.0	12.3										
B-22	S-06	13.0	24.4										
B-22	S-07	18.0	22.2										

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**

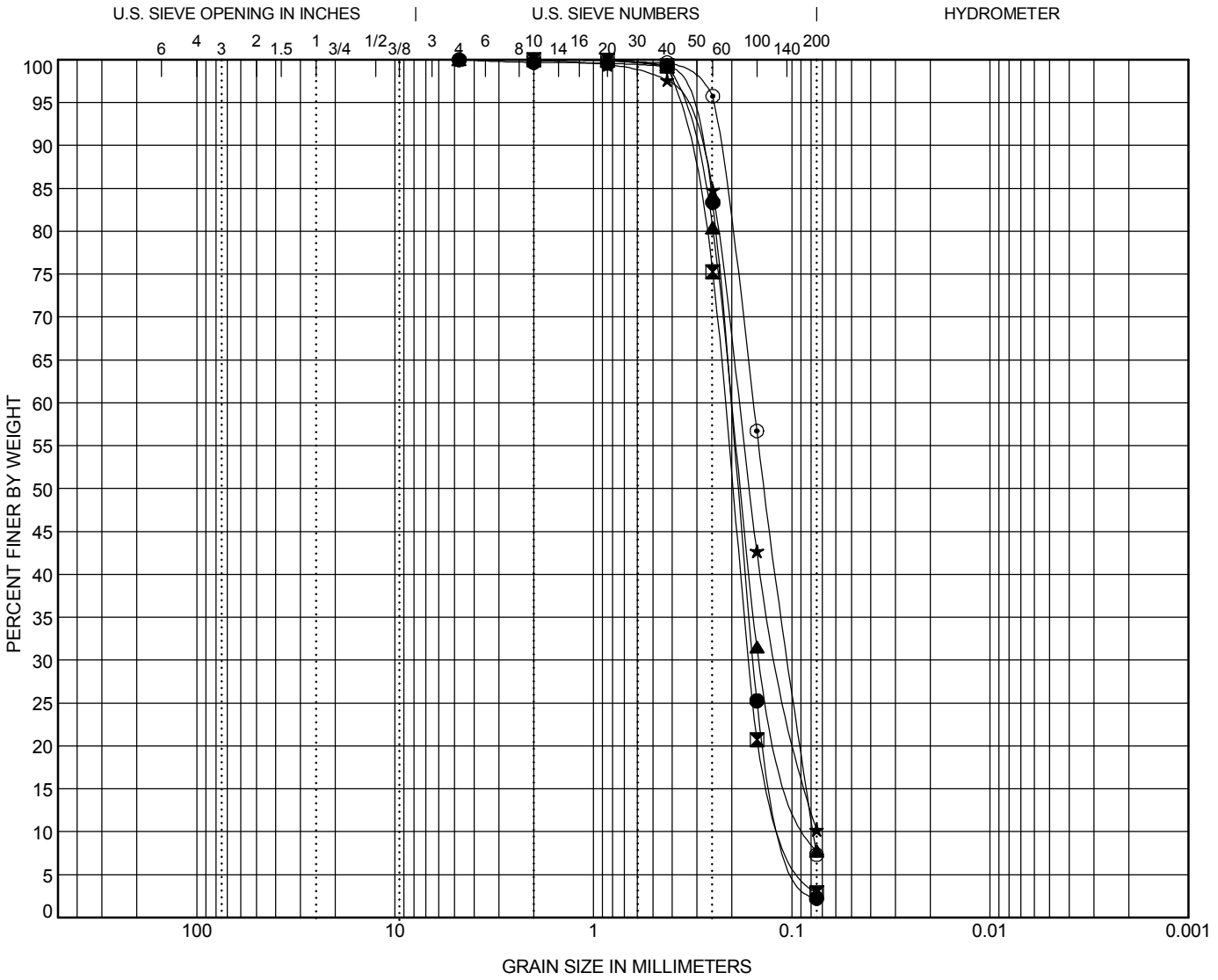
Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**

Number: **13001204A**

Figure LS- 1

LAB SUMMARY: NON KZA PROJECTS - US_LAB.GDT - 2/1/18 11:36 - \\MVCAD01\GEOTECH\GINT\PROJECTS\13001204A - COSTCO ALBANY.GPJ

GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL			SAND			SILT OR CLAY
	coarse	medium	fine	coarse	medium	fine	

Source	I.D.	Depth	Classification	LL	PL	PI	Cc	Cu
●	**B-01**	**S-03**	**4.0**	**mf(+) SAND, trace Silt/Clay**				**1.27**	**2.15**
⊠	**B-03**	**S-03**	**4.0**	**mf(+) SAND, trace Silt/Clay**				**1.25**	**2.19**
▲	**B-12**	**S-03**	**4.0**	**mf(+) SAND, trace Silt/Clay**				**1.27**	**2.52**
★	**B-13**	**S-03**	**4.0**	**mf(+) SAND, little(-) Silt/Clay**				**0.95**	**2.48**
⊙	**B-18**	**S-02**	**2.0**	**f SAND, trace Silt/Clay**				**0.87**	**2.01**

Source	I.D.	Depth	W (%)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-01**	**S-03**	**4.0**	**4.6**	**4.75**	**0.2**	**0.16**	**0.09**	**0.3**	**97.4**	**2.2**
⊠	**B-03**	**S-03**	**4.0**	**2.6**	**2**	**0.22**	**0.16**	**0.1**	**0.0**	**97.1**	**2.9**
▲	**B-12**	**S-03**	**4.0**	**7.0**	**4.75**	**0.2**	**0.14**	**0.08**	**0.0**	**92.2**	**7.7**
★	**B-13**	**S-03**	**4.0**	**13.6**	**4.75**	**0.19**	**0.11**		**0.1**	**89.7**	**10.2**
⊙	**B-18**	**S-02**	**2.0**	**9.1**	**2**	**0.16**	**0.1**	**0.08**	**0.0**	**92.7**	**7.3**

*Testing performed in accordance with ASTM Standards

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

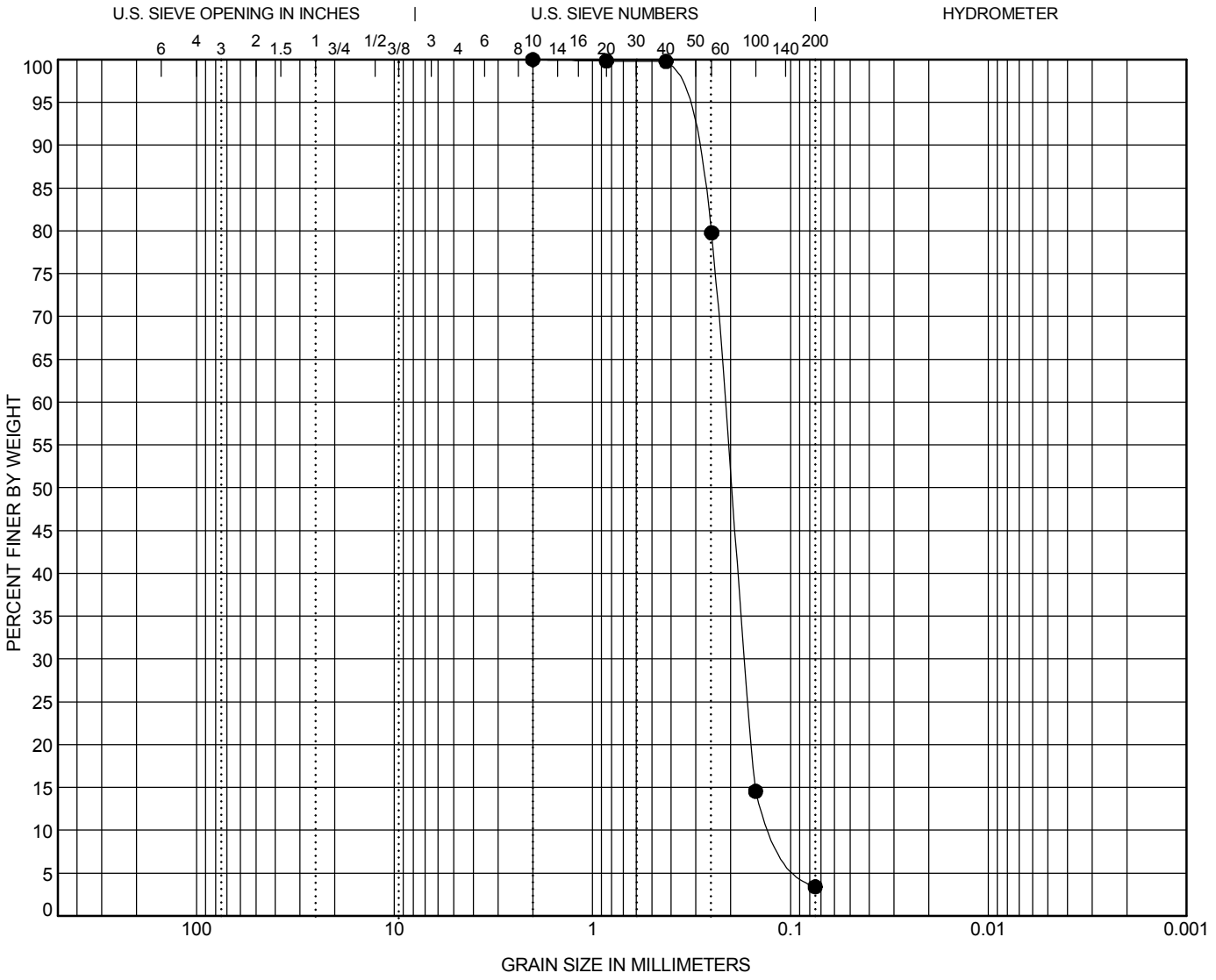
Project: **PROPOSED COSTCO WHOLESALE**

Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**

Number: **13001204A**

Figure GS- 1

GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL			SAND			SILT OR CLAY
	coarse	medium	fine	coarse	medium	fine	

Source	I.D.	Depth	Classification	LL	PL	PI	Cc	Cu
● **B-22**	**S-03**	**4.0**	**mf(+) SAND, trace Silt/Clay**				**1.18**	**1.89**

Source	I.D.	Depth	W (%)	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **B-22**	**S-03**	**4.0**	**7.1**	**2**	**0.21**	**0.17**	**0.11**	**0.0**	**96.6**	**3.4**	

*Testing performed in accordance with ASTM Standards

MASER CONSULTING P.A.
Consulting, Municipal & Environmental Engineers
Planners ▪ Surveyors ▪ Landscape Architects

Project: **PROPOSED COSTCO WHOLESALE**

Location: **CITY OF ALBANY, ALBANY COUNTY, NEW YORK**

Number: **13001204A**

Figure GS- 2

Project: COSTCO - Albany
Project No.: 60506207

AECOM

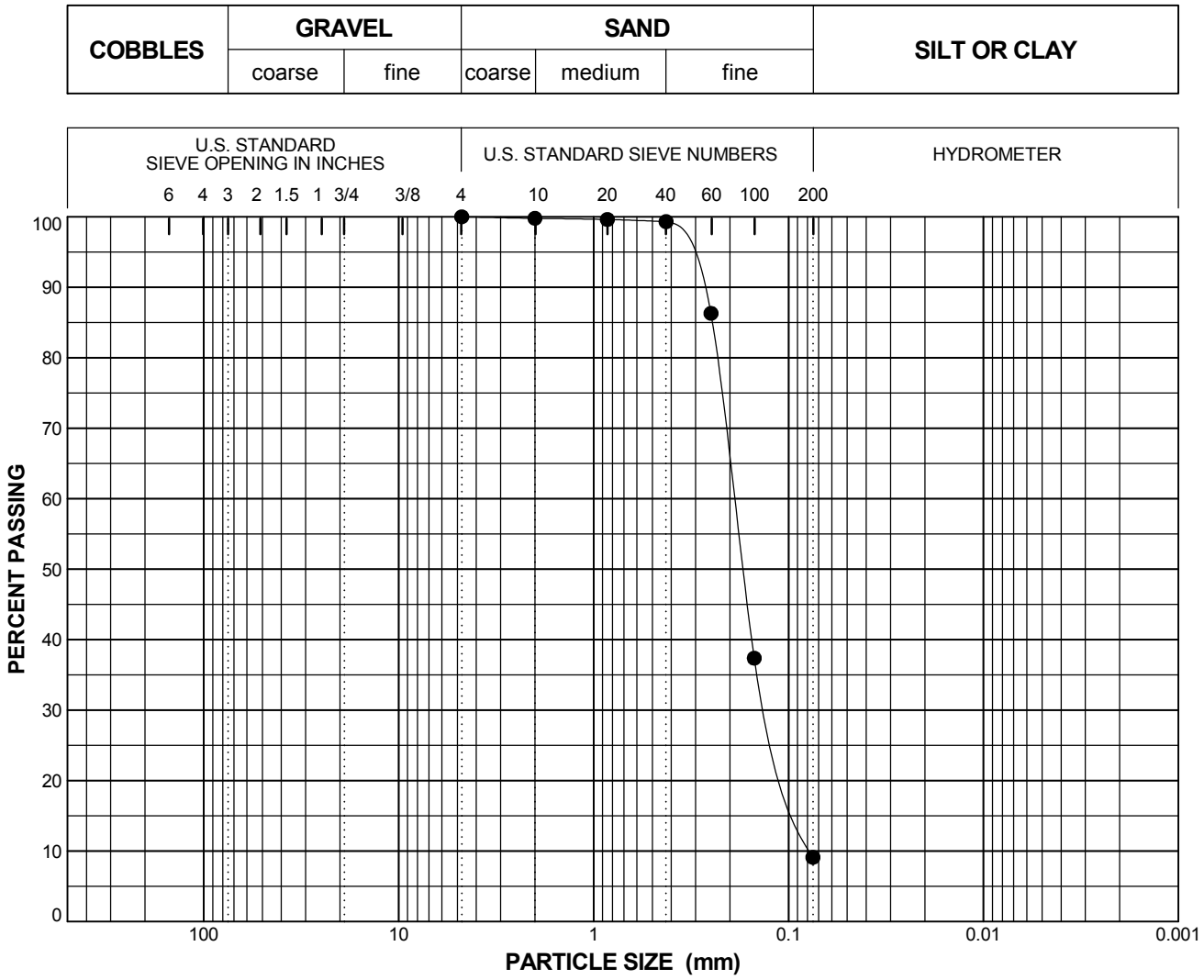
SUMMARY OF LABORATORY TEST RESULTS

Boring and Sample Number	Depth (feet)	Classification	USCS Symbol	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits		Specific Gravity	Organic Content (%)	Grain Size		Compaction	Consolidation	Unconfined Compression		Triaxial Compression		Permeability (cm/sec)	Special Tests
						Liquid Limit	Plastic Limit			<#200 (%)	<2μ (%)			Stress (psi)	Strain (%)	UU	CIU		
Composite Test Pit	2.0-6.0	Brown gray POORLY GRADED SAND with SILT	SP-SM	3.5						9		*							

Note: The soil classification is based partially on visual classification unless both grain size and Atterberg limits are performed.

* Refer to Laboratory Test Curves

Project File Path:



SYMBOL	●
Boring	Composite
Sample	Test Pit
Spec	
Depth (ft)	2.0-6.0
% +3"	0.0
% Gravel	0.0
% Sand	90.9
% Fines	9.1
% -2μ	
Cc	1.08
Cu	2.48
LL	
PL	
PI	
USCS	SP-SM
w (%)	3.5

Particle Size (Sieve #)	PERCENT FINER ●
2"	
1 1/2"	
1"	
3/4"	
1/2"	
3/8"	
4	100.0
10	99.8
20	99.6
40	99.3
60	86.3
100	37.4
200	9.1

SYMBOL	DESCRIPTION AND REMARKS
●	Brown gray POORLY GRADED SAND with SILT (SP-SM)

PARTICLE SIZE DISTRIBUTION

COSTCO - Albany

Project Number 60506207	February 2018	Figure 1

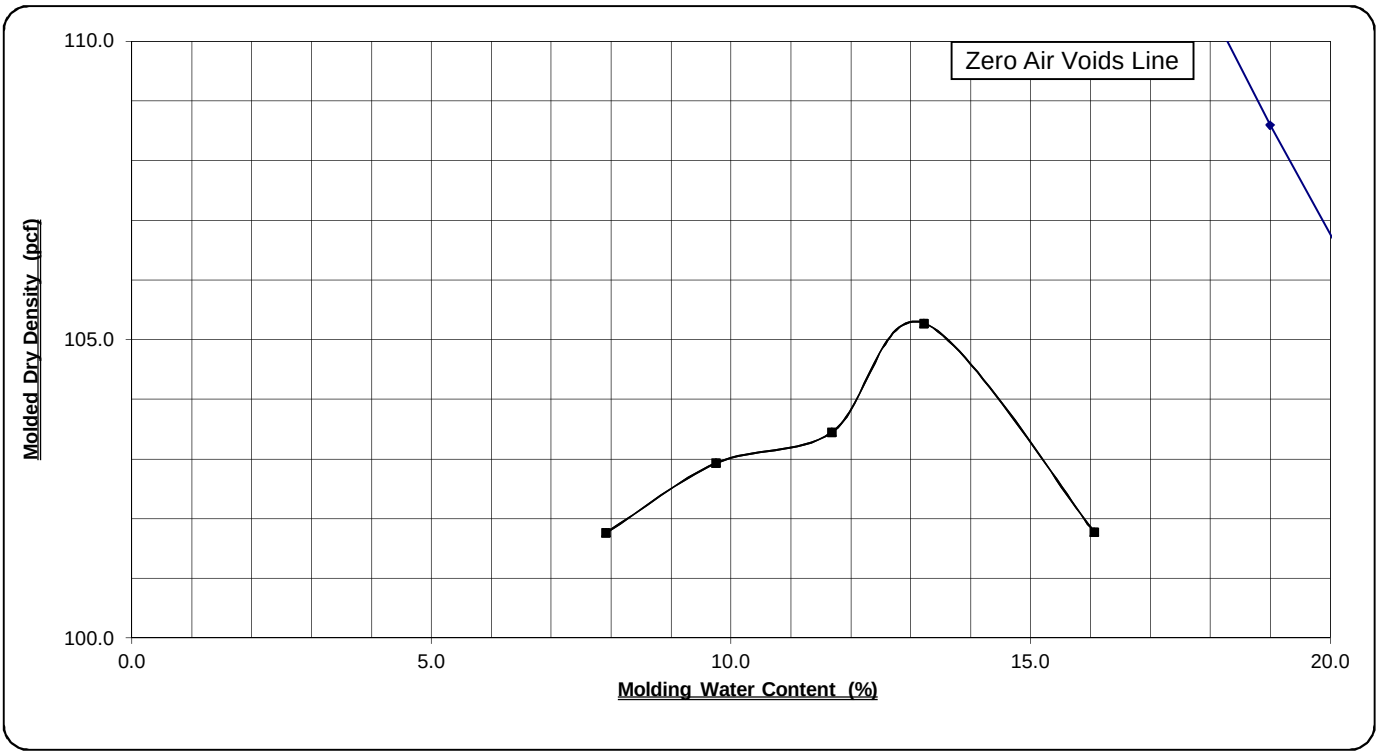
AECOM

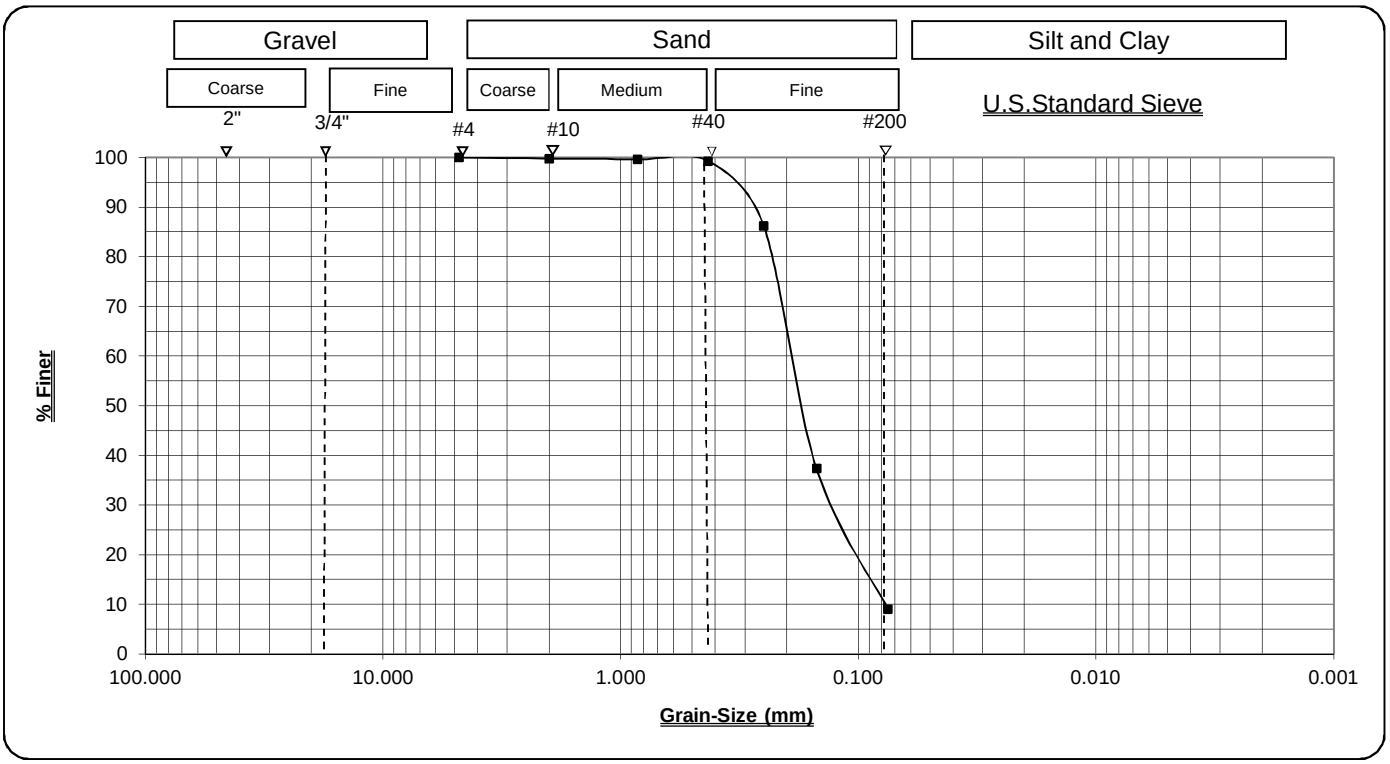
SIEVE_BLUEBELL_NEW 60506207_2018-02-01_COSTCO-ALBANY.GPJ URS_BLUE.GDT 2/7/18

AECOM

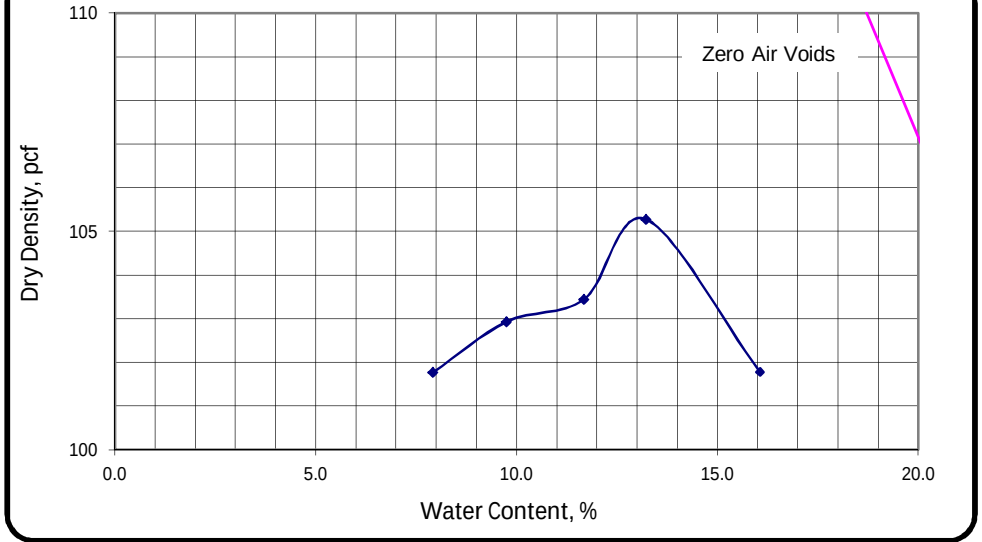
Laboratory Compaction Characteristic of Soil Using Modified Effort (ASTM D 1557) Method C

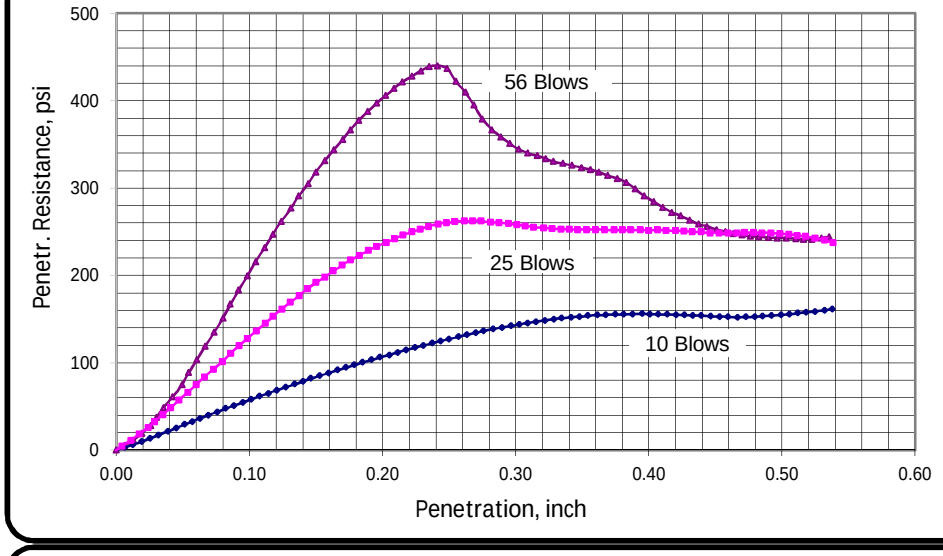
Job No.	60506207	Date	7-Feb-18
File No.	2018-02-01	Assumed Specific Gravity (-10 Sieve Mat.)	2.60
Job Name:	COSTCO - Albany	Assumed Specific Gravity (+#4 Sieve Mat.)	2.60
Boring No.:	Composite Sample: Test Pit 2.0-6.0 ft	Average Specific Gravity	2.60
Description:	Brown gray POORLY GRADED SAND with SILT	Maximum Dry Density, pcf	105.3
Liquid Limit:	NA	Optimum Water Content, %	13.2
Plastic Limit:	NA	Corrected Max. Dry Density, pcf	105.3
Plastic Index:	NA	Corrected Optimum Water Content, %	13.2
As-Received Water Content,%	3.5		

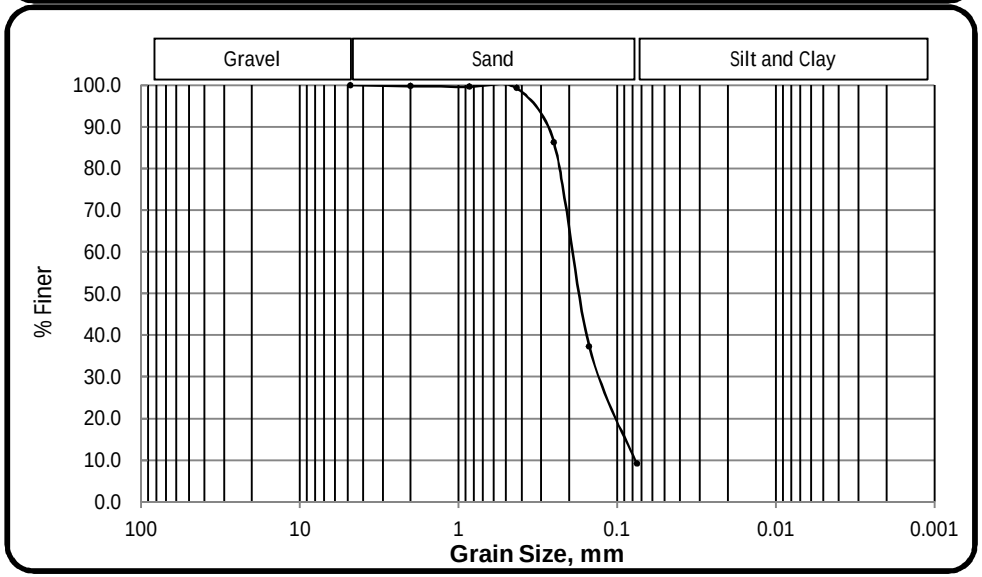


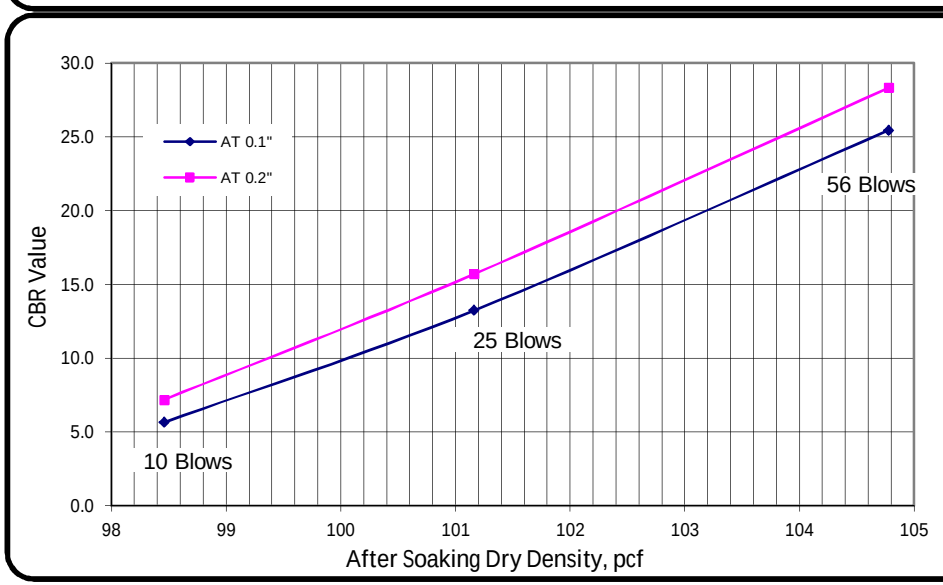


California Bearing Ratio ASTM D1883/1557









Maximum Dry Density, pcf = 105.3
Optimum Water Content, % = 13.2
Description: Brown gray POORLY GRADED SAND with SILT

AECOM

Job No:	60506207	Liquid Limit	NA	Molded Data (Initial)					After Soaked Condition				CBR		Swell
Client	Maser	Plastic Limit	NA	Dry Density	Water Cont.	Number	% Compact.	PP	Dry Density	Water Cont.	% Compact.	PP	0.1"	0.2"	%
Job Name	COSTCO - Albany	Plastic Index	NA	pcf	%	of Blows		tsf	pcf	%		tsf			
Label	Composite - Test Pit	Specific Gravity	2.60	98.4	13.1	10	93.5	1.0	98.5	20.7	93.5	1.3	5.6	7.2	0.02
Sample	2.0-6.0 ft	Water Content, %	3.5	101.1	13.1	25	96.0	1.3	101.2	19.0	96.1	1.5	13.2	15.7	-0.02
Date	7-Feb-18	Surcharge Used	10 lbs	104.7	13.1	56	99.4	1.8	104.8	17.3	99.5	1.9	25.4	28.3	-0.11

PP = Average Pocket Penetrometer Reading

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING



ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Edison
777 New Durham Road
Edison, NJ 08817
Tel: (732)549-3900

TestAmerica Job ID: 460-149690-1
Client Project/Site: ALBANY NEW YORK

For:
Maser Consulting P.A.
410 Eagleview Blvd.
Suite 104
Exton, Pennsylvania 19341

Attn: Matt Church

Authorized for release by:
2/15/2018 8:58:04 AM

Sapna Nayyar, Project Manager I
(732)549-3900
sapna.nayyar@testamericainc.com

LINKS

Review your project results through TotalAccess

Have a Question? Ask The Expert

Visit us at: www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Cover Page 1
Table of Contents 2
Definitions/Glossary 3
Case Narrative 4
Client Sample Results 5
Lab Chronicle 6
Certification Summary 7
Method Summary 8
Sample Summary 9
Chain of Custody 10
Receipt Checklists 12

Definitions/Glossary

Client: Maser Consulting P.A.
Project/Site: ALBANY NEW YORK

TestAmerica Job ID: 460-149690-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD Recovery is outside acceptance limits.
U	Indicates the analyte was analyzed for but not detected.
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Job ID: 460-149690-1

Laboratory: TestAmerica Edison

Narrative

Job Narrative
460-149690-1

Comments
No additional comments.

Receipt
The sample was received on 2/6/2018 9:30 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 17.5º C.

Receipt Exceptions

No TAT listed on COC.

The following sample(s) was received at the laboratory without a sample collection time documented on the chain of custody. There was a date only written on sample container.

The following sample(s) was received at the laboratory outside the required temperature criteria. Sample was received through Fedex in envelope.No cooler or ice present.

Method(s) Moisture: The sample duplicate precision for the following sample associated with analytical batch 460-495284 was outside control limits: composite sample bag (460-149690-1), (460-149677-A-9) and (460-149677-A-9 DU).

GC Semi VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client Sample ID: composite sample bag

Lab Sample ID: 460-149690-1
Date Collected: 02/02/18 00:00
Matrix: Solid
Date Received: 02/06/18 09:30

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
pH	7.1	HF			SU			02/14/18 15:53	1
Corrosivity	7.1	HF			SU			02/14/18 15:53	1
Percent Moisture	5.4		1.0	1.0	%			02/06/18 12:24	1
Percent Solids	94.6		1.0	1.0	%			02/06/18 12:24	1

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Oxidation Reduction Potential	537				millivolts			02/12/18 19:51	1

Client Sample ID: composite sample bag

Lab Sample ID: 460-149690-1
Date Collected: 02/02/18 00:00
Matrix: Solid
Date Received: 02/06/18 09:30
Percent Solids: 94.6

Method: 9056A - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.23		1.26	0.50	mg/Kg	☼		02/14/18 03:44	1
Sulfate	32.1		6.31	2.10	mg/Kg	☼		02/14/18 03:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	2.9	U F1	9.2	2.9	mg/Kg	☼	02/09/18 11:30	02/09/18 15:30	1

Lab Chronicle

Client: Maser Consulting P.A.
Project/Site: ALBANY NEW YORK

TestAmerica Job ID: 460-149690-1

Client Sample ID: composite sample bag
Lab Sample ID: 460-149690-1
Date Collected: 02/02/18 00:00
Matrix: Solid
Date Received: 02/06/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	9045C		1	497245	02/14/18 15:53	YAH	TAL EDI
Total/NA	Analysis	Moisture		1	495284	02/06/18 12:24	BJP	TAL EDI
Soluble	Leach	DI Leach			496655	02/12/18 15:00	YAH	TAL EDI
Soluble	Analysis	SM 2580B		1	496656	02/12/18 19:51	YAH	TAL EDI

Client Sample ID: composite sample bag
Lab Sample ID: 460-149690-1
Date Collected: 02/02/18 00:00
Matrix: Solid
Date Received: 02/06/18 09:30
Percent Solids: 94.6

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Soluble	Leach	DI Leach			495616	02/07/18 13:31	SOK	TAL EDI
Soluble	Analysis	9056A		1	496797	02/14/18 03:44	MJA	TAL EDI
Total/NA	Prep	9030B			496865	02/09/18 11:30	HTV	TAL EDI
Total/NA	Analysis	9034		1	496873	02/09/18 15:30	HTV	TAL EDI

Laboratory References:

TAL EDI = TestAmerica Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Accreditation/Certification Summary

Client: Maser Consulting P.A.
Project/Site: ALBANY NEW YORK

TestAmerica Job ID: 460-149690-1

Laboratory: TestAmerica Edison

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
New Jersey	NELAP	2	12028	06-30-18

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids
SM 2580B		Solid	Oxidation Reduction Potential

Pennsylvania	NELAP	3	68-00522	02-28-18

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids
SM 2580B		Solid	Oxidation Reduction Potential

Method Summary

Client: Maser Consulting P.A.
Project/Site: ALBANY NEW YORK

TestAmerica Job ID: 460-149690-1

Method	Method Description	Protocol	Laboratory
9056A	Anions, Ion Chromatography	SW846	TAL EDI
9034	Sulfide, Acid Soluble and Insoluble (Titrimetric)	SW846	TAL EDI
9045C	pH	SW846	TAL EDI
Moisture	Percent Moisture	EPA	TAL EDI
SM 2580B	Reduction-Oxidation (REDOX) Potential	SM	TAL EDI

Protocol References:

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL EDI = TestAmerica Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

Sample Summary

Client: Maser Consulting P.A.
Project/Site: ALBANY NEW YORK

TestAmerica Job ID: 460-149690-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
460-149690-1	composite sample bag	Solid	02/02/18 00:00	02/06/18 09:30

Job # 149690

CHAIN OF CUSTODY RECORD

TestAmerica ANALYTICAL TESTING CORPORATION

☐ Nashville, TN ☐ Orlando, FL ☐ Cedar Falls, IA ☐ Dayton, OH ☐ Watertown, WI ☐ Pontiac, MI ☐ Indianapolis, IN

To assist us in using the proper analytical methods, is this work being conducted for regulatory purposes?

Client Name/Account #: Maser Consulting — Compliance Monitoring? Yes x No

Address: 410 Eagleview Boulevard, Suite 104 — Enforcement Action? Yes x No

City/State/Zip: Exton, PA 19341 — **Report To:** Matt Church

Project Manager: John C. Walton — **Invoice To:** Matt Church

Telephone Number: (610) 254-9140 — **Fax No.:** (610) 254-9141 — **TA Quote #:**

Sampler Name: (Print) Nicholas Calvanese — **Project ID:** Albany, NY

Sampler Signature: — **Project #:** 13001204A

Sample ID / Description	Date Sampled	Time Sampled	No. of Containers Shipped	Grab	Composite	Field Filtered	Preservative: Ice	HNO_3 (Red Label)	HCl (Blue Label)	NaOH (Orange Label)	H_2SO_4 Plastic (Yellow Label)	H_2SO_4 Glass(Yellow Label)	None (Black Label)	Other (Specify)	Matrix: Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (specify):	Analyze For: pH	Redox Potential	Sulfides	Sulfate	Chloride					RUSH TAT (Pre-Schedule)	Standard TAT	Fax Results	Send QC with report
Composite Bag Sample			1		X								X						X		X	X	X	X	X						X	

460-149690 Chain of Custody

Special Instructions: ***Any questions, please call Matt Church, Mobile #: 732-539-6251

Method of Shipment: FedEX

Relinquished by:	Date	Time	Received by:	Date	Time
			[signature]	2/6/18	9:30
Relinquished by:	Date	Time	Received by TestAmerica:	Date	Time

Laboratory Comments:
Temperature Upon Receipt:
VOCs Free of Headspace? Y N
17.5 ° C
No Cooler / Ice

Job Number: 149690

TestAmerica Edison
Receipt Temperature and pH Log

Number of Coolers: _____ IR Gun # _____

Cooler Temperatures

	RAW	CORRECTED		RAW	CORRECTED		RAW	CORRECTED
Cooler #1:	7.5 °C	7.1 °C	Cooler #4:	°C	°C	Cooler #7:	°C	°C
Cooler #2:	°C	°C	Cooler #5:	°C	°C	Cooler #8:	°C	°C
Cooler #3:	°C	°C	Cooler #6:	°C	°C	Cooler #9:	°C	°C

TALS Sample Number	Ammonia (pH<2)	COD (pH<2)	Nitrate Nitrite (pH<2)	Metals (pH<2)	Hardness (pH<2)	Pest (pH 5-9)	EPH or QAM (pH<2)	Phenols (pH<2)	Sulfide (pH>9)	TKN (pH<2)	TOC (pH<2)	Total Cyanide (pH>12)	Total Phos (pH<2)	Other	Other

If pH adjustments are required record the information below:

Sample No(s). adjusted: _____

Preservative Name/Conc.: _____ Volume of Preservative used (ml): _____

Lot # of Preservative(s): _____ Expiration Date: _____

The appropriate Project Manager and Department Manager should be notified about the samples which were pH adjusted.

Samples for Metal analysis which are out of compliance must be acidified at least 24 hours prior to analysis.

Initials: DF Date: 2/6/18

Login Sample Receipt Checklist

Client: Maser Consulting P.A.

Job Number: 460-149690-1

Login Number: 149690
List Number: 1
Creator: Fernandez, Diana X

List Source: TestAmerica Edison

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	no cooler , no ice
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

RUTGERS
New Jersey Agricultural Experiment Station

Soil Testing Laboratory
Rutgers, The State University
ASB II
57 US Highway 1 South
New Brunswick, NJ 08901-8554

Soil Test Report
Lab #: 2018-65555

Maser Consulting
Matthew Church
410 Eagleview Blvd.
Suite 104
Exton, PA 19341

mchurch@maserconsulting.com
(610)254-9140
(610)254-9141(fax)
Sample ID: 13001204A-180110-Topsoil

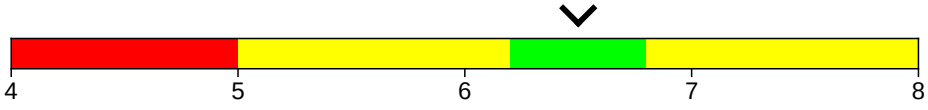
Date Received: 2018-01-23
Date Reported: 2018-02-01

Crop or Plant
NewOrnamental shrubs and small trees, non-acid-loving

Results and Interpretations

Loamy Sand

pH: 6.50 Slightly acidic; optimum pH range of many plants except acid-loving species.



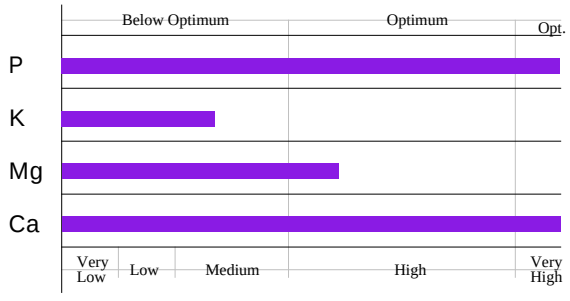
Lime Requirement Index: 7.59

The Lime Requirement Index (LRI) is a measure of the buffering capacity of the soil, its resistance to pH change, and is used to determine the appropriate amount of limestone, when necessary. LRI value near 8.0 indicates low buffering capacity of soil and a lower rate of limestone amendment compared to soil with high buffering capacity (LRI near 7.0).

Macronutrients (pounds per acre)

by Mehlich 3 extraction

Phosphorus:	150	(Above Optimum)
Potassium:	103	(Below Optimum)
Magnesium:	177	(Optimum)
Calcium:	2287	(Above Optimum)



Micronutrients (parts per million)

Zinc(Zn)	Copper(Cu)	Manganese(Mn)	Boron(B)	Iron(Fe)
5.92 (Adequate)	0.95 (Adequate)	75.32 (High)	0.42 (Low)	216.90 (High)

Special Tests Results

Visual Description: Moist Color: Very Dark Brown. As received: Moist, Aggregated (friable), Coarse-loamy Material. Coarse rock fragments: Few. Organic detritus: Common Roots.

Soluble Salts- Electrical conductivity= 0.09 mmho/cm
(Low)

Organic Matter by Carbon Analysis: Organic Matter=2.3%

Very High for Loamy Sand

Gravel Content- Larger than 2mm: 2.7%

Mechanical Analysis- Sand= 83% Silt=9% Clay= 8% Texture: Loamy Sand

pH, Calcium, and Magnesium Recommendations

The soil pH is in the optimum range of 6.20 to 6.80 for the growth of most Ornamental shrubs and small trees, non-acid-loving. Do not apply any limestone.

Fertilizer Recommendations

BEFORE PLANTING
Target ratio for fertilizer product is: 1-0-1 ,which represents the fertilizer's relative amounts of nitrogen (N), phosphorus as P_2O_5, and potassium as K_2O.

Nitrogen requirement is 2 pounds per 1000 square feet (or, equivalent to 0.2 pound per 100 square feet). New plantings provide opportunity to amend the whole root zone of soil for long term fertility and tilth; subsequent management for established plantings will be limited to surface applications.

DO THIS: Broadcast a fertilizer with the indicated N:P:K ratio at a rate to achieve the desired Nitrogen requirement, and mix into the surface 6- to 8-inches. On soils that are low in organic matter or in poor tilth, amend with 4 to 5 cubic feet of organic matter, such as peat moss or compost, for each 100 square feet of area. Blend into the soil. Do not include dry fertilizer in the backfill hole; young, tender roots are especially susceptible to tissue burn. Delay surface fertilization until after the first growing season.

WHAT ABOUT NEXT YEAR?

The fertilizer prescription above is intended to bring soil nutrients to optimal or near-optimal conditions, and subsequent management recommendations are intended to maintain soil nutrients levels near optimum. The best nutrient ratio for maintenance fertilization of the ornamental shrubs and small trees beyond 2 years is best determined by another soil test.

DO THIS: Broadcast a fertilizer with 2-1-1 ratio of N:P:K at a rate to achieve 1 pound Nitrogen per 1000 square feet (or/equivalent to 0.1 pound Nitrogen per 100 square feet) on the soil surface. Rake to improve contact with soil and water lightly.

How do I find the proper fertilizer product?

For help finding appropriate fertilizers and rates, consult the Rutgers Soil Testing Laboratory website: rci.rutgers.edu/~soilslab/FertProducts/. The website lists commercially available products according to their nutrient analyses to assist you with product selection and calculation of amount required.

Select a fertilizer that has a nutrient grade (also known as guaranteed minimum analysis) the same as or a multiple of the values recommended, or select a close match to that ratio. When no single fertilizer product matches or approximates the recommended N:P_2O_5:K_2O nutrient ratio, it will be necessary to use two or more fertilizers to reach the correct balance of nutrients. The proper amount of fertilizer to apply in a single application depends on the actual fertilizer grade of the fertilizer product selected, the total area (square feet) to be treated, and the total number of fertilizer applications to be made throughout the year.

Micronutrient Statements

Zinc does not appear to be a limiting factor. For information about zinc in soil for plant nutrition, see FS721.

Copper does not appear to be a limiting factor. As with most other micronutrients, copper availability is related to soil pH. Do not over-lime. For more information about soil copper, see FS720.

Manganese may be toxic to sensitive crops when grown on low pH soil. Adding lime to the soil raises the pH and decreases manganese toxicity. Liming is generally not recommended for acid-loving plants, which are more tolerant of high levels of manganese. In excessive amounts, soil manganese can cause plant damage. This occurs primarily in low pH soil. Lime soil as recommended to decrease availability of manganese to plants. Avoid fertilizers that contain manganese. See FS973 for more information.

Plant types differ in their susceptibility to boron deficiency; certain fruit, vegetable, and field crops are most susceptible. Symptoms include improper development or dieback of growing tips, poor flowering or fruit set, twisting and yellowing of young leaves from base to tip, and black heart of roots. Lime only as necessary, since pH above 7.0 limits boron availability. Building up organic matter content of soil will increase boron availability. Use of boron fertilizer must be done only with extreme care because of the toxicity that might occur if over-applied and the difficulty of applying the low rates necessary. See FS873 for more information and follow recommendations above.

Plant availability to iron is highly dependent on soil pH. Although soil iron appears plentiful, high soil pH could limit its availability. On the other hand, plant damage due to iron toxicity, though not common, could occur at low soil pH (acidic soil). Maintain soil pH in the optimum range as described in Recommendations. See FS971 for more information.

Comments:

Find Rutgers Cooperative Extension Fact Sheets at www.njaes.rutgers.edu/pubs

Soil Program 2017
NAPT
Participating Laboratory

APPENDIX D

(PAVEMENT DESIGN DATA)

Project: 13001204A – Proposed COSTCO Wholesale
City of Albany, Albany County, NY

==========

Based on AASHTO '93 -- Pavement Analysis Program

==========

Standard Duty Flexible Asphalt Pavement

********** Flexible Analysis **********

* Structural Number	=	2.13
* Design E 18's	=	65,000
* Reliability	=	95.00 percent
* Overall Deviation	=	0.45
* Resilient Modulus	=	9,388.70 psi
* Initial Serviceability	=	4.20
* Terminal Serviceability	=	2.00

Layer Number	Layer Coefficient a(i)	Drainage Coefficient (Cd)	Layer Thickness (t)(in.)	a(i) *Cd*t
1	0.44	1.00	2.00	0.88
2	0.38	1.00	2.50	0.95
3	0.10	1.00	6.00	0.60
			Total SN:	2.43

Project: 13001204A – Proposed COSTCO Wholesale
City of Albany, Albany County, NY

==========

Based on AASHTO '93 -- Pavement Analysis Program

==========

Heavy Duty Flexible Asphalt Pavement

********** Flexible Analysis **********

* Structural Number	=	3.00
* Design E 18's	=	485,000
* Reliability	=	95.00 percent
* Overall Deviation	=	0.45
* Resilient Modulus	=	9,388.70 psi
* Initial Serviceability	=	4.20
* Terminal Serviceablity	=	2.00

Layer Number	Layer Coefficient a(i)	Drainage Coefficient (Cd)	Layer Thickness (t)(in.)	a(i) *Cd*t
1	0.44	1.00	2.00	0.88
2	0.38	1.00	4.00	1.52
3	0.10	1.00	6.00	0.60
			Total SN:	3.00

Project: 13001204A – Proposed COSTCO Wholesale
City of Albany, Albany County, NY

==========

Based on AASHTO '93 -- Pavement Analysis Program

==========

Heavy Duty Rigid Concrete Pavement

********** Rigid Analysis **********

*** Pavement Depth**	**=**	**6.00 inches**
* Design E 18's	=	1,151,700
* Reliability	=	95.00 percent
* Overall Deviation	=	0.35
* Modulus of Rupture	=	550.0 psi
* Modulus of Elasticity	=	3,700,000 psi
* Load Transfer, J	=	3.20
* Mod. of Subgrade Reaction	=	428 psi/in
* Drainage Coefficient	=	1.25
* Initial Serviceability	=	4.50
* Terminal Serviceability	=	2.00

For k determination:

* Resilient Mod. Subgrade	=	9,388.7 psi
* Resilient Mod. Base	=	10,000 psi
* Base Thickness	=	6.0 in.
* Depth to Rigid Foundation	=	0.0 ft.
* Loss of Support Value	=	0

Rapp Road Falling Head Test Results

Job Number: 317AI.00

Date: 8/10/2020

Taken from "Stormwater Pollution Prevention Plan - Crossgates Rapp Road - Residential Development," prepared by The Chazen Companies, dated February 6, 2019, last revised August 24, 2020.

Falling Head No. 1				(Test Depth: 6.0')
	Test 1	Test 2	Test 3	
Start Time	10:42:00 AM	11:46:00 AM	12:47:00 PM	
End Time	11:42:00 AM	12:46:00 PM	1:47:00 PM	
Run Time (min)	60	60	60	
End Depth (in.)	55	54	55	
Start Depth (in.)	31	30	31	
Total Fall (in.)	24	24	24	
Rate (in/hr)	24.00	24.00	24.00	
Avg. Rate (in/hr)	24.00			

Falling Head No. 2				(Test Depth: 6.0')
	Test 1	Test 2	Test 3	
Start Time	10:26:00 AM	11:30:00 AM	12:33:00 PM	
End Time	11:26:00 AM	12:30:00 PM	1:33:00 PM	
Run Time (min)	60	60	60	
End Depth (in.)	43	44	43	
Start Depth (in.)	29	29	28	
Total Fall (in.)	14	15	14	
Rate (in/hr)	14.00	15.00	14.00	
Avg. Rate (in/hr)	14.33			

Falling Head No. 3				(Test Depth: 6.0')
	Test 1	Test 2	Test 3	
Start Time	10:16:00 AM	11:16:00 AM	12:16:00 PM	
End Time	11:16:00 AM	12:16:00 PM	1:16:00 PM	
Run Time (min)	60	60	60	
End Depth (in.)	51	49.25	50	
Start Depth (in.)	30	29.25	30	
Total Fall (in.)	21	20	20	
Rate (in/hr)	21.00	20.00	20.00	
Avg. Rate (in/hr)	20.33			

Falling Head No. 4				(Test Depth: 6.0')
	Test 1	Test 2	Test 3	
Start Time	10:52:00 AM	11:57:00 AM	1:07:00 PM	
End Time	11:52:00 AM	12:57:00 PM	2:07:00 PM	
Run Time (min)	60	60	60	
End Depth (in.)	48	49	51	
Start Depth (in.)	31	28.5	31	
Total Fall (in.)	16.75	20.5	20	
Rate (in/hr)	16.75	20.50	20.00	
Avg. Rate (in/hr)	19.08			

Falling Head No. 5				(Test Depth: 6.0')
	Test 1	Test 2	Test 3	
Start Time	11:21:00 AM	12:22:00 PM	1:24:00 PM	
End Time	12:21:00 PM	1:22:00 PM	2:24:00 PM	
Run Time (min)	60	60	60	
End Depth (in.)	40.5	40	40	
Start Depth (in.)	29	29	29	
Total Fall (in.)	11.5	11	11	
Rate (in/hr)	11.50	11.00	11.00	
Avg. Rate (in/hr)	11.17			

Falling Head No. 6				(Test Depth: 6.0')
	Test 1	Test 2	Test 3	
Start Time	8:48:00 AM	9:49:00 AM	10:52:00 AM	
End Time	9:48:00 AM	10:49:00 AM	11:52:00 AM	
Run Time (min)	60	60	60	
End Depth (in.)	51.5	52	51	
Start Depth (in.)	30	30	29	
Total Fall (in.)	21.5	22	22	
Rate (in/hr)	21.5	22	22	
Avg. Rate (in/hr)	21.83			

Falling Head No. 7				(Test Depth: 2.5')
	Test 1	Test 2	Test 3	
Start Time	1:59:00 PM	3:00:00 PM	4:01:00 PM	

End Time	2:59:00 PM	4:00:00 PM	5:01:00 PM
Run Time (min)	60	60	60
Start Depth (in.)	0	0	0
End Depth (in.)	24	24	24
Total Fall (in.)	24	24	24
Rate (in/hr)	24.00	24.00	24.00
Avg. Rate (in/hr)	24.00		

Falling Head No. 8			
	Test 1	Test 2	Test 3
Start Time	1:55:00 PM	2:57:00 PM	4:01:00 PM
End Time	2:56:00 PM	3:57:00 PM	5:01:00 PM
Run Time (min)	60	60	60
Start Depth (in.)	0	0	0
End Depth (in.)	24	24	24
Total Fall (in.)	24	24	24
Rate (in/hr)	24.00	24.00	24.00
Avg. Rate (in/hr)	24.00		

(Test Depth: 2.5')

Falling Head No. 9			
	Test 1	Test 2	Test 3
Start Time	1:56:00 PM	2:58:00 PM	3:59:00 PM
End Time	2:56:00 PM	3:58:00 PM	4:59:00 PM
Run Time (min)	60	60	60
Start Depth (in.)	0	0	0
End Depth (in.)	14	14.5	14
Total Fall (in.)	14	14.5	14
Rate (in/hr)	14.00	14.50	14.00
Avg. Rate (in/hr)	14.17		

(Test Depth: 2.5')

Falling Head No. 10			
	Test 1	Test 2	Test 3
Start Time	8:16:00 AM	9:18:00 AM	10:19:00 AM
End Time	9:16:00 AM	10:18:00 AM	11:19:00 AM
Run Time (min)	60	60	60
End Depth (in.)	63	65	63
Start Depth (in.)	41	39	41

(Test Depth: 6.0')

Total Fall (in.)	22	24	22
Rate (in/hr)	22.00	24.0	22.0
Avg. Rate (in/hr)	22.67		

Falling Head No. 11				
	Test 1	Test 2	Test 3	Test 4
Start Time	8:25:00 AM	9:27:00 AM	10:28:00 AM	11:30:00 AM
End Time	9:25:00 AM	10:27:00 AM	11:28:00 AM	12:30:00 PM
Run Time (min)	60	60	60	60
End Depth (in.)	46	45	44	44
Start Depth (in.)	42	42	42	42
Total Fall (in.)	4	1	2	2
Rate (in/hr)	4.0	1.0	2.0	2.0
Avg. Rate (in/hr)	2.25			

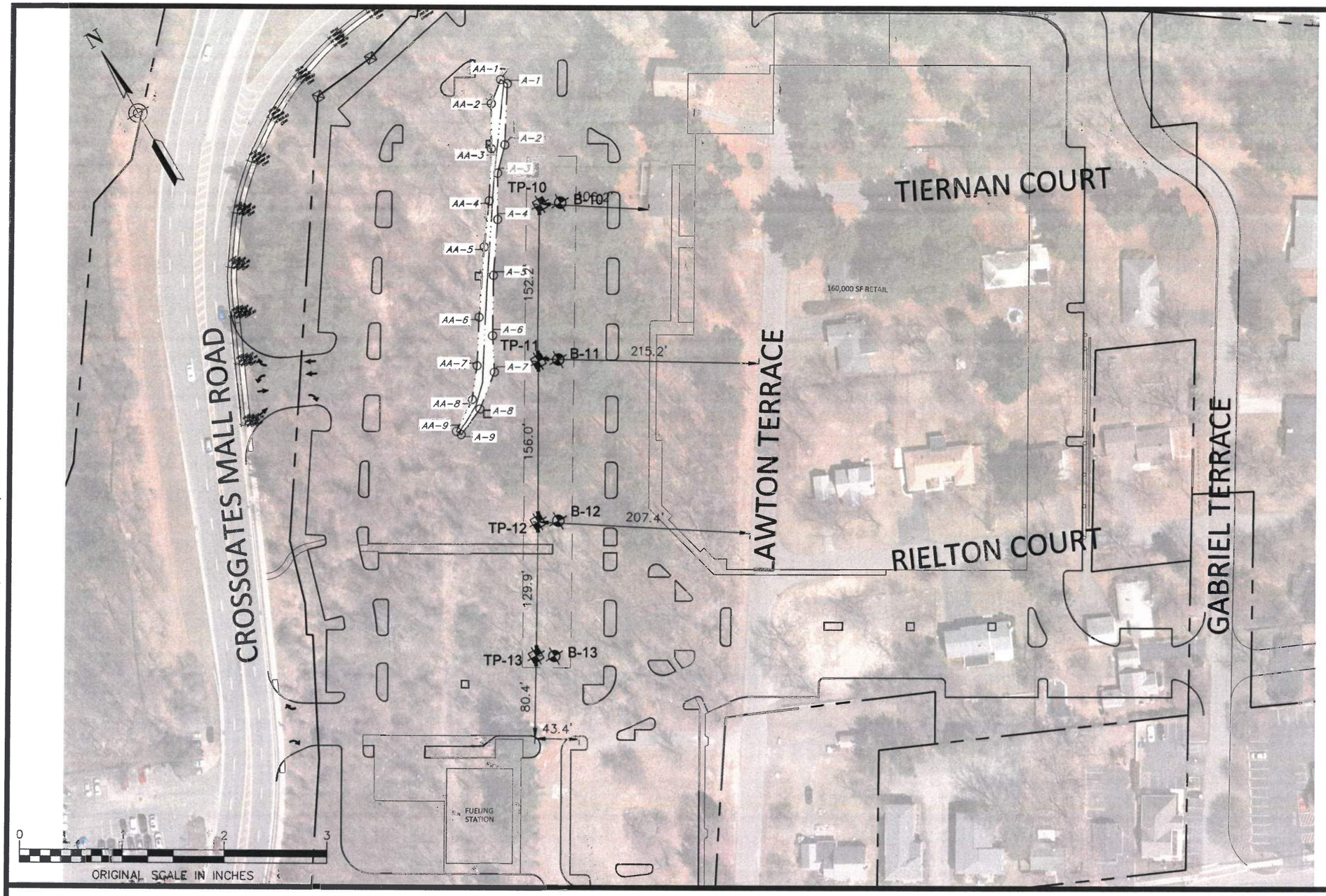
(Test Depth

Falling Head No. 12			
	Test 1	Test 2	Test 3
Start Time	9:35:00 AM	10:36:00 AM	11:38:00 AM
End Time	10:35:00 AM	11:36:00 AM	12:38:00 PM
Run Time (min)	60	60	60
End Depth (in.)	53	52	52
Start Depth (in.)	30	30	30
Total Fall (in.)	23	22	22
Rate (in/hr)	23.0	22.0	22.0
Avg. Rate (in/hr)	22.33		

(Test Depth: 5.5')

Falling Head No. 13			
	Test 1	Test 2	Test 3
Start Time	9:46:00 AM	10:27:00 AM	11:10:00 AM
End Time	10:26:00 AM	11:08:00 AM	11:51:00 AM
Run Time (min)	40	41	41
End Depth (in.)	54	54	54
Start Depth (in.)	30	30	30
Total Fall (in.)	24	24	24
Rate (in/hr)	36.0	35.1	35.1
Avg. Rate (in/hr)	35.41		

(Test Depth: 6.0')



LEGEND:

LAYOUT:

- LOT LINE
- SOIL BORING
- TEST PIT

D

ALL RIGHTS RESERVED. COPY OR REPRODUCTION OF THIS DRAWING OR DOCUMENT, OR ANY PORTION THEREOF, WITHOUT THE EXPRESS WRITTEN PERMISSION OF CHAZEN ENGINEERING, LAND SURVEYING & LANDSCAPE ARCHITECTURE CO., D.P.C. IS PROHIBITED. THIS DRAWING OR DOCUMENT IS NOT INTENDED OR REPRESENTED TO BE SUITABLE FOR ANY PURPOSE OTHER THAN THE SPECIFIC PROJECT, APPLICATION AND SITUATION FOR WHICH IT WAS INTENDED. ANY MODIFICATION OF THIS DRAWING OR DOCUMENT, OR ANY USE FOR ANY PROJECT, APPLICATION OR SITUATION OTHER THAN THAT FOR WHICH IT WAS INTENDED, WILL BE AT USER'S SOLE RISK AND WITHOUT LIABILITY TO CHAZEN ENGINEERING, LAND SURVEYING & LANDSCAPE ARCHITECTURE CO., D.P.C.

IT IS A VIOLATION OF NEW YORK STATE EDUCATION LAW FOR ANY PERSON TO ALTER THIS DRAWING OR DOCUMENT IN ANY WAY, UNLESS HE OR SHE IS ACTING UNDER THE DIRECTION OF A LICENSED DESIGN PROFESSIONAL (PROFESSIONAL ENGINEER, LAND SURVEYOR, ARCHITECT OR LANDSCAPE ARCHITECT). IF THIS DRAWING OR DOCUMENT IS ALTERED, THE ALTERING DESIGN PROFESSIONAL SHALL AFFIX TO THE DRAWING OR DOCUMENT HIS OR HER SEAL, THE NOTATION 'ALTERED BY' FOLLOWED BY HIS OR HER SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

CHAZEN ENGINEERING, LAND SURVEYING & LANDSCAPE ARCHITECTURE CO., D.P.C.

Office Locations:

- ☐ Hudson Valley Office: 21 Fox Street, Poughkeepsie, New York 12601, Phone: (845) 454-3980
- ☐ North Country Office: 20 Elm Street (Suite 110), Glens Falls, New York 12801, Phone: (518) 812-0513
- ☒ Capital District Office: 547 River Street, Troy, New York 12180, Phone: (518) 273-0055
- ☐ Westchester NY Office: 1 North Broadway, Suite 803, White Plains, New York 10601, Phone: (914) 997-8510
- Nashville Tennessee Office: 2416 21st Ave S. (Suite 103), Nashville, Tennessee 37212, Phone: (615) 380-1359
- Chattanooga Tennessee Office: 1426 Williams St. (Suite 12), Chattanooga, Tennessee 37408, Phone: (423) 241-6575

RAPP ROAD RESIDENTIAL DEVELOPMENT - DEIS

SOIL EXPLORATION MAP

TOWN OF GUILDERLAND, ALBANY COUNTY, NY

designed	checked
SM	RK
date	scale
06/02/20	1"=100'
project no.	
317A1.00	
sheet no.	
FIG.2	

Drawing Name: C:\temp\AcPublish_69372\ZZ_317A1-00_BORING LOCATION.dwg Date Printed: Sep 01, 2020, 4:57pm

APPENDIX 15

CHANNEL PROTECTION VOLUME CALCULATIONS

Costco Wholesale

March 2023

Town of Guilderland, Albany County, NY
Maser Consulting Project No. 13001204A

Channel Protection Volume (CPv) Calculation

Area (A)	=	18.378	acres (taken from HydroCAD)
CN	=	85	Composite (taken from HydroCAD)
Time of Concentration	=	0.08333	hours (taken from HydroCAD)
P, 1-year Design Storm	=	2.23	inches (taken from HydroCAD IDF)
Q, runoff	=	2.07	cfs (taken from HydroCAD)
Q, runoff	=	1.75	inches

Ia = (200/CN) - 2

Ia	=	(200/CN) - 2	=	0.353
Ia/P	=	(Ia/P)	=	0.158
q_u	=	640		(taken from Exhibit 4-III in TR-55)
q_o/q_i	=	0.03		(taken from Fig 8.5 in NYSSMDM)

Vs/Vr = 0.683 - 1.43(qo/qi) +1.69(qo/qi)^2 - 0.804(qo/qi)^3

Vs/Vr	=	0.64

Solve for Vs (a.k.a CPv Required) = Vs/Vr * Q * A / 12

Vs = CPv	=	1.720	acre-feet

CPv Provided equal to Volume provided at 10-year Storm Elevation within Basin

CPv	=	2.720	acre-feet	(taken from HydroCAD)

Is minimum CPv Provided: **Yes**

APPENDIX 16

CONTECH CASCADE SEPARATOR

DESIGN DOCUMENTS

Date: 3/6/2023
Project: Costco - Crossgates Mall
Location: Albany County, NY
Prepared For: Colliers Engineering

Purpose: To calculate the water quality flow rate (Qwq) over a given site area. In this situation the WQv to be analyzed is the runoff produced by the first 1.2 inch(es) of rainfall, per Fig 4.1 of the New York State Stormwater Management Design Manual

Reference: United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual, New York State Stormwater Management Design Manual - 2015

Formulas:

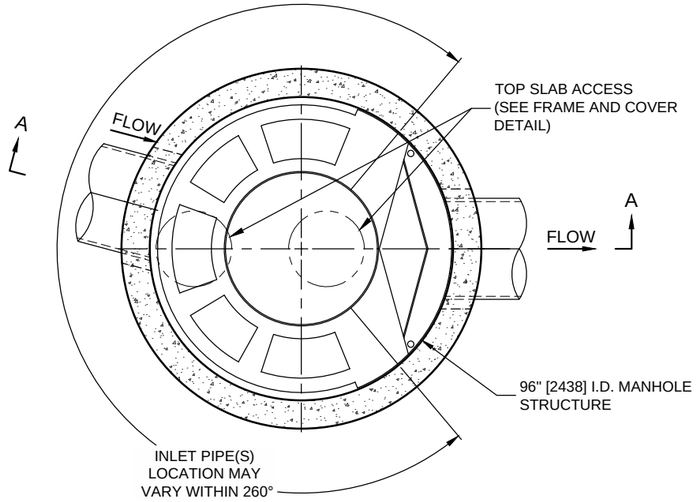
$$WQv = \frac{(P)(R_v)(A)}{12}$$

$$R_v = (0.05+0.009(I)$$

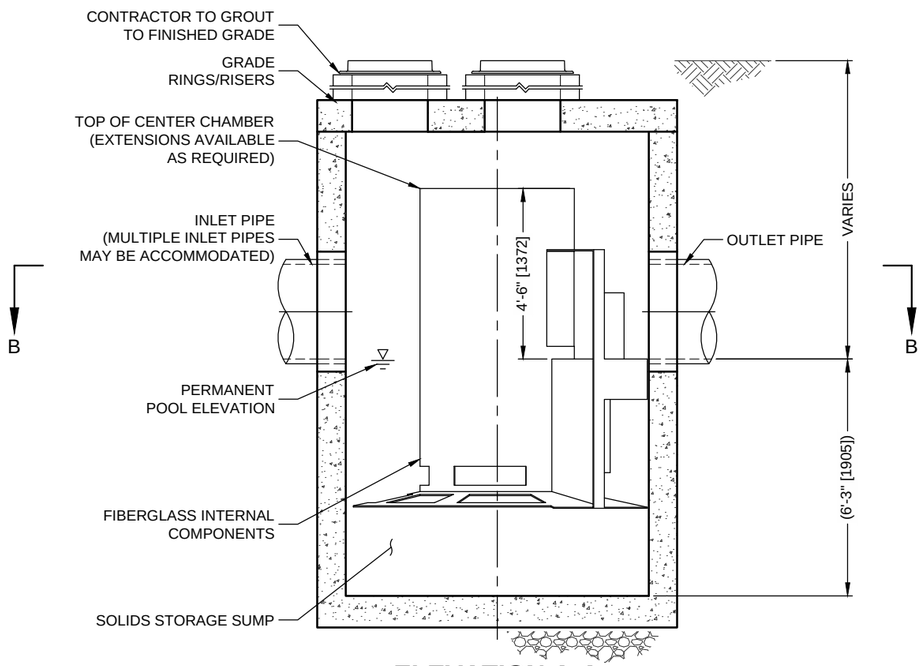
$$CN = 1000/[10+5P+10Qa-10(Qa^2+1.25QaP)^{1/2}]$$

$$Qwq = (q_u)*(A)*(Qa)$$

Structure:	WQ#301		**Structure:**	WQ#201	
P	1.20	in.	P	1.20	in.
A	8.785	ac	A	7.294	ac
I	92.74	%	I	80.86	%
t_c	6.0	min.	t_c	6.0	min.
t_c	0.100	hr.	t_c	0.100	hr.
R_v	0.885		R_v	0.778	
90% WQv	0.777	ac-ft	90% WQv	0.568	ac-ft
90% WQv	33863.54	ft^3	90% WQv	24720.30	ft^3
Qa	1.062	in.	Qa	0.934	in.
CN	98.76		CN	97.44	
I_a	0.041		I_a	0.053	
I_a/P	0.034		I_a/P	0.044	
qu	1000	(csm/in)	qu	1000	(csm/in)
A	0.01373	$miles^2$	A	0.01140	$miles^2$
Qwq	14.58	cfs	Qwq	10.64	cfs



PLAN VIEW B-B
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CASCADE
separator™

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-8 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

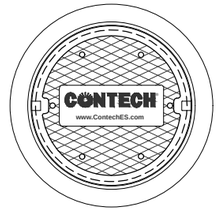
CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (cfs [L/s])	
PEAK FLOW RATE (cfs [L/s])	
RETURN PERIOD OF PEAK FLOW (yrs)	
RIM ELEVATION	

PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			

NOTES / SPECIAL REQUIREMENTS:



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

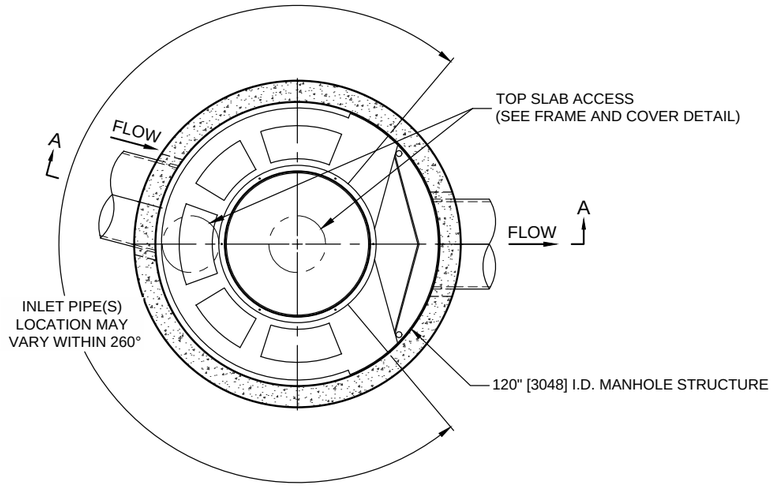
GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

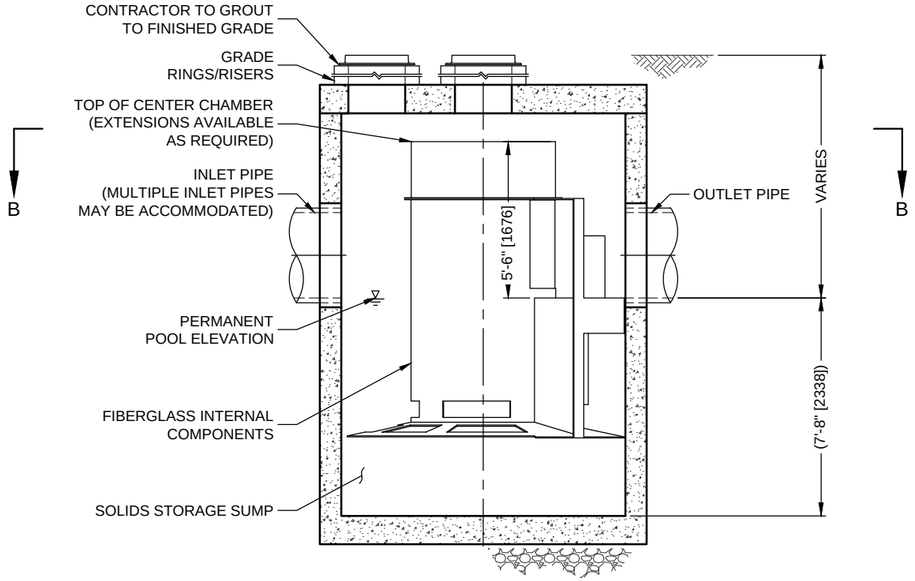
CONTECH
ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CS-8
CASCADE SEPARATOR
STANDARD DETAIL

I:\COMMON\CAD\TREATMENT\21 CASCADE\40 STANDARD DRAWINGS\DWG\CS-8-DTL.DWG 1/22/2019 9:39 AM



PLAN VIEW B-B
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

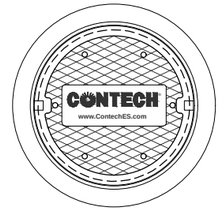
CASCADE
separator™

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-10 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

INTERNAL COMPONENTS WILL BE FIELD INSTALLED. CONTACT YOUR CONTECH REPRESENTATIVE FOR ADDITIONAL INFORMATION.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (cfs [L/s])	
PEAK FLOW RATE (cfs [L/s])	
RETURN PERIOD OF PEAK FLOW (yrs)	
RIM ELEVATION	

PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			

NOTES / SPECIAL REQUIREMENTS:

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm].

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH
ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CS-10
CASCADE SEPARATOR
STANDARD DETAIL

I:\COMMON\CAD\TREATMENT\21 CASCADE\40 STANDARD DRAWINGS\DWG\CS-10-DTL.DWG 1/22/2019 9:40 AM

APPENDIX 17

NJCAT TECHNOLOGY VERIFICATION

CONTECH CASCADE SEPARATOR

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Nonpoint Pollution Control
Division of Water Quality
401-02B
Post Office Box 420
Trenton, New Jersey 08625-0420
609-633-7021 Fax: 609-777-0432
http://www.state.nj.us/dep/dwq/bnpc_home.htm

PHILIP D. MURPHY
Governor

SHEILA Y. OLIVER
Lt. Governor

CATHERINE R. MCCABE
Commissioner

May 18, 2020

Derek M. Berg
Director – Stormwater Regulatory Management - East
Contech Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074

Re: MTD Lab Certification
Cascade Separator™
On-line Installation

TSS Removal Rate 50%

Dear Mr. Berg:

This revised certification letter supersedes the Department's prior certification dated October 1, 2019. This revision was completed to reflect Contech's enhanced fabrication capability to manufacture a smaller-size unit of its the Cascade Separator™ Manufactured Treatment Device (MTD), while still meeting the scaling methodology as agreed upon by the manufacturers' working group on September 19, 2016. Based on this modification, Table A-1 of the New Jersey Corporation for Advanced Technology (NJCAT) Verification report located at http://www.njcat.org/uploads/newDocs/NJCATTechnologyVerificationFinal.pdf has been revised to specify this smaller unit and associated maximum treatment flow rate. Table 1 below has been revised to reflect this same updated model size and flow rate.

The Stormwater Management rules under N.J.A.C. 7:8-5.5(b) and 5.7(c) allow the use of manufactured treatment devices (MTDs) for compliance with the design and performance standards at N.J.A.C. 7:8-5 if the pollutant removal rates have been verified by the New Jersey Corporation for Advanced Technology (NJCAT) and have been certified by the New Jersey Department of Environmental Protection (NJDEP). Contech Engineered Solutions, LLC (Contech) has requested an MTD Laboratory Certification for the Cascade Separator™ stormwater treatment system.

The project falls under the "Procedure for Obtaining Verification of a Stormwater Manufactured Treatment Device from New Jersey Corporation for Advance Technology" dated January 25,

New Jersey is an Equal Opportunity Employer
Printed on Recycled Paper and Recyclable

2013. The applicable protocol is the "New Jersey Laboratory Testing Protocol to Assess Total Suspended Solids Removal by a Hydrodynamic Sedimentation Manufactured Treatment Device" dated January 25, 2013.

NJCAT verification documents submitted to the NJDEP indicate that the requirements of the aforementioned protocol have been met or exceeded. The NJCAT letter also included a recommended certification TSS removal rate and the required maintenance plan. The NJCAT Verification Report with the Verification Appendix (dated September 2019) for this device is published online at http://www.njcat.org/verification-process/technology-verification-database.html.

The NJDEP certifies the use of the Cascade Separator™ stormwater treatment system at a TSS removal rate of 50% when designed, operated, and maintained in accordance with the information provided in the Verification Appendix and the following conditions:

1. The maximum treatment flow rate (MTFR) for the manufactured treatment device (MTD) is calculated using the New Jersey Water Quality Design Storm (1.25 inches in 2 hrs) in N.J.A.C. 7:8-5.5.

2. The Cascade Separator™ shall be installed using the same configuration reviewed by NJCAT and shall be sized in accordance with the criteria specified in item 6 below.

3. This Cascade Separator™ cannot be used in series with another MTD or a media filter (such as a sand filter) to achieve an enhanced removal rate for total suspended solids (TSS) removal under N.J.A.C. 7:8-5.5.

4. Additional design criteria for MTDs can be found in Chapter 9.6 of the New Jersey Stormwater Best Management Practices (NJ Stormwater BMP) Manual, which can be found online at www.njstormwater.org.

5. The maintenance plan for a site using this device shall incorporate, at a minimum, the maintenance requirements for the Cascade Separator™. A copy of the maintenance plan is attached to this certification. However, it is recommended to review the maintenance website at https://www.conteches.com/Portals/0/Documents/Maintenance%20Guides/Cascade-Maintenance%20Guide.pdf?ver=2018-11-05-093254-300. for any changes to the maintenance requirements.

6. Sizing Requirement:

   The example below demonstrates the sizing procedure for the Cascade Separator™:

   Example: A 0.25-acre impervious site is to be treated to 50% TSS removal using a Cascade Separator™. The impervious site runoff (Q) based on the New Jersey Water Quality Design Storm was determined to be 0.79 cfs.

   Maximum Treatment Flow Rate (MTFR) Evaluation:

   The site runoff (Q) was based on the following:

time of concentration = 10 minutes
i = 3.2 in/hr (page 5-8, Fig. 5-3 of the NJ Stormwater BMP Manual)
c = 0.99 (runoff coefficient for impervious)
Q = ciA = 0.99 x 3.2 x 0.25 = 0.79 cfs

Given the site runoff is 0.79 cfs and based on Table A-1 below, the Cascade Separator™ Model CS-3 with an MTFR of 1.02 cfs would be the smallest model approved that could be used for this site to remove 50% of the TSS from the impervious area without exceeding the MTFR.

The sizing table corresponding to the available system models is noted below. Additional specifications regarding each model can be found in the Verification Appendix under Table A-1.

Table A-1 Cascade Separator™ Models and Associated MTFRs

Model	Manhole Diameter (ft)	MTFR (cfs)	50% Maximum Sediment Storage Area Volume (ft^3)
CS-3	3	1.02	5.3
CS-4	4	1.80	9.4
CS-5	5	2.81	14.7
CS-6	6	4.05	21.2
CS-8	8	7.20	37.7
CS-10	10	11.3	58.9
CS-12	12	16.2	84.8

A detailed maintenance plan is mandatory for any project with a stormwater BMP subject to the Stormwater Management rules under N.J.A.C. 7:8. The plan must include all of the items identified in the Maintenance requirements section of the Stormwater Management rules under N.J.A.C. 7:8-5.8. Such items include, but are not limited to, the list of inspection and maintenance equipment and tools, specific corrective and preventative maintenance tasks, indication of problems in the system, and training of maintenance personnel. Additional information can be found in Chapter 8: Maintenance and Retrofit of Stormwater Management Measures.

If you have any questions regarding the above information, please contact Brian Salvo of my office at (609) 633-7021.

Sincerely,

Gabriel Mahon

Gabriel Mahon, Chief
Bureau of Nonpoint Pollution Control

Attachment: Maintenance Plan

cc: Chron File
Richard Magee, NJCAT
Jim Murphy, NJDEP-BNPC
Vince Mazzei, NJDEP-DLUR
Brian Salvo, NJDEP-BNPC

APPENDIX 18

OPERATION & MAINTENANCE PLAN

Engineers
Planners
Surveyors
Landscape Architects
Environmental Scientists

STORMWATER OPERATION & MAINTENANCE PLAN

COSTCO WHOLESALE

AT CROSSGATES MALL
TOWN OF GUILDERLAND
ALBANY COUNTY, NEW YORK

PREPARED FOR

COSTCO WHOLESALE CORPORATION

AUGUST 2022

MC PROJECT NO. 13001204A

TABLE OF CONTENTS

STORMWATER OPERATION & MAINTENANCE PLAN **PAGES 3-5**

APPENDIX A
STORMTRAP DOUBLETRAP OPERATION AND MAINTENANCE

APPENDIX B
CONTECH CASCADE SEPARATOR OPERATION AND MAINTENANCE

Project Description

The project proposes the construction of a Costco Wholesale and Fuel Facility, as well as associated parking lots and infrastructure on the approximately 15.83 acre lot. To mitigate the impacts of this development on the receiving watercourse, a StormTrap DoubleTrap infiltration system and two Contech Cascade Separators will be constructed as a part of this project. These systems, along with all catch basins, inlets, and roof leaders will need to be regularly inspected/maintained as described in this report to ensure they function as designed.

Site Drainage

A State Pollutant Discharge Elimination System Permit (SPDES GP 0-15-002) is required from the New York State Department of Environmental Conservation (NYSDEC) and a Storm Water Pollution Prevention Plan (SWPPP) has been prepared for review/approval by the Town of Guilderland (an MS4 community). The site improvements made to the parcel required this study of impacts on watercourses in and around the site. The study provides reviews the existing drainage conditions as well as the proposed improvements to provide measures that will be used to control potential impacts due to storm water runoff.

Constructed Stormwater Control Practices

Catch Basins:

Catch basins on-site are utilized to collect stormwater run-off and melting snow from the paved parking areas, driveway and sidewalks. These are located along the centerline of roadside swales.

Drain/Yard Inlets:

Drain/yard inlets are located within the landscaped areas and are utilized to collect overland stormwater run-off and snow melt.

Roof leaders:

Roof leaders are utilized to collect stormwater run-off from the roof and discharge it into the subsurface chamber system.

Subsurface StormTrap DoubleTrap System:

A subsurface StormTrap DoubleTrap system is proposed to provide water quality and quantity mitigation in keeping with the requirements in the New York State Storm Water Management Design Manual (NYSSMDM). The system also has an outlet control structure which regulates the out-flow of stormwater.

Contech Cascade Separator:

The Contech Cascade Separator systems are below grade stormwater treatment systems that provide water quality mitigation. These systems are located at two locations to the south of the proposed warehouse on either side of the proposed StormTrap DoubleTrap. They intercept flow from the storm sewer system prior to its introduction into the StormTrap DoubleTrap system.

See Design Plans and Details for these improvements.

Typical Maintenance for Stormwater Practices

As a consequence of its function, the stormwater conveyance system collects and transports runoff that may contain certain pollutants. Maintaining catch basins, stormwater inlets, the Contech Cascade Separators, and the StormTrap DoubleTrap system on a regular basis will remove pollutants, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly to avoid flooding.

Catch Basins:

Catch basins should be inspected monthly and after heavy rain fall to ensure they are functioning properly. Typical maintenance of catch basins includes removal of debris from the grate and sump. This can be done manually or using a vehicle equipped with a vacuum pump. Catch basins should be cleaned out at least one (1) time per year. A good time to clean out catch basins is in the spring to remove the build-up of leaves, sand used for traction, dirt, and other debris that accumulates during winter months.

Drain/Yard Inlets:

Drain/yard inlets, similar to the catch basins, require typical maintenance which includes removal of debris from the grate and sump manually. For this site, use of a vac truck may cause damage to the lawn areas around these structures. Inspections of the structures should occur monthly and after heavy rain fall to ensure they are still functioning properly. These should be cleaned out at least one (1) time per year.

Roof leaders:

Roof leaders, similar to the catch basins, require typical maintenance which includes removal of debris manually. Inspections of the leaders should occur monthly and after heavy rain fall to ensure they are still functioning properly. These should be cleaned out at least one (1) time per year.

StormTrap DoubleTrap System:

The StormTrap DoubleTrap System should be inspected at regular intervals and maintained when necessary to ensure optimum performance. At a minimum, inspections should be performed at least annually (chambers, outlet control structure, etc.) and after each major storm event. The system should be cleaned out when the level of sediment occupies more than 10% to 15% of the originally designed system's volume or if any blockages are observed.

Refer to Appendix A for Manufacturers recommended Operation & Maintenance of the StormTrap DoubleTrap system.

Contech Cascade Separators:

The Contech Cascade Separators should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects pollutants will depend more heavily on site activities than the size of the unit, i.e., unstable soils or heavy winter

sanding will cause the treatment chamber to fill more quickly, but regular sweeping will slow accumulation.

At a minimum, inspections should be performed twice per year (i.e. spring and fall) however more frequent inspections may be necessary in equipment washdown areas and in climates where winter sanding operations may lead to rapid accumulations of a large volume of sediment. The Contech Cascade Separators should be cleaned when the level of sediment has reached 50% of the storage volume or when significant level of hydrocarbons or trash has accumulated.

Cleaning of the Cascade Separators should be done during dry weather conditions when no flow is entering the system. Cleanout of the Cascade Separators with a vacuum truck is generally the most effective and convenient method of excavating pollutants from the system. Disposal of all material removed from the structures should be done in accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes.

Refer to Appendix B for Manufacturers recommended Operation & Maintenance of the Cascade Separators.

In general, any deficiencies identified during the regular inspections or otherwise for all the stormwater management facilities should be corrected immediately. See appendices for forms to record inspection and maintenance work for the stormwater facilities.

APPENDIX A

STORMTRAP DOUBLETRAP

OPERATION AND MAINENTANCE

APPENDIX B

CONTECH CASCADE SEPARATOR

OPERATION AND MAINENTANCE

STORMTRAP MAINTENANCE MANUAL

1. Introduction

Regular inspections are recommended to ensure that the system is functioning as designed. Please call your Authorized StormTrap Representative if you have questions in regards to the inspection and maintenance of the StormTrap system. Prior to entry into any underground storm sewer or underground detention systems, appropriate OSHA and local safety regulations and guidelines should be followed.

2. Inspection Schedules for Municipalities

StormTrap Stormwater Management Systems are recommended for inspection whenever the upstream and downstream catch basins and stormwater pipes of the stormwater collection system are inspected or maintained. This will economize the cost of the inspection if it is done at the same time the Municipal crews are visiting the area.

3. Inspection Schedules for Private Development

StormTrap Stormwater Mangement Systems, for a private development, are recommended for inspection after each major storm water event. At a minimum, until a cleaning schedule can be established, an annual inspection is recommended. If inspected on an annual basis, the inspection should be conducted before the stormwater season begins to be sure that everything is functioning properly for the upcoming storm season.

4. Inspection Process

Inspections should be done such that at least 2-3 days has lapsed since the most recent rain event to allow for draining. Visually inspect the system at all manhole locations. Utilizing a sediment pole, measure and document the amount of silt at each manhole location (Figure 1). Inspect each pipe opening to ensure that the silt level or any foreign objects are not blocking the pipes. Be sure to inspect the outlet pipe(s) because this is typically the smallest

pipe in the system. It is common that most of the larger materials will be collected upstream of the system in catch basins, and it is therefore important at time of inspections to check these structures for large trash or blockages.

Remove any blockages if you can during the inspection process only if you can do so safely from the top of the system without entering into the system**. Do not go into the system under any circumstances** without proper ventilation equipment and training. Pass any information requiring action onto the appropriate maintenance personnel if you cannot remove the blockages from above during the inspection process. Be sure to describe the location of each manhole and the type of material that needs to be removed.

The sediment level of the system should also be measured and recorded during the inspection process. Recording the sediment level at each manhole is very important in order get a history of sediment that can be graphed over time (i.e. years) in order to estimate when the system will need to be maintained next. It is also important to keep these records to verify that the inspection process was actually performed if anyone asks for your records in the future.

The sediment level in the underground detention system can be determined from the outside of the system by opening up all the manholes and using a sediment pole to measure the amount of sediment at each location. Force the stick to the bottom of the system and then remove it and measure the amount of sediment at that location. Again, do not go into the system under any circumstances without proper ventilation equipment and training.

5. When to Clean the System

Any blockages should be safely removed as soon as practical so that the Stormwater detention system will fill and drain properly before the next stormwater event.

The Dry Detention System should be completely cleaned whenever the sediment occupies more than 10% to 15% of the originally designed system's volume. The Wet Detention System should be cleaned when the sediment occupies more than 30% or 1/3rd of the originally designed system's volume. NOTE: Check with your municipality in regards to

cleaning criteria, as the allowable sediment before cleaning may be more or less then described above.

6. How to Clean the StormTrap

The system should be completely cleaned back to 100% of the originally designed storage volume whenever the above sediment levels have been reached. Be sure to wait at least 3 days after a stormwater event to be sure that the system is completely drained (if it is a Dry Detention System), and all of the sediments have settled to the bottom of the system (if it is a Wet Detention System).

Do not enter the System unless you are properly trained, equipped, and qualified to enter a confined space as identified by local occupational safety and health regulations.

There are many maintenance companies that are in business to help you clean your underground stormwater detention systems and water quality units. Please call your StormTrap representative for referrals in your area.

A. Dry Detention System Cleaning

Maintenance is typically performed using a vacuum truck. Sediment should be flushed towards a vacuum hose for thorough removal. For a Dry Detention System, remove the manhole cover at the top of the system and lower a vacuum hose into one of the rows of the StormTrap system. Open up the manhole at the opposite end of the StormTrap and use sewer jetting equipment to force water in the same row from one end of the StormTrap row to the opposite side. The rows of the StormTrap are completely open in one contiguous channel from one end to the other for easy cleaning.

Place the vacuum hose and the sewer jetting equipment in the next row and repeat the process until all of the rows have been cleaned.

When finished, replace all covers that were removed and dispose of the collected material properly.

B. Wet Detention System Cleaning

If the system was designed to maintain a permanent pool of water, floatables and any oil should be removed in a separate procedure prior to the removal of all sediment.

The floatable trash is removed first by using a bucket strainer to capture and remove any floating debris.

The floatable oils are then removed off the top of the water by using the vacuum truck to suck off any floatable fluids and liquids.

The next step is to use the vacuum truck to gently remove the clarified water above the sediment layer.

The final step is to clean the sediment for each row as described above in the paragraph "A. Dry Detention System Cleaning". For smaller systems, the vacuum truck can remove all of the sediment in the basin without using the sewer jetting equipment because of the smaller space.

7. Inspection Reports

Proof of these inspections is the responsibility of the property owner. All inspection reports and data should be kept on site or at a location where they will be accessible for years in the future. Some municipalities require these inspection and cleaning reports to be forwarded to the proper governmental permitting agency on an annual basis.

Refer to your local and national regulations for any additional maintenance requirements and schedules not contained herein. Inspections should be a part of your standard operating procedure.

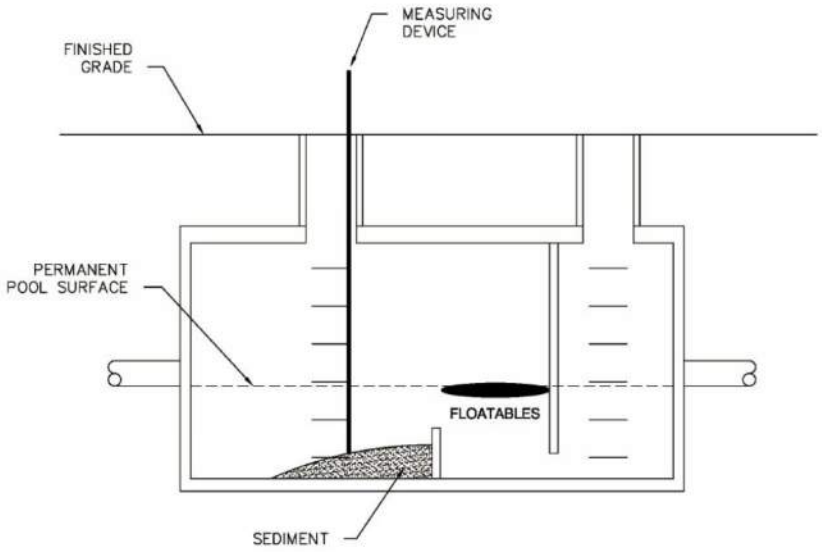


Figure 1. During inspection, measure the distance from finished grade to the top of the sediment inside the system.

Sample inspection and maintenance log

Date	Depth of Sediment	Accumulated Trash	Maintenance Performed	Maintenance Personnel	Comments
2/5/2012	3”	None	Sediment Removal/Vac	B. Johnson	

PHONE 815 941 4549
FAX 331 318 5347
WEB www.stormtrap.com
EMAIL info@stormtrap.com
1287 Windham Parkway
Romeoville, Illinois 60446

CONTECH®
ENGINEERED SOLUTIONS

Cascade Separator™ Inspection and Maintenance Guide



CASCADE
separator™

Maintenance

The Cascade Separator™ system should be inspected at regular intervals and maintained when necessary to ensure optimum performance. The rate at which the system collects sediment and debris will depend upon on-site activities and site pollutant characteristics. For example, unstable soils or heavy winter sanding will cause the sediment storage sump to fill more quickly but regular sweeping of paved surfaces will slow accumulation.

Inspection

Inspection is the key to effective maintenance and is easily performed. Pollutant transport and deposition may vary from year to year and regular inspections will help ensure that the system is cleaned out at the appropriate time. At a minimum, inspections should be performed twice per year (i.e. spring and fall). However, more frequent inspections may be necessary in climates where winter sanding operations may lead to rapid accumulations, or in equipment wash-down areas. Installations should also be inspected more frequently where excessive amounts of trash are expected.

A visual inspection should ascertain that the system components are in working order and that there are no blockages or obstructions in the inlet chamber, flumes or outlet channel. The inspection should also quantify the accumulation of hydrocarbons, trash and sediment in the system. Measuring pollutant accumulation can be done with a calibrated dipstick, tape measure or other measuring instrument. If absorbent material is used for enhanced removal of hydrocarbons, the level of discoloration of the sorbent material should also be identified during inspection. It is useful and often required as part of an operating permit to keep a record of each inspection. A simple form for doing so is provided in this Inspection and Maintenance Guide.

Access to the Cascade Separator unit is typically achieved through one manhole access cover. The opening allows for inspection and cleanout of the center chamber (cylinder) and sediment storage sump, as well as inspection of the inlet chamber and slanted skirt. For large units, multiple manhole covers allow access to the chambers and sump.

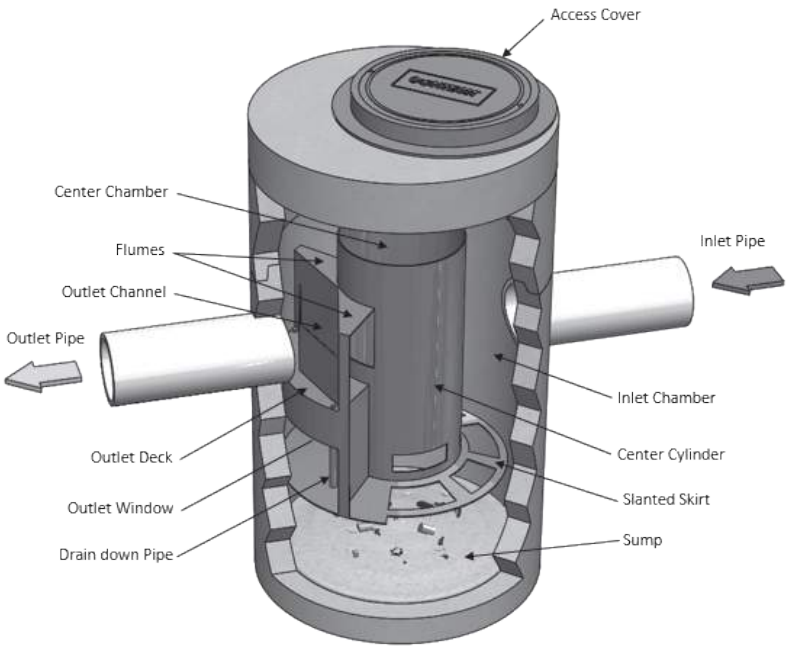
The Cascade Separator system should be cleaned before the level of sediment in the sump reaches the maximum sediment depth and/or when an appreciable level of hydrocarbons and trash has accumulated. If sorbent material is used, it must be replaced when significant discoloration has occurred. Performance may be impacted when maximum sediment storage capacity is exceeded. Contech recommends maintaining the system when sediment level reaches the 50% storage volume. The level of sediment is easily determined by measuring from finished grade down to the top of the sediment pile. To avoid underestimating the level of sediment in the chamber, the measuring device must be lowered to the top of the sediment pile carefully. Finer, silty particles at the top of the pile typically offer less resistance to the end of the rod than larger particles toward the bottom of the pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the total height of sediment storage sump.

Cleaning

Cleaning of a Cascade Separator system should be done during dry weather conditions when no flow is entering the system. The use of a vacuum truck is generally the most effective and convenient method of removing pollutants from the system. Simply remove the manhole cover and insert the vacuum hose down through the center chamber and into the sump. The system should be completely drained down and the sump fully evacuated of sediment. The areas outside the center chamber and the slanted skirt should also be washed off if pollutant build-up exists in these areas.

In installations where the risk of petroleum spills is small, liquid contaminants may not accumulate as quickly as sediment. However, the system should be cleaned out immediately in the event of an oil or gasoline spill. Motor oil and other hydrocarbons that accumulate on a more routine basis should be removed when an appreciable layer has been captured. To remove these pollutants, it may be preferable to use absorbent pads since they are usually less expensive to dispose than the oil/water emulsion that may be created by vacuuming the oily layer. Trash and debris can be netted out to separate it from the other pollutants. Then the system should be power washed to ensure it is free of trash and debris.

Manhole covers should be securely seated following cleaning activities to prevent leakage of runoff into the system from above and to ensure proper safety precautions. Confined space entry procedures need to be followed if physical access is required. Disposal of all material removed from the Cascade Separator system must be done is accordance with local regulations. In many locations, disposal of evacuated sediments may be handled in the same manner as disposal of sediments removed from catch basins or deep sump manholes. Check your local regulations for specific requirements on disposal. If any components are damaged, replacement parts can be ordered from the manufacturer.



Cascade Separator Inspection & Maintenance Log

Cascade Model:			Location:		
Date	Water Depth to Sediment[1]	Floatable Layer Thickness[2]	Describe Maintenance Performed	Maintenance Personnel	Comments

1. The depth to sediment is determined by taking a measurement from the manhole opening to the top of the sediment pile. Once this measurement is recorded, it should be compared to the as-built drawing for the unit to determine if the height of the sediment pile off the bottom of the sump floor exceeds 50% of the total height of sediment storage sump. Note: to avoid underestimating the volume of sediment in the chamber, the measuring device must be carefully lowered to the top of the sediment pile.
2. For optimum performance, the system should be cleaned out when the floating hydrocarbon layer accumulates to an appreciable thickness. In the event of an oil spill, the system should be cleaned immediately.



A Cascade Separator unit can be easily cleaned in less than 30 minutes.



A vacuum truck excavates pollutants from the systems.

SUPPORT

- Drawings and specifications are available at www.ContechES.com.
- Site-specific design support is available from our engineers.

©2018 Contech Engineered Solutions LLC, a QUIKRETE Company

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, and earth stabilization products. For information, visit www.ContechES.com or call 800.338.1122

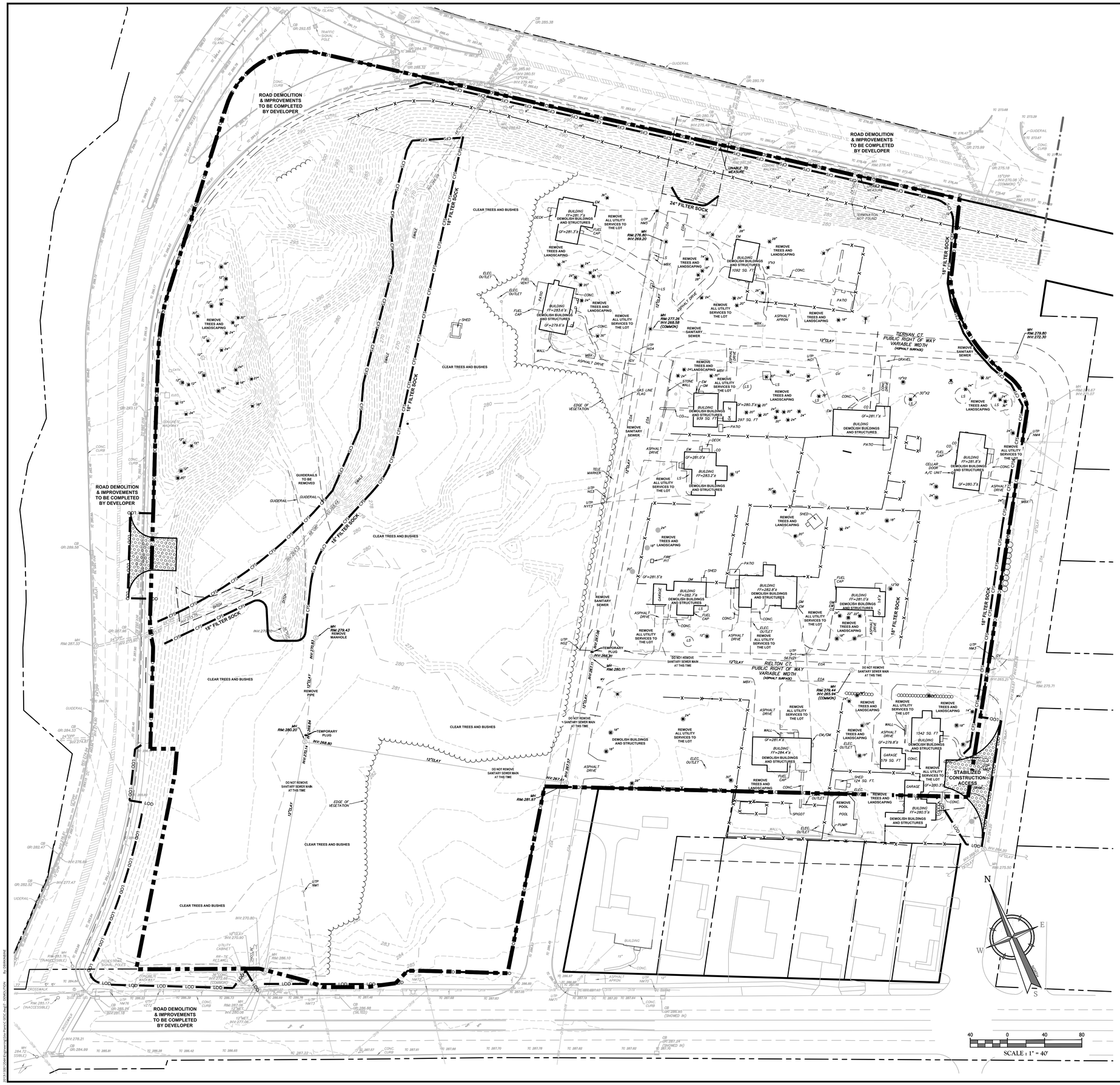
NOTHING IN THIS CATALOG SHOULD BE CONSTRUED AS A WARRANTY. APPLICATIONS SUGGESTED HEREIN ARE DESCRIBED ONLY TO HELP READERS MAKE THEIR OWN EVALUATIONS AND DECISIONS, AND ARE NEITHER GUARANTEES NOR WARRANTIES OF SUITABILITY FOR ANY APPLICATION. CONTECH MAKES NO WARRANTY WHATSOEVER, EXPRESS OR IMPLIED, RELATED TO THE APPLICATIONS, MATERIALS, COATINGS, OR PRODUCTS DISCUSSED HEREIN. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND ALL IMPLIED WARRANTIES OF FITNESS FOR ANY PARTICULAR PURPOSE ARE DISCLAIMED BY CONTECH. SEE CONTECH'S CONDITIONS OF SALE (AVAILABLE AT WWW.CONTECHES.COM/COS) FOR MORE INFORMATION.

CONTECH ENGINEERED SOLUTIONS
800.925.5240
www.ContechES.com

APPENDIX 19

EROSION & SEDIMENT CONTROL PLANS AND

DRAINAGE DETAILS



DEMOLITION NOTES:

1. IN ACCORDANCE WITH STATE LAW, THE CONTRACTOR SHALL BE REQUIRED TO CALL THE BOARD OF PUBLIC UTILITIES ONE CALL DAMAGE PROTECTION SYSTEM FOR UTILITY MARK OUT IN ADVANCE OF ANY EXCAVATION. DIG SAFELY, NEW YORK, 1-800-962-7962 OR 811. A PRE-DEMOLITION CONFERENCE WILL NEED TO BE ARRANGED WITH DIG SAFELY, NEW YORK AND MUST BE HELD A MINIMUM OF 7 DAYS BEFORE THE START OF ANY DEMOLITION.
2. THE ACCURACY AND COMPLETENESS OF THIS INFORMATION HAS BEEN PROVIDED TO THE BEST ABILITY OF THE ENGINEER, HOWEVER, THE CONTRACTOR IS ADVISED TO VERIFY IN THE FIELD ALL THE FACTORS CONCERNING THE LOCATION OF ALL UTILITIES PRIOR TO BIDDING AND CONSTRUCTION. LOCATIONS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE PLANS ARE TO BE CONSIDERED APPROXIMATE AND SHOULD BE VERIFIED BY THE CONTRACTOR.
3. THIS SET OF PLANS HAS BEEN PREPARED FOR PURPOSE OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OR APPROVALS HAVE BEEN SATISFIED ON THE DRAWINGS AND EACH DRAWING HAS BEEN REVISED TO INDICATE "ISSUED FOR CONSTRUCTION". THE CLIENT OR OWNER AND CONTRACTOR ARE RESPONSIBLE TO ASSURE THAT THE APPROVED PLANS ONLY, ARE USED FOR BIDDING AND CONSTRUCTION.
4. DO NOT SCALE DRAWINGS AS THEY PERTAIN TO ADJACENT AND SURROUNDING PHYSICAL CONDITIONS, BUILDINGS, STRUCTURES, ETC. THEY ARE SCHEMATIC ONLY, EXCEPT WHERE DIMENSIONS ARE SHOWN THERETO.
5. EXISTING UTILITY INFORMATION SHOWN HEREON HAS BEEN COLLECTED FROM VARIOUS SOURCES AND CANNOT BE GUARANTEED AS TO ACCURACY OR COMPLETENESS. THE CONTRACTOR SHALL VERIFY ALL INFORMATION TO HIS SATISFACTION PRIOR TO EXCAVATION. WHERE EXISTING UTILITIES ARE TO BE CROSSED BY PROPOSED CONSTRUCTION, TEST PITS SHALL BE DUG BY THE CONTRACTOR PRIOR TO CONSTRUCTION TO ASCERTAIN EXISTING INVERTS, MATERIALS AND SIZES. TEST PIT INFORMATION SHALL BE GIVEN TO THE ENGINEER PRIOR TO CONSTRUCTION, TO PERMIT ADJUSTMENT AS REQUIRED TO AVOID CONFLICTS. ANY EXISTING UTILITY SERVICE CONNECTIONS, LOCATED BY THE CONTRACTOR, CAPABLE OF SERVICING THE PROPOSED USE SHALL BE REUSED AS LONG AS THEY ARE IN GOOD CONDITION AND MEET THE UTILITY AUTHORITY'S STANDARDS AND SPECIFICATIONS. IF THE EXISTING UTILITY SERVICES DO NOT MEET THE ABOVE CRITERIA, THEN NEW SERVICE LINES SHALL BE INSTALLED.
6. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING SITE IMPROVEMENTS AND UTILITIES. ALL DISCREPANCIES SHALL BE IDENTIFIED TO THE ENGINEER IN WRITING.
7. ALL DEMOLITION DEBRIS TO BE REMOVED BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE REGULATIONS.
8. ALL DEMOLITION ACTIVITIES ARE TO BE PERFORMED IN ACCORDANCE WITH THESE PLANS, AS WELL AS ALL FEDERAL, STATE AND LOCAL REGULATIONS. ANY DISCREPANCIES OR DEVIATIONS SHALL BE IDENTIFIED BY THE CONTRACTOR TO MASER CONSULTING, P.A. IN WRITING FOR RESOLUTION PRIOR TO INITIATION OF SITE ACTIVITY.
9. PRIOR TO STARTING ANY DEMOLITION CONTRACTOR IS RESPONSIBLE FOR/TO:
   A. ENSURING COPIES OF ALL PERMITS AND APPROVALS MUST BE MAINTAINED ON SITE AND AVAILABLE FOR REVIEW (SEE "EROSION AND SEDIMENT CONTROL PLAN," THIS DRAWING SET).
   B. INSTALLING THE REQUIRED SOIL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO SITE DISTURBANCE.
   C. ALL UTILITIES AND SERVICES, INCLUDING BUT NOT LIMITED TO GAS, WATER, ELECTRIC, SANITARY AND STORM SEWER, TELEPHONE, CABLE, FIBER OPTIC CABLE, ETC. WITHIN THE LIMITS OF DISTURBANCE. THE CONTRACTOR SHALL USE AND COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY NOTIFICATION SYSTEM TO LOCATE ALL THE UNDERGROUND UTILITIES.
   D. PROTECTING AND MAINTAINING IN OPERATION, ALL ACTIVE SYSTEMS THAT ARE NOT BEING REMOVED DURING ALL DEMOLITION ACTIVITIES.
   E. FAMILIARIZING THEMSELVES WITH THE APPLICABLE UTILITY SERVICE PROVIDER AND IS RESPONSIBLE FOR ALL COORDINATION REGARDING PROVIDER AND IS RESPONSIBLE FOR ALL COORDINATION REGARDING UTILITY DEMOLITION REQUIRED FOR THE PROJECT. THE CONTRACTOR SHALL PROVIDE THE OWNER WRITTEN NOTIFICATION THAT THE EXISTING UTILITIES AND SERVICES HAVE BEEN TERMINATED AND ABANDONED IN ACCORDANCE WITH JURISDICTION AND UTILITY COMPANY REQUIREMENTS.
   F. CLEAN THE EXISTING UTILITY STRUCTURES ON-SITE PRIOR TO CONSTRUCTION AND VERIFY THE INVERTS FOR CONNECTION.
10. COORDINATION WITH UTILITY COMPANIES AND THE TOWN OF GUILDERLAND REGARDING WORKING "OFF-PEAK" HOURS OR ON WEEKENDS AS MAY BE REQUIRED TO MINIMIZE THE IMPACT ON THE AFFECTED PARTIES.
11. A COMPLETE INSPECTION FOR CONTAMINANTS BY A LICENSED ENVIRONMENTAL TESTING AGENCY, SHALL BE PERFORMED OF ALL BUILDINGS AND/OR STRUCTURES PRIOR TO REMOVAL. SAME SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL ENVIRONMENTAL REGULATIONS. ANY/ALL CONTAMINANTS SHALL BE REMOVED AND DISPOSED OF BY A FEDERALLY LICENSED CONTRACTOR IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS. ALL ENVIRONMENTAL WORK INCLUDING HAZARDOUS MATERIAL, SOILS, ASBESTOS, OR OTHER RECOGNIZED OR IMPLIED HEREIN IS THE SOLE RESPONSIBILITY OF THE OWNER'S ENVIRONMENTAL CONSULTANT.
12. COLLIERS ENGINEERING & DESIGN IS NOT RESPONSIBLE FOR JOB SITE SAFETY OR SUPERVISION, CONTRACTOR IS TO PROCEED WITH THE DEMOLITION IN A SYSTEMATIC AND SAFE MANNER, FOLLOWING ALL THE O.S.H.A. REQUIREMENTS, TO ENSURE PUBLIC AND CONTRACTOR SAFETY.
13. THE CONTRACTOR SHALL PROVIDE ALL THE "MEANS AND METHODS" NECESSARY TO PREVENT MOVEMENT, SETTLEMENT, OR COLLAPSE OF EXISTING STRUCTURES, AND ANY OTHER IMPROVEMENTS THAT ARE REMAINING ON OR OFF SITE. THE DEMOLITION CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS OF DAMAGE TO ALL ITEMS THAT ARE TO REMAIN AS A RESULT OF HIS ACTIVITIES. ALL REPAIRS SHALL USE NEW MATERIAL, THE REPAIRS SHALL RESTORE THE ITEM TO THE PRE-DEMOLITION CONDITION.
14. THE CONTRACTOR SHALL PERFORM EARTH MOVEMENT ACTIVITIES, DEMOLITION AND REMOVAL OF ALL FOUNDATION WALLS, FOOTINGS, AND OTHER MATERIALS WITHIN THE LIMITS OF DISTURBANCE IN ACCORDANCE WITH DIRECTION BY OWNER'S STRUCTURAL OR GEOTECHNICAL ENGINEER.
15. ROCK EXCAVATIONS WILL BE PERFORMED BY MECHANICAL MEANS ONLY. USE OF EXPLOSIVES IS PROHIBITED. ALL THE REQUIRED PERMITS AND CONTROL MEASURES THAT ARE REQUIRED BY THE FEDERAL, STATE, AND LOCAL GOVERNMENTS SHALL BE IN PLACE PRIOR TO STARTING. THE CONTRACTOR IS ALSO RESPONSIBLE FOR ALL INSPECTION AND SEISMIC VIBRATION TESTING THAT IS REQUIRED TO MONITOR THE EFFECTS ON ALL LOCAL STRUCTURES, AS APPLICABLE.
16. CONTRACTOR SHALL PROVIDE TRAFFIC CONTROL AND GENERALLY ACCEPTED SAFE PRACTICES IN CONFORMANCE WITH: THE "MANUAL ON UNIFORM TRAFFIC CONTROL", AS WELL AS FEDERAL, STATE, AND LOCAL REGULATIONS WHEN DEMOLITION RELATED ACTIVITIES IMPACT ROADWAYS OR ROADWAY RIGHTS-OF-WAY.
17. CONDUCT DEMOLITION ACTIVITIES IN SUCH A MANNER TO ENSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, SIDEWALKS, WALKWAYS, AND OTHER ADJACENT FACILITIES. STREET CLOSURE PERMITS MUST BE RECEIVED FROM THE APPROPRIATE GOVERNMENTAL AUTHORITY.
18. DEMOLITION ACTIVITIES AND EQUIPMENT SHALL NOT USE AREAS OUTSIDE THE DEFINED PROPERTY LINE WITHOUT WRITTEN PERMISSION OF THE OWNER, AND/OR APPROPRIATE GOVERNMENT AGENCY.
19. USE DUST CONTROL MEASURES TO LIMIT AIRBORNE DUST AND DIRT RISING AND SCATTERING IN THE AIR IN ACCORDANCE WITH FEDERAL, STATE, AND/OR LOCAL STANDARDS. AFTER THE DEMOLITION IS COMPLETE, ADJACENT STRUCTURES AND IMPROVEMENTS SHALL BE CLEANED OF ALL DUST AND DEBRIS CAUSED BY THE DEMOLITION OPERATIONS. THE CONTRACTOR IS RESPONSIBLE FOR RETURNING ALL ADJACENT AREAS TO THEIR "PRE-DEMOLITION" CONDITION.
20. THIS DEMOLITION PLAN IS INTENDED TO IDENTIFY THOSE EXISTING ITEMS/CONDITIONS WHICH ARE TO BE REMOVED. IT IS NOT INTENDED TO PROVIDE DIRECTION OTHER THAN THAT ALL METHODS AND MEANS ARE TO BE IN ACCORDANCE WITH STATE, FEDERAL, LOCAL, AND JURISDICTIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL O.S.H.A. AND OTHER SAFETY PRECAUTIONS NECESSARY TO PROVIDE A SAFE WORK SITE.
21. DEBRIS SHALL NOT BE BURIED ON THE SUBJECT SITE. ALL DEMOLITION WASTES AND DEBRIS (SOLID WASTE) SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL TOWN, COUNTY, STATE, AND FEDERAL LAWS AND APPLICABLE CODES.
22. DEMOLITION SHALL NOT PROCEED UNTIL THE APPROXIMATE LOCATION OF THE EXISTING UTILITIES ARE MARKED IN THE FIELD AND ALL UTILITY CONNECTIONS ARE SUITABLY SHUT OFF AND DISCONNECTED AND PROPER DEMOLITION PERMITS ARE IN PLACE WITH THE CITY.
23. PROTECT ALL EXISTING UTILITIES TO REMAIN (INCLUDING DRAINAGE STRUCTURES, HYDRANTS, VALVES, SEWER MANHOLES, ETC.) DURING DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY HIMSELF OR SUB-CONTRACTORS.
24. CONTRACTOR TO RESET ALL UTILITY CASTINGS TO FINISHED GRADE.
25. CONTRACTOR TO MAINTAIN ALL UTILITY SERVICES TO SURROUNDING OFF SITE BUILDINGS.
26. THE DEMOLITION CONTRACTOR AND GENERAL CONTRACTOR SHALL BE DEEMED TO HAVE VISITED THE SITE AND ACCEPTED THE SITE AS IS.
27. THE DEMOLITION CONTRACTOR SHALL CARRY OUT THE WORK OF THIS CONTRACT PLACING THE SAFETY AND PROTECTION OF THE SURROUNDING COMMUNITY AND PROPERTY AT THE HIGHEST PRIORITY. THE DEMOLITION CONTRACTOR SHALL IMPLEMENT SPECIFIED MEASURES, AND ANY OTHER MEASURES DEEMED NECESSARY, TO PROTECT ADJACENT AND ON-SITE PROPERTY, BUILDINGS, HOMES, BUSINESSES, FACILITIES AND UTILITIES.
28. THE DEMOLITION CONTRACTOR SHALL ENSURE FREE AND SAFE PASSAGE OF PERSONS AROUND THE AREA OF THE DEMOLITION AS DIRECTED BY THE OWNER AND THE BOROUGH OFFICIALS. ALL OPERATIONS SHALL BE CONDUCTED SO AS TO PREVENT DAMAGE TO ADJACENT BUILDINGS, STRUCTURES, OTHER FACILITIES, AND INJURY TO PERSONS, BOTH PEDESTRIAN AND WORKERS ALIKE.
29. THE DEMOLITION CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR MAINTAINING THE SECURITY OF THE PROJECT SITE DURING ALL NON-WORKING HOURS, SEVEN DAYS A WEEK.
30. ALL UTILITY LOCATIONS ARE APPROXIMATE AND ADDITIONAL UTILITIES MAY EXIST. IT SHALL BE THE DEMOLITION CONTRACTOR'S RESPONSIBILITY TO IDENTIFY THE ACTUAL LOCATION OF ALL UTILITIES IMPACTED BY THIS WORK, AND WHICH MUST BE MAINTAINED OR REMOVED, WHETHER SHOWN OR NOT SHOWN ON THE CONTRACT DRAWINGS.
31. THE DEMOLITION CONTRACTOR SHALL COMPLETELY REMOVE ALL UTILITY SERVICE CONNECTIONS AND APPURTENANCES TO ALL FACILITIES WITHIN THE DEMOLITION AREA UNLESS OTHERWISE NOTED. ALL FOUNDATIONS ARE TO BE COMPLETELY REMOVED.
32. ALL BUILDING, STRUCTURE AND FACILITY FOUNDATIONS ARE TO BE REMOVED COMPLETELY BY THE DEMOLITION CONTRACTOR.
33. THE DEMOLITION CONTRACTOR SHALL BACKFILL ALL VOIDS REMAINING FROM THE REMOVAL OF FOUNDATIONS, UTILITIES AND OTHER SUBSURFACE ELEMENTS WITH STRUCTURAL, COMPACTED FILL MATERIAL IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.
34. THE DEMOLITION CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF OFF-SITE ANY HAZARDOUS MATERIALS ENCOUNTERED DURING THE DEMOLITION OR SITE CLEARING ACTIVITIES. BEFORE ANY OFF-SITE REMOVALS, THE DEMOLITION CONTRACTOR HAS TO PROVIDE, IN WRITING, THE PROPOSED DESTINATION OF ALL MATERIALS.
35. DEMOLITION AND BACKFILLING WORK IS TO BE PERFORMED IN DRY WEATHER.
36. THE DEMOLITION CONTRACTOR SHALL COORDINATE ALL UTILITY REMOVAL WITH EACH RESPECTIVE UTILITY PROVIDER.
37. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENTATION CONTROLS MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENTATION CONTROL AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING, AND RENETTING, MUST BE PERFORMED IMMEDIATELY.
38. ALL PERISHABLE AND OBJECTIONABLE MATERIAL INCLUDING BUT NOT LIMITED TO BOARDS, TREES, BRUSH, SHRUBS, LOGS, STUMPS, ROOTS, AND OTHER ORGANIC MATTER SHALL BE REMOVED FROM THE CONSTRUCTION SITE.

DEMOLITION SEQUENCE OF ACTIVITIES:

AT LEAST SEVEN (7) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE EROSION AND SEDIMENT CONTROL PREPARER, AND THE SOIL CONSERVATION DISTRICT TO AN ON-SITE MEETING.

AT LEAST THREE (3) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED ON THOSE ACTIVITIES SHALL NOTIFY THE NEW YORK UTILITY ONE-CALL SYSTEM AT "811" TO ORDER A UTILITY MARK-OUT.

ALL STRUCTURES ASSOCIATED WITH THE CONSTRUCTION OF SEDIMENT REMOVAL FACILITIES MUST BE ON-SITE PRIOR TO EARTH DISTURBANCE.

CONTRACTOR SHALL TAKE IMMEDIATE ACTION TO INSTITUTE ADDITIONAL MEASURES IF ANY EROSION AND SEDIMENTATION CONTROL PROBLEMS ARISE PRIOR TO THE STABILIZATION OF EROSION AND SEDIMENTATION CONTROL MEASURES ON-SITE.

1. THE TOWN OF GUILDERLAND AND THE SOIL CONSERVATION DISTRICT SHALL BE NOTIFIED 72 HOURS PRIOR TO ANY LAND DISTURBANCE.
2. INSTALL FILTER SOCK SEDIMENT CONTROL BARRIERS AS SHOWN ON THIS PLAN.
3. INSTALL SEDIMENT CONTROL DEVICES OVER EXISTING STORM SEWER STRUCTURES
4. LOCATE AND DECOMMISSION ALL ON-SITE UTILITIES. REMOVE EXISTING UTILITY SERVICE FEATURES AND CONNECTIONS. UTILITY REMOVAL SHALL BE COORDINATED WITH EACH RESPECTIVE UTILITY SERVICE PROVIDER.
5. BEFORE DEMOLISHING ANY EXISTING SANITARY SEWER PIPE, THE CONTRACTOR SHALL ADHERE TO THE FOLLOWING:
   a. THE CONTRACTOR CANNOT REMOVE ANY SANITARY SEWER PIPE UNTIL THE PROPOSED SANITARY PIPE IS INSTALLED PER THE PROJECT DOCUMENTS
   b. THE CONTRACTOR SHALL ENSURE THAT THE EXISTING MANHOLE HAS BEEN SECURELY PLUGGED BEFORE REMOVING THE UPSTREAM SEWER PIPE.
   c. ONCE THE ASSOCIATED MANHOLES HAVE BEEN SECURELY PLUGGED AND THE PROPOSED SANITARY SEWER PIPE HAS BEEN PROPERLY INSTALLED, THE CONTRACTOR MAY BEGIN DEMOLISHING THE EXISTING SEWER PIPE.
6. BEGIN DEMOLITION OF ABOVE GROUND STRUCTURES AND FOUNDATIONS.
7. RELOCATE OR REMOVE UNDERGROUND UTILITIES.
8. DEMOLISH REMAINING EXISTING SITE ELEMENTS AND BELOW GRADE STRUCTURES INCLUDING BUT NOT LIMITED TO BUILDING FOUNDATIONS, UTILITY FOUNDATIONS, SITE LIGHTING STRUCTURES AND FOUNDATIONS, UNDERGROUND VAULTS, WIRING AND PIPING. REMOVE AND DISPOSE ALL DEBRIS OFF SITE.
9. BACKFILL ALL VOIDS CREATED FROM DEMOLITION AND UTILITY REMOVAL WITH STRUCTURAL FILL MATERIAL PLACED AND COMPACTED IN ACCORDANCE WITH TECHNICAL SPECIFICATION.
10. REMOVE ASPHALT PAVING, PAVERS AND CONCRETE PADS. DISPOSE OF DEBRIS OFF SITE.
11. INSPECT AND RECONDITION EROSION CONTROL MEASURES IN PREPARATION FOR THE NEXT PHASE OF SITE DEVELOPMENT.

TOTAL PROJECT DISTURBANCE: 735,400 SF

FOR EXISTING WETLANDS REFER TO AQUATIC RESOURCE DELINEATION, LANDS NOW OR FORMERLY OF CROSSGATES RELEASECO LLC, PREPARED BY THE CHAZEN COMPANIES, DATED 8/23/19.

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2023. Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	11/21/23	DB	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
2	12/20/23	SVD	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
3	1/22/24	RMA	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND
4	2/8/24	SVD	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND
5	5/31/24	DB	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND
6	-	-	-
7	-	-	-
8	-	-	-
9	-	-	-
10	-	-	-

RUSSELL T. McFALL II
NEW YORK LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: 090030

SPECIAL USE PERMIT SITE PLANS
FOR
COSTCO WHOLESALE

CROSSGATES MALL
TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

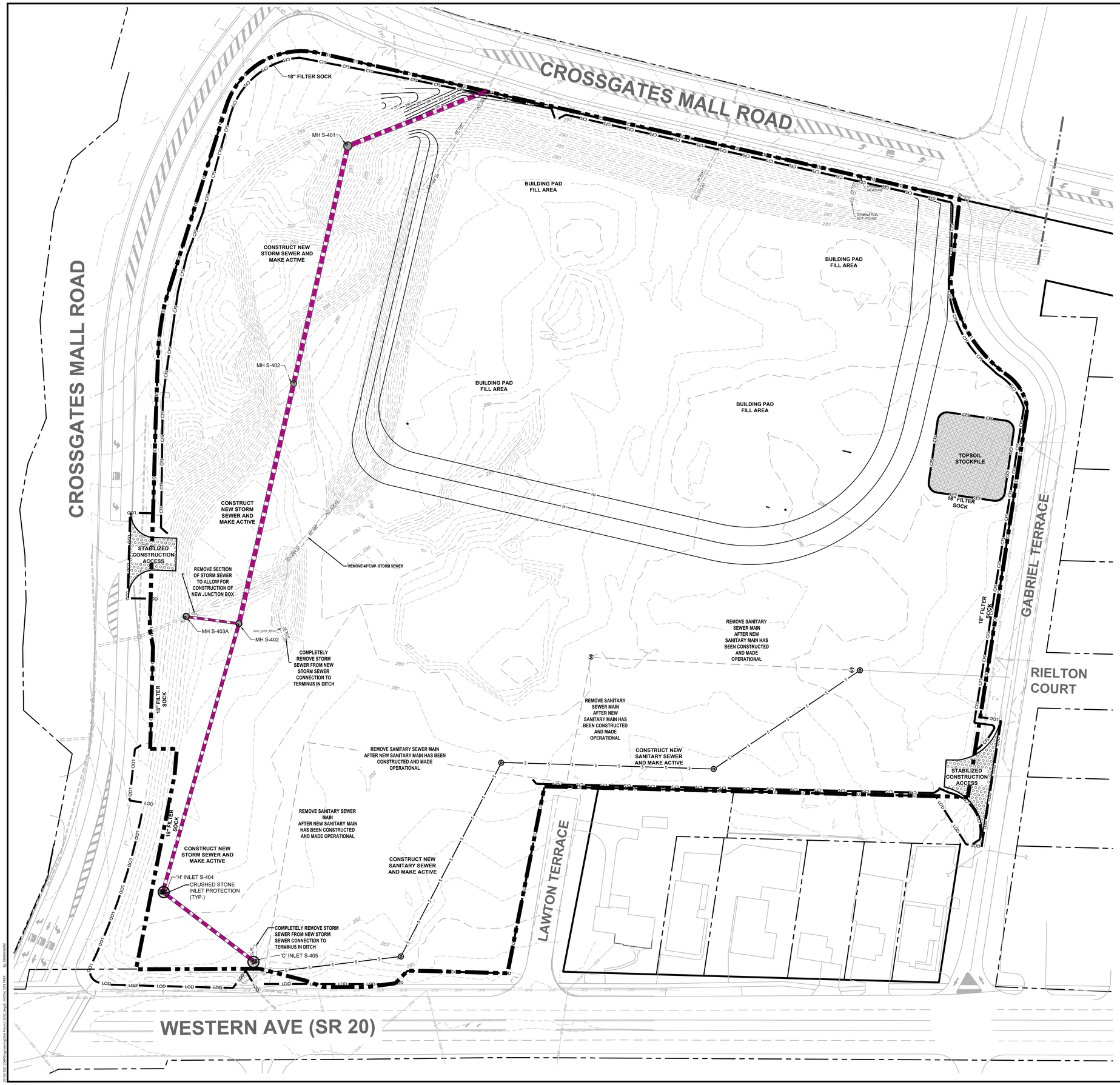
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIR	RTM

PROJECT NUMBER: 13001204A
DRAWING NAME: C-SESC

SHEET TITLE:
EROSION CONTROL DEMOLITION PLAN

SHEET NUMBER: 7 of 22

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.



EROSION CONTROL LEGEND

- PROPERTY LINE
- LOD — LIMIT OF DISTURBANCE
- CFS — SILT FENCE
- STABILIZED CONSTRUCTION ENTRANCE
- TOPSOIL STOCKPILE
- 270 — PROPOSED CONTOURS
- 270 — EXISTING CONTOURS
- STORM PIPE
- S — S — SANITARY SEWER PIPE

INITIAL SITE PREPARATION SEQUENCE OF ACTIVITIES:

AT LEAST SEVEN (7) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE EROSION AND SEDIMENT CONTROL PREPARER, AND THE SOIL CONSERVATION DISTRICT TO AN ON-SITE MEETING.

AT LEAST THREE (3) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED ON THOSE ACTIVITIES SHALL NOTIFY THE NEW YORK UTILITY ONE-CALL SYSTEM AT 811 TO ORDER A UTILITY MARK-OUT.

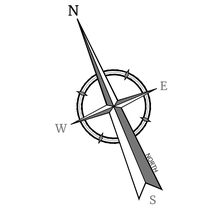
ALL STRUCTURES ASSOCIATED WITH THE CONSTRUCTION OF SEDIMENT REMOVAL FACILITIES MUST BE ON-SITE PRIOR TO EARTH DISTURBANCE.

CONTRACTOR SHALL TAKE IMMEDIATE ACTION TO INSTITUTE ADDITIONAL MEASURES IF ANY EROSION AND SEDIMENTATION CONTROL PROBLEMS ARISE PRIOR TO THE STABILIZATION OF EROSION AND SEDIMENTATION CONTROL MEASURES ON-SITE.

1. THE TOWN OF GUILDERLAND AND THE SOIL CONSERVATION DISTRICT SHALL BE NOTIFIED 72 HOURS PRIOR TO ANY LAND DISTURBANCE.
2. INSPECT SEDIMENT CONTROL BARRIERS INSTALLED AS PART OF THE DEMOLITION PROCEDURES. RE-ESTABLISH SEDIMENT CONTROL BARRIERS AS NECESSARY. REFER TO DETAILS
3. VERIFY ALL ON SITE UTILITIES HAVE BEEN LOCATED, DECOMMISSIONED AND REMOVED. UTILITY REMOVAL SHALL BE COORDINATED WITH EACH RESPECTIVE UTILITY SERVICE PROVIDER.
4. CLEAR AND GRUB AREAS OF CONSTRUCTION
5. STRIP AND STOCKPILE TOPSOIL FROM CONSTRUCTION AREAS. STABILIZE TOPSOIL STOCKPILE WITH TEMPORARY SEEDING REQUIREMENTS.
6. CONSTRUCT SANITARY SEWER MAIN AND STORM SEWERS TO THE EXTENTS SHOWN ON THIS PLAN. START PLACING FILL FOR THE BUILDING PAD.
7. DEMOLISH AND REMOVE THE EXISTING SANITARY SEWER MAIN. DEMOLISH AND REMOVE SECTIONS OF STORM SEWER NOTED ON THIS PLAN
8. BACKFILL ALL VOIDS CREATED FROM CONSTRUCTION PROCEDURES WITH STRUCTURAL FILL MATERIAL PLACED AND COMPACTED IN ACCORDANCE WITH TECHNICAL SPECIFICATION.
9. INSPECT AND RECONDITION EROSION CONTROL MEASURES IN PREPARATION FOR THE NEXT PHASE OF SITE DEVELOPMENT.

TOTAL PROJECT DISTURBANCE: 735,400 SF

FOR EXISTING WETLANDS REFER TO AQUATIC RESOURCE DELINEATION, LANDS NOW OR FORMERLY OF CROSSGATES RELEASECO LLC. PREPARED BY THE CHAZEN COMPANIES, DATED 8/23/19.



40 0 40 80

SCALE : 1" = 40'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

REV	DATE	DRAWN BY	DESCRIPTION
1	04/27/20	DB	MINOR REVISIONS
2	09/08/20	SVD	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
3	11/20/20	AMA	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
4	08/30/22	SVD	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND
5	01/10/23	DB	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

RUSSELL T. McFALL II
NEW YORK LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: 090030

SPECIAL USE PERMIT SITE PLANS

FOR

COSTCO WHOLESALE

CROSSGATES MALL
TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

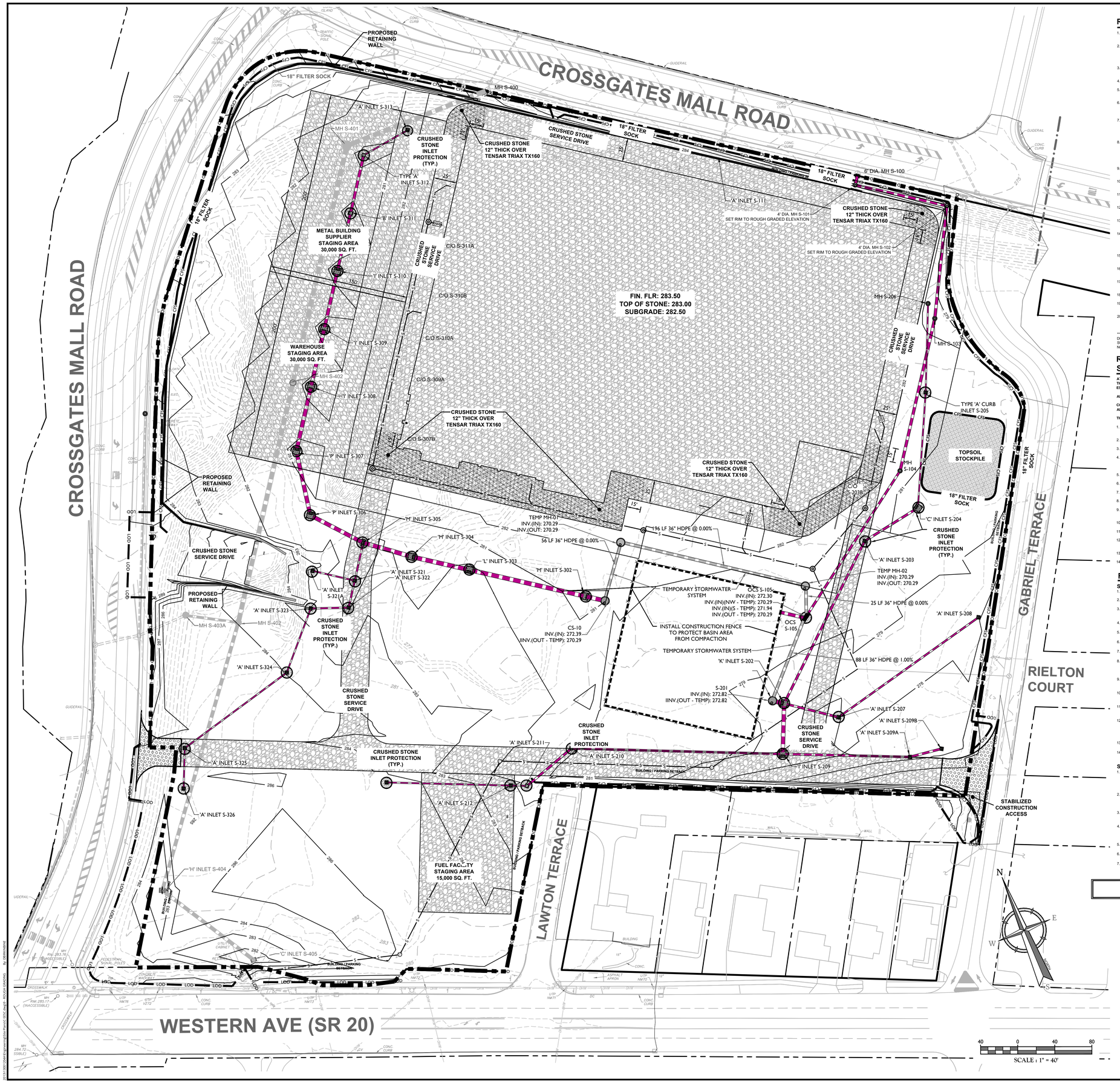
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIII	RTM

PROJECT NUMBER:	DRAWING NAME:
13001204A	C-SESC

SHEET TITLE:
EROSION CONTROL INITIAL SITE PREPARATION

SHEET NUMBER:
8 of 22

2023/13001204/Civil/Drawings/Cad/Sheet/C-SESC.dwg 8/30/2022 8:47:39 AM EDT By: DBERNSTEIN



ROUGH GRADING SOIL EROSION AND SEDIMENT CONTROL NOTES

1. ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES ARE TO BE INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCE, OR IN THEIR PROPER SEQUENCE, AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
2. ANY DISTURBED AREAS THAT WILL BE LEFT EXPOSED MORE THAN FOURTEEN (14) DAYS FOR DISTURBANCES LESS THAN FIVE (5) ACRES AND SEVEN (7) DAYS FOR DISTURBANCES GREATER THAN FIVE (5) ACRES, AND NOT SUBJECT TO CONSTRUCTION TRAFFIC, WILL IMMEDIATELY RECEIVE A TEMPORARY SEEDING. IF THE SEASON PREVENTS THE ESTABLISHMENT OF TEMPORARY COVER, THE DISTURBED AREAS WILL BE MULCHED WITH STRAW, OR EQUIVALENT MATERIAL, AT A RATE OF TWO (2) TONS PER ACRE, ACCORDING TO STATE STANDARDS.
3. PERMANENT VEGETATION TO BE SEEDED OR SODDED ON ALL EXPOSED AREAS WITHIN FIVE (5) DAYS AFTER FINAL GRADING. MULCHING IS REQUIRED ON ALL SEEDING. WHEN HYDROSEEDING, MULCH SHALL NOT BE INCLUDED IN THE TANK WITH THE SEED.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE NEW YORK STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
5. A SUBBASE COURSE WILL BE APPLIED IMMEDIATELY FOLLOWING ROUGH GRADING AND INSTALLATION OF IMPROVEMENTS TO STABILIZE STREETS, ROADS, DRIVEWAYS, AND PARKING AREAS.
6. IMMEDIATELY FOLLOWING INITIAL DISTURBANCE OR ROUGH GRADING, ALL CRITICAL AREAS SUBJECT TO EROSION (I.E. STEEP SLOPES AND ROADWAY EMBANKMENTS) WILL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH OR A SUITABLE EQUIVALENT, AT A RATE OF TWO (2) TONS PER ACRE, ACCORDING TO STATE STANDARDS.
7. IN ACCORDANCE WITH THE STANDARD FOR MANAGEMENT OF HIGH ACID PRODUCING SOILS, ANY SOIL HAVING A PH OF 4 OR LESS OR CONTAINING IRON SULFIDES SHALL BE COVERED WITH A MINIMUM OF TWELVE (12) INCHES OF SOIL. HAVING A PH OF 5 OR MORE PRIOR TO SEEDBED PREPARATION. AREAS WHERE TREES OR SHRUBS ARE TO BE PLANTED SHALL BE COVERED WITH A MINIMUM OF TWENTY-FOUR (24) INCHES OF SOIL HAVING A PH OF 5 OR MORE.
8. AT THE TIME THE SITE PREPARATION FOR PERMANENT VEGETATIVE STABILIZATION IS GOING TO BE ACCOMPLISHED, ANY SOIL THAT WILL NOT PROVIDE A SUITABLE ENVIRONMENT TO SUPPORT ADEQUATE VEGETATIVE GROUND COVER, SHALL BE REMOVED OR TREATED IN SUCH A WAY THAT IT WILL PERMANENTLY ADJUST THE SOIL CONDITIONS AND RENDER IT SUITABLE FOR VEGETATIVE GROUND COVER. IF THE REMOVAL OR TREATMENT OF THE SOIL WILL NOT PROVIDE SUITABLE CONDITIONS, NON-VEGETATIVE MEANS OF PERMANENT GROUND STABILIZATION WILL HAVE TO BE EMPLOYED.
9. CONDUIT OUTLET PROTECTION MUST BE REVIEWED AND SUPPLEMENTED AT ALL OUTFALLS PRIOR TO THE DRAINAGE SYSTEM BECOMING OPERATIONAL.
10. UNFILTERED DEWATERING IS NOT PERMITTED. TAKE ALL NECESSARY PRECAUTIONS DURING ALL DEWATERING OPERATIONS TO MINIMIZE SEDIMENT TRANSFER. ANY DEWATERING METHODS USED MUST BE IN ACCORDANCE WITH STATE STANDARDS.
11. SHOULD THE CONTROL OF DUST AT THE SITE BE NECESSARY, THE SITE WILL BE SPRINKLED UNTIL THE SURFACE IS WET. TEMPORARY VEGETATIVE COVER SHALL BE ESTABLISHED OR MULCH SHALL BE APPLIED IN ACCORDANCE WITH STATE STANDARDS FOR EROSION CONTROL.
12. THE PROPERTY OWNER SHALL BE RESPONSIBLE FOR ANY EROSION AND SEDIMENTATION THAT MAY OCCUR BELOW STORMWATER OUTFALLS OR OFFSITE AS A RESULT OF CONSTRUCTION OF THE PROJECT.
13. STOCKPILE AND STAGING LOCATIONS DETERMINED IN THE FIELD, SHALL BE PLACED WITHIN THE LIMITS OF DISTURBANCE ACCORDING TO THE CERTIFIED PLAN.
14. CONCRETE WASHOUT, DUMPSTER, AND STAGING AREA LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED AT THE PRE-CONSTRUCTION MEETING. THEY SHALL BE PLACED IN THE PROXIMITY OF THE CONSTRUCTION ENTRANCE AND STAGING AREAS AND SHALL BE USED PRIOR TO EXITING THE PROJECT SITE. THE LOCATION SHALL BE IN A PRACTICAL, CLEARLY DELINEATED, AREA AND BE MAINTAINED THROUGHOUT CONSTRUCTION.
15. ALL SOIL STOCKPILES ARE TO BE TEMPORARILY STABILIZED IN ACCORDANCE WITH THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
16. IF SOIL ACTIVITIES HAVE BEEN TEMPORARILY SUSPENDED, ie. WINTER SHUTDOWN, ALL DISTURBED AREAS MUST BE TEMPORARILY STABILIZED AND ONCE A MONTH INSPECTIONS CAN OCCUR.
17. ALL PERMANENT SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED BY THE PROPERTY OWNER, AND SHALL BECOME THEIR RESPONSIBILITY.
18. PAVEMENT AREAS ARE TO BE KEPT CLEAN AT ALL TIMES.
19. DURING CONSTRUCTION, ANY ADDITIONAL CONTROL MEASURES DEEMED NECESSARY TO PREVENT EROSION OR CONTROL SEDIMENT BEYOND THESE MEASURES SHOWN ON THE APPROVED PLAN SHALL BE INSTALLED OR EMPLOYED AT THE DIRECTION OF THE PROJECT ENGINEER.
20. ALL TEMPORARY, STRUCTURAL EROSION AND SEDIMENT CONTROL MEASURES CAN BE REMOVED, WHEN ALL CONSTRUCTION ACTIVITY IDENTIFIED IN THE SWPPP HAS BEEN COMPLETED, ALL AREAS OF DISTURBANCE HAVE ACHIEVED FINAL STABILIZATION** AND ALL POST-CONSTRUCTION STORMWATER MANAGEMENT PRACTICES HAVE BEEN CONSTRUCTED IN CONFORMANCE WITH THE SWPPP AND ARE OPERATIONAL.

**FINAL STABILIZATION - MEANS THAT ALL SOIL DISTURBANCE ACTIVITIES HAVE CEASED AND A UNIFORM, PERENNIAL VEGETATIVE COVER WITH A DENSITY OF EIGHTY (80) PERCENT OVER THE ENTIRE PERVIOUS SURFACE HAS BEEN ESTABLISHED, OR OTHER EQUIVALENT STABILIZATION MEASURES, SUCH AS PERMANENT LANDSCAPE MULCHES, ROCK RIP-RAP OR WASHED/CRUSHED STONE HAVE BEEN APPLIED ON ALL DISTURBED AREAS THAT ARE NOT COVERED BY PERMANENT STRUCTURES, CONCRETE OR PAVEMENT.

ROUGH GRADING SEQUENCE OF ACTIVITIES:

AT LEAST SEVEN (7) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE EROSION AND SEDIMENT CONTROL PREPARER, AND THE HUDSON ESSEX PASSAIC SOIL CONSERVATION DISTRICT TO AN ON-SITE MEETING.

ALL STRUCTURES ASSOCIATED WITH THE CONSTRUCTION OF SEDIMENT REMOVAL FACILITIES MUST BE ON-SITE PRIOR TO EARTH DISTURBANCE.

CONTRACTOR SHALL TAKE IMMEDIATE ACTION TO INSTITUTE ADDITIONAL MEASURES IF ANY EROSION AND SEDIMENTATION CONTROL PROBLEMS ARISE PRIOR TO THE STABILIZATION OF EROSION AND SEDIMENTATION CONTROL MEASURES ON-SITE.

THIS PLAN IS A CONTINUATION OF PROCEDURES INITIATED ON THE INITIAL SITE PREPARATION PLAN.

1. INSPECT ALL SOIL EROSION / SEDIMENT CONTROL MEASURES CONSTRUCTED AS PART OF THE INITIAL SITE PREPARATION ACTIVITIES INCLUDING BUT NOT LIMITED TO SEDIMENT CONTROL BARRIERS, INLET PROTECTION AND CONSTRUCTION ACCESS. REPAIR OR REPLACE AS NECESSARY.
2. BEGIN ROUGH GRADING, FILLING AND COMPACTING SITE.
3. CONSTRUCT STORM SEWERS AS ROUGH GRADING OPERATIONS PERMIT.
4. ALL STORM INLETS CONSTRUCTED DURING ROUGH GRADING OPERATIONS ARE TO HAVE HOODS RAISED ON BRICKS TO FACILITATE RUNOFF ENTERING THE INLET DURING ROUGH GRADING. ALL INLET BOXES TO HAVE CRUSHED STONE SEDIMENT PROTECTION INSTALLED AS SOON AS INLET TOPS ARE SET.
5. CONSTRUCTION OF SANITARY SEWERS, WATER MAINS AND GAS SERVICE CAN BE CONSTRUCTED AS ROUGH GRADING OPERATIONS PERMIT.
6. CURBING CAN BE CONSTRUCTED AS ROUGH GRADING PROGRESSES AND CONDITIONS ALLOW.
7. PAVING STONE BASE CAN BE PLACED AS ROUGH GRADING PROGRESSES AND CONDITIONS ALLOW.
8. COMPLETE ROUGH GRADING OF SITE.
9. AS SOON AS SUBGRADE ELEVATION HAS BEEN ESTABLISHED WITHIN THE LIMITS OF THE BUILDING, PLACE AND COMPACT CRUSHED STONE BUILDING PAD. ESTABLISH FINISH PAD ELEVATION.
10. CONSTRUCT CRUSHED STONE LAYDOWN AREAS AND 25 FT. WIDE CRUSHED STONE ACCESS DRIVE AS INDICATED ON THIS PLAN.
11. CONSTRUCTION OF BUILDING CAN BEGIN AS SOON AS THE BUILDING PAD AND LAYDOWN AREAS ARE IN PLACE AND HAVE BEEN APPROVED.
12. CONSTRUCTION OF GASOLINE FUELING FACILITIES CAN BEGIN AS SOON AS THE BUILDING PAD AND LAYDOWN AREAS ARE IN PLACE AND HAVE BEEN APPROVED.
13. CONSTRUCT BUILDING UTILITY SERVICE CONNECTIONS TO WITHIN 5 FEET OF THE BUILDING LIMITS.
14. INSPECT AND RECONDITION EROSION CONTROL MEASURES IN PREPARATION FOR THE NEXT PHASE OF CONSTRUCTION.

FILL MATERIALS, PLACEMENT AND COMPACTION

SITE PREPARATION

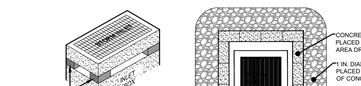
1. INSTALL EROSION AND SEDIMENT CONTROL DEVICES AS SHOWN ON THE APPROVED EROSION/SEDIMENT CONTROL PLANS.
2. DECOMMISSION AND REMOVE ALL UNDERGROUND AND ABOVE-GROUND UTILITIES IN BUILDING AREAS.
3. COMPLETELY REMOVE FROM BUILDING AREAS ALL EXISTING STRUCTURES INCLUDING BELOW-GRADE COMPONENTS (FOUNDATIONS, STORAGE TANKS, ETC.) AND OTHER SITE IMPROVEMENTS (FENCING, LIGHT POLES, ETC.) NOT TO REMAIN.
4. ALL DEMOLISHED COMPONENTS SHOULD BE DISPOSED OFF-SITE.
5. REMOVE AND DISPOSE OFF-SITE ALL TREES AND SURFACE VEGETATION NOT TO REMAIN.
6. STRIP ALL TOPSOIL FROM CONSTRUCTION AREA INCLUDING 5 FEET PERIMETER ZONE AND STOCKPILE ON-SITE.
7. EARTHWORK MAY BE PERFORMED USING CONVENTIONAL CONSTRUCTION EQUIPMENT (EXCAVATORS, LOADERS, DOZERS, ETC.).
8. PRIOR TO FILL PLACEMENT, COMPACT EXPOSED SUBGRADE WITH MIN. 10-TON ROLLER AND PROOF-ROLL WITH LOADED TANDEM-AXLE DUMP TRUCK. SELECTIVELY EXCAVATE ANY UNSTABLE AREAS DETECTED AND REPLACE WITH COMPACTED STRUCTURAL FILL. THE EXCAVATED MATERIALS MAY BE REUSED PROVIDED THEY MEET THE CRITERIA FOR STRUCTURAL FILL/BACKFILL.
9. PLACE AND COMPACT STRUCTURAL FILL AS NECESSARY TO ACHIEVE THE FINAL SUBGRADE ELEVATIONS. STRUCTURAL FILL MUST BE BENCHED INTO EXISTING SLOPES WITH MIN. HORIZONTAL AND VERTICAL SLOPE DIMENSIONS OF 5 FEET AND OSHA-COMPLIANT TEMPORARY SLOPE ANGLES.
10. THE CONTRACTOR MUST BE PREPARED TO REMOVE STANDING WATER OR FROZEN PRECIPITATION FROM THE COMPLETED BUILDING PAD SUBGRADE WITHIN 24 HOURS OF EACH PRECIPITATION EVENT THROUGHOUT THE CONSTRUCTION PERIOD.
11. SURFACE RUNOFF SHOULD BE DIRECTED AWAY FROM SOIL SLOPES AND OPEN EXCAVATIONS. SLOPES SHOULD BE PROTECTED FROM PRECIPITATION UNTIL PERMANENT EROSION PROTECTION MEASURES ARE IN-PLACE, WHICH SHOULD BE ESTABLISHED AS SOON AS PRACTICAL.
12. ALL EXCAVATIONS SHOULD BE SLOPED, BENCHED, OR SHORED IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), WHICH CAN BE FOUND IN THE CODE OF FEDERAL REGULATIONS, TITLE 29, PART 1926 (29 CFR PART 1926), SUBPARTS M AND P. THE CONTRACTOR SHOULD DESIGNATE AND PROVIDE A "COMPETENT PERSON" WHOSE RESPONSIBILITIES INCLUDE SELECTION OF TEMPORARY SLOPE ANGLES OR SUPPORT SYSTEMS FOR EXCAVATION SIDEWALLS.
13. TEMPORARY SLOPES SHOULD BE MONITORED FOR MOVEMENT DURING THE ENTIRE CONSTRUCTION PERIOD.
14. PERMANENT SOIL SLOPES SHOULD BE DESIGNED AND CONSTRUCTED WITH A SLOPE FACE NO STEEPER THAN 3 HORIZONTAL TO 1 VERTICAL (3H:1V).

STRUCTURAL FILL AND BACKFILL

1. ALL FILL PROPOSED FOR SUPPORT OF LOAD-BEARING COMPONENTS (BUILDINGS, PAVEMENTS, ETC.) IS CONSIDERED STRUCTURAL FILL. STRUCTURAL FILL SHOULD CONSIST OF INORGANIC MATERIAL AT MOISTURE CONTENTS SUITABLE FOR COMPACTION AND BE FREE OF DELETERIOUS MATTER, DEBRIS, CLAY CLODS, AND FROZEN MATERIAL. ON-SITE SOILS EXCAVATED DURING EARTHWORK OPERATIONS THAT MEET THESE CRITERIA MAY BE REUSED AS STRUCTURAL FILL.
2. THE MAXIMUM PARTICLE SIZE FOR STRUCTURAL FILL UP TO 6 FEET BELOW THE BUILDING SUBGRADE LEVELS SHOULD BE 18 INCHES. THE MAXIMUM PARTICLE SIZE WITHIN 6 FEET BELOW THE BUILDING SUBGRADE LEVELS SHOULD BE 6 INCHES AND WITHIN 3 FEET BELOW THE BUILDING SUBGRADE LEVELS SHOULD BE 2 INCHES.
3. IMPORTED STRUCTURAL FILL MATERIALS SHOULD MEET THE ABOVE CRITERIA AND CONTAIN NO MORE THAN 20% MATERIAL PASSING THE #200 SIEVE WITH A LIQUID LIMIT (LL) NOT EXCEEDING 25 AND PLASTIC INDEX (PI) NOT EXCEEDING 10.
4. STRUCTURAL FILL SHOULD BE PLACED IN HORIZONTAL LIFTS NOT EXCEEDING 12 INCHES IN LOOSE THICKNESS. THINNER LIFTS MAY BE REQUIRED DEPENDING ON MATERIAL TYPE, PREVAILING WEATHER CONDITIONS, AND PERFORMANCE OF THE COMPACTED SOIL. ALL FILL MATERIAL SHOULD BE PLACED ON APPROVED SUBGRADES, PROPERLY STRIPPED AND SCARIFIED AS NEEDED.
5. FILL SHOULD NOT BE PLACED ON FROZEN OR SATURATED SUBGRADES.
6. FILL SHOULD BE PLACED AND COMPACTED TO COSTCO'S MINIMUM COMPACTION REQUIREMENTS INCLUDED IN THE GEOTECHNICAL REPORT.
7. IN-SITU DENSITY TESTS SHOULD BE PERFORMED FOR EACH LIFT OF FILL AT A MINIMUM FREQUENCY SPECIFIED BY COSTCO AND INCLUDED IN THE GEOTECHNICAL REPORT.

TOTAL PROJECT DISTURBANCE: 735,400 SF

SCALE : 1" = 40'





ROUGH GRADING
ROCK BARRIER FOR AREA DRAINS
N.T.S.

Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	04/27/20	DB	MINOR REVISIONS PER COMMENTS
2	09/02/20	EVD	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
3	10/20/20	RMA	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
4	08/30/22	EVD	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND
5	03/10/23	DB	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

RUSSELL T. McFALL II
NEW YORK LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: 090030

SPECIAL USE PERMIT SITE PLANS
FOR
COSTCO WHOLESALE

CROSSGATES MALL
TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIR	RTM

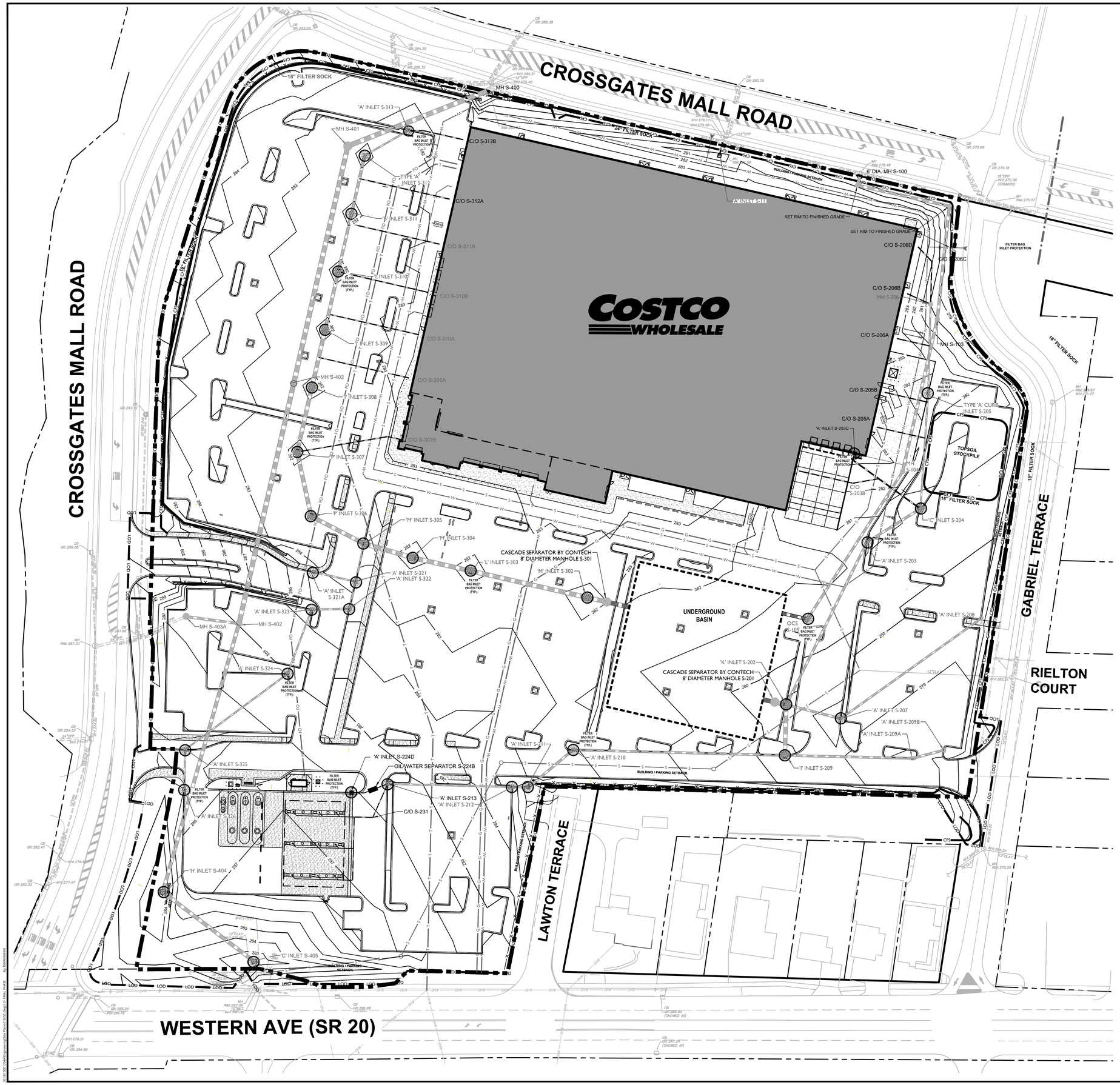
PROJECT NUMBER: 13001204A
DRAWING NAME: C-SESC

SHEET TITLE:
EROSION CONTROL
ROUGH GRADING PLAN

SHEET NUMBER:
9 of 22

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2023.10.30 I:\2019\13001204A\Engineering\Maps\Plans\C-SESC.dwg, 10/30/2023 8:59:09 AM, By: DBRANDOW



FINAL SEQUENCE OF ACTIVITIES:

AT LEAST SEVEN (7) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE EROSION AND SEDIMENT CONTROL PREPARER, AND THE SOIL CONSERVATION DISTRICT TO AN ON-SITE MEETING.

AT LEAST THREE (3) DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED ON THOSE ACTIVITIES SHALL NOTIFY THE NEW YORK UTILITY ONE-CALL SYSTEM AT 811 TO ORDER A UTILITY MARK-OUT AT THE SITE.

ALL STRUCTURES ASSOCIATED WITH THE CONSTRUCTION OF SEDIMENT REMOVAL FACILITIES MUST BE ON-SITE PRIOR TO EARTH DISTURBANCE.

CONTRACTOR SHALL TAKE IMMEDIATE ACTION TO INSTITUTE ADDITIONAL MEASURES IF ANY EROSION AND SEDIMENTATION CONTROL PROBLEMS ARISE PRIOR TO THE STABILIZATION OF EROSION AND SEDIMENTATION CONTROL MEASURES ON-SITE.

THIS PLAN IS A CONTINUATION OF PROCEDURES INITIATED ON THE DEMOLITION, INITIAL SITE PREPARATION AND ROUGH GRADING PLANS

1. INSPECT ALL SOIL EROSION / SEDIMENT CONTROL MEASURES INCLUDING BUT NOT LIMITED TO SEDIMENT CONTROL BARRIERS AND STONE CONSTRUCTION ACCESS. REPAIR OR REPLACE AS NECESSARY.
2. CONSTRUCT UNDERGROUND STORMWATER MANAGEMENT SYSTEM COMPLETE WITH DISCHARGE CONTROL STRUCTURE.
3. FINISH CONSTRUCTION OF ALL REMAINING STORM SEWERS.
4. FINISH CONSTRUCTION OF ALL ON SITE UNDERGROUND UTILITIES AND BUILDING SERVICE CONNECTIONS. CONSTRUCT FOUNDATIONS FOR AREA LIGHT STANDARDS AND RUN ELECTRIC SERVICE TO FOUNDATIONS AND ALL LOCATIONS FOR ILLUMINATED SIGNS (DIRECTIONAL, MONUMENT, AND PYLON).
5. FINISH CONSTRUCTION OF ALL CURBING AROUND PERIMETER OF NEW PARKING AND DRIVEWAY AREAS. CONSTRUCT CURBING AROUND BUILDING. CONSTRUCT CURBING AROUND LANDSCAPE ISLANDS.
6. FINISH PLACEMENT OF PAVING STONE BASE COURSE ON AREAS TO BE PAVED AND COMPACTED.
7. ALL INLETS SET DURING ROUGH GRADING OPERATIONS WITH TEMPORARY GRATE ELEVATIONS ARE TO BE SET TO PERMANENT GRATE ELEVATIONS AS SOON AS PAVING STONE BASE HAS BEEN PLACED AROUND THE INLET. REPLACE CRUSHED STONE INLET PROTECTION WITH FILTER BAG INLET PROTECTION.
8. CONSTRUCT ALL CONCRETE PADS AND CONCRETE PAVEMENT.
9. INSTALL ASPHALT PAVING BINDER COURSE.
10. INSTALL ALL SIGNAGE ON THE SITE INCLUDING TRAFFIC CONTROL AND DIRECTIONAL SIGNS.
11. SPREAD TOPSOIL IN ALL AREAS TO BE LANDSCAPED OR SEEDED AND ESTABLISH PERMANENT GROUND COVER AND LANDSCAPING AS SPECIFIED BY LANDSCAPING PLAN. MULCH ALL EXPOSED AREAS AS SPECIFIED BY THESE PLANS.
12. INSTALL FINAL PAVING WEARING SURFACE. APPLY PARKING AREA AND TRAFFIC CONTROL PAVEMENT PAINT.
13. REMOVE ALL TEMPORARY SOIL EROSION AND SEDIMENT CONTROLS. ESTABLISH PERMANENT VEGETATION ON ALL AREA DISTURBED BY THE REMOVAL OF THE TEMPORARY CONTROLS. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 85 PERCENT PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	04/27/23	DIB	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
2	05/02/23	JWD	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
3	05/25/23	RMA	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
4	06/30/23	JWD	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND
5	07/10/23	DIB	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

RUSSELL T. McFALL II
NEW YORK LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: 090030

SPECIAL USE PERMIT SITE PLANS

FOR

COSTCO WHOLESALE

CROSSGATES MALL
TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

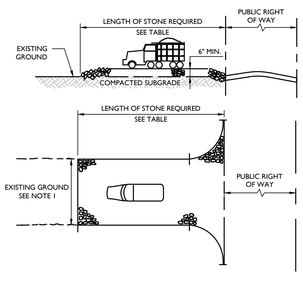
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIB	RTM

PROJECT NUMBER: 13001204A
DRAWING NAME: C-SESC

SHEET TITLE:
EROSION CONTROL FINAL PHASE

SHEET NUMBER: 10 of 22

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.



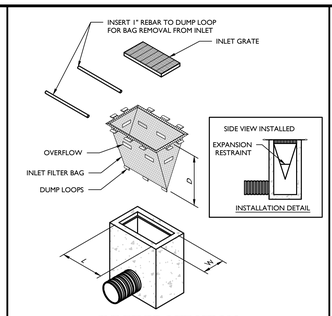
NOTES:

1. THE WIDTH OF CONSTRUCTION ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF POINTS OF INGRESS OR EGRESS, OR AS SHOWN ON THE PLAN.
2. THICKNESS SHOWN IS FOR STONE CONSTRUCTION ENTRANCE ONLY.
3. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO ROADWAYS.
4. THE ENTRANCE SHALL BE PERIODICALLY TOP DRESSED WITH ADDITIONAL STONE OR ADDITIONAL LENGTH AS ON-SITE CONDITIONS REQUIRE.
5. SPILLED, DROPPED, WASHED, OR TRACKED SEDIMENT ONTO ROADWAYS OR OTHER IMPERVIOUS SURFACES SHALL BE REMOVED IMMEDIATELY.
6. WHERE ACCUMULATION OF DUST AND SEDIMENT IS INADEQUATELY CLEANED OR REMOVED BY CONVENTIONAL METHODS, A POWER BROOM OR STREET SWEEPER SHALL BE USED TO CLEAN PAVED AREAS.
7. ALL OTHER ACCESS POINTS TO THE SITE WHICH DO NOT CONTAIN A CONSTRUCTION ACCESS PAD SHALL BE BLOCKED OFF.
8. STONE SIZE PER ASTM C-33, SIZE #2 (2 $\frac{1}{2}$" TO 1 $\frac{1}{2}$") OR #3 (2" TO 1") STONE.
9. INDIVIDUAL INTERIOR LOT INGRESS/EGRESS CONSTRUCTION ACCESS SHALL HAVE # 3 (1" TO 2") STONE, MINIMUM 10' (L) X 10' (W) AND 6" THICK.

PERCENT SLOPE OF ROADWAY	LENGTH OF STONE REQUIRED	
	COARSE GRAINED SOILS	FINE GRAINED SOILS
0% TO 2%	50 FT	100 FT
2% TO 5%	100 FT	200 FT
> 5%	ENTIRE SURFACE STABILIZED WITH HMA BASE COURSE, MIX I-2	

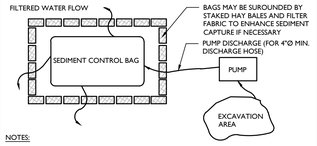
STABILIZED CONSTRUCTION ACCESS DETAIL

NOT TO SCALE 05/01/17



INLET PROTECTION (FILTER BAG) DETAIL

NOT TO SCALE 05/01/17

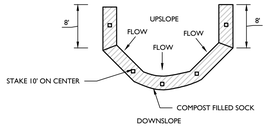


NOTES:

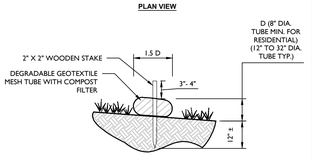
1. THE GEOTEXTILE SEDIMENT CONTROL BAG SHALL BE LOCATED TO MINIMIZE INTERFERENCE WITH CONSTRUCTION ACTIVITIES AND PEDESTRIAN TRAFFIC, AND PROVIDES FOR EASE OF ACCESS BY HEAVY EQUIPMENT, CLEANOUT, DISPOSAL OF TRAPPED SEDIMENT, AND PROPER RELEASE OF FILTER WATER.
2. THE FILTER BAG SHALL BE LOCATED MINIMUM 50 FEET AWAY FROM ALL WETLANDS, STREAM AND SURFACE WATERS.
3. THE BAG SHALL BE PLACED IN A LOCATION THAT IS VEGETATED THAT IS RELATIVELY LEVEL, OR ON A 2" THICK GRAVEL PAD, OR ON A 4" THICK STRAW MAT, TO ALLOW WATER TO FLOW OUT OF BAG IN ALL DIRECTIONS. AND PROPER RELEASE OF FILTER WATER.
4. BAG SHALL BE SIZED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS BASED ON THE PUMP DISCHARGE RATE. WHEN THE REMAINING BAG FLOW AREA HAS BEEN REDUCED BY 75%, REPLACE WITH A NEW BAG.
5. DISPOSE THE SEDIMENT IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. SPREAD THE SEDIMENT IN THE APPROPRIATE UPLAND AREA.

SEDIMENT CONTROL BAG FOR DEWATERING DETAIL

NOT TO SCALE 05/01/17



PLAN VIEW



SECTION

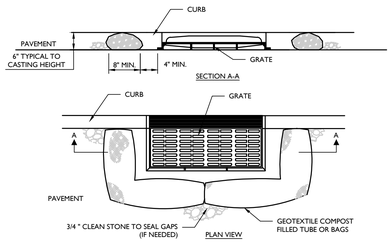
DIA. (in.)	SLOPE%						
	2	5	10	20	25	33	50
8	225*	200	100	50	20	-	-
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50
*Length in feet							

NOTES:

1. ALL MATERIAL TO MEET **FILTREXX SILTSOX** SPECIFICATIONS OR APPROVED EQUAL.
2. COMPOST/SOIL/ROCK/SEED FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

COMPOST FILTER SOCK DETAIL

NOT TO SCALE 05/01/17



NOTES:

1. GEOTEXTILE TO BE WOVEN POLYPROPYLENE PRODUCT, OR APPROVED EQUAL.
2. FILLER CORE MAY BE SAND, COMPOST, OR PEA GRAVEL COMPLETELY CONTAINED WITHIN GEOTEXTILE SEAMS, CLOSED BY SUITABLE MECHANICAL MEANS TO PREVENT LEAKAGE OF FILLER.
3. WHERE NO CURB IS PRESENT, BARRIER SHALL COMPLETELY ENCIRCLE THE DRAIN INLET.
4. INLET GRATE OPENING IS TO BE KEPT CLEAR OF OBSTRUCTIONS AT ALL TIMES.
5. THE PROTECTION DEVICE WILL BE DESIGNED TO CAPTURE OR FILTER RUNOFF FROM THE 1 YEAR/ 24 HOUR STORM EVENT AND SHALL SAFELY CONVEY HIGHER FLOWS DIRECTLY INTO THE STORM SEWER SYSTEM.
6. OTHER METHODS THAT ACCOMPLISH THE PURPOSE OF STORM SEWER INLET PROTECTION MAY BE USED IF APPROVED BY THE SOIL CONSERVATION DISTRICT.
7. INSPECTIONS SHALL BE FREQUENT, MAINTENANCE, REPAIR, AND REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED. THE BARRIER SHALL BE REMOVED WHEN THE AREA DRAINING TOWARDS THE INLET HAS BEEN STABILIZED.

INLET PROTECTION (FILTER BARRIER) DETAIL

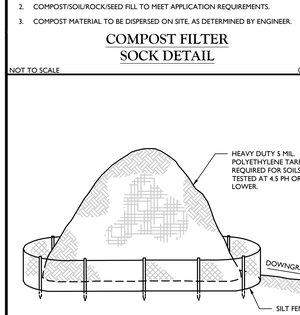
NOT TO SCALE 05/01/17

NOTES:

1. CONCRETE WASHOUTS ARE REQUIRED ON ALL CONSTRUCTION SITES INVOLVING CONCRETE AND STUCCO USE:
2. THE CONTRACTOR SHALL REQUIRE ALL CONCRETE DRIVERS TO UTILIZE THE CONCRETE WASHOUTS ONSITE.
3. WASHOUT FACILITIES SHALL BE LOCATED AT LEAST 50 YARDS AWAY FROM STORM SEWER DRAIN INLETS, GUTTERS, OPEN DITCHES, AND WATER COURSES.
4. APPROPRIATE STONE SHOULD COVER PATHS TO CONCRETE WASHOUT.
5. THE NUMBER OF CONCRETE WASHOUTS DEPENDS ON THE EXPECTED DEMAND FOR STORAGE CAPACITY. LARGE SITES WITH EXTENSIVE CONCRETE WORK SHALL BE PLACED AT MULTIPLE LOCATIONS FOR USE BY CONCRETE TRUCK DRIVERS.
6. CONCRETE WASHOUT AREAS SHALL BE IDENTIFIED BY POSTING SIGNS ONSITE.
7. CONCRETE WASHOUTS ARE TO BE INSPECTED DAILY BY THE CONTRACTOR FOR LEAKS OR TEARS IN PLASTIC LINER.
8. REMOVE AND DISPOSE OF ALL MATERIAL WHEN THE WASHOUT HAS BEEN FILLED TO 75% CAPACITY.
9. PRIOR TO ANY RAINFALL, ALL CONCRETE WASHOUTS ARE TO BE CLEANED OUT OR COVERED.
10. ONCE THE MATERIAL HAS BEEN CLEANED OUT OF THE CONCRETE WASHOUT FACILITY, THE FACILITY MUST BE INSPECTED FOR REPAIR, RECONSTRUCTION OR REPLACEMENT. ALL PLASTIC LINING SHALL BE REMOVED AND REPLACED.
11. PRE-FABRICATED OR ONSITE FABRICATED CONCRETE WASHOUTS MAY BE USED.
12. OPTIONS FOR ONSITE CONCRETE WASHOUTS:
    - A. DIG A PIT AND LINE WITH 10 MIL PLASTIC SHEETING.
    - B. CREATE AN ABOVE-GROUND STRUCTURE FROM STRAW BALES OR SANDBAGS, WITH 10 MIL PLASTIC LINING.

CONCRETE WASHOUT NOTES

05/01/17

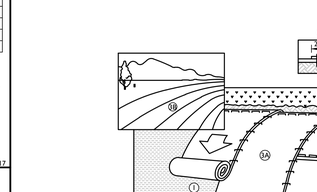


NOTES:

1. ALL STOCKPILES SHALL NOT TO BE LOCATED WITHIN 50 FEET OF A FLOODPLAIN, SLOPE, ROADWAY OR DRAINAGE FACILITY.

TOPSOIL STOCKPILE DETAIL

NOT TO SCALE 05/01/17



NOTES:

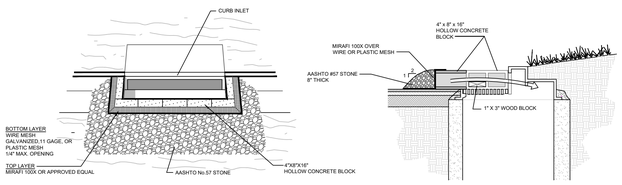
1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECPS), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER AND SEED.
   - * WHEN USING MATTING WITH SEED, DO NOT SEED THE AREA. FOLLOW MANUFACTURER'S RECOMMENDATIONS.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECPS IN A 6" DEEP x 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECPS EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECPS WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECPS BACK OVER SEED AND COMPACTED SOIL. SECURE RECPS OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" APART ACROSS THE WIDTH OF THE RECPS.
3. ROLL THE RECPS (A.) DOWN OR (B.) HORIZONTALLY STEP BY STEP ACROSS THE SLOPE TAMPERING IT DOWN ALONG THE WAY. RECPS SHALL UNROLL WITH APPROPRIATE SIDE TIGHTLY AGAINST THE SOIL SURFACE. RECPS MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKESSHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECPS MUST BE STAKED WITH APPROXIMATELY 2" TO 5" OVERLAP DEPENDING ON RECPS TYPE.
5. CONSECUTIVE RECPS SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART ACROSS ENTIRE RECPS WIDTH.
   - * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY SECURE THE RECPS.

EROSION MATTING (CURLEX ENFORCER I) DETAIL

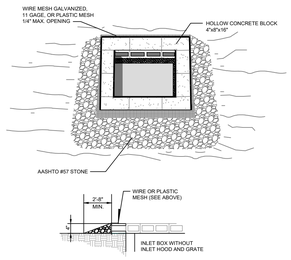
NOT TO SCALE 05/01/17



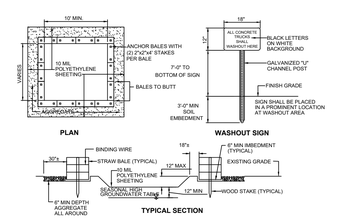
TRACKING DETAIL



STONE AND CONCRETE BLOCK INLET PROTECTION DETAIL CURBED DRIVE



STONE AND CONCRETE BLOCK INLET PROTECTION DETAIL



NOTES:

1. CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
2. CONTAINMENT DEVICES MUST BE OF SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED.
3. WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE WASHOUT IS 75% FULL.
4. WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
5. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
6. AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.

CONCRETE WASHOUT AREA DETAIL

EARTH DISTURBANCE REQUIREMENTS

ACCORDING TO THE NYSDEC SPDES GENERAL PERMIT GP-0-20-001 PART II.D.3, THE OWNER OR OPERATOR OF A CONSTRUCTION ACTIVITY SHALL NOT DISTURB GREATER THAN FIVE (5) ACRES OF SOIL AT ANY ONE TIME WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE DEPARTMENT OR, IN AREAS UNDER THE JURISDICTION OF A REGULATED, TRADITIONAL LAND USE CONTROL MS4, THE REGULATED, TRADITIONAL LAND USE CONTROL MS4 (PROVIDED THE REGULATED, TRADITIONAL LAND USE CONTROL MS4 IS NOT THE OWNER OR OPERATOR OF THE CONSTRUCTION ACTIVITY). AT A MINIMUM, THE OWNER OR OPERATOR MUST COMPLY WITH THE FOLLOWING REQUIREMENTS IN ORDER TO BE AUTHORIZED TO DISTURB GREATER THAN FIVE (5) ACRES OF SOIL AT ANY ONE TIME:

1. THE OWNER OR OPERATOR SHALL HAVE A QUALIFIED INSPECTOR CONDUCT AT LEAST TWO SITE INSPECTIONS IN ACCORDANCE WITH PART IV.C. OF THIS PERMIT EVERY SEVEN CALENDAR DAYS, FOR AS LONG AS GREATER THAN FIVE (5) ACRES OF SOIL REMAIN DISTURBED. THE TWO (2) INSPECTIONS SHALL BE SEPARATED BY A MINIMUM OF TWO FULL CALENDAR DAYS.
2. IN AREAS WHERE SOIL DISTURBANCE ACTIVITY HAS TEMPORARILY OR PERMANENTLY CEASED, THE APPLICATION OF SOIL STABILIZATION MEASURES MUST BE INITIATED BY THE END OF THE NEXT BUSINESS DAY AND COMPLETED WITHIN SEVEN (7) DAYS FROM THE DATE THE CURRENT SOIL DISTURBANCE ACTIVITY CEASED. THE SOIL STABILIZATION MEASURES SELECTED SHALL BE IN CONFORMANCE WITH THE TECHNICAL STANDARD, NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL, DATED NOVEMBER 2016.
3. THE OWNER OR OPERATOR SHALL PREPARE A PHASING PLAN THAT DEFINES MAXIMUM DISTURBED AREA PER PHASE AND SHOWS REQUIRED CUTS AND FILLS.
4. THE OWNER OR OPERATOR SHALL INSTALL ANY ADDITIONAL SITE-SPECIFIC PRACTICES NEEDED TO PROTECT WATER QUALITY.
5. THE OWNER OR OPERATOR SHALL INCLUDE THE REQUIREMENTS ABOVE IN THEIR SWPPP.

GENERAL SEEDING NOTES

1. TEMPORARY SEEDING SHALL CONSIST OF PERENNIAL RYEGRASS APPLIED AT A RATE OF 1.0 LBS. PER 1000 SF OR SPRING OATS APPLIED AT A RATE OF 2.0 LBS. PER 1000 SF. TEMPORARY SEEDING SHALL BE MULCHED AND MAINTAINED UNTIL DISTURBED AREAS ARE PERMANENTLY STABILIZED WITH PERMANENT SEEDING.
2. PERMANENT SEEDING SHALL CONSIST OF THE FOLLOWING MIXTURE OR APPROVED EQUAL - OPTIMUM SEEDING DATES ARE BETWEEN APRIL 1 AND MAY 31: AND AUGUST 16 AND OCTOBER 15.

MIXTURE -	HARD FESCUE	120 LBS/ACRE
	PERENNIAL RYE GRASS	30 LBS/ACRE
	KENTUCKY BLUE GRASS (BLEND)	40 LBS/ACRE

3. PERMANENT SEEDING TO BE APPLIED BY RAKING OR DRILLING INTO THE SOILS AT A RATE OF 150# PER ACRE, SLOPED AREA TO BE COVERED WITH MULCH AS INDICATED IN NOTE 5.
4. FERTILIZER FOR THE ESTABLISHMENT OF TEMPORARY AND PERMANENT VEGETATIVE COVER SHALL BE IN COMPLIANCE WITH THE LATEST NYSDEC REGULATIONS. A SOIL TEST PRIOR TO FERTILIZER APPLICATION IS RECOMMENDED.
5. IF SEASON PREVENTS THE ESTABLISHMENT OF TEMPORARY OR PERMANENT SEEDING, EXPOSED AREA TO BE STABILIZED WITH MULCH AS INDICATED IN NOTE 6.
6. MULCH TO CONSIST OF SMALL GRAIN STRAW OR SALT HAY ANCHORED WITH A WOOD AND FIBER MULCH BINDER OR AN APPROVED EQUAL. MULCH WILL BE SPREAD AT RATES OF 90 TO 115 LBS. PER 1000 SF AND ANCHORED WITH A MULCH ANCHORING TOOL OR LIQUID MULCH BINDER, AND SHALL BE PROVIDED ON ALL SEEDINGS. HYDROMULCH SHALL ONLY BE USED DURING OPTIMUM GROWING SEASONS.
7. WORK LIME AND FERTILIZER INTO SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC, SPRINGTOOTH HARROW, OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON ON THE GENERAL CONTOUR. CONTINUE TILLAGE UNTIL A REASONABLY UNIFORM, FINE SEEDBED IS PREPARED. ALL BUT CLAY OR SILTY SOILS AND COARSE SANDS SHOULD BE ROLLED TO FIRM THE SEEDBED WHEREVER FEASIBLE.
8. REMOVE FROM THE SURFACE ALL STONES TWO INCHES OR LARGER IN ANY DIMENSION. REMOVE ALL OTHER DEBRIS, SUCH AS WIRE, CABLE, TREE ROOTS, PIECES OF CONCRETE, CLODS, LUMPS, OR OTHER UNSUITABLE MATERIAL.
9. INSPECT SEEDBED JUST BEFORE SEEDING. IF TRAFFIC HAS LEFT THE SOIL COMPACTED, THE AREA MUST BE RETILLED AND FIRMED AS ABOVE.

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	06/21/00	BB	MINOR MDP REVISIONS
2	09/06/00	EVD	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
3	12/20/00	RMA	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
4	08/30/02	SVD	REVISED SITE LAYOUT AND ENGINEERING

RUSSELL T. McFALL II
NEW YORK LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: 090030

PRELIMINARY/FINAL LAND DEVELOPMENT

FOR

COSTCO WHOLESALE

CROSSGATES MALL
TAX MAP 52.10 & 52.14

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIR	RTM

PROJECT NUMBER:	DRAWING NAME:
13001204A	C-SESC

SHEET TITLE:
EROSION CONTROL NOTES AND DETAILS

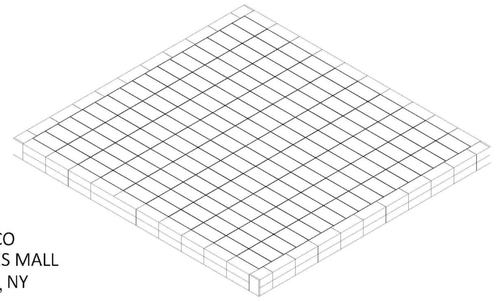
SHEET NUMBER:
11 of 21

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2013\13001204A\Engineering\Site Plan\ref SESC.dwg11, NOTES AND DETAILS, By: DIRKHORNE

StormTrap
MODULAR CONCRETE STORMWATER MANAGEMENT

THE STORMTRAP DRAWINGS SHALL NOT BE ALTERED OR MANIPULATED IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF STORMTRAP. USE OF THESE DRAWINGS IS STRICTLY GRANTED TO YOU, OUR CLIENT, FOR THE SPECIFIED AND NAMED PROJECT ONLY. THESE DRAWINGS ARE FOR YOUR REFERENCE ONLY AND SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.



COSTCO
CROSSGATES MALL
ALBANY, NY

SHEET INDEX

PAGE	DESCRIPTION
0.0	COVER SHEET
1.0	DOUBLETRAP DESIGN CRITERIA
2.0	DOUBLETRAP SYSTEM LAYOUT
3.0	DOUBLETRAP INSTALLATION SPECIFICATIONS
3.1	DOUBLETRAP INSTALLATION SPECIFICATIONS
4.0	DOUBLETRAP BACKFILL SPECIFICATIONS
5.0	RECOMMENDED PIPE / ACCESS OPENING SPECIFICATIONS
6.0	DOUBLETRAP MODULE TYPES

STORMTRAP CONTACT INFORMATION

STORMTRAP SUPPLIER: STORMTRAP
CONTACT NAME: TONY MESSINA
CELL PHONE: 207-284-5983
SALES EMAIL: TMESSINA@STORMTRAP.COM

StormTrap
NORMA LIBERI AS. [STR-(STORMWATER)-(FILTRATION)]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	3/7/2023	PRELIMINARY	LR

SCALE:
NTS

SHEET TITLE:
COVER SHEET

SHEET NUMBER:
0.0

STRUCTURAL DESIGN LOADING CRITERIA

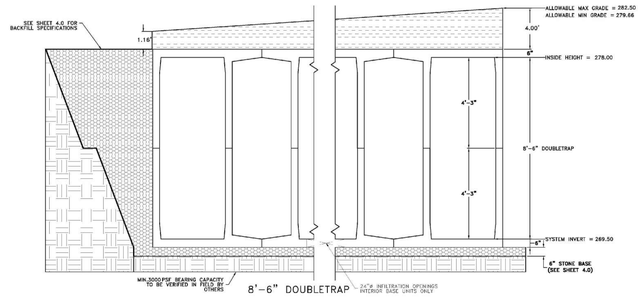
LIVE LOADING: AASHTO HS-20 HIGHWAY LOADING
GROUND WATER TABLE: BELOW INVERT OF SYSTEM
SOIL BEARING PRESSURE: 3000PSF
SOIL DENSITY: 120 PCF
EQUIVALENT UNSATURATED
LATERAL ACTIVE EARTH PRESSURE: 55 PSF / FT.
EQUIVALENT SATURATED
LATERAL ACTIVE EARTH PRESSURE: 80 PSF/FT. (IF WATER TABLE PRESENT)
APPLICABLE CODES: ASTM C857
ACI-318
BACKFILL TYPE: SEE SHEET 4.0 FOR BACKFILL OPTIONS

STORMTRAP SYSTEM INFORMATION

WATER STORAGE PROV: (IN 6" STONE BASE):	205,617.84 CUBIC FEET / 5,330.62 CUBIC FEET
TOTAL WATER STORAGE PROV:	211,148.46 CUBIC FEET
UNIT HEADROOM:	8'-6" DOUBLETRAP

SITE SPECIFIC DESIGN CRITERIA

1. STORMTRAP UNITS SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS AND SIZE OF OPENINGS.
2. COVER RANGE: MIN. 1.16' MAX. 4.00' CONSULT STORMTRAP FOR ADDITIONAL COVER OPTIONS.
3. ALL DIMENSIONS AND SOIL CONDITIONS, INCLUDING BUT NOT LIMITED TO GROUNDWATER AND SOIL BEARING CAPACITY ARE REQUIRED TO BE VERIFIED IN THE FIELD BY OTHERS PRIOR TO STORMTRAP INSTALLATION.
4. FOR STRUCTURAL CALCULATIONS THE GROUND WATER TABLE IS ASSUMED TO BE BELOW INVERT OF SYSTEM IF WATER TABLE IS DIFFERENT THAN ASSUMED, CONTACT STORMTRAP.



StormTrap
NORMA LIBERI AS. [STR-(STORMWATER)-(FILTRATION)]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	3/7/2023	PRELIMINARY	LR

SCALE:
NTS

SHEET TITLE:
DOUBLETRAP DESIGN CRITERIA

SHEET NUMBER:
1.0

BILL OF MATERIALS

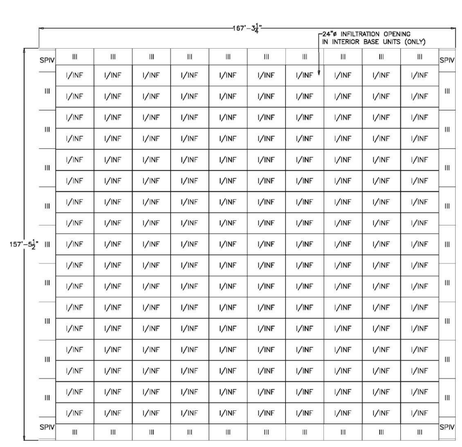
QTY.	UNIT TYPE	DESCRIPTION	TOP WEIGHT	BASE WEIGHT
170	I/INF	8'-6" DOUBLETRAP	15035	14833
0	II	8'-6" DOUBLETRAP		
38	III	8'-6" DOUBLETRAP	14465	14362
0	IV	8'-6" DOUBLETRAP	–	–
0	VII	8'-6" DOUBLETRAP	–	–
4	SPIV	8'-6" DOUBLETRAP	VARIES	VARIES
0	T2 PANEL	8" THICK PANEL		–
4	T4 PANEL	8" THICK PANEL	8294	
0	T7 PANEL	8" THICK PANEL		–
39	JOINT WRAP 150' PER ROLL			
72	JOINT TAPE 14.5' PER ROLL			
	TOTAL PIECES = 424			
	TOTAL PANELS = 4			
	HEAVIEST PICK WEIGHT = 15,035			

LOADING DISCLAIMER:
STORMTRAP IS NOT DESIGNED TO ACCEPT ANY ADDITIONAL LOADINGS FROM ASPHALT CONSTRUCTIONS AND EQUIPMENT OVER THE TOP OF STORMTRAP. IF ADDITIONAL LOADING CONCENTRATIONS ARE REQUIRED FOR STRUCTURAL DESIGN OF STORMTRAP, PLEASE CONTACT STORMTRAP IMMEDIATELY.

TREE LOADING DISCLAIMER:
THE STORMTRAP SYSTEM HAS NOT BEEN DESIGNED TO SUPPORT THE ADDITIONAL LOADS OF TREES AND THEIR ROOTS. FURTHERMORE, THE ROOTS OF THE TREES MUST BE CONTAINED TO PREVENT FUTURE DAMAGE TO THE STORMTRAP SYSTEM. STORMTRAP ACCEPTS NO LIABILITY FOR DAMAGES CAUSED BY TREES OR OTHER VEGETATION PLACE AROUND OR ON TOP OF THE SYSTEM.

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 282.50
ALLOWABLE MIN GRADE =279.68
INSIDE HEIGHT ELEVATION =278.00
SYSTEM INVERT = 269.50

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.



StormTrap
NORMA LIBERI AS. [STR-(STORMWATER)-(FILTRATION)]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	3/7/2023	PRELIMINARY	LR

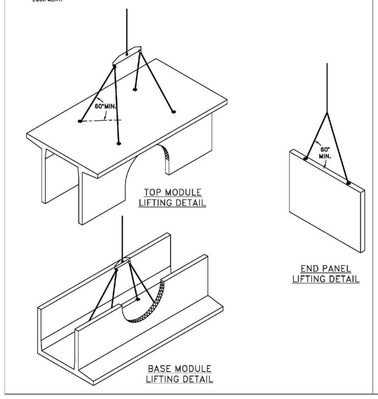
SCALE:
NTS

SHEET TITLE:
DOUBLETRAP SYSTEM LAYOUT

SHEET NUMBER:
2.0

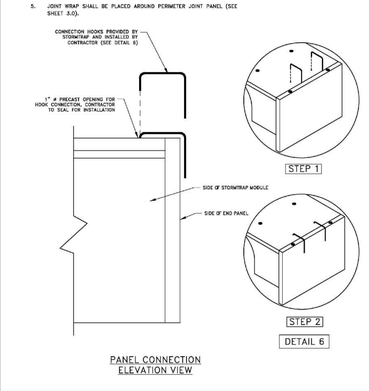
STORMTRAP MODULE LIFTING INSTALLATION NOTES

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL (4) CHAINS/CABLES ARE SECURED PROPERLY TO THE LIFTING ANCHORS AND IN EQUAL TENSION WHEN LIFTING THE STORMTRAP MODULE (SEE RECOMMENDATIONS 2 & 3).
2. MINIMUM 7'-0" CHAIN/CABLE LENGTH TO BE USED TO LIFT STORMTRAP MODULES (SUPPLIED BY CONTRACTOR).
3. CONTRACTOR TO ENSURE MINIMUM LIFTING ANGLE IS 60° FROM TOP SURFACE OF STORMTRAP MODULE. SEE DETAIL.
4. IT IS UNDERSTOOD AND AGREED THAT AT ALL TIMES DURING WHICH HOISTING AND RIGGING EQUIPMENT IS BEING SUPPLIED TO THE PURCHASER, OPERATOR OF SUCH EQUIPMENT SHALL BE IN CHARGE OF HIS ENTIRE EQUIPMENT AND SHALL AT ALL TIMES BE THE JUDGE OF THE SAFETY AND PROPERTY OF ANY SUGGESTION TO HIM FROM THE SELLER, ITS AGENTS OR EMPLOYEES. PURCHASER AGREES TO SAVE, INDEMNIFY AND HOLD HARMLESS SELLER FROM ALL LOSS, CLAIMS, DEMANDS OR CAUSES OF ACTION, WHICH MAY ARISE FROM THE EXISTENCE OR OPERATION OF SAID EQUIPMENT.



END PANEL ERECTION/INSTALLATION NOTES

1. END PANELS WILL BE SUPPLIED TO CLOSE OFF OPEN ENDS OF ROWS.
2. PANELS SHALL BE INSTALLED IN A TILT UP FASHION DIRECTLY ADJACENT TO OPEN END OF MODULE (REFER TO SHEET 2.0 FOR END PANEL LOCATIONS).
3. CONNECTION HOOKS WILL BE SUPPLIED WITH END PANELS TO SECURELY CONNECT PANEL TO ADJACENT STORMTRAP MODULE (SEE PANEL CONNECTION ELEVATION VIEW).
4. ONCE CONNECTION HOOK IS ATTACHED, LIFTING CLUTCHES MAY BE REMOVED.
5. JOINT WRAP SHALL BE PLACED AROUND PERIMETER JOINT PANEL (SEE SHEET 3.0).



StormTrap
NORMA LIBERI AS. [STR-(STORMWATER)-(FILTRATION)]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	3/7/2023	PRELIMINARY	LR

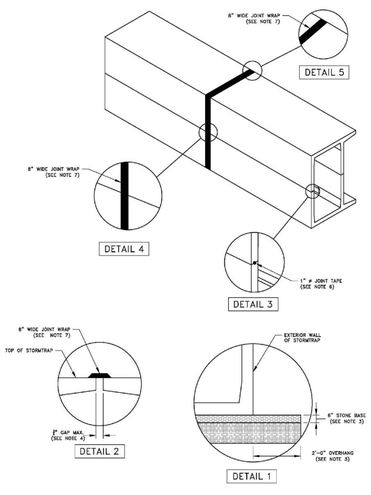
SCALE:
NTS

SHEET TITLE:
DOUBLETRAP INSTALLATION SPECIFICATIONS

SHEET NUMBER:
3.1

STORMTRAP INSTALLATION SPECIFICATIONS

1. STORMTRAP SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C891, STANDARD FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES. THE FOLLOWING ADDITIONS AND/OR EXCEPTIONS SHALL APPLY:
2. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT PROPER/ADEQUATE EQUIPMENT IS USED TO SET/INSTALL THE MODULES.
3. STORMTRAP MODULES CAN BE PLACED ON A LEVEL, 6" FOUNDATION OF ¾" AGGREGATE EXTENDING 3'-0" PAST THE OUTSIDE OF THE SYSTEM (SEE DETAIL 1) AND SHALL BE PLACED ON PROPERLY COMPACTED SOILS (SEE SHEET 1.0 FOR SOIL BEARING CAPACITY REQUIREMENTS), AND IN ACCORDANCE WITH ASTM C891 STANDARD PRACTICE FOR INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES.
4. THE STORMTRAP MODULES SHALL BE PLACED SUCH THAT THE MAXIMUM SPACE BETWEEN ADJACENT MODULES DOES NOT EXCEED ¾" (SEE DETAIL 2). IF THE SPACE EXCEEDS ¾", THE MODULES SHALL BE RESET WITH APPROPRIATE ADJUSTMENT MADE TO LINE AND GRADE TO BRING THE SPACE INTO SPECIFICATION.
5. STORMTRAP MODULES ARE NOT WATERTIGHT. IF A WATERTIGHT SOLUTION IS REQUIRED, CONTACT STORMTRAP FOR RECOMMENDATIONS. THE WATERTIGHT APPLICATION IS TO BE PROVIDED AND IMPLEMENTED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE SELECTED WATERTIGHT SOLUTION PERFORMS AS SPECIFIED BY THE MANUFACTURER.
6. THE PERIMETER HORIZONTAL JOINT BETWEEN THE TOP AND BASE LEG CONNECTION OF THE STORMTRAP MODULES SHALL BE SEALED WITH PREFORMED MASTIC JOINT TAPE ACCORDING TO ASTM C891, 8.8 AND 8.12. (SEE DETAIL 3). THE MASTIC JOINT TAPE DOES NOT PROVIDE A WATERTIGHT SEAL.
7. ALL EXTERIOR ROOF AND EXTERIOR VERTICAL WALL JOINTS BETWEEN ADJACENT STORMTRAP MODULES SHALL BE SEALED WITH 8" WIDE PRE-FORMED, COLD-APPLIED, SELF-ADHERING ELASTOMERIC RESIN, BONDED TO A WOVEN, HIGHLY PUNCTURE RESISTANT POLYMER WRAP, CONFORMING TO ASTM C891 AND SHALL BE INTEGRATED WITH PRIMER SEALANT AS APPROVED BY STORMTRAP (SEE DETAILS 2, 4, & 5). THE JOINT WRAP DOES NOT PROVIDE A WATERTIGHT SEAL. THE SOLE PURPOSE OF THE JOINT WRAP IS TO PROVIDE A SILT AND SOIL TIGHT SYSTEM. THE ADHESIVE EXTERIOR JOINT WRAP SHALL BE INSTALLED ACCORDING TO THE FOLLOWING INSTALLATION INSTRUCTIONS:
   - 7.1. USE A BRUSH OR WET CLOTH TO THOROUGHLY CLEAN THE OUTSIDE SURFACE AT THE POINT WHERE JOINT WRAP IS TO BE APPLIED.
   - 7.2. A RELEASE PAPER PROTECTS THE ADHESIVE SIDE OF THE JOINT WRAP. PLACE THE ADHESIVE TAPE (ADHESIVE SIDE DOWN) AROUND THE STRUCTURE, REMOVING THE RELEASE PAPER AS YOU GO. PRESS THE JOINT WRAP FIRMLY AGAINST THE STORMTRAP MODULE SURFACE WHEN APPLYING.
8. IF THE CONTRACTOR NEEDS TO CANCEL ANY SHIPMENTS, THEY MUST DO SO 48 HOURS PRIOR TO THEIR SCHEDULED ARRIVAL AT THE JOB SITE. IF CANCELED AFTER THAT TIME, PLEASE CONTACT THE PROJECT MANAGER.
9. IF THE STORMTRAP MODULE(S) IS DAMAGED IN ANY WAY PRIOR, DURING, OR AFTER INSTALL, STORMTRAP MUST BE CONTACTED IMMEDIATELY TO ASSESS THE DAMAGE AND TO DETERMINE WHETHER OR NOT THE MODULE(S) WILL NEED TO BE REPLACED. IF ANY MODULE ARRIVES AT THE JOBSITE DAMAGED (DO NOT UNLOAD IT) CONTACT STORMTRAP IMMEDIATELY. ANY DAMAGE NOT REPORTED BEFORE THE TRUCK IS UNLOADED WILL BE THE CONTRACTOR'S RESPONSIBILITY.
10. STORMTRAP MODULES CANNOT BE ALTERED IN ANY WAY AFTER MANUFACTURING WITHOUT WRITTEN CONSENT FROM STORMTRAP.



StormTrap
NORMA LIBERI AS. [STR-(STORMWATER)-(FILTRATION)]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	3/7/2023	PRELIMINARY	LR

SCALE:
NTS

SHEET TITLE:
DOUBLETRAP INSTALLATION SPECIFICATIONS

SHEET NUMBER:
3.0

ZONE CHART

ZONES	ZONE DESCRIPTIONS	REMARKS
ZONE 1	FOUNDATION AGGREGATE	#3 (3") STONE AGGREGATE (SEE NOTE 4 FOR DESCRIPTION)
ZONE 2	BACKFILL	UNIFIED SOILS CLASSIFICATION: GW, GP, SW, SP; OR SEE BELOW FOR APPROVED BACKFILL OPTIONS
ZONE 3	FINAL COVER OVERTOP	MATERIALS NOT TO EXCEED 130 PCF

FILL DEPTH	TRACK WIDTH	MAX VEHICLE WEIGHT (TOPS)	MAX GROUND PRESSURE
12"	12"	51.8	1590 psf
	18"	34.5	1215 psf
	24"	68.1	1111 psf
	30"	76.7	1000 psf
	36"	83.0	924 psf

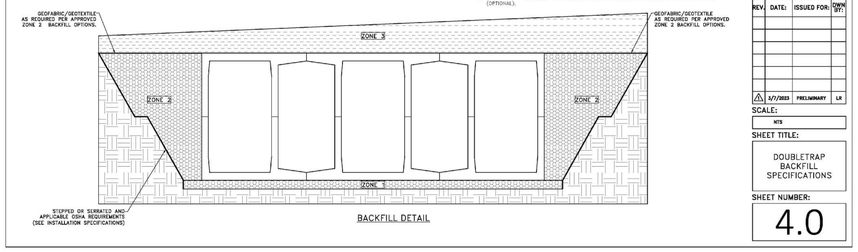
NOTE:
TRACK LENGTH NOT TO EXCEED 16'-4".
ONLY TWO TRACKS PER VEHICLE.

APPROVED ZONE 2 BACKFILL OPTIONS

OPTION	REMARKS
¾" STONE AGGREGATE	THE STONE AGGREGATE SHALL CONSIST OF CLEAN AND FREE DRAINING ANGULAR MATERIAL. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL (ASTM SIZE #57) AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
SAND	IMPORTED PURE SAND IS PERMITTED TO BE USED AS BACKFILL IF IT IS CLEAN AND FREE DRAINING. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING #4 SIEVE AND LESS THAN OR EQUAL TO 5% PASSING #200 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL.
CRUSHED CONCRETE AGGREGATE	CLEAN, FREE DRAINING CRUSHED CONCRETE AGGREGATE MATERIAL CAN BE USED AS BACKFILL FOR STORMTRAP'S MODULES. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL.
ROAD PACK	STONE AGGREGATE 100% PASSING THE 1-1/2" SIEVE WITH LESS THAN 10% PASSING THE #200 SIEVE (ASTM SIZE #467). GEOFABRIC AS PER GEOTECHNICAL ENGINEER RECOMMENDATION.

STORMTRAP ZONE INSTALLATION SPECIFICATIONS/PROCEDURES

1. THE FILL PLACED AROUND THE STORMTRAP MODULES MUST EXTENDED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION, AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/FILTERING MATERIAL IS WELL SEATED AND PROPERLY INTER LOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR BENCHED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILLING PROCESS. SEE SHEET 4.0 FOR BACKFILL OPTIONS. REFER TO THE ABOVE CHART ON THIS PAGE FOR APPROVED BACKFILL OPTIONS. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED (PROVIDED BY OTHERS).
2. DURING PLACEMENT OF MATERIAL OVERTOP THE SYSTEM, AT NO TIME SHALL MACHINERY BE USED OVERTOP THAT EXCEEDS THE DESIGN LIMITATIONS OF THE SYSTEM, WHEN PLACEMENT OF MATERIAL OVERTOP THE SYSTEM IS REQUIRED, THE MATERIAL SHALL BE PLACED AND SPREAD IN A PARALLEL WITH THE OVERALL LONGITUDINAL DIRECTION OF THE SYSTEM WHENEVER POSSIBLE.
3. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED AT A MINIMUM OF 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN HS-20 LOADING CRITERIA TRAVEL OVERTOP THE SYSTEM WITHOUT THE MINIMUM DESIGN COVERAGE. IF TRAVEL IS NECESSARY OVERTOP THE SYSTEM PRIOR TO ACHIEVING THE MINIMUM DESIGN COVER, IT MAY BE REQUIRED TO PLACE THE FILL IN LIFTS LESS THAN 6" IN ORDER TO REDUCE THE WHEEL LOADS SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. IN SOME CASES, IN ORDER TO ACHIEVE REQUIRED COMPACTION, HAND COMPACTION MAY BE NECESSARY IN ORDER NOT TO EXCEED THE ALLOTTED DESIGN LOADING. SEE CHART FOR TRACKED VEHICLE WIDTH AND ALLOWABLE MAXIMUM PRESSURE PER TRACK.
4. STONE AGGREGATE FOUNDATION IN ZONE 1 MAY BE REQUIRED FOR THE FOLLOWING:
   - 4.1. INFILTRATION – IF INFILTRATION IS REQUIRED, A FREE DRAINING MATERIAL SHALL BE USED AT A DEPTH DETERMINED BY THE EOR. FREE DRAINING AGGREGATE IS DEFINED AS 85% AGGREGATE RETAINED ON SPECIFIED MACHINERY OF AGGREGATE SIZE BETWEEN ¾"AND 1", AND ONLY 5% OF MATERIAL PASSING #3/8" SIEVE.
   - 4.2. LEVELING – STORMTRAP RECOMMENDS STONE SUBBASE FOR LEVELING PURPOSES ONLY. (OPTIONAL).



StormTrap
NORMA LIBERI AS. [STR-(STORMWATER)-(FILTRATION)]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	3/7/2023	PRELIMINARY	LR

SCALE:
NTS

SHEET TITLE:
DOUBLETRAP BACKFILL SPECIFICATIONS

SHEET NUMBER:
4.0

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
1	04/07/20	DB	MINOR NOTE REVISIONS
2	09/09/20	SVD	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
3	11/20/20	RMA	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
4	08/30/22	SVD	REVISED PER TOWN OF GUILDERLAND ENGINEERING PER TOWN OF GUILDERLAND
5	03/17/23	DB	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

RUSSELL T. McFALL II
NEW YORK LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: 090030

SPECIAL USE PERMIT SITE PLANS
FOR
COSTCO WHOLESALE

CROSSGATES MALL
TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIII	RTM

PROJECT NUMBER:	DRAWING NAME:
13001204A	C-DTLS

SHEET TITLE:
STORMWATER MANAGEMENT DETAILS

SHEET NUMBER:
17 of 22

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

3013130\2024\Engineering\Cad\Plans\C-DTLS.dwg 11 APR 2023 15:16 By: DDUVALL

RECOMMENDED ACCESS OPENING SPECIFICATION

1. A TYPICAL ACCESS OPENING FOR THIS STORMTRAP SYSTEM ARE 2'-0" IN DIAMETER. ACCESS OPENINGS LARGER THAN 3'-0" IN DIAMETER NEED TO BE APPROVED BY STORMTRAP. ALL OPENINGS MUST RETAIN AT LEAST 1'-0" OF CLEARANCE FROM THE END OF THE STORMTRAP MODULE UNLESS NOTED OTHERWISE. ALL ACCESS OPENINGS TO BE LOCATED ON INSIDE LEG UNLESS OTHERWISE SPECIFIED.
2. PLASTIC COATED STEEL STEPS PRODUCED BY M.A. INDUSTRIES PART #PS3-PFC OR APPROVED EQUAL (SEE STEP DETAIL) ARE PROVIDED INSIDE ANY MODULE WHERE DEEMED NECESSARY. THE HIGHEST STEP IN THE MODULE IS TO BE PLACED A DISTANCE OF 1'-0" FROM THE INSIDE EDGE OF THE STORMTRAP MODULES. ALL ENSUING STEPS SHALL BE PLACED AT A DISTANCE BETWEEN 10" MIN AND 14" MAX BETWEEN THEM. STEPS MAY BE MOVED OR ALTERED TO AVOID OPENINGS OR OTHER IRREGULARITIES IN THE MODULE.
3. STORMTRAP LIFTING INSERTS MAY BE RELOCATED TO AVOID INTERFERENCE WITH ACCESS OPENINGS OR THE CENTER OF GRAVITY OF THE MODULE AS NEEDED.
4. STORMTRAP ACCESS OPENINGS MAY BE RELOCATED TO AVOID INTERFERENCE WITH INLET AND/OR OUTLET PIPE OPENINGS SO PLACEMENT OF STEPS IS ATTAINABLE.
5. ACCESS OPENINGS SHOULD BE LOCATED IN ORDER TO MEET THE APPROPRIATE MUNICIPAL REQUIREMENTS. STORMTRAP RECOMMENDS AT LEAST TWO ACCESS OPENINGS PER SYSTEM FOR ACCESS AND INSPECTION.
6. USE PRECAST ADJUSTING RINGS AS NEEDED TO MEET GRADE. STORMTRAP RECOMMENDS FOR COVER OVER 2' TO USE PRECAST BARREL OR CONE SECTIONS. (PROVIDED BY OTHERS)

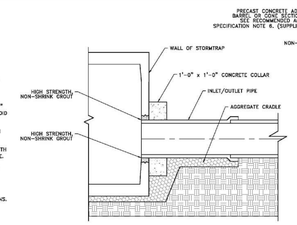
RECOMMENDED PIPE OPENING SPECIFICATION

1. MINIMUM EDGE DISTANCE FOR AN OPENING ON THE OUTSIDE WALL SHALL BE NO LESS THAN 1'-10".
2. MAXIMUM OPENING SIZE TO BE DETERMINED BY THE MODULE HEIGHT. PREFERRED OPENING SIZE # 36" OR LESS. ANY OPENING NEEDED THAT DOES NOT FIT THIS CRITERIA SHALL BE BROUGHT TO THE ATTENTION OF STORMTRAP FOR REVIEW.
3. CONNECTING PIPES SHALL BE INSTALLED WITH A 1'-0" CONCRETE COLLAR, AND AN AGGREGATE CRADLE FOR AT LEAST ONE PIPE LENGTH (SEE PIPE CONNECTION DETAIL). A STRUCTURAL GRADE CONCRETE OR HIGH STRENGTH, NON-SHRINK GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI SHALL BE USED.
4. THE ANNULAR SPACE BETWEEN THE PIPE AND THE HOLE SHALL BE FILLED WITH HIGH STRENGTH NON-SHRINK GROUT.

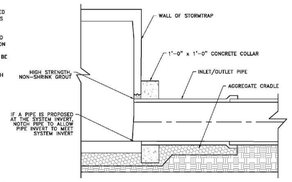
RECOMMENDED PIPE INSTALLATION INSTRUCTIONS

1. CLEAN AND LIGHTLY LUBRICATE ALL OF THE PIPE TO BE INSERTED INTO STORMTRAP.
2. 6" PIPE IS CUT, CARE SHOULD BE TAKEN TO ALLOW NO SHARP EDGES. BEVEL AND LUBRICATE LEAD END OF PIPE.
3. ALIGN CENTER OF PIPE TO CORRECT ELEVATION AND INSERT INTO OPENING.

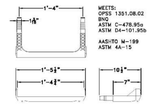
NOTE: ALL ANCILLARY PRODUCTS/SPECIFICATIONS RECOMMENDED AND SHOWN ON THIS SHEET ARE RECOMMENDATIONS ONLY AND SUBJECT TO CHANGE PER THE INSTALLING CONTRACTOR AND/OR PER LOCAL, MUNICIPAL CODE/REQUIREMENTS.



RISER / STAIR DETAIL



PIPE CONNECTION DETAIL



WEETS:
OPEN 1301.08.02
BND
ASTM C-478.95a
ASTM D4-101.95b

AASHTO M-199
ASTM 4A-15

STEP DETAIL

*** NOTICE ***
03-25-2022

DUE TO CURRENT INCONSISTENCIES IN THE 16" STEP SUPPLY, STORMTRAP MAY SUBSTITUTE THE 16" STEP WITH THE CLOSEST ALTERNATIVE LENGTH STEP UNTIL THE SUPPLY CHAIN ISSUE IS RESOLVED.

StormTrap
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

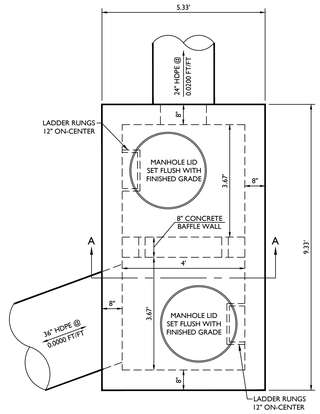
ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DRWN BY:
1	3/7/2023	PRELIMINARY	LR

SCALE: NTS

SHEET TITLE: RECOMMENDED PIPE / ACCESS OPENING SPECIFICATIONS

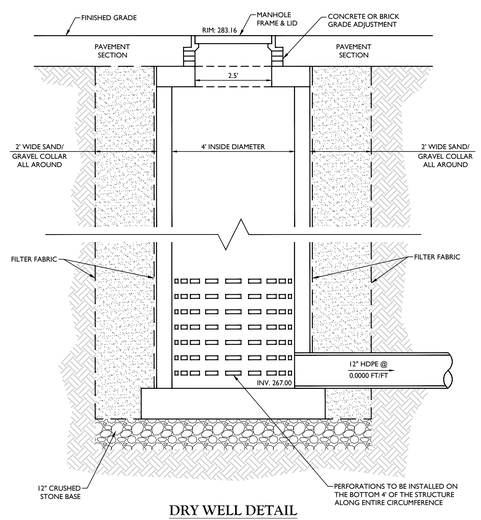
SHEET NUMBER: 5.0



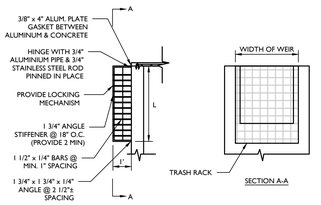
PLAN VIEW

NOTES:

1. CONTRACTOR MUST SUBMIT SHOP DRAWINGS PRIOR TO CONSTRUCTION FOR REVIEW AND APPROVAL
2. A MAXIMUM OF 6 INCHES OF BRICK AND MORTAR OR A MAXIMUM OF 2 INCHES OF MORTAR ALONE SHALL BE USED FOR FRAME AND GRATE ADJUSTMENT. FOR ADJUSTMENTS OVER 6 INCHES, CAST-IN-PLACE CONCRETE CHIMNEY ELEMENT SHALL BE USED.
3. CONCRETE SHALL BE CLASS A.
4. ALL ELEMENTS SHALL CONFORM TO NYDOT STANDARDS.



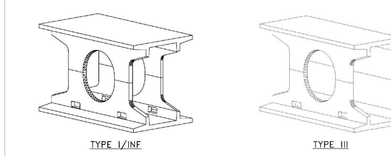
DRY WELL DETAIL
NOT TO SCALE



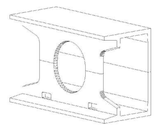
TRASH RACK NOTES:

1. MINIMUM BAR SPACING: 1 INCH.
2. MAXIMUM BAR SPACING: 1/3 THE DIAMETER OF THE ORIFICE OR 1/3 THE WIDTH OF WEIR, WITH A MAXIMUM SPACING OF 6 INCHES, FOR ELEVATIONS IN EXCESS OF WATER QUALITY DESIGN STORM.
3. MAXIMUM AVERAGE VELOCITY OF FLOW THROUGH CLEAN RACK: 2.5 FEET/SECOND.
4. CONSTRUCTED OF RIGID, DURABLE AND CORROSION RESISTANT MATERIAL, AND
5. DESIGNED TO WITHSTAND A PERPENDICULAR LIVE LOADING OF 300 LBS./SF.
6. CONTRACTOR TO SUBMIT SHOP DRAWINGS.

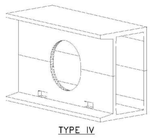
FLAT TRASH RACK DETAIL
NOT TO SCALE



TYPE I/INF



TYPE III



TYPE IV



TYPE IV END PANEL

NOTES:
1. OPENING LOCATIONS AND SHAPES MAY VARY.
2. SP = INDICATES A MODULE WITH MODIFICATIONS.
3. P = INDICATES A MODULE WITH A PANEL ATTACHMENT.
4. POCKET WINDOW OPENINGS ARE OPTIONAL.

StormTrap
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4548 / F:331-318-5347

ENGINEER INFORMATION:
COLLIERS ENGINEERING
410 EAGLE VIEW BLVD
EXTON, PA
610-254-9140

PROJECT INFORMATION:
COSTCO
CROSSGATES MALL
ALBANY, NY

CURRENT ISSUE DATE:
3/7/2023

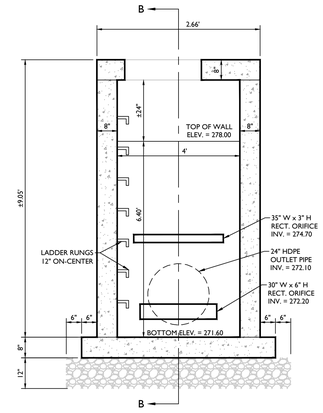
ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DRWN BY:
1	3/7/2023	PRELIMINARY	LR

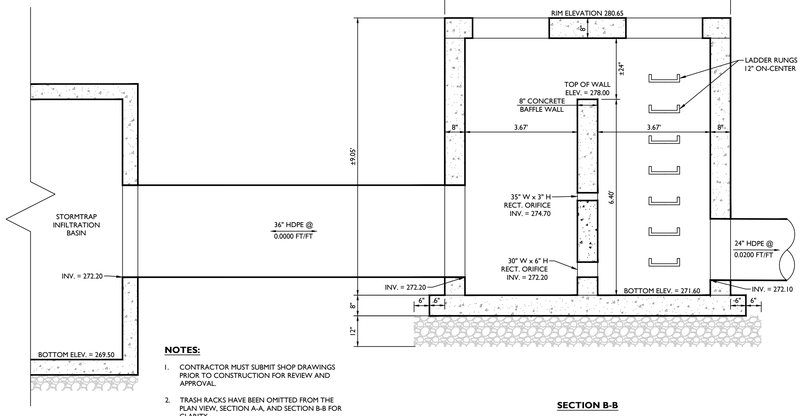
SCALE: NTS

SHEET TITLE: DOUBLETRAP MODULE TYPES

SHEET NUMBER: 6.0



SECTION A-A

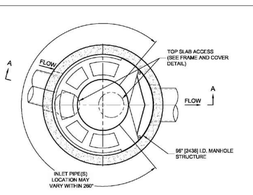


NOTES:

1. CONTRACTOR MUST SUBMIT SHOP DRAWINGS PRIOR TO CONSTRUCTION FOR REVIEW AND APPROVAL.
2. TRASH RACKS HAVE BEEN OMITTED FROM THE PLAN VIEW, SECTION A-A, AND SECTION B-B FOR CLARITY.
3. CONCRETE SHALL BE CLASS A.

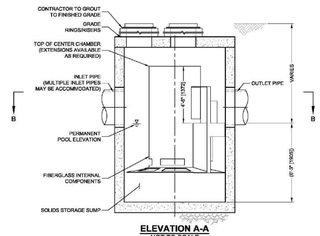
SECTION B-B

OUTLET CONTROL STRUCTURE I DETAIL
N.T.S.



PLAN VIEW B-B
NOT TO SCALE

FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CASCADE separator™

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm.]

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE (INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-8 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

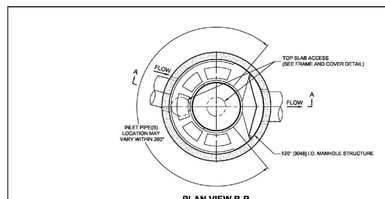
CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
NOTES / SPECIAL REQUIREMENTS:			

CONTECH ENGINEERED SOLUTIONS LLC
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

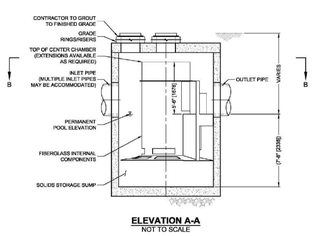
CS-8
CASCADE SEPARATOR
STANDARD DETAIL



PLAN VIEW B-B
NOT TO SCALE



FRAME AND COVER
(DIAMETER VARIES)
NOT TO SCALE



ELEVATION A-A
NOT TO SCALE

CASCADE separator™

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CASCADE SEPARATOR WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. CASCADE SEPARATOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' [610], AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. CASCADE SEPARATOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. ALTERNATE UNITS ARE SHOWN IN MILLIMETERS [mm.]

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CASCADE SEPARATOR MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE (INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CASCADE SEPARATOR DESIGN NOTES

THE STANDARD CS-10 CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

INTERNAL COMPONENTS WILL BE FIELD INSTALLED. CONTACT YOUR CONTECH REPRESENTATIVE FOR ADDITIONAL INFORMATION.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (cfs [L/s])			
PEAK FLOW RATE (cfs [L/s])			
RETURN PERIOD OF PEAK FLOW (yrs)			
RIM ELEVATION			
PIPE DATA:	INVERT	MATERIAL	DIAMETER
INLET PIPE 1			
INLET PIPE 2			
OUTLET PIPE			
NOTES / SPECIAL REQUIREMENTS:			

CONTECH ENGINEERED SOLUTIONS LLC
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CS-10
CASCADE SEPARATOR
STANDARD DETAIL

CONTECH CASCADE SEPARATOR OPERATION AND MAINTENANCE:

1. THE CASCADE SEPARATORS REQUIRE REGULAR INSPECTION AND MAINTENANCE TO ENSURE OPTIMAL PERFORMANCE. MAINTENANCE FREQUENCY WILL BE DRIVEN BY SITE CONDITIONS. QUARTERLY VISUAL INSPECTIONS ARE RECOMMENDED, AT WHICH TIME THE ACCUMULATION OF POLLUTANTS CAN BE DETERMINED. ON AVERAGE, THE CASCADE SEPARATORS REQUIRE ANNUAL REMOVAL OF ACCUMULATED POLLUTANTS.

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2023, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Doing Business as MASER CONSULTING

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
4	04/07/20	DB	MINOR NOTE REVISIONS
3	09/30/20	SVD	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
2	11/20/20	RMA	REVISED PER TOWN OF GUILDERLAND REVIEW COMMENTS
1	10/20/22	SVD	REVISED PER TOWN OF GUILDERLAND ENGINEERING
5	03/10/23	DB	REVISED SITE LAYOUT AND ENGINEERING PER TOWN OF GUILDERLAND

RUSSELL T. McFALL II
NEW YORK LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: 090030

SPECIAL USE PERMIT SITE PLANS
FOR
COSTCO WHOLESALE

CROSSGATES MALL
TAX MAP 52.10, 52.14 & 52.01

TOWN OF GUILDERLAND
ALBANY COUNTY
STATE OF NEW YORK

Colliers Engineering & Design
EXTON
410 Eagleview Boulevard, Suite 104
Exton, PA 19341
Phone: 610.254.9140
COLLIERS ENGINEERING & DESIGN, INC. DOING BUSINESS AS MASER CONSULTING

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	10/28/19	DIII	RTM

PROJECT NUMBER:	DRAWING NAME:
1300120AA	C-DTLS

SHEET TITLE: STORMWATER MANAGEMENT DETAILS

SHEET NUMBER: 18 of 22

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

2023.1300120AA\Engineering\Civil\Plan Sheet\C-DTLS.dwg 03/10/2023 8:49:44 AM by DEREK.RYE