Analysis of Environmental Impacts
Pursuant to the
State Environmental Quality Review Act

Project Name:
Project Fifi Proposed Warehouse and Distribution Facility
Town of Niagara, New York

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Project Fifi
Proposed Warehouse and Distribution Facility

JB2 Partners LLC ("JB2"), is proposing the development of the former Niagara Airport Commercial Park located at sites identified in tax records as parcels 132.18-1-2, 146.05-1-9, 146.06-1-1 and 146.06-1-2 ("Site") in the Town of Niagara, Niagara County, New York ("Town"), for use as an e-commerce storage and distribution facility for consumer products ("Facility"), for a single, prospective tenant ("Project"). The Project will be located in an area bounded by Haseley Drive on the west, Packard Road/Lockport Road on the north, Tuscarora Road on the east and the Niagara Falls Air Reserve Station and Niagara Falls International Airport on the east and south.

The Facility will be occupied and operated by a single prospective entity to address growing demand for warehouse distribution facilities throughout the United States. The Facility will operate as a fulfillment center, receiving in-bound bulk shipments of products from various vendors, suppliers and sellers, and then packaging and shipping these items directly to customers, either through the prospective entity's own delivery network or through third party shippers. The Facility is proposing to bring at least 1,000 new full-time jobs, typically in two shifts

Under the Town of Niagara Zoning Code ("Code"), the Site is located in the Heavy Industry ("HI") District which authorizes the proposed use as a permitted use. The Site was certified as a Build-Now NY Shovel Ready Site in 2012, and the Town reached out to JB2 to acknowledge the Town's "total support" for the Project to be sited at the Site.

Under the New York State Environmental Quality Review Act ("SEQRA"), prior to an agency undertaking or approving a project, it must consider the potential environmental impacts of a proposed project. As such, the Town Board cannot act on the Application until a SEQRA process has been completed.

An evaluation of the potential environmental impacts associated with the construction and operation of the Project is provided herein. This section provides an evaluation of the potential environmental impacts associated with the construction and operation of the Project. For the convenience of the Lead Agency and interested and involved agencies, this analysis is organized based on Part 2 of the Full Environmental Assessment Form.

The purpose of this analysis is to provide the Town Board, interested and involved agencies, stakeholders, and the public with a clear understanding of the areas of potential environmental concern arising out of the Project, and the likelihood of severity of potential impacts associated with such areas of concern. In addition to submitting the site survey, architectural elevations, Part 1 of the Full Environmental Assessment Form ("EAF"), and this Analysis of the Environmental Impacts, the following Exhibits are annexed hereto and made part hereof:

Exhibit A:	**Geotechnical Engineering Study Report**
Exhibit B:	**Sound Study**
Exhibit C:	**SWPPP**
Exhibit D:	**Wetlands/Waters Impact Assessment**
Exhibit E:	**Threatened and Endangered Species Assessment**
Exhibit F:	**Visual Analysis Assessment**
Exhibit G:	**Historic and Cultural Resources**
Exhibit H:	**Traffic Impact Study**
Exhibit I:	**Water System Engineer's Report**
Exhibit J:	**Sanitary Sewer System Engineer's Report**

PROJECT DETAILS

Project Background

The Project will include the construction of an approximately 650,000 square foot concrete and steel building, comprised of a ground floor with a footprint, a sortation mezzanine, and four elevated levels, for a floor area of approximately 3,075,950 square feet. The Facility will have a maximum height of 107 feet. The Facility will be constructed of concrete and steel and will be protected throughout by automatic sprinkler systems. The Project would include 55 loading docks, 414 trailer parking stalls, 469 total trailer locations, and 1,755 car parking stalls (including 16 motorcycle parking spaces), water tank, stormwater management basins and improvements, accessory site driveways, lighting, landscaping, signage, and other related improvements as demonstrated in the attached Site Plans. Landscaping will be included as part of the site design and the warehouse will meet setback requirements.

The Site is approximately 216 acres and consists primarily of farmland used for row crops. The Project will include the disturbance of a total of 56.3 acres for roads, buildings, and other paved or impervious surfaces, with the remainder of the site undeveloped. Lot coverage will only total approximately seven percent of the Site, though up to 30 percent lot coverage is permitted pursuant to the Code.

All on-Site activities will take place within the Facility, in a secured environment that is not open to the public. The Facility will operate 24 hours, 7 days a week, 365 days per year and is expected to be fully operational in approximately 18 to 24 months from the start of construction. The Facility will also employ additional seasonal workers in the fourth quarter annually, and will create at least 300 construction jobs.

The Facility will be considered a Group S-1 occupancy and will be dedicated primarily to the storage and distribution of Class I-IV and Group A plastic commodities. No hazardous materials will be stored. The first floor will primarily facilitate material handling and sorting equipment. The remaining floors will house a large automated storage system with shelf-like storage units that are moved by low-profile robots. Approximately 1,500 robots per floor will be used.

On the top four floors, storage pods and robots will occupy most of the footprint, with employees located around the perimeter of each floor, awaiting deliveries from the robots. The area consisting of the robots and storage pods will be physically separated from the employees by a fence, and the area is not normally occupied by any employees. Only limited personnel will be allowed inside the fence as necessary for maintenance and repairs.

Project Location & Setting

Site Description

The Site is located on the south side of Lockport and Packard Roads in the Town of Niagara. The Project site is located in an area of mixed residential, commercial, industrial and agricultural land uses. The Niagara Falls Air Reserve Station and the Niagara Falls International Airport are located immediately east and south of the Site. The former Niagara Drag Strip, which ceased operation in 1974, traverses the southern portion of the Site between Haseley Road and Tuscarora Road. Most of the concrete/asphalt drag strip, unpaved parking areas (now vegetated) and a few dilapidated structures are all that remain.

Approximately 150 acres of the Site is currently being used for active agriculture (corn). Successional old field/shrub land plant communities are located on both sides of the former drag strip, becoming broader at the eastern and western ends of the drag strip. A strip of woodland is located in the western portion of the property bordering the Air Reserve Station to the south. Small woodland areas are located on the north and east sides of the drag strip in the eastern portion of the property. Many of the prominent east-west and north-south ditches located throughout the property are lined with woody vegetation. The large east-west ditch in the northern part of the property is fairly wide and lined with trees.

The Site includes 16 wetlands/wetland complexes, totaling approximately 45.559 acres. The majority of these wetlands are agricultural or associated with drainage improvements (ditches) that appear to have been historically constructed to manage agricultural runoff or relict features associated with the prior Niagara Drag Strip.

Site History

The Site was rezoned by the Town to Heavy Industrial and was then extensively reviewed by the Town in connection with obtaining shovel ready certification pursuant to the Build Now NY program in 2011. The Town conducted a review pursuant to the State Environmental Quality Review Act ("SEQRA") and completed a Final Generic Environmental Impact Statement ("FGEIS") on December 13, 2011. In the FGEIS, the Town conceptually reviewed development on the Site consisting of approximately 850,000 square feet of development and the combination of the existing individual parcels comprising the Site.

The FGEIS included consultation with various other agencies including: New York State Department of Environmental Conservation ("NYSDEC"), Niagara County Industrial Development Agency, Empire State Development, Niagara County Sewer District, Niagara County Water District, New York State Historic Preservation Office ("SHPO"), New York State Department of Transportation ("NYSDOT"), New York State Department of Agriculture and Markets, and the United States Army Corps of Engineers ("USACE"). Written comments on the Draft GEIS from members of the public, as well as consultation with each of the above agencies, were considered prior to the issuance of the FGEIS.

The FGEIS carefully analyzed the development of the Site in the context of geological resources, water resources, ecological resources, historic and archaeological resources, noise, air quality, land use, socioeconomic conditions, visual and aesthetic conditions, agricultural resources, transportation, public services including utilities, and proposed Site-specific mitigation to minimize impacts to the environment to the greatest extent practicable. On August 9, 2012, the Site received Build-Now NY Shovel Ready certification.

Following efforts to construct a similar project in a neighboring jurisdiction, the Town provided a letter to JB2 encouraging an effort to locate the Project at the Site, citing the Site's shovel ready status and location adjacent to important transportation infrastructure.

Environmental Conditions

The Site is currently undeveloped, consisting mostly of agricultural fields and herbaceous/scrub-shrub areas. The agricultural wetlands are interspersed throughout the site and mainly consist of corn crop. The Site's wetlands were previously documented in the FGEIS, however, conditions on the Site have changed over the last decade as wetlands have expanded to cover approximately 45.559 acres of the Site. The scrub/shrub communities are generally dominated by European buckthorn, gray dogwood, and silky dogwood. Emergent wetlands are also interspersed throughout the site and feature drainage ditches and swales. The site does not contain any United States Fish and Wildlife Service ("USFWS") National Wetlands Inventory (NWI) wetlands or NYSDEC mapped wetlands or streams onsite. Cayuga Creek and a tributary to Cayuga Creek are mapped offsite to the east and southeast.

While the NYSDEC Natural Heritage Program ("NHP") indicates records of rare or state-listed animals, plants or significant natural communities in the Site's vicinity (Short-eared owl and Devil Crawfish), the potential presence or absence was reviewed by specialists and neither species nor their habitats will be adversely impacted by the Project as detailed below as well as in the Threatened and Endangered Species Assessment attached as Exhibit E. Additionally, there are no Critical

Environmental Areas, or unique geological features noted on the Site, and the Site soils are generally characteristic of loamy/clayey soils.

JB2 and its representatives have reached out and continue to engage in communications with the NYSDEC, USACE, National Grid, National Fuel and local officials regarding the Project. JB2 and its representatives will continue this outreach as the Project moves through the zoning and approval process with the Town, and the permitting process with the requisite agencies.

Project Consistency with Comprehensive Plan

In 2018, a draft comprehensive plan was introduced but never adopted by the Town. The last comprehensive plan adopted by the Town is *the Town of Niagara Comprehensive Plan* from 1972 (the "Comprehensive Plan"). The Project is consistent with many goals and objectives identified in the 1972 Comprehensive Plan. As stated in the Comprehensive Plan, one of "Specific Goals for the Town of Niagara" emphasized the need for industrial business, "The expansion of existing industries and the attraction of new industry should be encouraged in order to provide opportunities for the expanding population of the Town, within the limitations of resources and markets." (Comprehensive Plan, p. 98). Additionally, the Comprehensive Plan identifies the effects of proposed industrial activities will be considered in regard to its impact upon the economic and environmental character of the Town. (Comprehensive Plan, p. 99).

The Project will result in the type of redevelopment envisioned by the Comprehensive Plan, and is proposed to be located on undeveloped land along a minor arterial road in an area with existing sewer capacity. The Project will make productive economic use of currently vacant property, resulting in substantial tax revenues generated for the Town, with limited demands upon Town services. A significant number of new jobs will be created, both for construction and related to the operation of the Facility. The Site is ideally located with convenient access between Interstate Highway 190 ("I-190") and State Route 62 leading to Niagara Falls and other Erie County communities to the south and Niagara County to the north.

The Site has been designated by the Empire State Development Corporation ("ESDC") and the Niagara County Center for Economic Development as "shovel ready", meaning the property can be marketed to business prospects as "pre-permitted", designated for faster-track development. The Site has been targeted for development for over a decade, as evidenced by the completion of the FGEIS, shovel ready certification, and the Town's request that JB2 consider the Site as a location for the Project.

In addition there is available sewer and water service, and the proposed Site avoids conflicts with incompatible uses based on the size of the Site, the location of the Facility on the Site, and the limited development surrounding in the immediate vicinity of the Site. The long-term impact, in addition to job creation, would also include some likely additional economic activity generated in the Town of Niagara and beyond. All of these factors contribute to developing a balanced and vibrant economy consistent with the goals and objectives of the Comprehensive Plan.

ANALYSIS OF ENVIRONMENTAL IMPACTS

For the convenience of the Lead Agency and interested and involved agencies, this analysis is organized based on Part 2 of the Full Environmental Assessment Form (Full EAF).

A. Impact on Land

1. Physical Resources: The Project will involve construction on, and physical alteration of, the land surface of the Site, and the addition of impervious surfaces on the Site. All work will be completed in conformance with applicable State and local regulations.

   The Project will not involve construction on land where the depth to bedrock is less than 6.6 feet. A Draft Preliminary Geotechnical Engineering Study Report (the "GeoTech Report") was prepared for the Project and is annexed hereto as **Exhibit A**. As shown in the GeoTech Report, groundwater levels recorded were approximately el +595 and el +599 and are below the proposed top of slab elevation (el +612) (P. 14, GeoTech Report). The Site has no slopes of 15 percent or greater. Depth to bedrock ranges from approximately 10 to 22 feet below the proposed finished floor elevation (between about el +590 to el +602) (P. 11, GeoTech Report). There is grading and excavation work related to Site preparation, building foundations (including a minor gradient change to accommodate stormwater discharge from the Facility), parking areas, stormwater management features, and installation of utilities. However, all excavated material will remain on Site. Except for this grading and excavation work, the slope of the land will not be significantly altered by the Project.

   Project construction does not involve multiple phases and is expected to be completed in approximately 18 to 24 months. While construction will take more than one year, the Site adjoins other commercial and industrial sites, including the Niagara Falls International Airport. In addition, activity will be intermittent with planned winter shutdowns to mitigate construction impacts to the surrounding area. Moreover, given the size of the Site and location of the disturbance on the Site, the impacts to nearby neighboring properties from construction activities will be limited.

   An Evaluation of Site Sound Emissions Report (the "Sound Report") was prepared for the Project, a copy of which is annexed hereto as **Exhibit B,** to assess potential sound impacts associated with the Project. Although construction conditions are temporary in nature, the Project will be subject to applicable Town regulations. While the construction of the Project will conform to these requirements, construction equipment, such as bulldozers, front end loaders, and dump trucks, can typically produce maximum sound levels of 80 dB(A) at 50 feet.

   While New York State does not have a noise code, the New York Department of Environmental Conservation (NYSDEC) does provide guidelines for assessing and mitigating noise impacts. The Town has a noise code that addresses sound qualitatively, but does not provide specific code limits. The code generally prohibits the creation of unreasonable noise between the hours of 2300-to-0700. Unreasonable noise is defined as any sound which creates a noise disturbance, which annoys, disturbs, injures, or endangers the reasonable quiet, comfort or repose of a reasonable person of normal sensitivities or health or safety of others. Unreasonable noise is also defined as sound that is audible on property being used for residential purposes at a point more than 100 feet from the real property boundary line.

The code specifically prohibits the activity of loading and unloading as to project a sound across a real property line and cause a noise disturbance, during the hours of 2100-to-0600. Also, listed as enumerated exceptions are noises of safety signals and warning devices. Notably, the FGEIS carefully reviewed potential impacts caused by both construction and operational noise resulting from the development of the Site. The Town, citing NYSDEC Program Policy DEP-00-1, noted that the rezoning of the Site included consideration of noise impacts as "an inherent component of the activity that has been found acceptable in consideration of the zoning designation."

As detailed in the Sound Report, the Site is located adjacent to various sources of significant background noise, including the Niagara Falls International Airport, and Niagara Falls Air Reserve Station.

Among the mitigation measures for operations include (1) outfitting trucks owned and controlled by the site with smart, ambient sensing, multi-frequency back-up alarms, and (2) proceed with the current HVAC equipment plans, assuming the plans do not markedly deviate from those presented in the model. To minimize receptor exposure to construction noise during construction, the Sound Report recommends (1) limiting all heavy equipment operation to non-noise-sensitive daytime hours and follow town construction hours, (2) if possible, limit the number of equipment operating near one receptor at a given time. Avoid exposing any one receptor to high sound levels for an extended period of time (3) place stationary equipment, such as generators, compressors, and office trailers, away from noise-sensitive receptors, (4) avoid having construction parking or laydown areas near noise-sensitive receptors, and (5) coordinate and high sound level construction activities with Town representatives and provide advanced notice to residents as feasible. Accordingly, based on the above, and with the proposed recommendation measures, the Project will not have any significant adverse impacts from sound relating to construction activities or during operations.

The Project will not result in increased erosion. A Stormwater Pollution Prevention Plan ("SWPPP") has been prepared for the Project. **See Exhibit C**. As shown in the SWPPP, temporary erosion and sediment control measures will be used during construction and permanent erosion and sediment control measures will be used after construction. Before construction, a stabilized construction access shall be installed to reduce the tracking of sediment onto adjacent roadways. The erosion control, sediment control, pollution-prevention, and stormwater management measures to be implemented during construction will minimize soil erosion and control sediment transport off-Site, and after construction will control the water quality and quantity of stormwater runoff.

Thus, while the Site has a high potential for turbid runoff due to high clay content and construction activities present the possibility of silt laden runoff entering streams due to storm events, a State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001) will be obtained and, as shown in the SWPPP, permanent and temporary stormwater control measures will be used to minimize runoff during construction and operation of the Project. **See Exhibit C**. Soil and erosion control measures will be implemented so there are no inappropriate discharges of contaminants to surface waters during construction. As indicated in the SWPPP, the overall comparison of the pre- and post-development stormwater runoff peak discharge rates demonstrates no significant adverse impacts to the design points analyzed. **See Exhibit C**. The Site is not located in a Coastal Erosion hazard area.

Accordingly, the Project will not have any significant adverse impacts to the physical resources of the land.

2. Land Use and Zoning: The Project will result in a new e-commerce distribution Facility on vacant land that has been zoned for heavy industrial uses. The Site was the subject of the FGEIS approved in 2011 by the Town Board that involved the development of the Site into a "High Technology Manufacturing" site. Public improvements were proposed to be installed to service the Site and a sanitary sewer system was to be created as part of the proposed action. As detailed above, the Town undertook an extensive review of the Site in order to obtain Shovel Ready certification, and the Town has continued to target the Site for development, including reaching out to solicit the Project.

The Code authorizes the Facility as a permitted use (warehousing) in the Town's Light Industrial District, with such uses also permitted in the Site's Heavy Industrial District. The Project is consistent with setback, lot coverage, and other dimensional requirements of the Town Code, with the exception of the height limitation of the Heavy Industrial zone, size of the proposed signage on the Facility, as well as the proposed location of the access points of the Site. While the Project will require area variances to address each of these matters, the extensive discussion of the justification for such variances included in the letter of intent for the application demonstrates that the deviations from the Code will not significantly adversely impact neighboring land uses.

The Project is consistent with the industrial goals for the Town of Niagara outlined in the Comprehensive Plan. In addition, the Site is consistent with the character of the surrounding uses, which includes the Niagara Falls International Airport to the east and south. The Site is also mentioned in the proposed "Industrial Land Development" section of the Comprehensive Plan (page 112) as an area for ultimate light industrial use (in reference to the area adjacent to the Niagara Falls International Airport) that can be compatible with the airport and other adjacent uses.

In the Comprehensive Plan, the Town developed principles relating to community planning, residential neighborhood planning, recreation planning, industrial planning, and central shopping area planning. Specifically, the Comprehensive Plan identifies four principles for industrial planning. The Town's four guiding principles are: (1) General; (2) Accessibility; (3) Site Design; and (4) Internal Circulation.

1. General - The Comprehensive Plan states this principle as "Planned industrial districts or parks should be encouraged where possible. Industrial sites should be located on reasonable level, well-drained, extensive parcels capable of supporting large industrial buildings. Industrial sites should be located within a convenient distance of existing or potential employee concentrations and should be located where there is adequate water supply and room for expansion, storage, parking and site design."

   Response: The proposed Project is located in an area adjacent to the Niagara Falls International Airport zoned for heavy industrial uses. The site was previously reviewed by the Town to be developed as a high technology manufacturing site as stated in the 2011 FGEIS. The proposed Project would introduce a warehouse to the Site, which would be consistent to the use previously reviewed and accepted by the Town - the Project is consistent with the proposed footprint that was reviewed for development, is located on the Site evaluated by the Town, includes the types of permits and approvals contemplated by the Town in the FGEIS, and includes new employment on the scale envisioned by the Town. The Site is over 200 acres and would provide appropriate design measures including parking and stormwater management and access along Lockport and Packard roads.

2. Accessibility - The Comprehensive Plan states this principle as "Direct access to a major arterial is desirable; optimum location would be within one-half to one mile of a freeway interchange. Arterial routes in direct contact with the site should permit a sufficient number of adequately spaced entrances and exits. For most industries, rail access should be directly or readily attainable; water or air access should also be considered for certain industries."

Response: The Site is less than 1.5 miles from Interstate Highway 190 which connects to other parts of Niagara County to the north and Erie County to the south. The proposed warehouse will have access along Packard and Lockport roads to the north and Tuscarora Road to the east. All roads are characterized by the New York State Department of Transportation ("NYSDOT") as minor arterial roads. Packard Road becomes a principal arterial road towards Military Road and the on-ramp for I-190. The Niagara Falls International Airport is east and south of the site.

3. Site Design — The Comprehensive Plan states, "All sites should be sufficient size and configuration to afford flexibility of use and potential expansion of facilities; building coverage of 20 to 30 percent is generally desirable. Landscaping should provide sensory satisfaction as well as fulfilling the practical needs of space definition, recreation activities, screening, control, and identity of development. Parking and loading spaces should be allocated generously, a factor of their consideration being the ultimate conversion of some spaces for other purposes or for future expansion.

   Response: The approximately 200-acre undeveloped site is adjacent to the Niagara Falls International Airport and bordering Lockport and Packard roads. The Project would occupy approximately 6.9 percent of the Site where there is a 30 percent maximum lot coverage on heavy industrial sites. The Proposed project would include 55 loading docks, 414 trailer parking stalls, 469 total trailer locations, and 1,755 car parking stalls (including 16 motorcycle parking spaces). Landscaping improvements include 318 shade trees, 582 evergreen trees, 89 evergreen shrubs, 121 deciduous shrubs, and 176 ornamental grasses. The warehouse will meet setback requirements.

4. Internal Circulation — The Comprehensive Plan states, "Various modes of transportation should be planned as an integrated system and designed to minimize conflict. Internal circulation should minimize the movement of individuals, vehicles, goods, materials, etc."

   Response: The Site has been designed to support a variety of vehicles and provides parking for trailers, cars, and motorcycles. Additionally, the site will provide 28 Americans with Disabilities Act (ADA) parking spaces and five ADA van parking spaces. It is estimated that approximately 8% of Project employees will carpool, thereby increasing efficiencies in terms of circulation. Further, the Site is designed to accommodate an on-Site transit stop which will be coordinated with the Niagara Frontier Transportation Authority. The project design and signage will facilitate efficient circulation for cars and trucks at the Site.

The Application letter of intent further outlines consistency with the Comprehensive Plan. Additionally, a draft comprehensive plan for the Town of Niagara from 2018, which has not been adopted, displayed the need for a more balanced local economy and citing the need for a diversification of the local labor market. The public input summary also listed that expanding manufacturing jobs and businesses development along with developing the shipping and logistics industry are opportunities for the Town of Niagara to explore. The Project would provide new industrial business and jobs to the community, supporting the draft comprehensive plan's public input. Accordingly, the Project will not have any significant adverse impacts on land use and zoning.

B. Impact on Geological Features

The Site is undeveloped and has no unusual or unique land forms, such as cliffs, dunes, minerals, fossils or caves, that may be modified or face destruction. There are no National Natural Landmarks at or near the Site. Accordingly, the Project will not have any significant adverse impact upon geological features.

C. Impact on Wetlands and Surface Waters

There will be impacts to wetlands and surface waters at the Site. The Project will result in new impervious surfaces that require stormwater management systems to handle stormwater flows and provide proper management of on-Site stormwater.

The Wetlands/Waters Impact Assessment is annexed hereto as **Exhibit D**. A Wetland Delineation Report dated January 25, 2022 (the "Wetland Report") was completed for the Site by Langan Engineering ("Langan"), a copy of which is annexed to **Exhibit D**. The Wetland Report was prepared in accordance with federal delineation methodology outlined under the U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual and Northcentral and Northeast Regional Supplement. The Wetland Report is based on an evaluation of the Site during several weeks in November and December of 2021.

There are 16 wetlands/wetland complexes are present on the Site. See **Exhibit D** at Figure WN101. On-Site wetlands generally consist of agricultural wetlands and scrub-shrub wetlands with a total of approximately 45.559 acres. This is a notable increase from the extent of wetland resources identified in the FGEIS. The on-site surface water drainage varies from culverts to runoff in agricultural fields to ditches/pipes and smaller wetlands being isolated. In total, the Project proposes to impact approximately 2.75 acres of wetlands/waters on the Site, with approximately 42.809 acres of wetlands remaining undisturbed. The Project has been redesigned in order to reduce impacts to the greatest extant practical, and consultation with both USACE and NYSDEC is ongoing in order to obtain necessary permits before construction can proceed, and consultation (including discussion of the proposed mitigation measures) has commenced.

The Project will require limited impacts to wetlands/waters (approximately 2.75 acres) for the construction of parking areas, access roads, utilities, the Facility, and stormwater basins. The Project has been designed to avoid wetlands/waters impacts to the greatest extent practicable while achieving the desired Project goals. The Site totals approximately 216 acres with approximately 45.559 acres of wetlands interspersed across the Site. The total limit of Project disturbance is approximately 115 acres, generally positioned in the central and northern portions of the Site. Of the 115 acres to be disturbed, the Project will impact only 2.75 acres of wetlands.

Areas of wetlands to be impacted are limited to agriculture wetlands and ditches with low ecological value/function. Avoidance of additional wetland impacts was accomplished through an iterative site layout selection process and detailed design and grading of specific Project elements. As shown on the Site Plans, wetlands present in the southern portion of the site and along the eastern and western site boundary are avoided. In addition, the strategic placement of stormwater management facilities avoids wetland impacts and ultimately allows for a landscape that promotes un-fragmented open space across approximately 140 acres of the site (inclusive of the basins and wetlands to remain).

In addition, the current stormwater runoff from the Site (untreated agricultural runoff) will be replaced with runoff managed pursuant to a SPDES permit. Furthermore, upon completion of construction, areas of wetlands and uplands to remain will be allowed to naturally succeed. These areas are expected to revert to a natural condition that will provide an ecological uplift to the site and region, providing habitat for local wildlife and enhancing the functions and value of the wetlands onsite. Naturalization of these areas will ultimately benefit the watershed as a whole.

As required by the USACE under Section 404 of the Clean Water Act, compensatory mitigation for the 2.75 acres of wetland impacts is proposed to be completed through the purchase of an equal number of credits from the Ducks Unlimited (DU) In-Lieu Fee Program (ILF) — Buffalo-Eighteenmile service area.

Based on the limited area of wetlands impacts relative to the size of the Site and Project, the incorporated design elements, and the proposed mitigation measures, the Project is not expected to result in a significant impact to wetlands. A Joint Permit Application to the USACE and NYSDEC seeking authorization of the Project and associated wetland impacts will be submitted for review and approval, and coordination with NYSDEC and USACE has already begun.

D. Impact on Groundwater

The Project will not affect groundwater. Groundwater resources were analyzed in the FGEIS, which noted that the Site does not overlay any Primary or Principal Aquifers that would be impacted by construction or operations on the Site, and that the nature of the majority of the soils on the Site precluded impacts.

As contemplated in the FGEIS, water to the Facility will be supplied by the Town of Niagara Water Department. The sanitary sewer system is designed to collect the wastewater generated from the proposed development and convey it by gravity to the existing 8-inch diameter concrete gravity sewer line located along Tuscarora Road through a doghouse manhole. The existing 8-inch diameter concrete sewer line connects to the existing 18-inch diameter concrete gravity sewer main located on Lockport Road by gravity. All sanitary flows will be domestic in nature and void of any industrial solid, hazardous, or toxic waste contamination.

There is available water and sewer capacity to address the demands of the Project. No bulk storage of petroleum or chemical products over ground water or an aquifer is proposed. The Project does not involve the commercial application of pesticides within 100 feet of potable drinking water or irrigation sources. Accordingly, the Project will not have any significant adverse impact on ground water.

E. Impact on Flooding

A Cayuga Creek West Tributary is mapped in the western portion of the site. Based on a review of the Federal Emergency Management Agency (FEMA) Effective Flood Insurance Rate Map (FIRM), the stream contains a mapped floodway, generally limited to the stream centerline and 100-year floodplain elevations that range from approximate elevation 600 (NAVD88) at the upstream end of the site to approximate elevation 590 (NAVD88) at the downstream end of the site. The Site is not located in a 500-year floodplain. Stormwater generated from the impervious surface associated with the Project will be handled on-site in accordance with its SWPPP. There are no dams located on the Site. Accordingly, the Project will not have any significant adverse impacts on flooding or flooding conditions.

F. Impact on Air

The Project does not entail the types of activities or operations that require JB2 to acquire air registration permits or that are associated with a significant potential for air emissions. Any impacts to air quality from construction activities will be minor, and temporary in nature. Regular operation of the Project will have no significant impact on air quality. The primary energy source for heating the warehouse is natural gas and back-up generators are subject to NYSDEC regulations, specifically 6 NYCRR Part 222. Regular operation of the Project will have minimal impacts on air quality. The primary energy source for heating the warehouse is natural gas and back-up generators, which are subject to NYSDEC regulations. Based on the Project operations, vehicles associated with the Project will not idle excessively and will comply with NYSDEC regulations regarding heavy duty vehicle idling. The Facility will have full time yard jockeys that move the trailers around the truck court. Trucks will enter the Site, drop their trailer in one of the trailer parking spaces, pick up a new trailer and immediately exit the Site, thereby eliminating the potential sound and air impacts associated with idling trucks.

Accordingly, the Project will not have any significant adverse impacts on air quality.

G. Impact on Plants and Animals

The FGEIS contemplated a loss of approximately 19% of the Site to permanent development, and analyzed impacts to species in that context. Here, the Project proposes to permanently develop only 7% of the Site, and so impacts to species are anticipated to be significantly reduced from what was originally contemplated in the FGEIS. A Threatened and Endangered Species Assessment ("T&E Report") was prepared for the Project, which is annexed hereto as **Exhibit E**. Based on a response from the NYSDEC Natural Heritage Program ("NHP") (**see Exhibit E**), there are no documented occurrences of rare or state-listed animals, plants or significant natural communities on the project Site. The response indicates that short-eared owl (*Asio flammeus*), a New York State endangered species, has been documented within 0.25 miles of the Site. The Devil Crawfish (*Lacunicambarus diogenes*), a New York State imperiled, but not state-listed species, has been documented within 50 yards south of the Site at the Niagara Falls Air Force Reserve Base, as previously referenced in the FGEIS.

In addition, an official species list was generated for the Site in January 2022 using the U.S. Fish and Wildlife Service ("USFWS") Information for Planning and Consultation ("IPaC") tool. **See Exhibit E**. The official species list identifies the Monarch Butterfly (*Danaus plexippus*) as a species that should be considered in a review of the Project.

Based on the analysis included in the T&E Report, which also includes various Site observations completed by Langan in November and December 2001, it does not appear that the Site is used as habitat by any of the threatened and endangered species of concern. The FGEIS similarly concluded that the Site is of low value as habitat, and that the species which would utilize the Site are common in the general region and would occupy new areas in the vicinity of the Site. The following information is noted:

1. Short-eared Owl: Short-eared owls prefer expansive, open areas such as grasslands and marshes. According to the NHP, the Short-eared owl was documented within one-quarter mile of the Site and there is uncertainty regarding its continued presence. Although the Site historically afforded large areas of open space that may have been considered suitable habitat, the Site is currently dominated by row crops (corn), scrub-shrub, successional stage and mature wooded areas that are not conducive to Short-eared owl habitats. Only the northern portion of the Site has limited grassy, open areas, and this portion of the Site has been subject to land disturbance for construction of an 8-inch diameter sanitary sewer force main, several manholes associated with the line, and a concrete vault associated with the sanitary sewer. Based on the above, the Site is unlikely to be frequently utilized by any local populations of short-eared owl. Furthermore, based on the land use and character of the region, particularly to the north and east, significant tracts of open land more suitable for use by this species is available. As such, the Project is not expected to adversely impact this species.
2. Devil Crawfish: According to the NHP, the Devil Crawfish was documented within 50 yards south of the site at the Niagara Falls Air Force Reserve Base. In 2003 the crawfish were observed in a ditch with cattails, purple loosestrife, watercress, water plantain, curly dock, and duckweed. As detailed in the FGEIS, this species is not located on the Property and would not be directly impacted by development on the Site. Since the Project will not adversely impact water quality of drainage leaving the Site, and instead is expected to significantly improve the same, the Project is not expected to impact the Devil Crawfish.

3. Monarch Butterfly: The USFWS has identified monarch butterfly as a candidate species that may occur onsite. According to the USFWS, the monarch butterfly lives in a variety of habitat throughout North America. Monarchs are typically found in open grass areas during the breeding seas and need milkweed (Asclepias spp.) for breeding. The Site contains large open areas; however, these areas are devoid of grasslands and occupied entirely by agricultural land utilized for row crops (corn). The Site lacks any notable areas of wildflowers or other herbaceous species crucial to monarch habitat.

Additionally, because the Site is currently undeveloped and primarily consists of agricultural and scrub/shrub wetlands, the Project will likely displace on-site animal and plant populations. Moreover, much of the southern portion of the site will remain in its current state, except for the addition of stormwater management features, providing habitat for any impacted plants or animals. To the extent the Project has any impacts, they are consistent with the impacts analyzed in the FGEIS. Each of these impacts was carefully assessed by not only the Town, but also the extensive list of agencies with which the Town consulted (including NYSDEC). Further, the Project's footprint is smaller than that which was analyzed in the FGEIS, lot coverage is significantly less than what is permitted under the Code as well as the FGEIS analysis, and mitigation measures consistent with or exceeding those proposed in the FGEIS have been incorporated into the Project.

Accordingly, the Project will not have any significant adverse impact on plants and animals.

H. Impact on Agricultural Resources

The FGEIS contemplated that the entirety of the Site would be converted from agricultural use to a use consistent with the heavy industrial zoning of the Site. The FGEIS acknowledges that the Site includes prime soils, however, the FGEIS concluded that the conversion of the Site would not be a significant adverse impact to the agricultural industry county-wide, and that the owner of the Site would satisfy requirements established by New York Agriculture and Markets Law by providing a waiver from the Notice of Intent process. The Department of Agriculture and Markets confirmed the acceptability of such a waiver in correspondence included in the FGEIS.

The Site currently has agricultural wetlands interspersed throughout the site, consisting of corn crop. The site is also listed as Agricultural District No. 7 in the Niagara County Agricultural & Farmland Protection Plan from September 2018. However, the site is currently zoned for Heavy Industrial uses and is in an area designated as a development corridor. Much of the Town of Niagara is characterized as developed areas in the 2018 Agricultural & Farmland Protection Plan and the site contains a low Land Evaluation and Site Assessment ("LESA") rating for agricultural and natural resource factors, including not having good soil characteristics, not located in an agricultural district, and are likely experiencing development pressures due to their location within the various development areas. Further, a waiver will be obtained from the owner of the Site as contemplated by the FGEIS prior to the commencement of construction. Accordingly, the Project will not have any significant adverse impact on agriculture or agricultural uses.

I. Impact on Aesthetic Resources

The Site is adjacent on the east and south to the Niagara Falls International Airport and the Niagara Falls Air Reserve Station to the east. The closest open space resource is Veterans Memorial Park, 2.2-miles to the northwest of the site along Lockport Road. Additionally, open space resources include Oppenheim County Park and Fairmount Park to the southeast of the site and Hyde Park and Niagara Falls State Park further west of the site opposite I-190. The Facility has a footprint of approximately 650,000 square feet and (at its highest point) reaches a height of 107 feet. As such, an analysis of possible Project impacts on aesthetics is warranted.

As defined by NYSDEC Program Policy (DEP-00-2 / Assessing and Mitigating Visual and Aesthetic Impacts, latest date revised December 13, 2019), an "aesthetic impact" is "the consequence of a visual impact on the public's use and enjoyment of the appearance or qualities of a listed resource". Visual impact is not determined by whether a specific structure can be seen. It is based on the context in which new structures or elements are located and viewed, the degree to which they are visible, and how they blend in with the landscape. Based on the size and height of the building, and because the Site is located within five miles of areas noted as aesthetic resources, a fulsome Visual Assessment was completed, a copy of which is annexed hereto as **Exhibit F.**

As demonstrated in the Visual Assessment, despite the scale of the Facility, while the Facility is visible from immediately surrounding areas, it is generally not visible outside of the immediate area of the Site and most of the visual impact will be along Lockport and Packard roads where visual sensitivity is lowest. Given the location of the Site relative to the scenic resources, the proposed Facility will not be have a substantial impact on nearby aesthetic resources identified above.

Given the proposed building setback and site plan features, the Facility will not have a substantial visual impact from residential areas in the vicinity of the Site. According to the Sound Report, while there are some residences on Lockport Road, the nearest dense single-family residential neighborhood is beyond Packard Road to the northwest and over 1,000 feet away from on-site activity. While the Facility has a proposed footprint of approximately 650,000 SF and a proposed height of 107 feet, any potential aesthetic impacts are sufficiently mitigated by the Facility location on the Site, the size of the overall Site where the Facility will be developed, the fact that majority of the Site will remain undeveloped, the significantly lower lot coverage than what was analyzed in the FGEIS, significant setbacks from surrounding lot lines, the distance from surrounding development, screening provided by the existing wooded area, proposed extensive landscaping, including include 318 shade trees, 582 evergreen trees, 89 evergreen shrubs, 121 deciduous shrubs, and 176 ornamental grasses. and the surrounding airport uses, there are no significant adverse impacts to the surrounding community. In addition, the proposed signage size matches the scale of the Facility as a whole and will be set significantly setback from adjacent property lines.

Any potential adverse aesthetic impacts from the Project have been sufficiently mitigated, and the Project will not have significant adverse impact on views from various viewpoints in Niagara and the surrounding area, including residential areas and State and local aesthetic resources such as parks, parkways, and scenic byways. Accordingly, while the Project requires a height variance and signage size variance, the Project will not have significant adverse impact on aesthetic resources.

J. Impact on Historic and Archaeological Resources

The FGEIS included consultation with SHPO regarding potential impacts to archaeological and historic resources. In the context of the FGEIS, SHPO concluded that the development of the Site would not impact cultural resources in or eligible for inclusion on the National Register of Historic Places. Further, the FGEIS noted that the Site is not located in an area flagged for sensitivity to archaeological resources.

Renewed consultation with SHPO is ongoing. There is one historic property and one historic district within a one-mile radius of the Site. Of the two historic properties and district, the property (Town of Niagara District School No.2) is listed on the State or National Register of Historic Places (NRHP) and the historic district (Niagara Falls Air Reserve Station) is listed as not eligible. **Exhibit G** will be updated to include the NY CRIS response letter once received.

Research on the CRIS confirmed that there are also no previously identified historic structures on or adjacent to the Site. There were no buildings identified 50 years or older that would be impacted by the Project due to screening by trees. Based on the above, the Project will not have any significant adverse impact on cultural resources.

K. Impact on Open Space and Recreation

The Site is not presently used for open space or recreation purposes. The entire Site is privately owned and not available for public use. The closest recreational resource is Veteran's Memorial Park, located approximately 2.2 miles northwest of the Site and the Project will not have any impacts upon the local park. Based on the distance between area parks and the level of development between the Site and the respective parks, there will not be a significant adverse visual impact form the Project. See **Exhibit F**. Accordingly, the Project will not have any significant adverse impacts on open space and recreation.

L. Impact on Critical Environmental Areas (CEA)

There are no designated CEA as described per 6 NYCRR 617.14(g) at the Site or in the area. Accordingly, the Project will not have any significant adverse impacts upon CEA.

M. Impact on Transportation

On-Site parking will consist of approximately 1,755 car parking spaces, 16 motorcycle parking spaces, 414 trailer parking spaces, and 55 loading docks. There are four proposed access driveways, located as follows:

- Packard Road opposite Lockport Road (Proposed Driveway #1).
- Two curb cuts on Packard Road (Proposed Driveways #2 and #3)
- A new curb cut on Tuscarora Road will be gated and only used as an overflow truck exit.

Sidewalks currently exist along both sides of Military Road. There is a sidewalk along the north side of Packard Rd that extends to the east of the eastern Packard Road/Porter Road intersection to Haseley Drive. Another sidewalk is located along the south side of Niagara Falls Blvd to the east of Walmore Road. There are no dedicated bicycle facilities; however, bicyclists are permitted to share the road on all roadways within the study area, except for the I-190 ramps.

The Niagara Frontier Transportation Authority ("NFTA") provides transit service along Niagara Falls Blvd in the vicinity of the site via Route 55. There are no transit routes immediately adjacent to the site. However, the site will be designed to accommodate an on-site transit stop and extension of a transit route will be discussed with NFTA.

To evaluate potential impacts to transportation from the Project, a Traffic Impact Study ("TIS") was prepared, which is annexed hereto as **Exhibit H**. The TIS concludes that the Project will be reasonably accommodated by the existing roadway network with the Project mitigations proposed.

The Project is anticipated to reach full buildout in approximately two years. To account for normal increases in background traffic growth, including potential development in the study area, a 0.5 percent annual growth rate was applied to existing traffic volumes. The TIS compared the use of transit and carpooling for a typical distribution facility with statistics for Niagara and nearby Erie County and estimates that approximately 8 percent of Project's employees will either carpool or use public transit. In addition, in terms of anticipated levels of traffic, based on Project shift times, peak traffic will occur between 6:30-7:30 a.m. and 5:30-6:30 p.m.

For employee vehicles, at full buildout, the Project is anticipated to generate 443 entering and 19 exiting vehicles during AM peak hour, and 392 entering and 399 exiting during PM peak hour. For trucks, at full buildout, the Project is anticipated to generate 24 entering and 24 exiting vehicles during AM peak hour, and 20 entering and 20 exiting during PM peak hour.
Since the most amount of delay to motorists usually occurs at intersections, a capacity analysis of the nearby intersections was conducted. Eleven (11) intersections in the surrounding area were studied during weekday commuter AM and PM peak hours and for Level of Service (LOS) to determine potential delays at intersections.

The TIS concludes that the existing roadway network can reasonably accommodate the Project with implementation of the following recommendations:

- The combination of projected traffic volumes approaching Proposed Driveway #2 indicate the warrant for a left-turn treatment is met during the weekday AM and PM peak hours. Therefore, left turn treatments is warranted and recommended at this site driveway intersection.

- The combination of projected traffic volumes approaching Proposed Driveway #1 and #3 (shown in Figure 8) indicate the warrant for signal treatments are met. Therefore, a signal treatment is warranted and recommended at these site driveway intersections.
- Signal timings at the Lockport Road/Walmore Road (South) intersections should be adjusted such that the northbound green time is increased by six seconds and the east/westbound green time is reduced by six seconds to accommodate the additional northbound traffic.
- The following Project improvements are recommended and, if approved by review agencies, shall be constructed by the Project sponsor:
  - ↓350 foot long westbound left turn lane with a ±75 foot taper on Lockport Road at Proposed Driveways #2 and #3.
  - ↓350 foot long southwest-bound right and left turn lane with a ±75 foot taper on Lockport Road at Proposed Driveway #1.
  - ↓350 foot long northeast-bound right and left turn lane with a ±75 foot taper on Lockport Road at Proposed Driveway #1.
  - ↓350 foot long southeast-bound left turn lane with a ±75 foot taper on Lockport Road at Proposed Driveway #1.
- Proposed Driveways #1, #2, and #3 should be designed to provide one entering lane and two exiting lanes. Traffic exiting the site at Proposed Driveway #2 shall be stop controlled and Proposed Driveways #1 and #3 shall have a signal installed.
- The project sponsor should have discussions with NFTA to provide transit service on-site.

The Project adopts and will include each of the above-referenced mitigation measures. With the recommended improvements in place, the Project will not have any significant adverse impact on transportation or the surrounding roadway network as any potential impacts have been sufficiently mitigated.

N. Impact on Energy and Utilities

The Project will have minor impacts to energy and utilities in line with what was contemplated in the FGEIS in connection with the development of the Site consistent with its Heavy Industrial zoning classification.

1. Water: **Exhibit I** is the Water System Engineer's Report. The Project will create a new demand for approximately 44,022 gallons per day (GPD) of water to serve its operations and employees. There are currently a 12-inch diameter ACP water main that transitions to a 10-inch diameter ACP water main along Packard and Lockport roads. There is sufficient capacity to meet demand without expansion of the water district or extension within the water district.

2. Sewer: **Exhibit J** is the Sanitary Sewer System Engineer's Report. The Project will generate approximately 44,022 GPD of sanitary wastewater. There are two gravity sewer mains within the vicinity of the property. There is an 8-inch diameter concrete sewer main located along Tuscarora Road and an 18-inch diameter concrete sewer main along Lockport Road. The sanitary sewer system will collect the wastewater generated from the proposed project and convey it by gravity to the existing 8-inch diameter concrete gravity sewer line located along Tuscarora Road through a doghouse manhole. The existing 8-inch diameter concrete sewer line connects to the existing 18-inch diameter concrete gravity sewer main located on Lockport Road by gravity. Sanitary flows will be domestic in nature and void of industrial solid, hazardous, or toxic waste contamination.

The sanitary sewer system has been designed in accordance with the requirements of the NYSDEC and the *Ten States Recommended Standards for Wastewater Facilities*, latest edition. The project will not have an adverse impact on the sewer district and no expansion of the district will be needed.

3. Natural Gas and Electricity: The primary energy source for heating will be natural gas, which will also be used to operate ventilation and HVAC systems. Electricity will be used to provide lighting and energy for warehouse and accessory office operations. Electric and natural gas service would be extended from the utility lines north and south of the Site, however, plans for routing the utility lines have not been finalized. The Project will create a demand for approximately 8.4-megawatt (MW) hours of electricity. National Grid services the electricity for the Site and has indicated that there is sufficient capacity to accommodate the Project's energy needs.

   National Fuel indicated that a summary of all natural gas equipment with Btu requirements specifying process equipment versus heating and cooling equipment, site drawings and specifications, preferred location of outside gas meter at the site and a new service line application will be required together with a review of required permits and rights-of-way to provide a cost for gas service and capacity requirements.

   The Project will also implement energy conservation measures, such as high-efficiency motors and transformers, LED lighting, motion sensors to avoid lighting areas that are not in use, and use of temperature set points to maximize energy conservation potential.

Overall, the Project will not have any significant impact on energy or utilities.

O. Impacts on Noise and Light

1. Noise: As noted above, the FGEIS evaluated that the Site would be developed and that new heavy industrial uses of the Site would result in increased noise levels. An evaluation of Site sound emissions was prepared for the Project, which is annexed hereto as **Exhibit A**. As discussed above, the construction of the Project would bring personnel vehicle and truck activity near noise-sensitive receptors which is a potential acoustical concern. The sound emission evaluation concludes that the Project will meet all applicable noise standards, including the Town Code and NYSDEC guidelines, and that the Project will not create any significant adverse sound impacts.

   Among the recommendations for operations include (1) outfitting trucks owned and controlled by the site with smart, ambient sensing, multi-frequency back-up alarms, and (2) proceed with the current HVAC equipment plans, assuming the plans do not markedly deviate from those presented in the model. To minimize receptor exposure to construction noise during construction, the Sound Report recommends (1) limiting all heavy equipment operation to non-noise-sensitive daytime hours and follow town construction hours, (2) if possible, limit the number of equipment operating near one receptor at a given time. Avoid exposing any one receptor to high sound levels for an extended period of time (3) place stationary equipment, such as generators, compressors, and office trailers, away from noise-sensitive receptors, (4) avoid having construction parking or laydown areas near noise-sensitive receptors, and (5) coordinate and high sound level construction activities with Town representatives and provide advanced notice to residents as feasible.

   Analyses show that distance and Site geometry will sufficiently attenuate on-site HVAC and vehicle noise to comply with the intent of local and State noise requirements and have no negative effect on the surroundings. Modelled steady and intermittent Site sound will be below existing average and maximum ambient levels, respectively. Given the results of this analysis and the prevailing ambient sound levels, on-site noise is expected to have no negative acoustical impact per DEC guidelines. Accordingly, based on the above, and with the proposed mitigation measures, the Project will not have any significant adverse impacts due to noise.

2. Light: The Project includes only sufficient lighting to allow for safe circulation of traffic and people around the Site and is not expected to appreciably increase ambient lighting of any neighboring properties. The Project will require night time lighting in parking and loading areas and around the buildings. Light sources are building-mounted at approximately 25 feet in height and pole-mounted at a maximum height of 40 feet. High quality lighting will be installed as a part of the Project, however, as the detailed Lighting Plan included in the Site Plans shows, Project Site lighting will be LED fixtures designed to focus lighting in needed areas and minimize light spillover onto adjacent areas. Exterior lighting will include fixtures at parking lots and building entrances as well as Pedestrian-scale fixtures. Luminaries are dark-sky, high-efficiency LED lights with cut-off shields to provide uniform and energy-conscious illumination to walkways and parking lots on-Site. In addition, as previously noted, the Facility is well away from surrounding residential or recreational uses and abuts a well-lit airport to the south. Accordingly, the Project will not create any significant adverse impacts from lighting.

P. Impacts on Human Health

A Health and Safety Plan (HASP) will be prepared for the construction and operations of the facility. Neither the construction nor the daily operation of the Project will have any significant impacts on public health and safety.

1. Construction Activities: A majority of the Project construction will take place within the boundaries of the Site, with off-site improvements to surrounding roadways to improve site access. Fencing, signs, and barriers will be used at the Site during construction. Where necessary, construction areas will be delineated and entry of unauthorized personnel will be restricted. Appropriate signs will be posted to inform of potential construction hazards. The Project will minimize risks to construction personnel by complying with applicable Occupational Safety and Health Administration (OSHA) and New York State Labor Law requirements. Accordingly, the construction activities associated with the Project will not have significant impact on public health and safety.

2. Operational Activities: The Project is a private and secure facility with 24-hour-a-day, seven days a week (24/7) operations. The Facility will not be open to the public. Two guard houses are located at each access point and the perimeter of the Site is fenced for security purposes. The primary guardhouse is on the western portion of the site and accessible from the Packard/Lockport road entrance, while the secondary guardhouse is on the eastern portion of the site near Tuscarora Road.

   Current emergency services are anticipated to be sufficient to serve the Project. The Site will be serviced by the Town of Niagara Police Department, with after-hours service provided by the Niagara County Sheriff Department dispatch, as indicated on the Town of Niagara Police Department website. While there is no anticipated need for additional police manpower at the Project site, it is acknowledged that there may be calls generated by the Facility operations.

   While there could be the potential increase in the need for police services due to the proposed use at the Project site, it is anticipated that on-site security measures will be implemented at the Facility to mitigate any potential impacts. Security measures include, among others, gates and guardhouses, video surveillance, alarms, internal training of its staff, identification badges for employees, guest sign in and escort, and trailer parking area access limited by guardhouses. Such security measures would be fully implemented and function on a 24/7 basis and the Town Police will have the opportunity to review the application and plans to address concerns.

The Site will also be serviced by the Town of Niagara Fire Company ("NFC"), who will provide fire protection and emergency medical services (EMS) for the Site. The Utility Plan (Site Plan Drawing Nos. CU100-CU104, bound separately) indicates the location of fire hydrants, fire riser rooms, and fire pump discharge to tie into the internal fire service loop and includes the provision of well labeled sprinkler and standpipe connections on the outside of the Facility. As required by the NYS Fire Code, multiple points of access to the building will be provided allowing for alternate routes of entry and exit in the event of an emergency. The NFC will have the opportunity to review plans for new construction, and JB2 has already engaged in extensive discussions with the Town and NFC regarding the Project. Training and drills at the Facility will be mandatory to ensure that employees are familiar with all safety procedures, and NFC will be consulted in the preparation of the Facility-specific fire safety plan.

The Facility will be also equipped with completely independent and redundant automatic fire water supplies, each of sufficient capacity, reliability, and duration to serve automatic fire sprinkler systems in the facility in accordance with NFPA 13, NFPA 24, and all local requirements. Also, a second water storage tank has been incorporated for redundancy. The fire suppression water supply source will meet the greater of the sprinkler hose demand and the fire flow demand. All sprinkler systems and fire alarm components such as smoke detectors and pull stations will be properly labeled. This will allow NFC to quickly locate activated alarms and minimize the facility's evacuation time.

The proposed access driveways will be designed to accommodate fire engines. Emergency vehicle access will be provided around the building and fire lanes will be provided at appropriate locations around the building in accordance with the applicable codes.

Due to enhanced and state-of-the art fire protection measures that shall be implemented at the Site and a review with NFC regarding the site plans and a determination of equipment requirements for the Project, any potential impacts will not be significant and can be appropriately addressed within the existing resources of the NFC. Based on the foregoing, the Project will not pose a significant adverse impact to the NFC in carrying out fire protection duties at the Site.

Based on the aforementioned operational safety measures proposed as part of the Project, that the daily operational activities of the Project will not have significant impact on public health and safety.

3. <u>Remedial Sites</u>: As indicated in the Part 1 EAF, the NYSDEC Environmental Site Remediation database identifies site number 932106 as an Active Resource Conservation and Recovery Program at 914 Tactical Airlift Group, related to the closure of a hazardous waste storage unit associated to the U.S. Reserve Command at Niagara Falls International Airport, which is near the project Site. According the NYSDEC Environmental Site Remediation database, containment and removal of site contaminants through long term operation of the remedial actions installed at the airport remedial site minimize environmental impacts from that site. There are no institutional controls limiting property uses at the Site nor is it expected that remedial site will have a significant impact on the development of the Site for the proposed warehouse use.

Q. Consistency with Community Plans

As detailed above, the Site was identified by the Town as suited for development as a Shovel ready site with a zoning classification for heavy industrial uses. An extensive evaluation was undertaken by the Town, County, and State for this purpose, and the Site was confirmed by the Town as being well-suited for the Project. The Site is consistent with the character of the surrounding uses, which includes the Niagara Falls International Airport to the east and south, a mix of commercial and industrial uses to the west, and the Niagara Falls Air Reserve Station to the east. The area north of the airport has been designated for industrial use and a warehouse would be a compatible light industrial use as stated in the Comprehensive Plan under Industrial Land Development.

The Heavy Industrial (HI) zoning bulk regulations were incorporated into the design of the Facility, and while three area variances (due to height, signage size, and the design of the access roads) are required, these variances will facilitate the development of a modern warehouse distribution facility at a location with convenient access to I-190 less than 1.5 miles to the southwest on the Site selected by the Town both in 2011 for such development as well as more recently for the Project itself. The Project would serve as a catalyst for economic activity through the creation of construction and operation jobs and a substantial tax base on what is now vacant land, long targeted for development. The long-term impact, in addition to jobs creation, would be additional economic activity generated around the Site. All of these factors contribute to developing a balanced and vibrant economy consistent with the goals and objectives of the Comprehensive Plan, especially related to industrial development, and the Site's Shovel Ready Certification.

Although the Site is not currently developed, there is sufficient capacity available for water, sewer, electric and natural gas service to service the Project in the area. The Project is consistent with the overall vision and goals of the Town to activate a Site that is approved for industrial use to further economic development. Accordingly, the Project will not have significant adverse impacts to community plans and will in fact further the community plans as set forth in the Comprehensive Plan and FGEIS.

R. Consistency with Community Character

While the Facility is visible from immediately surrounding areas, most of the visual impact will be along Lockport and Packard roads where visual sensitivity is lowest. **See Exhibit F**. While the Facility has a proposed footprint of approximately 650,000 SF and a proposed height of 107 feet, any potential aesthetic impacts are sufficiently mitigated by the Facility location on the Site, the size of the overall Site where the Facility will be developed, the fact that majority of the Site will remain undeveloped, the significantly lower lot coverage than what was analyzed in the FGEIS, significant setbacks from surrounding lot lines, the distance from surrounding development, screening provided by the existing wooded area, proposed extensive landscaping, and the surrounding airport and quarry uses. There are no significant adverse impacts to the surrounding community.

Moreover, south and east of the site as mentioned, is the Niagara Falls International Airport within a light industrial zoning area. It will remain in its current state, acting as a buffer area for other existing residential/commercial development in the area. North of the Site across Lockport Road consists of Business-1 (B-1) district lots developed with residential homes, agriculture, and commercial business. Additionally, heavy industry zoning continues north of Lockport Road whereas Residential zoning (R-1) is found further west of Packard Road. The majority of the surrounding area, however, is zoned light industrial, and the Site itself is zoned Heavy Industrial and the Site went through the extensive FGEIS and Shovel Ready certification processes. Further, the Project was solicited by the Town for this Site. The proposed Project is consistent with the character of the surrounding uses. Furthermore, given the size of the Site, significant setbacks, areas left undisturbed by the Project, and minimal lot coverage aided by the facility's height, there is sufficient area to address potential concerns regarding land use impacts.

The Project will not replace or eliminate existing facilities, structures or areas of historic and cultural importance to the community. It is anticipated that community services are sufficient to accommodate the Project. The Project will not impact use of Veterans Memorial Park, the closest park to the Site, since is located approximately 2.2 miles from the Site.

While the scale of the Project differs from nearby development, given the size of the Site and the location of the Facility on the Site adjacent to the airport, no significant adverse impacts to neighboring properties are anticipated. Potential aesthetic impacts are mitigated as shown in the Visual Analysis Assessment (**Exhibit F**). The Project will not introduce objectionable lighting or noise to the area, and the Site has been targeted for development by the Town, County, and State.

Accordingly, the Project will not have any significant adverse impacts to community character.

S. Cumulative/Growth Inducing Impacts

Certain proposed actions covered under the SEQRA process have the potential to trigger further development by either attracting a significant local population, inviting commercial industrial growth, or by inducing the development of similar projects adjacent to the project constituting an action. The Project has the potential to induce growth in the Town and the surrounding areas through employment opportunities, housing and ancillary businesses. The development of the Project will result in a significant number construction workers with seasonal employment at the Site, and the permanent jobs resulting the warehouse facility operation. It is anticipated that these workers will come from the Buffalo-Niagara region, and that many of these workers will be drawn from the existing labor pool along with residents of Niagara County and Western New York, within an approximate 60 to 70 mile radius of the Site.

Some jobs may be filled by professionals moving into the area. However, the Project is not expected to impact the local housing market in the Town. Construction workers and Facility employees will most likely patronize restaurants, hotels/motels, entertainment facilities, and other services provided in the vicinity of the Site and surrounding communities. While the Project has the potential to induce growth, as discussed above, it will be consistent with the local zoning and the Comprehensive Plan. Accordingly, the Project will not have any significant adverse growth inducing impacts on the Town.

CONCLUSION

The Site has been exhaustively reviewed by the Town, County, and State in connection with its certification as a Shovel Ready site. An FGEIS was completed for the Site, which contemplated a project with more extensive potential impacts than the Project proposed now. The Town reached out to solicit the Project specifically, and extensive additional diligence has been completed. A number of temporary and/or minor environmental impacts have been identified in connection with the Project. However, a thorough analysis of these potential impacts reveals that, where necessary, such impacts have been mitigated to the greatest extent possible by the Project design and/or off-Site mitigation, and that none of these impacts will be significant. Accordingly, it is respectfully submitted that it is appropriate that the lead agency issue a negative declaration for the Project.

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Exhibit A

LANGAN

Technical Excellence
Practical Experience
Client Responsiveness

01 February 2022
Revised 14 February 2022

John Bancroft
JB2 Partners, LLC
3322 Grant Valley Road NW
Atlanta, GA 30305

Re: Preliminary Geotechnical Engineering Study
Lockport Road and Packard Road
Town of Niagara, New York
Langan Project No.: 190071801

Dear John:

This letter report presents our preliminary geotechnical engineering study for the proposed development in the Town of Niagara, New York. The purposes of this study were to explore subsurface conditions, evaluate feasible foundation options, and develop geotechnical engineering recommendations. Services were performed in accordance with our authorized proposal (01 October 2021).

Our exploration plan was developed considering Concept CP05 entitled "Concept Site Plan" by Langan (25 October 2021, revised 13 December 2021). The concept plan was updated after the completion of the exploration program. Our approach and recommendations were developed considering Concept CP06 entitled "Site Plan" by Langan dated 25 October 2021, revised 11 January 2022. The following design criteria, preliminary loads, and design bulletin were also used to develop our preliminary recommendations:

- "Building Design Template" drawings prepared by the proposed tenant dated 30 July 2021; and,
- "Design Criteria and Outline Specification" prepared by the proposed tenant issued 26 August 2021, revised 17 September 2021.

At this time, the site grading is still progressing and additional exploration within the updated building footprint is needed to finalize design recommendations. As such, the recommendations provided here are subject to change with the revised site grading and additional subsurface information.

Elevations are referenced from a survey entitled "Instrument & Topographic Survey of a Portion of Lands Now or Formerly of Gatham Home 18 LLC" (December 2021) prepared by Passero Associates, referencing the North American Vertical Datum of 1988 (NAVD88).

SITE DESCRIPTION

The about 217-acre site is located on the southern intersection of Lockport Road and Packard Road in Niagara Falls, Niagara County, New York. Surrounding properties include:

- North: Lockport Road, residential and commercial building, and farmland areas beyond;
- East: by farmland areas, Tuscarora Road, and Niagara Falls Air Reserve Station beyond;
- South: by Niagara Falls International Airport taxiways and main runways; and,
- West: by Commercial buildings, Haseley Drive, Packard Road, and residential buildings beyond.

Figure 1 shows the site location and surrounding properties.

The site is primarily farmland with wooded areas at the south part of the site and some small, localized wooded areas throughout. An existing asphalt roadway, previously identified as the "Niagara Drag Strip" was constructed 1960s and runs east to west, bisecting the southern part of the site. The asphalt roadway is still visible at the site today. The west tributary of the Cayuga Creek runs through the southwest part of the site. Localized wetland areas were identified around the site. Delineation of wetlands is outside the scope of this study.

The existing site is relatively flat, with existing grades varying between about el +590 and el +615, generally sloping down from north to south. The existing grades within the proposed building footprint vary between about el +601 to +608. The southern part of the site was leveled off at about el +598 to create the existing drag strip.

PROPOSED DEVELOPMENT

The proposed development will include demolition of the existing farm fields, and the construction of a building at the northern part of the property. The concept plan referenced above proposes a 649,653 square foot (SF) building footprint. The proposed building prototype typically consists of a steel structure with estimated column loads up to about 2,300 kips. The slab on grade will support 30- to 45-kip posts in addition to the floor load. We estimate floor loads up to about 500 pounds per square foot (psf). No below-grade levels are proposed.

The proposed building will have associated parking stalls, loading docks, access roads, landscaped areas, utilities and stormwater basins. Additionally, two above-ground water tanks are proposed for the site (to be designed by others). The water tanks for the fire suppression system have a weight of about 3,100 kips per tank and a diameter of about 47 feet.

A Finished Floor Elevation (FFE) of el +612 is proposed for the main building based on concept CP06. Final site grades are still being developed at this time, however, we understand the proposed concepts consider raising the site between about 4 to 11 feet within the proposed building footprint to aid with stormwater design. At this time, fills up to 7 feet are proposed within the parking areas and cuts are proposed for the stormwater basins. We assume several fill retaining walls up to about 7 feet high will be used at the site to transition from existing grades to fill areas.

Four new access roadways are proposed; one at the intersection of Packard Road (County Road 82) and Lockport Road (County Road 6) to the northwest, two at Lockport Road (Country Road 6) to the north, and one at Tuscarora Road to the east.

REVIEW OF AVAILABLE INFORMATION

Regional Geology

The 1989 "Surficial Geologic Map of New York" (Figure 2) indicates the overburden material is glacial till. The glacial till typically consists clay and silt with varying proportions of sand, gravel, cobbles and boulders. The 1970 "Geological Map of New York" (Figure 3) indicates the bedrock below the site is a Guelph Dolostone. Both maps were prepared by the New York State Geological Survey.

Generally, the Niagara Falls area contains dolostone and shale bedrock. Dolostone, a known carbonate bedrock, is susceptible to void formation and subsequent karst solution features. Karst solution features such as sinkholes, caves, springs, and mudboils may occur when carbonate bedrock dissolves. The site appears to be outside of areas of carbonate rock as shown in "Karst in the United States: A Digital Map Compilations and Database" by USGS (see Figure 4), but due to the proximity of the carbonate rock in Figure 4, the presence of karst features may be a concern at the site.

We also reviewed the New York State Department of Environmental Conservation online GIS-based database for New York State Mines and Wells. According to the GIS database, no mining operations have been reported on the project site, with the nearest known mining operation to be a borrow area for limestone about 1,500 feet north of the project site.

Federal Emergency Management Agency Flood Map

We reviewed the Flood Insurance Rate Map (FIRM) published by the Federal Emergency Management Agency (FEMA), Map No. 36063C0327E effective 17 September 2010 (Figure 5). The majority of the site is primarily in Zone X - unshaded, "areas determined to be outside the 500 year floodplain." The southwestern portion of the site is located in Zone AE, identified as areas of that have "1% chance of being equal to or exceeded in any given year" annual base flood elevations, with established base flood elevations ranging from about el +587 to el +600. We note the proposed area of development appears to be located at the northeast part of the site, within "Zone X."

AVAILABLE INFORMATION

Langan completed a Geotechnical Desktop Study (13 October 2021), which includes subsurface information for adjacent and local properties; see the Desktop Study for additional information. Aerial and Topographic information included in the Desktop Study is summarized below.

Historic Aerial Images and Topographic Maps

Historical aerial photos (dating back to 1958) and topographic maps (dating back to 1897) show the Site was occupied by undeveloped, agricultural land since at least the mid-1950s, and as early as the late 1800s. The 1967 topographic map shows the asphalt roadway known as the "Niagara Drag Strip" as constructed. Aerial photos from this timeframe also show two buildings located on the western portion of the drag strip. Remnants of the drag strip and structures are still visible on current aerial photos. The site remains relatively unchanged since the construction of the Niagara Drag Strip. Historic aerial images and topographic maps are included in Appendix A.

Wetland areas are located on the northern portion of the adjacent property to the east, as well as the southern and southeastern portions of the adjacent Niagara Falls International Airport.

SUBSURFACE EXPLORATION

Langan performed a subsurface exploration consisting of borings, observation wells, test pits, refraction microtremor (ReMi) testing and geophysical testing throughout the proposed development area. All work was overseen by a Langan field engineer. An exploration location plan is shown in Figure 6.

Borings

48 borings (LB-01 through LB-17 and LB-101 through LB-131) were drilled by SJB Services, Inc., between 30 November and 17 December 2021. The borings were drilled using a Diedrich D-50 track-mounted drill rig and hollow-stem-auger (HSA) techniques to about 4.5 to 22.5 feet below existing grades (about el +578 to +604).

Standard Penetration Test (SPT) N-values[1] were documented and soil samples were generally obtained continuously to a depth of 12 feet and every 5 feet thereafter. Disturbed soil samples were obtained using a standard 2-inch-outer-diameter split-spoon sampler driven by a 140-pound automatic or safety hammer in accordance with ASTM D1586, Standard Penetration Test. Undisturbed samples were collected using a standard 3-inch-outer-diameter Shelby tube in accordance with ASTM D1587, Thin-Walled Tube Sampling for Geotechnical Purposes.

Recovered soil samples were visually examined and classified in the field in general accordance with the Unified Soil Classification System (USCS). Soil classifications, N-values, and other field observations were recorded on our field logs provided in Appendix B.

Bedrock was cored in selected borings using a 2.15-inch NX core barrel. The core barrel was equipped with a diamond cutting bit in accordance with ASTM D2113, Rock Core Drilling. Rock type, percent recovery (REC)[2] and Rock Quality Designation (RQD)[3] were determined for each the core run.

Groundwater Observation Wells

Four groundwater observation wells were installed throughout the building footprint. An additional nine observation wells were installed around the site for water level observation and environmental testing. Well construction logs are provided in Appendix C.

Test Pits

Test pit were excavated throughout the site to further observe the subsurface soils and groundwater. 49 test pits (TP-01 through TP-49) were excavated by Mark Cerrone Inc., between 01 and 15 December 2021. The test pits were excavated using a Komatsu PC138 excavator to about 2 to 22 feet below existing grades (about el +582 to +606). Test Pit logs are provided in Appendix D, and photographs are provided in Appendix E.

Lab Testing

Selected samples were sent to a certified testing laboratory to confirm visual classifications and to determine index properties (physical and mechanical) of the soils for use in our evaluation. 5 grain-size analyses (ASTM D422), 14 Atterberg Limits (ASTM D4318), 2 incremental consolidation

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[1] The Standard Penetration Test (SPT) is an in situ testing technique used to infer soil density and consistency. The SPT N-value is defined as the number of blows required to drive a 2-inch-diameter split-barrel sampler 12 inches after an initial penetration of 6-inches using a 140-pound hammer falling freely from 30 inches.

[2] Rock Core Recovery (REC) is defined as the ratio of the total length of rock recovered to the total core run length, expressed as a percent.

[3] The RQD is defined as the ratio of the summation of each rock piece greater than 4 inches long (for NX cores) to total core run length, expressed as a percent.

(ASTM D2435) and 19 moisture-content determinations (ASTM D2216) were performed. Lab testing results are provided in Appendix F.

ReMi Testing

ReMi seismic testing uses ambient noise and surface induced waves to generate a vertical shear wave velocity profile for the subsurface soils. The ReMi equipment used for the data collection included: (1) a SeisDaq ReMi recording unit, (2) alignments of 60- to 240-foot lengths with a twelve 10-Hz vertical geophone array, and (3) a laptop with the “VScope” software used for storing the raw data. We completed 12 alignments throughout the proposed building footprint. The data sets were sent to our Subconsultant, Subterraseis, for processing. Results are provided in Figure 7. The site appears to be relatively uniform and we believe the ReMi testing completed to date is representative of the subsurface conditions throughout the site.

Geophysical Testing (ERI)

Electrical Resistivity Imaging (ERI) was completed by our subcontractor, NOVA Geophysical Engineering. ERI uses electric current between positioned electrodes to map the differences in electrical properties of the subsurface materials, which can indicate variations in lithology, water content, buried debris, voids, etc. The resulting resistivity is modeled to create a map of the subsurface resistivity to determine if anomalies or variations in the subsurface are present. Results of the ERI geophysical testing are included in Appendix G.

SUBSURFACE CONDITIONS

Subsurface Materials

The subsurface conditions generally consist of a surficial layer of topsoil underlain by layers of clay, glacial till, and bedrock. A description of subsurface materials encountered is provided below in order of increasing depth.

Topsoil – A layer of topsoil was encountered in 42 borings and 46 test pits. The topsoil was about 3 inches to 3 feet thick, and generally consists of brown to dark brown fine to medium silt with varying proportions of sand, clay, and roots. In the nine borings and test pits where topsoil was not encountered, a surficial layer of asphalt about 3 to 6 inches thick was encountered. The surficial asphalt material was encountered near the existing drag strip area.

Fill – Below the surficial materials, a layer of fill was encountered in two borings and five test pits (LB-119, TP-30, TP-33, TP-36, TP-37, and TP-46). The fill was about 0.3 to 1.7 feet thick, and generally consists of gray to black fine to coarse sand with varying amounts of silt, clay, gravel, and roots. One SPT N-value within the fill layer was 29 blows per foot (bpf). Note the high SPT N-values within the fill layer is likely the result of obstructions (boulders, cobbles, or gravel) blocking the sampler. The fill layer is generally classified as SP or SC (poorly graded to clayey sands) in accordance with the Unified Soil Classification System (USCS).

Clay – Below the fill or topsoil, a layer of clay about 2 to 10 feet thick was encountered in all borings and test pits, except TP-18. The top of the clay layer was encountered between about el +590 to +612 throughout the site and between about el +601 and 607 within the proposed building footprint. The clay is generally composed of reddish brown clay with varying amounts of silt and sand. N-values within the clay layer typically vary between 11 and 28 bpf, with an average of 17 bpf. The clay is stiff to very stiff consistency and is generally classified as low-plasticity clay (CL) in accordance with the USCS.

Glacial Till – Below the clay, a layer of glacial till about 0.5 to 7 feet thick was encountered in 36 borings and 44 test pits. The top of the till layer was encountered between about el +583 to +608 throughout the site and between about el +595 and 603 within the proposed building footprint. The glacial till is generally a mix of brown to reddish brown sand with varying amounts of gravel, silt, clay, cobbles, boulders and weathered rock fragments. N-values within the clay layer typically vary between 10 bpf and split spoon refusal (greater than 100 blows per 6 inches), with an average of 35 bpf. Note that higher SPT N-values within the glacial till layer are likely the result of obstructions (boulders, cobbles, or gravel) blocking the sampler. The glacial till layer is generally classified as poorly graded sand and clayey sand (SP and SC) in accordance with the USCS.

Weathered Rock – Below the glacial till and clay, a layer of weathered rock was encountered in nine borings. The weathered rock is general composed of gray fine to medium gravel and weathered rock pieces with varying amounts of sand and silt. N-values within the weathered rock layer were split spoon refusal; note that higher SPT N-values are likely the result of obstructions (weathered rock or gravel) blocking the sampler. All borings and test pits were advanced to assumed top of weathered rock or bedrock, inferred by split spoon, auger or excavator refusal. REC and RQD of rock core samples in the weathered rock layer ranged from about 42% to 98% and 7% to 38%, respectively, indicative of poor rock quality. The weathered rock displayed the structure of the parent rock.

Bedrock – Below the weathered rock or glacial till, a layer of competent bedrock was cored in 11 borings. The bedrock consists of gray dolostone, fine to medium grained, moderately weathered, with near horizontal fractures. The REC and RQD of the competent rock core samples ranged from about 73% to 100% and 50% to 100%, respectively.

Karst Features – ERI testing was completed to explore the subsurface for indicators of karst formations (voids, anomalies, caverns, etc.) within the subsurface and Dolostone rock. There were minimal indicators of karstic formations observed within the ERI data profiles, and we believe there is a low probability of karstic features within the subsurface materials below the building footprint shown in CP05. The subsurface conditions at the site appear to be relatively uniform, but additional ERI testing should be completed within the revised CP06 building footprint to confirm there is a low probability of karstic features within the shifted building footprint.

Groundwater – Groundwater was encountered between about el +588 to +610 throughout the site and between about el +595 and el +599 within the proposed building footprint. Groundwater, if encountered, should be expected to fluctuate with seasons, precipitation, construction activities, irrigation activities, etc.

GEOTECHNICAL DESIGN RECOMMENDATIONS

Additional Explorations & Analysis

The building footprint was moved following completion of the exploration program. We recommend the following additional exploration and analysis work be performed to advance the geotechnical design and construction recommendations:

- Borings and test pits should be completed within the revised building and water tank footprints, and within parking areas and drive aisles.
- Geophysical testing should be completed to explore potential karstic features within the proposed building footprint.
- Groundwater levels should be obtained throughout design for additional measurements and potential refinements to recommendations for any water controls.
- Sulfate and Chloride testing within the proposed building footprint.
- The water tower foundations, ground improvement system, and retaining walls will need to be designed by others as this is a delegated design.

Preliminary Seismic Design

This section presents seismic design recommendation, in accordance with the 2020 New York State Building Code (International Building Code 2018). We have considered the soil conditions encountered in the borings and the shear wave velocities from ReMi testing to be consistent and representative of the soil conditions in the top 100 feet of soil at this lot.

Based on the below spectral accelerations and the anticipated risk category, we have estimated the Seismic Design Category (SDC). The structural engineer is responsible for confirming the appropriate use group, occupancy category, and final SDC for the proposed structure.

Table 1. Seismic Design Values

Description	Parameter	Recommended Value
Mapped Spectral Acceleration for short periods[4]:	S_s	0.161 g
Mapped Spectral Acceleration for 1-sec period[5]:	S_1	0.044 g
Site Class:	--	**C – Very Dense Soil**
Site Coefficient:	F_a	1.3
Site Coefficient:	F_v	1.5
5% damped design spectral response acceleration at short periods:	$\mathbf{S_{DS}}$	**0.140g**
5% damped design spectral response acceleration at 1-sec period:	$\mathbf{S_{D1}}$	**0.044g**
Anticipated Risk Category	--	**II**
Seismic Design Category	**--**	**A**

Liquefaction

We evaluated the liquefaction potential of non-cohesive soil below the groundwater table and up to 50 feet below the ground surface as required by the New York State Building Code. The subsurface consists of cohesive materials, dense soils, and bedrock, and it is our opinion that the soils at the site are not susceptible to liquefaction as defined in the Building Code.

Preliminary Building Foundations

The current concept includes raising grades between about 4 and 11 feet within the proposed building footprint. Raise-in-grade fills will cause consolidation of the clay soils below the fill materials, in addition to settlement of the newly placed fill under the anticipated building loads. We estimate settlements across the building footprint to be between about 2 and 6 inches, with the larger settlements observed in the higher fill areas and where the largest loads are anticipated, which are likely unacceptable. Therefore, we assessed alternative approaches to support the building. We understand that the proposed construction schedule would likely not allow for a surcharge program, which would take several months. Therefore, we recommend the following preliminary foundation support approach for budgeting purposes.

Ground Improvement and Shallow Foundations

A ground-improvement (GI) program consisting of rigid inclusions or grouted aggregate elements could be performed to reduce anticipated settlements of the proposed structure. Ground improvement elements can be installed under footings and walls; however, they are not

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[4] Value obtained from AT Council Hazards by Location as provided by the USGS.

[5] Value obtained from AT Council Hazards by Location as provided by the USGS.

structurally connected to the foundation. The number of ground-improvement elements at each location will vary depending on the loading, the subsurface conditions, and the final design (by others).

Rigid Inclusions (RIs) consist of using an auger to replace a column of soil with cement-based grout. Aggregate piers consist of vibrating or ramming a mandrel into the ground; as the mandrel is extracted, the column of soil is replaced with densified crushed stone and grout. A Load Transfer Platform (LTP) of well-compacted granular soil, typically about 18 to 24 inches thick, is used to transfer loads from the structure to the GI elements. Grout-based GI elements typically can provide bearing pressures around 8 ksf. Grouted GI elements are stiffer than aggregate piers and therefore will better aid in reducing settlements.

The ground-improvement element diameter, spacing, grout mix (if applicable), strength, depth and locations, in addition to the need for a LTP should be designed by the contractor's Professional Engineer licensed in New York and submitted to the design team for review. The depth of the ground-improvement elements should be established by the contractor performing the ground-improvement work. The minimum depth of the ground-improvement elements should be such that the allowable bearing pressures recommended here are reached.

All exterior footings should be constructed 48 inches or deeper below the lowest adjacent grade for frost protection. Interior footings in heated spaces may be constructed at a convenient depth below the slab; however, all bottoms of footings should be at least 1.5 feet below the finished-floor elevation. Interior footings in non-heated spaces, or where frost protection is not provided throughout construction, should be protected from frost (e.g., lowering footings, backfilling, heaters/blankets, etc.).

Isolated column footings should have a minimum dimension of 3 feet, and strip footings should have a minimum width of 2 feet even if smaller dimensions can be justified using the recommended allowable bearing pressure.

Foundations should not be located so that one foundation is within the zone of influence of an adjacent foundation. The zone of influence is taken as a 1H:1V projection extending outward and downward from the edge of the foundation.

For mass concrete poured against approved compacted soil subgrade, a coefficient of sliding friction of 0.25 can be used. If a minimum 6-inch-thick layer of compacted processed aggregate is placed on top of the approved, compacted soil subgrade, a coefficient of sliding friction of 0.3 can be used.

Alternative – Driven Piles

Ground conditions encountered at the site to date indicate the probability of large karstic features within the subsurface is low. Larger karst features, if encountered, may be remediated by grouting. However, if significant karst features are encountered within the CP06 building footprint, a pile foundation may be evaluated. Additional testing within the building footprint is needed to confirm our above recommendations before evaluating remedial measures or deep foundation support.

Building Settlement

We understand up to 12 feet of fill will be placed within the building footprint. We estimate settlements within the building to be between about 2 to 6 inches with the raise-in-grade fills and building loads.

Ground improvement will help minimize settlements to meet the design tolerances. Total settlement of the structures should be on the order of 1 inch or less, provided the bearing pressure recommended here is used and the subgrade preparation work described here is performed. Differential settlements of adjacent columns should be about ½ inch. The settlement criteria must be provided as part of the specifications for the ground improvement.

The raise-in-grade fills should be placed prior to the commencement of ground improvement. It is anticipated that the settlement within the raise-in-grade fills will be nearly immediate and will take place during construction if granular material is used. If on-site materials (clay and till soils) are used for the mass fill, the material should be properly handled and dried prior to placement to minimize consolidation of these materials over time.

Consolidation of the natural clay layer will take place over time and should be monitored during construction. Consolidation of the subsurface clayey soils is estimated to take between about 2 to 7 months depending on the height of the fill materials and working pad elevation, mass fill material type, ground improvement column material, etc. We recommend the first layer of fill over the natural clays be a granular material to act as a drainage layer and aid in consolidation. Settlement monitoring points should be used to monitor the existing clay and proposed fill settlement within the raise-in-grade area during earthwork. The total settlement measured at the monitoring points can be used to evaluate timing of slab and utility construction. Additional recommendations are provided in the Mass Fill Placement and Monitoring section of this report.

Preliminary Building Floor Slabs

Slab on Grade

Fills up to 11 feet are proposed within the building footprint, and will lead to consolidation of the clays within the subsurface. The floor loads of up to 500 psf in addition to post loads up to 45 kips will also contribute to the consolidation. Depending on the schedule for construction of the building slab, we believe a slab-on-grade bearing on structural fill may be feasible. The raise-in-grade fills should be placed at the onset of construction to allow for the natural clays to consolidate. The consolidation settlement must be monitored during construction to determine when settlements have leveled off. If the schedule does not permit to allow the clays or consolidate or settlement is still observed during proposed slab construction, additional ground improvement elements may be necessary with the slab-on-grade to support localized slab areas and minimize settlements below the slab.

We recommend granular material be used for the upper 1.5 to 2 feet below the building slab. This should be coordinated with the vapor mitigation system, if necessary, as the sub-slab materials may aid in determining the subgrade modulus. The slab-on-grade supporting short-term loads over smaller areas (e.g., vehicle wheel loads)[6] should be designed for a preliminary modulus of subgrade reaction of 125 pounds per cubic inch (pci). The slab-on-grade supporting long-term loads over larger areas (e.g., uniform or rack loading) should be designed for a reduced preliminary modulus of subgrade reaction of 80 pci.

Utilities below the slab should be installed following settlement monitoring and when settlements have leveled off. Utilities should have flexible connections to allow to some movement.

Alternative – Structural Slab

Ground conditions encountered at the site to date indicate the probability of large karstic features within the subsurface is low, but additional testing within the revised building footprint is necessary to confirm our recommendations. If significant karstic features are encountered within the revised building footprint, we can evaluate a structural slab supported by grade beams and piles, if necessary.

General

We recommend a minimum 6-inch-thick layer of ¾-inch clean crushed stone be included beneath the slabs to protect the prepared subgrade and to serve as a capillary break. A vapor barrier should be used below the ground-floor slab to limit transmission of water vapor through the slab in

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[6] "Engineering Bulletin, Modulus of Subgrade Reaction – Which One Should be Used?" by Structural Services, Inc. (8 April 2016).

critical areas. We recommend a vapor barrier with a minimum thickness of 20 mils. Omission of a vapor barrier can lead to floor-covering problems including delamination and mold. The vapor barrier should be coordinated with any environmental requirements for the development. The overall thickness of the crushed stone may be altered to meet the requirements of the vapor mitigation system (to be filed under a separate cover) and the ground improvement designer.

Below Grade Walls

Permanent below-grade walls will be required for the proposed loading dock areas. The below-grade walls are expected to bear on compacted fill or natural soils. Below-grade walls can be designed using an equivalent fluid pressure of 100 lbs/ft^3 where the structure provides lateral restraint at the top of the wall and the backfill material consists of the on-site clayey (non-expansive) soils or imported granular soil. This parameter presumes the retaining wall backfill meets the minimum requirements for approved compacted fill previously discussed, that full drainage is provided behind the wall, and that there are not any surface surcharge or structure loads at the top of the wall. Adjustment of the pressures should be made by the designer where appropriate to consider these factors. Presuming the aforementioned fill, fill placement, and compaction requirements, a coefficient of at-rest earth pressure K_o = 0.66 can be used in evaluating surcharge loads transmitted to the wall.

Passive resistance for approved compacted on-site granular soils can be calculated using an equivalent fluid unit weight of 120 lbs/ft^3, which includes a reduction factor of 2. Extreme care and proper construction sequencing must be taken during construction in areas where passive resistance is required for wall support. This includes filling simultaneously on both sides of the wall, and not performing future excavations without properly bracing the wall.

Water Tower

The design engineer of record should confirm that the bearing capacity and calculated settlements (based on the water tower loads) are acceptable for use with a shallow foundation design. If not, the water tower design engineer of record should determine if supplemental foundation recommendations are required. Ground improvement to achieve higher bearing capacities may be required or piles could be used to support the structure, if needed.

Given the design of the water tower is not finalized, we recommend that an allowance for ground improvement (stone columns) be provided for initial cost estimating until a final design can be prepared by others.

Permanent Groundwater Control

Building Areas

Perimeter wall and footing drains should be installed to divert groundwater flow away from the structure during prolonged precipitation, snowmelt, or utility breaks. Manufactured geocomposite drainage panels or a 12-inch-wide layer of ¾-inch washed crushed stone should be installed against the outside of all perimeter walls and should extend to within 1 foot of adjacent surface grade. In the truck court areas, gravel should be used. The drainage panels (or washed crushed stone) should connect to a perforated footing drain at the base of the footing having a minimum diameter of 6 inches. The footing drains should be connected to the site stormwater system and where possible drain by gravity. Where used, drainage panels should be secured in place and the filter-fabric side must face the soil. If washed crushed stone is used, it should be wrapped with a geotextile filter fabric such as Mirafi 140N or equivalent.

Groundwater levels encountered within the proposed building footprint are between about el +595 and el +599, and are below the proposed top of slab elevation (el +612). As such, we don't expect permanent dewatering measures for the building at this time. It should be noted, the grading plans are currently being finalized and additional exploration within the proposed building footprint is necessary to confirm our recommendations.

Preliminary Retaining Walls

Fill retaining walls are likely necessary at the site and may be designed as geogrid reinforced modular block walls (such as Mesa, Keystone, Versa-lok, or Redi-Rock type walls) or gravity-type retaining walls, depending on the location and size of the proposed wall. Site retaining walls, where movement is acceptable, can be designed using active earth pressures. Walls where movement cannot be tolerated should be designed for at-rest earth pressures. We assume the following parameters for any potential site retaining walls (1) the wall backfill materials (i.e., within the reinforced zones) are select imported granular soils, (2) full drainage is provided behind the reinforced zone and wall facing to prevent the buildup of hydrostatic pressure, (3) that surface loads at the top of the retaining walls will consist of parking and driving areas and vehicles, and (4) the slope at the top of the retaining wall is level. Design parameters will be determined once the grading plans have been advanced and locations of the retaining walls are finalized.

Retaining-wall foundations should bear on natural soils (if fill or topsoil is encountered it should be fully removed and replaced) or well-compacted structural/engineered fill compacted with at least six coverages of a minimum 5-ton static-drum-weight vibratory roller. Soft or otherwise unsuitable natural or fill identified by the geotechnical engineer in the field during proofrolling and compaction should be removed and replaced with approved compacted structural/engineered fill.

We estimate a preliminary bearing of 4 ksf can be used for natural soils, but should be confirmed with additional testing and included as part of the delegated design.

The proposed retaining wall design (including calculations and global stability and groundwater mounding analyses) and construction means and methods should be provided and signed and sealed by a Professional Engineer licensed in the State of New York.

Preliminary Pavement Design

We have provided recommendations for minimum asphalt pavement sections in accordance with tenant design guidelines and preliminary daily traffic loading estimates of: 2,000 cars, 50 light trucks/busses, and 350 heavy trucks. The pavement sections were designed using a 20-year life expectancy and a California Bearing Ratio (CBR) of 7 for proofrolled site soils or properly placed compacted fill. CBR testing must be performed by the contractor in pavement areas at the start of construction to confirm the design assumptions. Pavement design calculations for the site are provided in Appendix H. Refer to subsequent sections for subgrade preparation procedures. Our recommendations for both the flexible and rigid pavement sections are provided in Table 2 and Table 3, respectively.

Table 2: Recommended Standard & Heavy Duty Flexible Pavement Sections

Material	**Thickness**	
	Standard Duty (Car Parking Areas)	**Heavy Duty (Drive Aisles & Truck Areas)**
Surface (Finish) Course (9.5M64):	2.0 inches	2.0 inches
Bituminous Concrete Base Course (25M64):	2.0 inches	4.0 inches
Processed Aggregate Base Course (Subbase):	6.0 inches	18.0 inches
Refer to Standard Specifications for Highways and Bridges, latest edition.		

The recommended pavement sections use the Superpave mixes in accordance with New York State Department of Transportation (NYSDOT) specifications. The processed aggregate base course should be Type 2 subbase material, consisting of stone which is the product of crushing ledge rock, in accordance with NYSDOT specifications. For any paving outside the subject property limits, the minimum pavement sections specified by the Town of Niagara or NYSDOT should be utilized.

Table 3: Recommended Standard & Heavy Duty Rigid Pavement Sections

Material	**Thickness**	
	Standard Duty (Car Parking Areas)	**Heavy Duty (Drive Aisles & Truck Areas)**
Concrete	5 inches	11 inches
Aggregate Base Course	8 inches	11 inches
Standard-duty pavement section should be used in parking lots. Heavy duty pavement should be used in loading docks, truck courts, drive isles, snow removal areas and heavy equipment storage areas.		

The concrete pavement sections should be reinforced in accordance with the latest American Concrete Institute (ACI) standards. Fiber reinforcement could also be evaluated as an alternative to traditional steel reinforcement for the rigid pavement sections. We can re-evaluate the preliminary pavement thicknesses after the grading had been finalized to determine subgrade materials. We also believe that the pavement section can be reduced by using a granular working pad below the subbase.

General

Pavement subgrade preparation work should be inspected by a qualified geotechnical engineer. If isolated areas exhibit unsuitable conditions, the isolated areas should be over-excavated to a depth as determined by the geotechnical engineer and immediately replaced with approved compacted fill.

Underdrains for Site Areas

Groundwater was encountered to the northwest and northeast of the building within 4 feet of the preliminary proposed pavement and truck court grades for about 200,000 square feet of the overall pavement footprint. We recommend that allowances and unit rates be carried for permanent dewatering measures at this point in the design (i.e. pavement underdrains). Additional exploration will be completed in this area to obtain additional subsurface information.

Underdrains should consist of a minimum of a 12-inch-thick gravel layer (3/4-inch washed, crush stone) beneath the pavement. Filter fabric should be placed between the soil subgrade and the stone. Within the stone, an inter-connected grid network of 6-inch diameter SCH-80 PVC pipes should be placed. The pipes should be spaced at 20 feet on-center. The pipes should be routed to the site stormwater system to discharge via gravity.

GEOTECHNICAL CONSTRUCTION RECOMMENDATIONS

Site Preparation

Any debris should be completely removed within 10 feet of the proposed footprint. Below grade structures outside the building footprint can be abandoned in place provided they are removed to at least 3 feet below finished subgrade levels, 2 feet below proposed utilities, and to eliminate conflicts with new utilities or structures. Slabs left in place should be sufficiently broken up to allow water to drain and so that a geotechnical engineer can observe whether voids exist beneath the slab. Existing asphalt pavement and concrete walkways should be completely removed.

Existing utilities within the building footprint should be completely removed. Existing utilities outside of the proposed building footprint should be removed or abandoned in place by completely filling with grout.

Excavations made to remove below grade elements should be backfilled with approved, compacted fill in accordance with the Excavation, Fill, Placement, and Compaction Criteria section of this report and any environmental requirements.

Clearing and grubbing of trees and vegetation designated for removal (including root systems) should be performed. Buried debris should be completely removed beneath proposed building slab, footing, and pavement locations. Given the former and current uses of the site, bury holes with topsoil, tree stumps, or similar unknown objects should be expected throughout. Topsoil should be stripped from the proposed building and pavement areas and should be stockpiled and protected from erosion. Topsoil will be evaluated by the landscape architect (Langan) for reuse in landscape areas and coordinated with the environmental engineer (Langan). All clearing and stripping activities should be performed in strict accordance with the approved soil-erosion and sediment-control plan and the environmental reports prepared for the project.

Existing wetlands slated for removal should be completely dewatered at the on-set and maintained dry during backfilling activities. Once dewatered, all organic and silty materials should be completely removed to the top of natural granular soils, weathered rock, or bedrock. A choker 2-foot-thick layer of 3- to 6-inch diameter stone should be placed at the subgrade. A layer of filter fabric should be placed above the stone. The resulting excavation should be backfilled with structural fill as described here.

All demolition and site-clearing work should be performed in accordance with any environmental requirements established for the site, and all local, state, and federal regulations. All debris and trees and other vegetation should be properly disposed of off-site in accordance with applicable regulations. All construction work should be performed so as not to adversely impact the neighboring buildings, off site structures or utilities, including the existing utilities and trees that are to remain. Protection of these elements should be provided as necessary. Before beginning grading or placing fill, any miscellaneous trash, debris, or other unsuitable materials should be removed from the site.

Subgrade Preparation

All soil footing and utility-trench subgrades should be proofrolled with six overlapping coverages of a double-drum 1-ton walk-behind vibratory roller (such as a Bomag BW75 or equivalent). All slab and raise-in-grade fill subgrade areas should be proofrolled with six overlapping coverages of a vibratory drum roller having a minimum static drum weight of 10 tons.

Soft areas identified during proofrolling should be excavated and replaced with approved structural fill. The actual extent of necessary removal and replacement should be determined by a qualified Langan geotechnical engineer. Care should be taken when proofrolling near any existing underground utilities that are to remain.

Soil footing subgrades should be excavated level and if any cobbles or boulders are encountered at the footing subgrade level such that a relatively level subgrade is not achieved, the cobbles or boulders should be removed and replaced with compacted structural fill, compacted ¾-inch crushed stone, or lean concrete. All soil subgrades for footings or slabs should be compacted to the project specified compaction criteria.

If foundations are not poured in a timely manner, the subgrade should be protected with a lean-concrete mud mat to protect the footing subgrades.

Steps should be taken by the contractor to control and remove surface-water runoff and precipitation. When soil is wet and subjected to construction traffic, previously acceptable subgrades can soften and become unacceptable. A smooth-drum roller should be used to seal the surface and provide for better drainage. We also recommend crowning or sloping the subgrade to provide positive drainage off the subgrades.

Material Reuse, Fill Placement, and Wet-Weather Construction

The site is underlain by a near-surface layer of clayey (fine-grained) soils. Glacial till, typically consisting of sand or clayey sand, underlies the near-surface deposits. The glacial till typically has fines contents of about 5% to >50%. Based on the fines content of the on-site soils, the materials will be more sensitive to moisture and more challenging to work with, particularly if they become wet. When tested, the on-site soil was usually above the optimum moisture content as determined by the modified Proctor test (ASTM D1557). The contractor may reuse the excavated on-site clayey and glacial till as structural fill with the following considerations:

- Fill is placed and compacted per the compaction criteria to meet the design intent in this Report,
- Fill should have a maximum particle size of 4 inches within 6 feet of the foundation or slab subgrade levels, and proposed utilities,
- Larger obstructions such as cobbles or boulders excavated at the site can be crushed, reused onsite, or buried in raise-in-grade fill areas. If buried on site, larger obstructions should be preferably placed outside the proposed building footprint, but at a minimum at

least 6 feet below the bottom of new structural elements and utilities. Larger obstructions should be spread during placement to minimize void development during fill operations.

- Large site fills, particularly near planned building areas, should be placed as early as practical to allow the subsurface materials to settle under the fill loads prior to construction of foundations. Settlement monitoring points should be installed within the raise-in-grade fill areas and monitored during earthwork.

Additional means and methods or remedial measures the contractor may consider employing for managing moisture during fill placement, subgrade preparation, and improving compaction with on-site soils, include, but are not limited to

- aerating material prior to placement,
- sealing and compacting soils directly after placement and prior to wet weather,
- protecting material stockpiles from repeated heavy precipitation,
- placing gravel drainage layers between fill layers to promote material drainage,
- providing geogrid soil reinforcement,
- performing in-situ stabilization treatments (lime, cement, kiln dust, etc.),
- initial compaction with a sheeps-foot roller, and
- blending materials with courser grade materials and aggregates.

Note, a portion of the on-site soils may not be practical or economical to use as structural fill but can be used as general fill for non-structural areas (i.e., landscape areas). The overall amount of soil that can practically be reused as structural fill will depend on the amount of fines present within the soil, the time of year the earthwork is carried out (e.g., potentially inclement weather), and the earthwork contractor’s ability to stage, aerate, and process the material to facilitate the recommended placement and compaction.

Excavation, Fill, Placement, and Compaction Criteria

Excavation through the clay and glacial till can likely be performed using conventional earthmoving equipment (e.g., backhoes, excavators, dozers, etc.). Excavations made for footings and utilities should be conducted to minimize disturbance to the subgrade (i.e., backhoe with a smooth-edge bucket). Larger equipment may be required for removal of obstructions such as boulders, etc.

Within the proposed building footprint, the top of competent rock (based on limited rock coring) was encountered from about el +590 to +592. Based on a preliminary proposed finished floor elevation of el +612, rock removal within the proposed building is not anticipated. Within the proposed roadway and site areas, the top of competent rock (from rock coring) was encountered from about el +586 to +604. Based on the preliminary site grading, rock removal within the pavement areas is not anticipated.

All excavations should be properly sloped or braced and conform with applicable OSHA regulations including, but not limited to, temporary shoring, trench boxes, temporary rock stabilization, or proper benching or both.

All excavation and backfilling must be performed in accordance with the project environmental engineer's recommendations.

The following types of fill can be used.

Structural Fill – Structural fill should be well-graded sand and gravel having a maximum particle size of 3 inches and no more than 10% passing the No. 200 sieve. Additionally, the structural fill should be free of organics, clay, roots, concrete, other non-soil constituents, and other deleterious or compressible materials. Any approved imported structural fill should be "certified clean fill" free of hazardous substances and meeting all local, state, federal and project environmental regulations.

The contractor may reuse the on-site clay and glacial till as structural fill provided that the soils meet the requirements outlined in the Material Reuse, Fill Placement, and Wet-Weather Construction section of this report and is approved by the environmental engineer. Note that samples obtained within the sand and glacial till layers have a fines content (material passing the No. 200 sieve) from about 12% to 56% and will be sensitive to moisture.

General Fill – On-site soils not meeting the requirements for structural fill can be used as general fill for site landscape and other nonstructural areas (e.g., landscaped areas) if environmentally suitable for reuse. The fill and silt layers may be used as general fill, if required.

Compaction Criteria – All fill should be placed in uniform 12-inch-thick loose lifts and compacted. Fill in landscaped areas should be compacted to 90% of its maximum dry unit weight as determined by ASTM D1557; all other fill should be compacted to at least 95%. In restricted areas where only hand-operated compactors can be used, the maximum lift thickness should be limited to 8 inches. The appropriate water content at the time of compaction should be plus or minus 2% points of optimum as determined by the laboratory compaction tests of proposed fill. No backfill should be placed on areas where free water is standing or on frozen subsoil areas.

Groundwater Control

Across the lot, groundwater was encountered from about el +588 to +610. Based on the proposed grades, we expect that groundwater will be encountered to the north of the proposed building. Temporary groundwater control in this area, and potentially throughout the site, will be required.

We anticipate that dewatering will be required during construction. Water infiltration to the foundation excavation can likely be controlled using gravity-fed sump pumps via gravel trenches or sumps assisted with collector trenches. The final dewatering measures required should be evaluated and designed by the contractor. The dewatering measures implemented should adequately dewater all foundation-related excavations such that compaction of footing subgrades is feasible.

Collection of rainwater runoff may also be needed during the excavation during the subgrade preparation work. Water runoff is expected to be controlled with the use of gravel-lined collection trenches, pits and submersible pumps. Care should be taken to ensure that drainage is provided during all phases of excavation work. Environmental pretreatment of groundwater, if necessary, is beyond the scope of this study. Collected water should be discharged in accordance with applicable regulations and any environmental requirements.

SERVICES DURING DESIGN, CONSTRUCTION DOCUMENTS AND CONSTRUCTION QUALITY ASSURANCE

During final design, Langan should be retained to consult with the design team as geotechnical questions arise. Technical specifications and design drawings should incorporate our recommendations. When authorized, we will assist the design team in preparing specification sections related to geotechnical issues such as earthwork, shallow foundations, backfill, retaining walls, and excavation support. Langan should also, when authorized, review the project plans and contractor submittals relating to materials and construction procedures for geotechnical work to confirm the designs incorporate the intent of our recommendations.

Langan has explored and interpreted the site subsurface conditions and developed the foundation design recommendations contained here, and is therefore best suited to perform quality-assurance observation and testing of geotechnical-related work during construction. The work requiring quality-assurance confirmation or special inspections per the Building Code includes, but is not limited to, earthwork, shallow foundations, backfill, retaining walls, and excavation support.

Recognizing that construction observation is the final stage of geotechnical design, quality-assurance observation during construction by Langan is necessary to confirm the design assumptions and design elements, to maintain our continuity of responsibility on this project, and allow us to make changes to our recommendations, as necessary. The foundation system and general geotechnical construction methods recommended herein are predicated upon Langan's assisting with the final design and providing construction observation services for the owner. If Langan is not retained for these services, we cannot assume the role of geotechnical engineer of record, and the entity providing the final design and construction observation services must serve as the engineer of record.

LIMITATIONS

The conclusions and recommendations provided in this report result from our interpretation of the geotechnical conditions existing at the site inferred from a limited number of borings and test pits, and information provided by J2B. Actual subsurface conditions may vary. Recommendations provided are dependent upon one another and no recommendation should be followed independent of the others.

Any proposed changes in structures or their locations should be brought to Langan's attention as soon as possible so we can determine whether such changes affect our recommendations. Information on subsurface strata and groundwater levels shown on the logs represent conditions encountered only at the locations indicated and at the time of our exploration. If different conditions are encountered during construction, they should immediately be brought to Langan's attention for evaluation because they might affect our recommendations.

This report has been prepared to assist the owner, architect, and structural engineer in the design process and is only applicable to the design of the specific project identified. The information in this report cannot be used or depended on by engineers or contractors involved in evaluations or designs of facilities (including underpinning, grouting, stabilization, etc.) on adjacent properties beyond the limits of that which is the specific subject of this report.

Environmental issues (such as permitting or potentially contaminated soil and groundwater) are outside the scope of this study and are addressed in a separate Langan evaluation.

Sincerely,

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.

Clayton Patterson, P.E.
Associate

TDS:ap/mf/cz/jb

Enclosure(s):

Enclosure(s):	Figure 1	Site Location Map
	Figure 2	Surficial Geology
	Figure 3	Bedrock Geology
	Figure 4	Karst Map
	Figure 5	Effective FEMA FIRM
	Figure 6	Exploration Location Plan
	Figure 7	Shear Wave Profiles from ReMi Testing
	Appendix A	Historic Aerials and Topographic Maps
	Appendix B	Langan Boring Logs
	Appendix C	Groundwater Observation Well Logs
	Appendix D	Langan Test Pits Logs
	Appendix E	Test Pit Photographs
	Appendix F	Laboratory Testing Results
	Appendix G	Geophysical Testing Results
	Appendix H	Pavement Design

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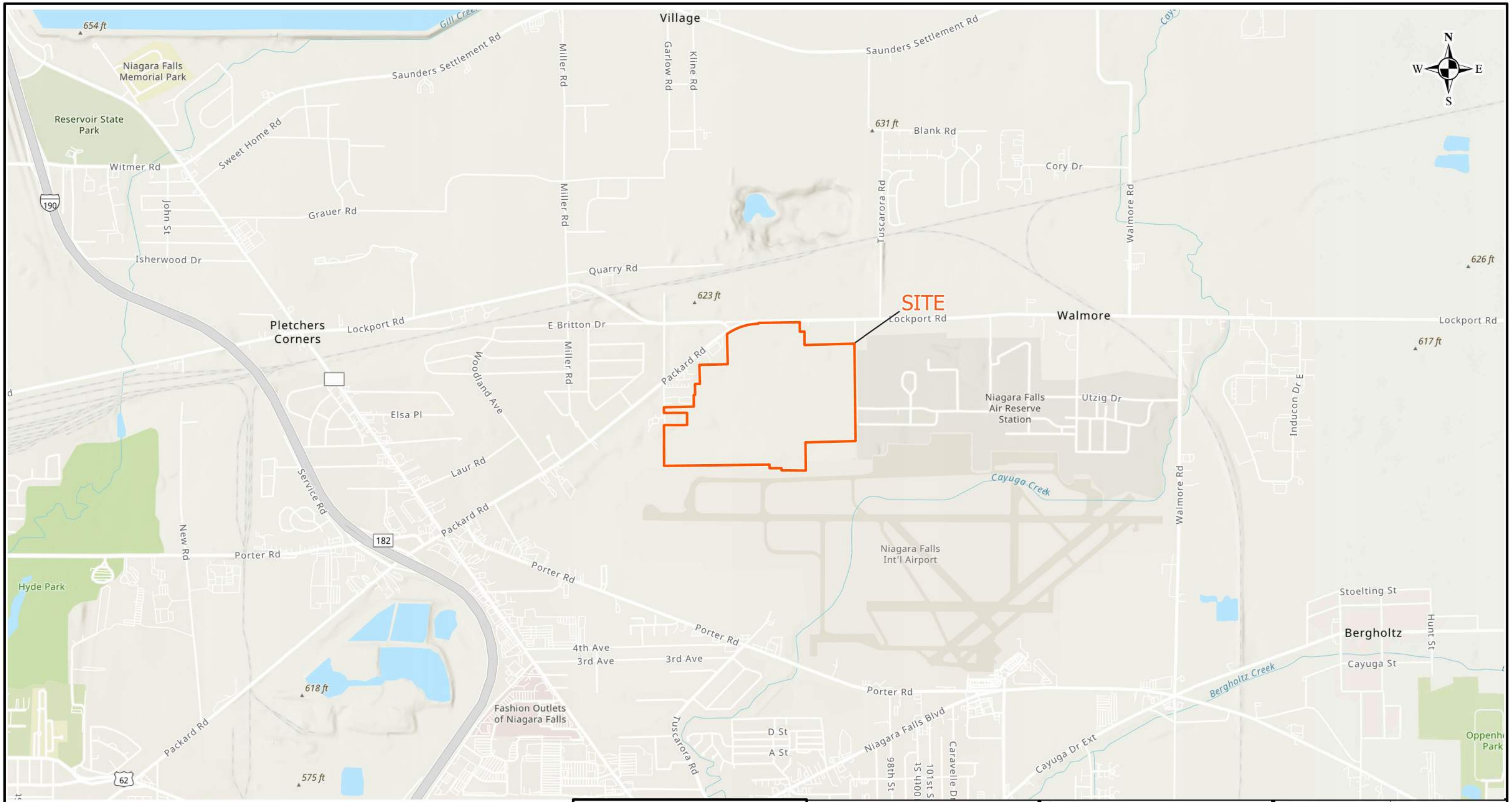
FIGURES



Legend

▭ Site Boundary

Notes:
1. Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
2. All features shown are approximate.

2,000 0 2,000
SCALE IN FEET

LANGAN

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Environmental Services, Inc.

21 Penn Plaza
360 West 31st Street, 8th Floor
New York, NY 10001-2727

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Project

PROJECT FIFI

NIAGARA FALLS

NIAGARA COUNTY NEW YORK

Figure Title

SITE LOCATION MAP

Project No.
190071801

Date
10/7/2021

Scale
1" = 2,000'

Drawn By
GS

Figure

1

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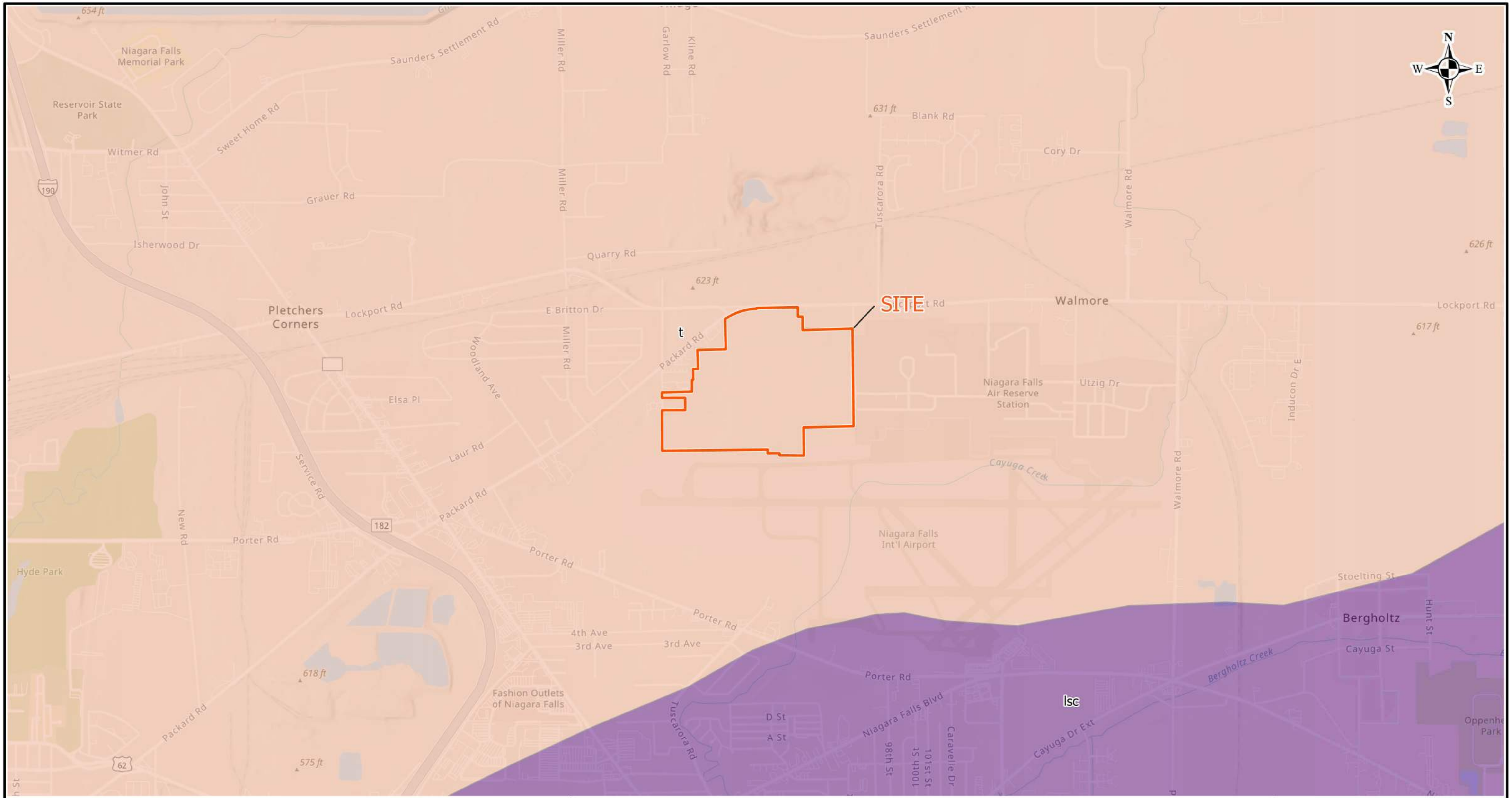

Legend

🟧 Site Boundary

Surficial Geology

🟪 Lacustrine Clay (lsc)

🟫 Till (t)

Notes:
1. Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
2. Geologic layer provided by the New York State Museum. UTM zone 18, meters, NAD 27
3. All features shown are approximate.

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Project	PROJECT FIFI NIAGARA FALLS NIAGARA COUNTY NEW YORK
Figure Title	SURFICIAL GEOLOGY
Project No.	190071801
Date	10/7/2021
Scale	1" = 2,000'
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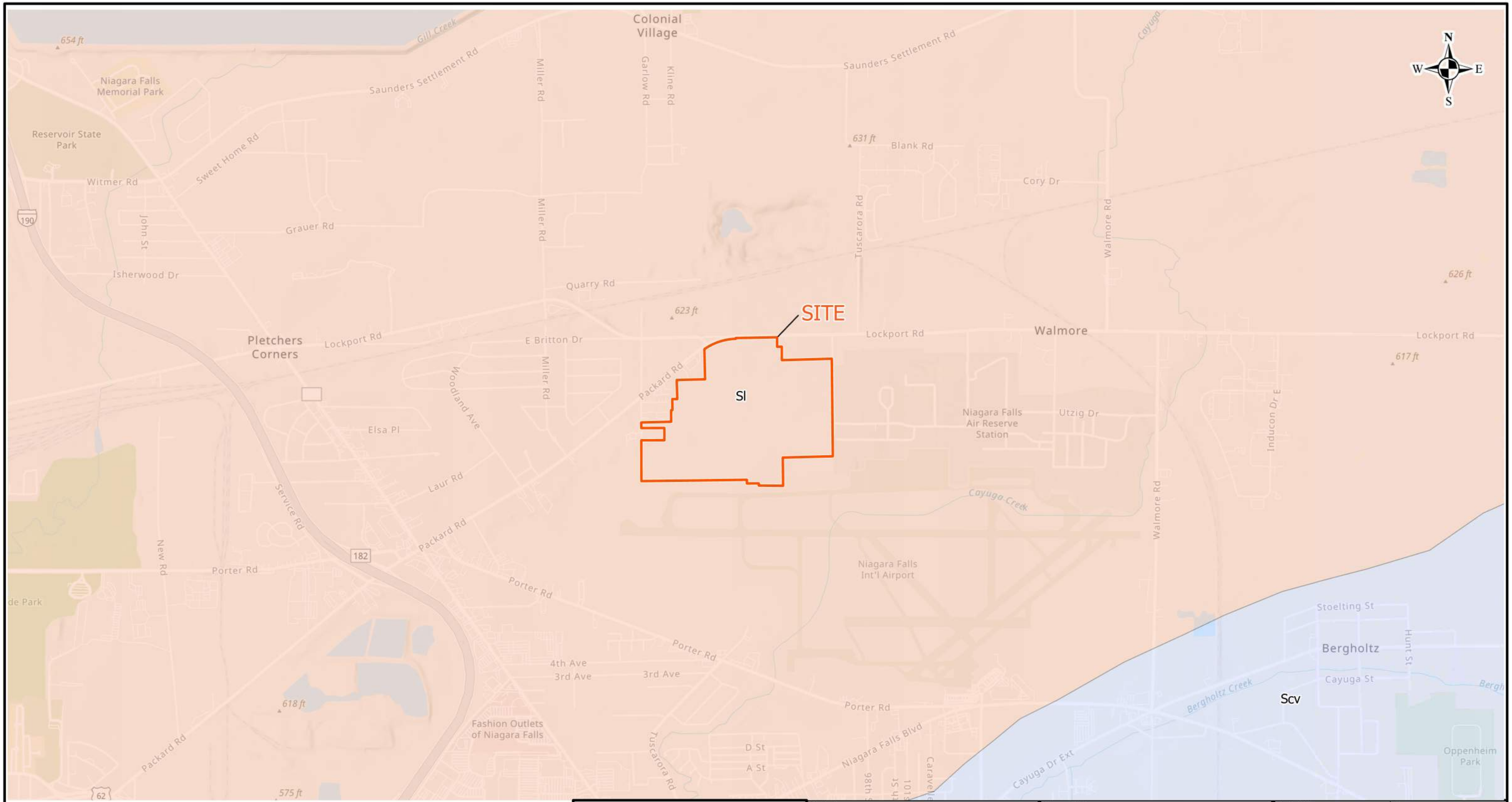

Legend

▭ Site Boundary

Bedrock Geology

▭ Camillus Shale (Scv)

▭ Guelph Dolostone (Sl)

Notes:
1. Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
2. Geologic layer provided by the New York State Museum. UTM zone 18, meters, NAD 27
3. All features shown are approximate.

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Project

PROJECT
FIFI

NIAGARA FALLS

NIAGARA COUNTY NEW YORK

Figure Title

BEDROCK
GEOLOGY

Project No.
190071801

Date
10/7/2021

Scale
1" = 2,000'

Drawn By
GS

Figure
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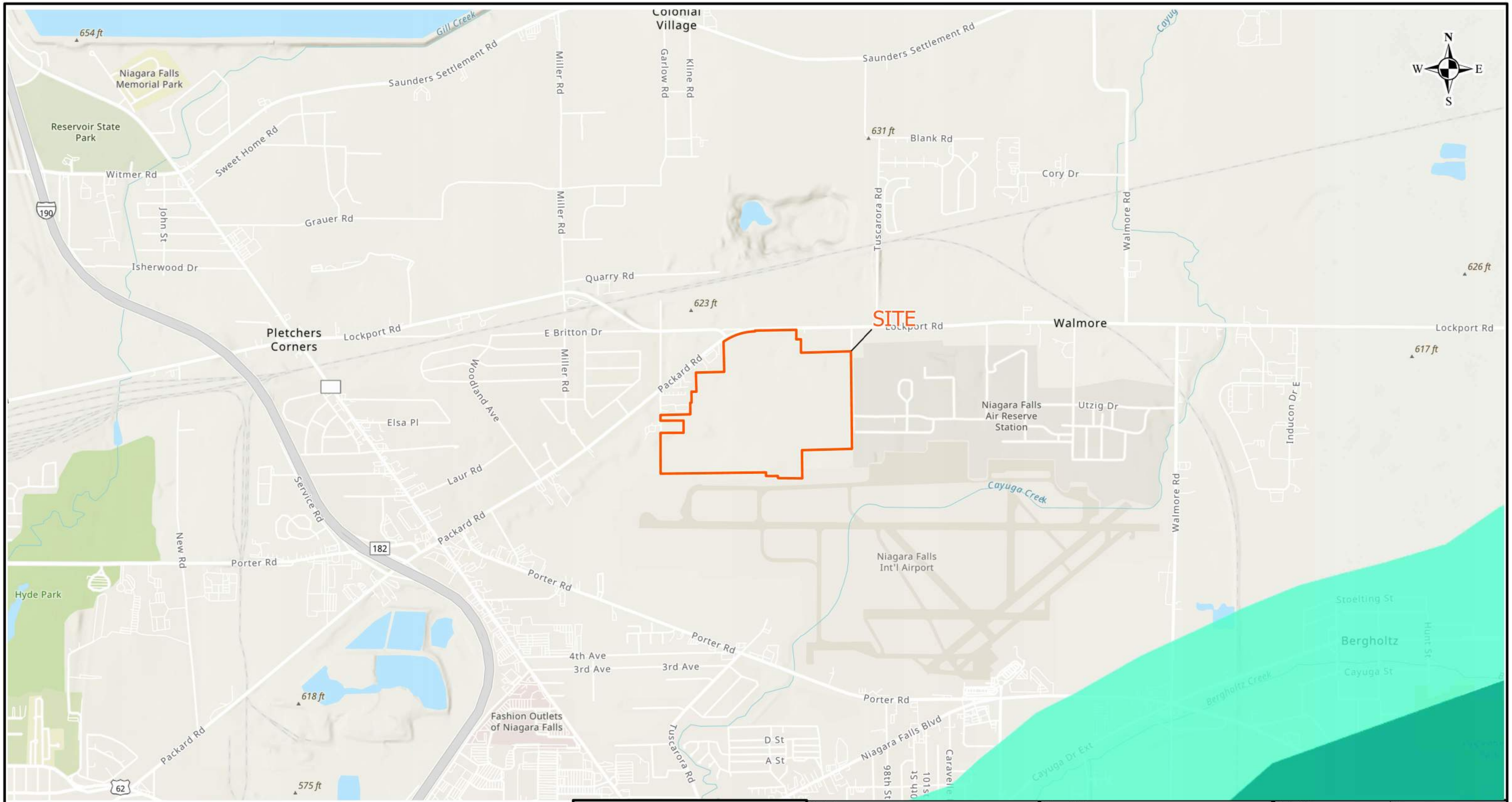

Legend

- 🟧 Site Boundary
- 🟩 Evaporative Basin
- 🟩 Carbonate Rocks buried under ≤ 50 ft. of glacially derived insoluble sediments in a humid climate

Notes:
1. Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
2. US Karst layer provided by USGS.
3. All features shown are approximate.

2,000 0 2,000

SCALE IN FEET

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Project

PROJECT FIFI

NIAGARA FALLS

NIAGARA COUNTY NEW YORK

Figure Title

KARST MAP

Project No.
190071801

Date
10/7/2021

Scale
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GS

Figure
4

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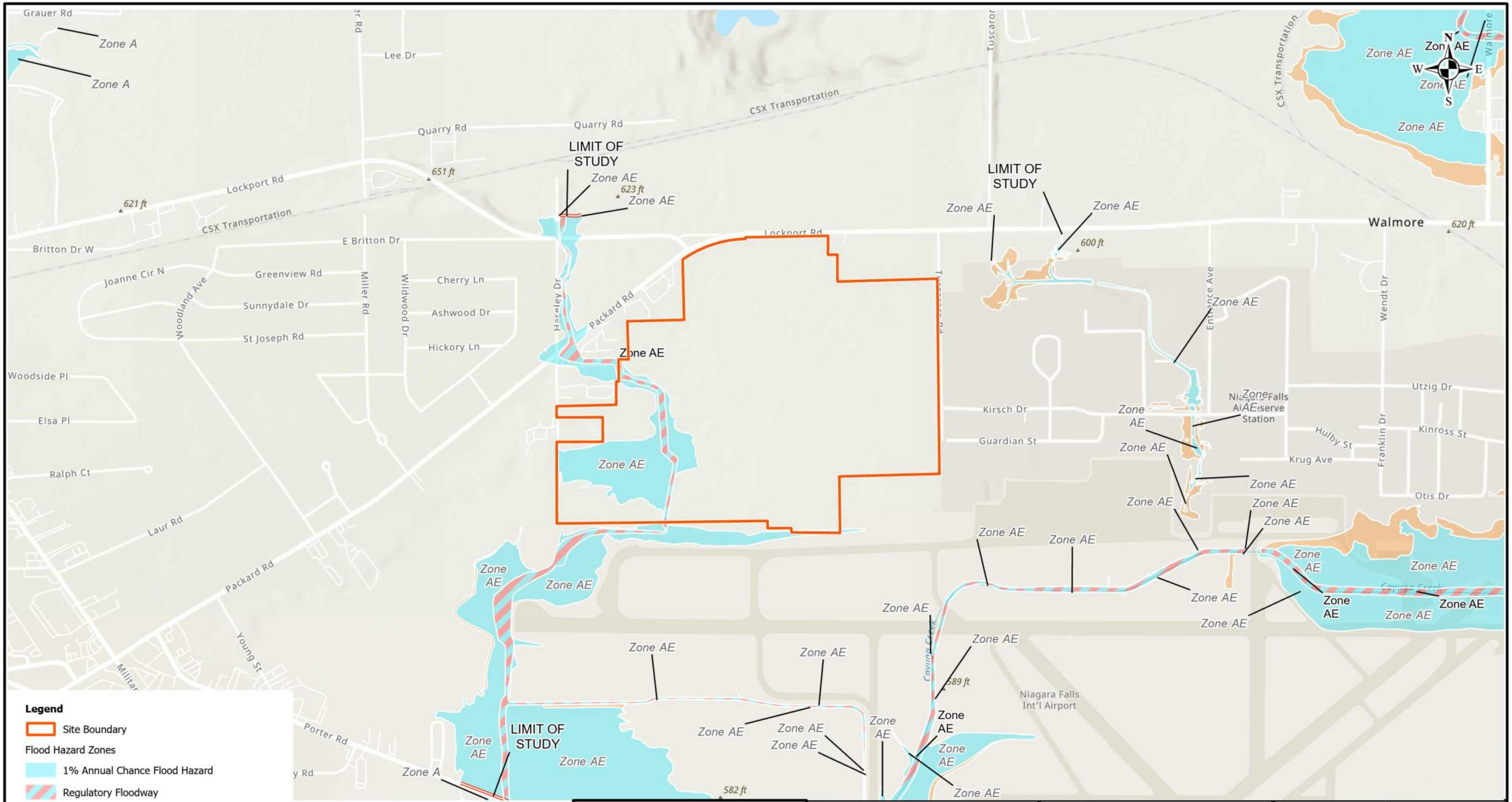

Legend

▭ Site Boundary

Flood Hazard Zones

🟦 1% Annual Chance Flood Hazard

▨ Regulatory Floodway

▨ Special Floodway

🟨 Area of Undetermined Flood Hazard

🟧 0.2% Annual Chance Flood Hazard

▨ Future Conditions 1% Annual Chance Flood Hazard

▨ Area with Reduced Risk Due to Levee

▨ Area with Risk Due to Levee

Notes:
1. Topographic basemap is provided through Langan's Esri ArcGIS software licensing and ArcGIS online, National Geographic Society, i-cubed.
2. FEMA layer provided by NFHL.
3. All features shown are approximate.

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SCALE IN FEET

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Project

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NIAGARA COUNTY NEW YORK

Figure Title

FEMA MAP

Project No.
190071801

Date
1/18/2022

Scale
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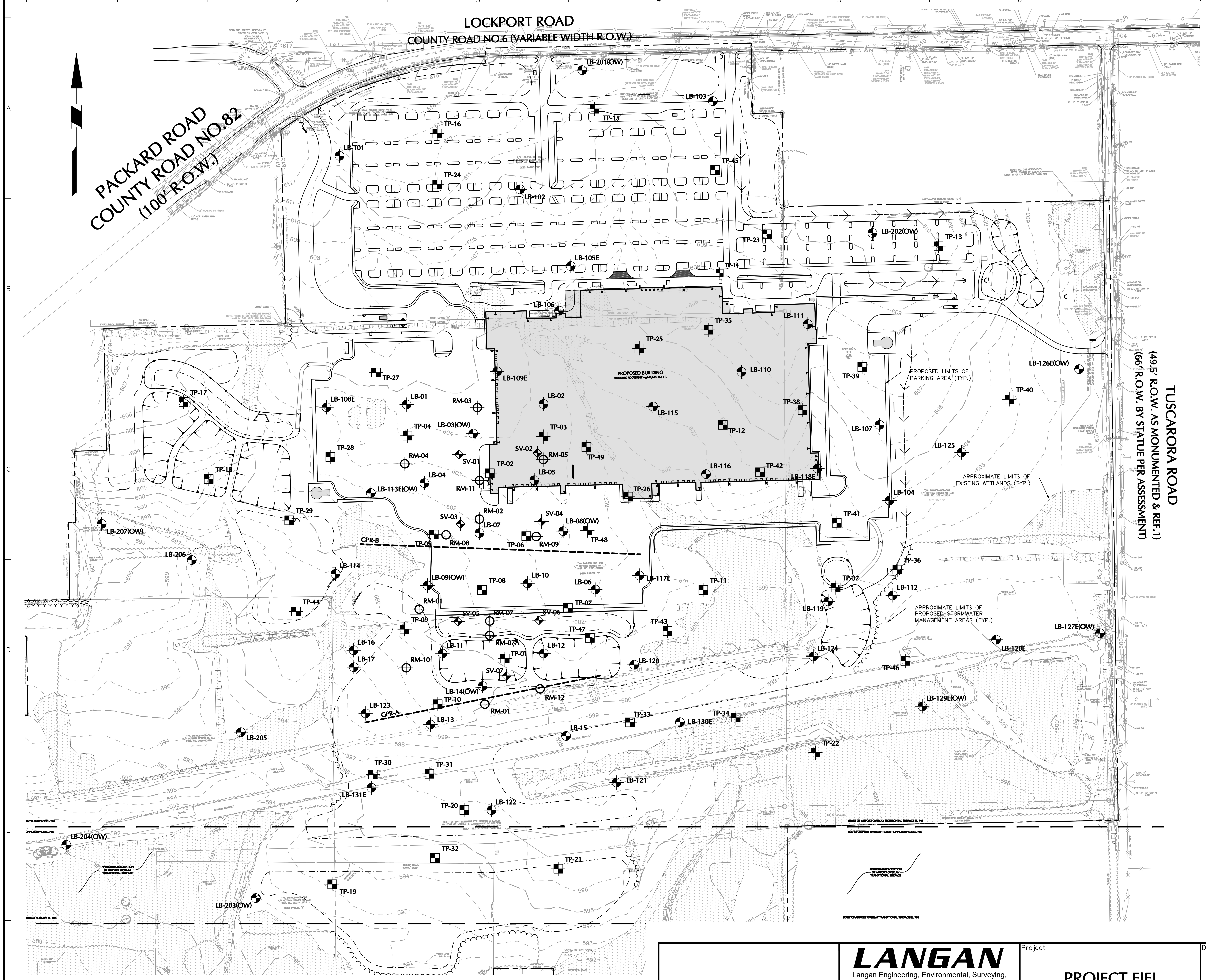

NOTES

1. ALL BORING, TEST PIT, WELL AND REMI LOCATIONS ARE APPROXIMATE.
2. BASE MAP INFORMATION OBTAINED FROM A SURVEY ENTITLED, "INSTRUMENT AND TOPOGRAPHIC SURVEY" PREPARED BY PASSERO ASSOCIATES DATED 02 DECEMBER 2021.
3. PROPOSED DEVELOPMENT INFORMATION OBTAINED FROM A DRAFT PLAN ENTITLED "OVERALL SITE PLAN" PREPARED BY LANGAN DATED 15 FEBRUARY 2022.
4. ELEVATION REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).
5. REMI TESTING WAS PERFORMED BY A LANGAN FIELD ENGINEER BETWEEN 20 AND 21 NOVEMBER 2021.
6. LANGAN TEST PITS WERE PERFORMED BY MARK CERRONE, INC. BETWEEN 21 NOVEMBER AND 15 DECEMBER 2021, UNDER THE OBSERVATION OF A LANGAN FIELD ENGINEER.
7. LANGAN BORINGS WERE PERFORMED BY SJB, INC. BETWEEN 30 NOVEMBER AND 17 DECEMBER 2021, UNDER THE OBSERVATION OF A LANGAN FIELD ENGINEER.
8. LANGAN SOIL VAPOR POINTS WERE PERFORMED BY SJB, INC. ON 27 DECEMBER 2021, UNDER THE OBSERVATION OF A LANGAN FIELD ENGINEER.

LEGEND

LB-XX	GEOTECH BUILDING BORINGS
LB-1XX	GEOTECH SITE BORINGS
E	ENVIRONMENTAL SAMPLING FROM GEOTECH BORING
LB-2XX	ENVIRONMENTAL BORING
(OW)	OBSERVATION WELL
SV-01	SOIL VAPOR POINT
TP-01	GEOTECH TEST PIT
RM-01	REMI TESTING LOCATION
GPR-X	GPR TESTING LOCATION

150 0 50 100 150
SCALE: 1 INCH = 40 FEET

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

Date	Description	No.
REVISIONS		

SIGNATURE DATE SIGNED
PROFESSIONAL XXXXXXXXXX
STATE LIC. No. XXXXX

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Project
PROJECT FIFI
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title
EXPLORATION LOCATION PLAN

Project No. 190071801
Date 01/18/2022
Drawn By TDS
Checked By CAP
Figure No. 6

PROJECT NO. 190071801

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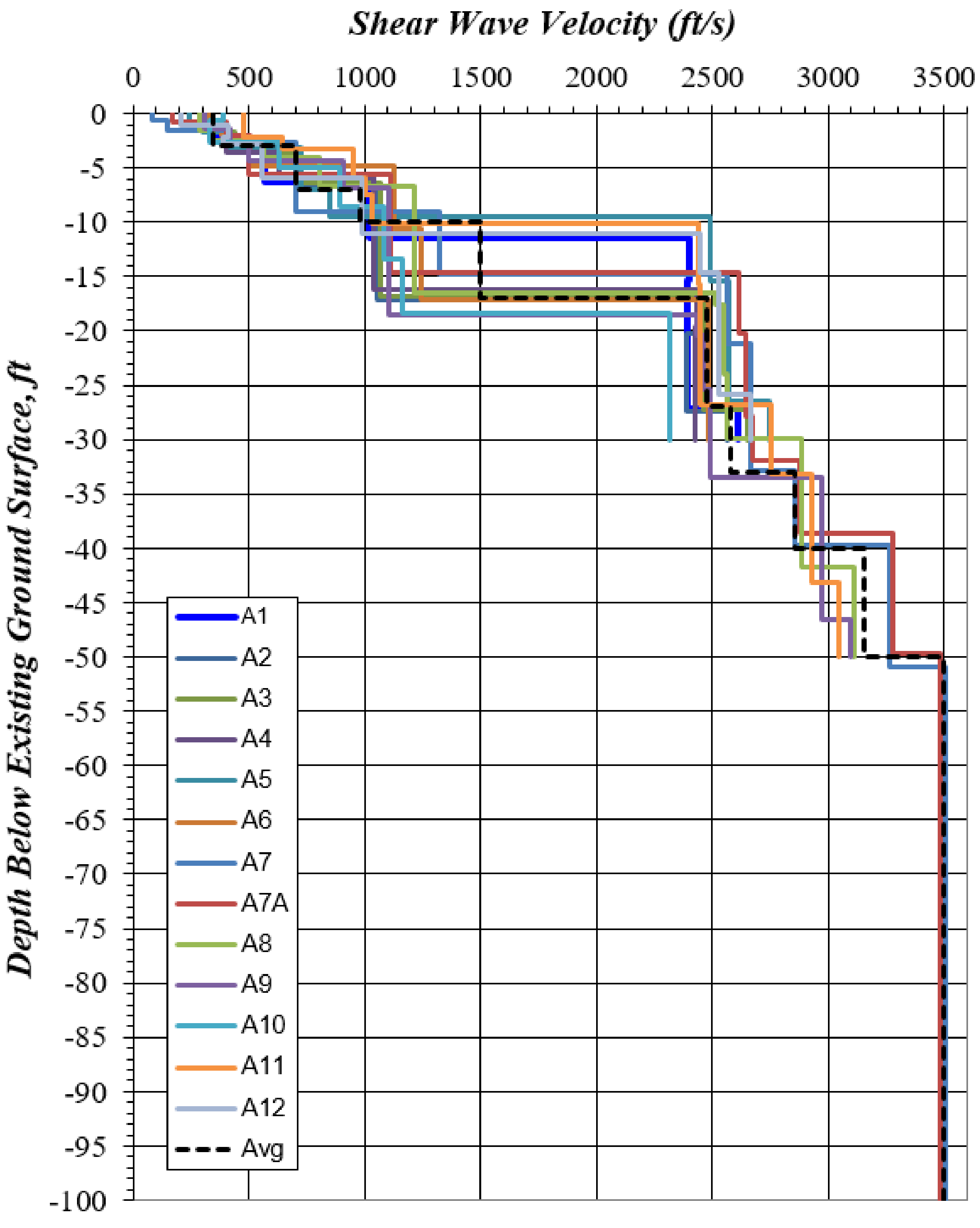

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Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
Langan Engineering and Environmental Services, Inc.
Langan CT, Inc.
Langan International LLC

Collectively Known as Langan

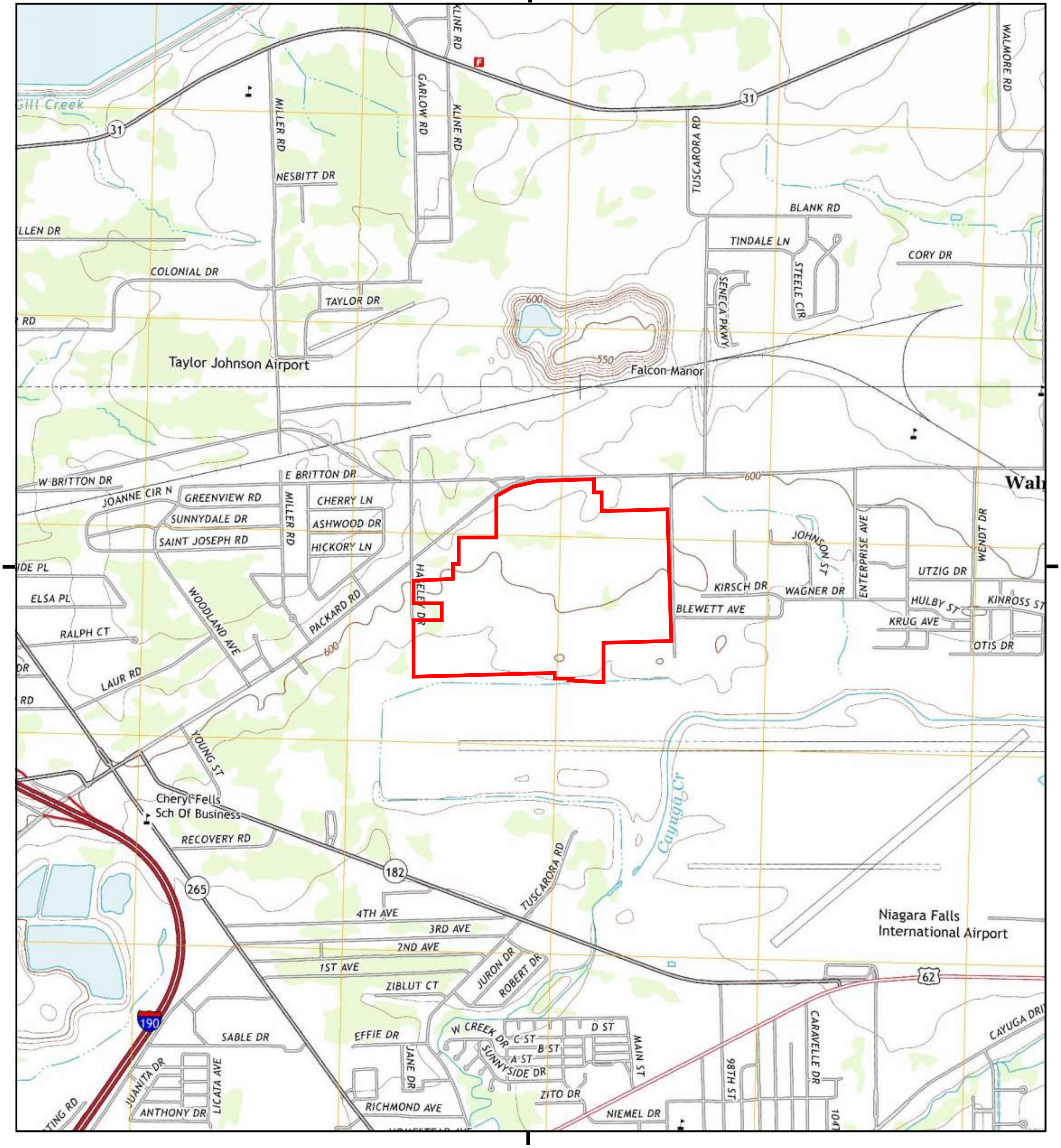
Project	PROJECT FIFI TOWN OF NIAGARA Niagara County New York
Drawing Title	Shear Wave Velocity Profile
Project No.	190071801
Date	12/6/21
Scale	N.T.S.
Drawn By	TDS
Figure No.	7

APPENDIX A

HISTORIC AERIALS AND TOPOGRAPHIC MAPS

Historical Topo Map

2013



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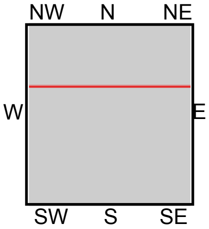
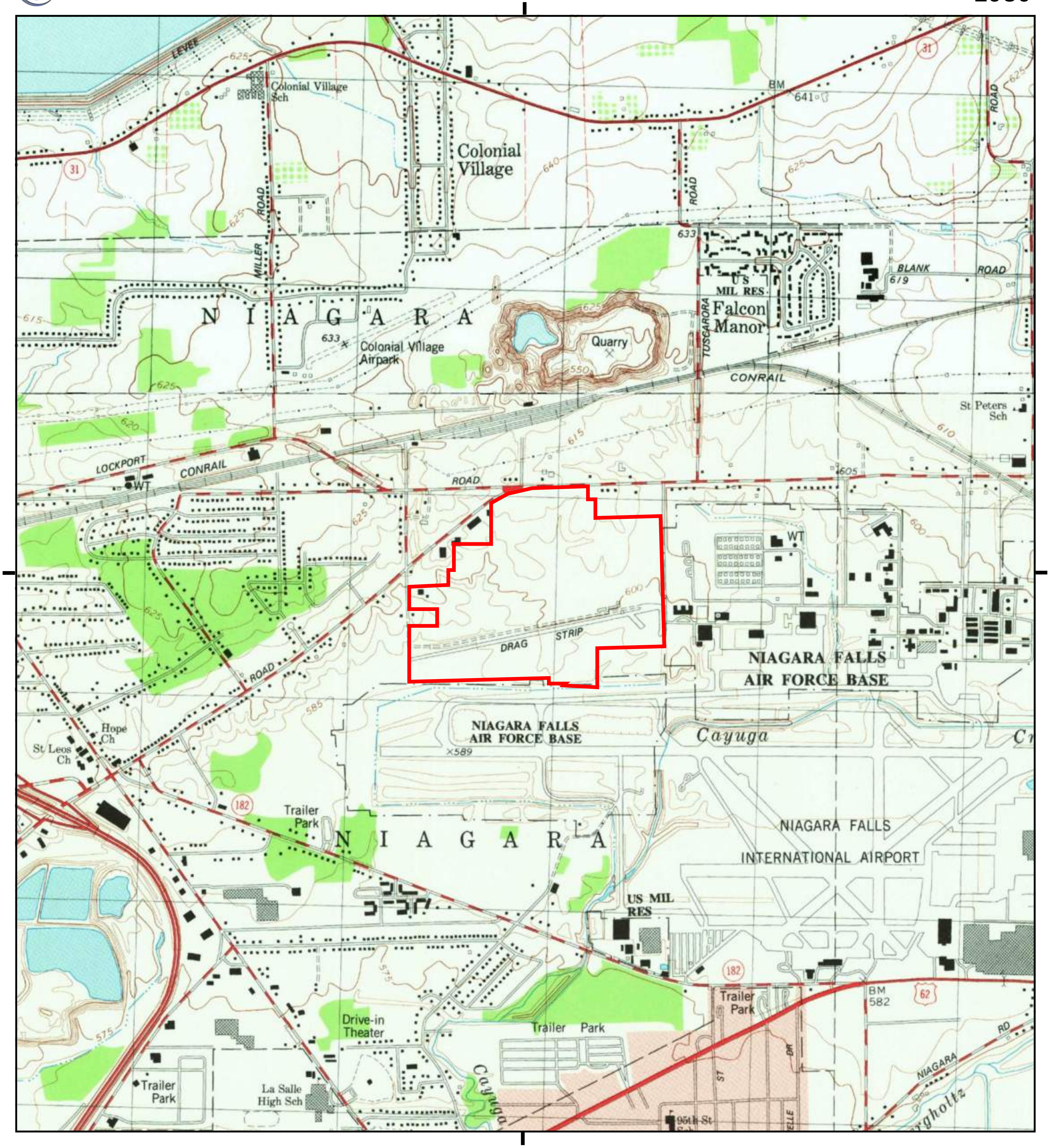


TP, Tonawanda West, 2013, 7.5-minute
N, Ransomville, 2013, 7.5-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

Historical Topo Map

1980



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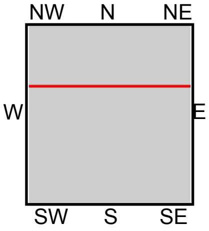

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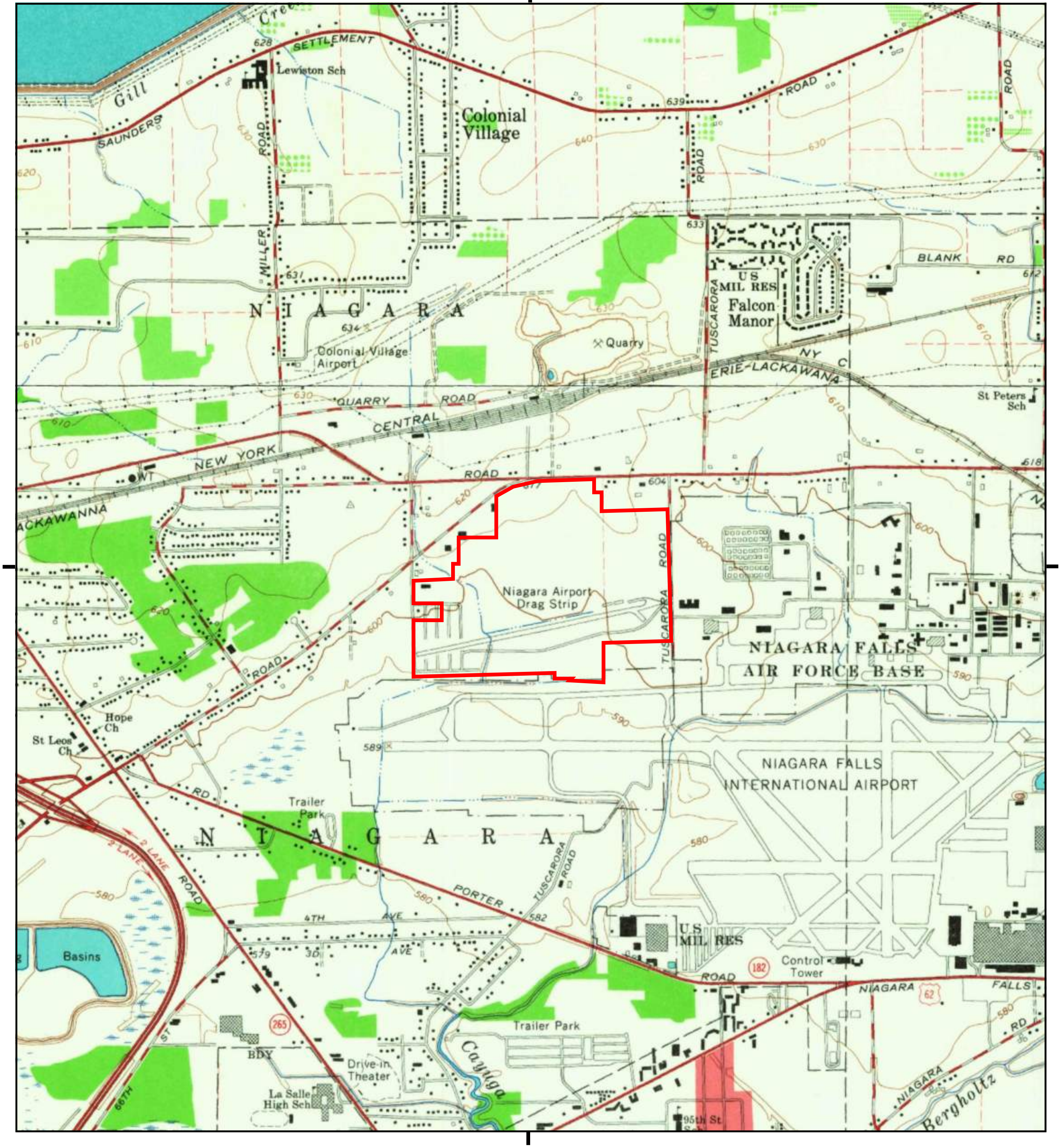
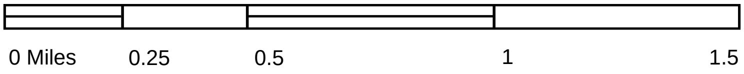
N, Ransomville, 1980, 7.5-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

Historical Topo Map

1965





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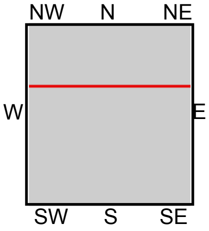
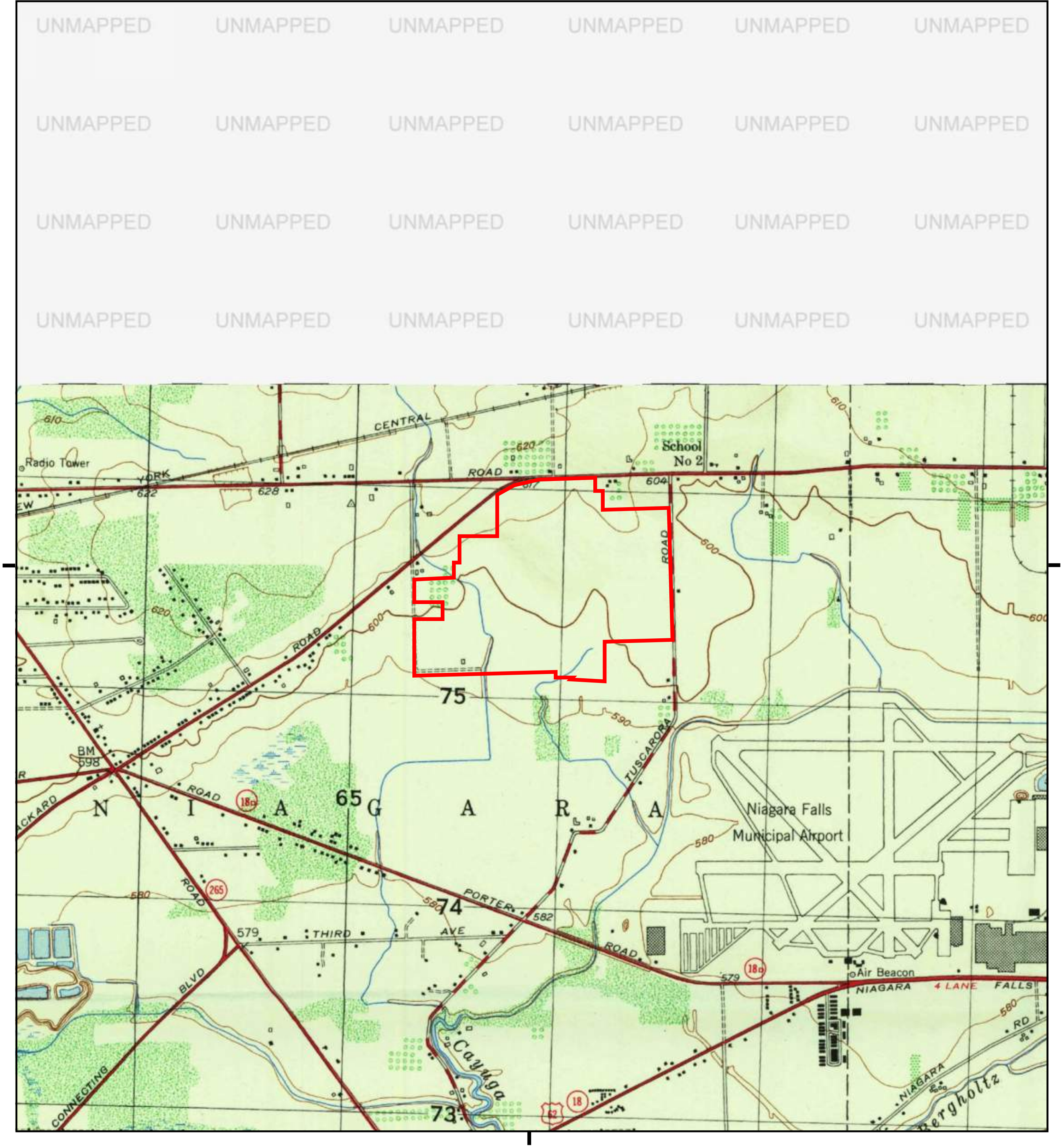


TP, Tonawanda West, 1965, 7.5-minute
N, Ransomville, 1965, 7.5-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

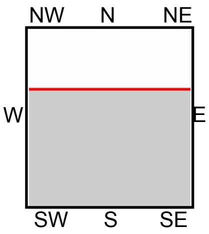
Historical Topo Map

1954



This report includes information from the following map sheet(s).

0 Miles 0.25 0.5 1 1.5



TP, Tonawanda West, 1954, 7.5-minute

SITE NAME: Niagara

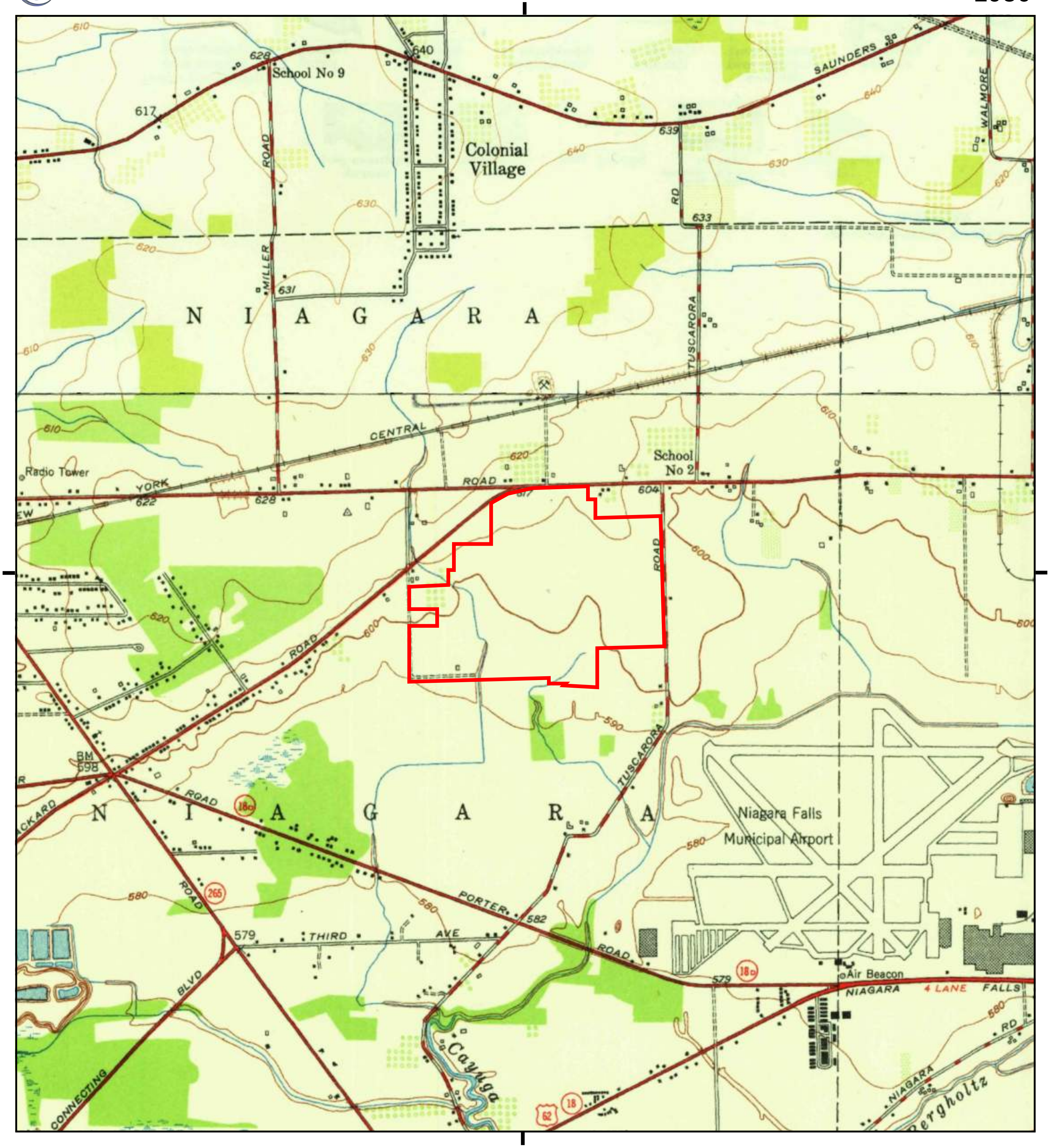
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304

CLIENT: Langan Environmental Services

N

Historical Topo Map

1950



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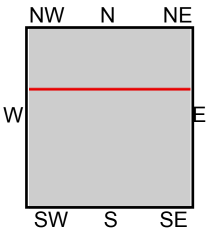
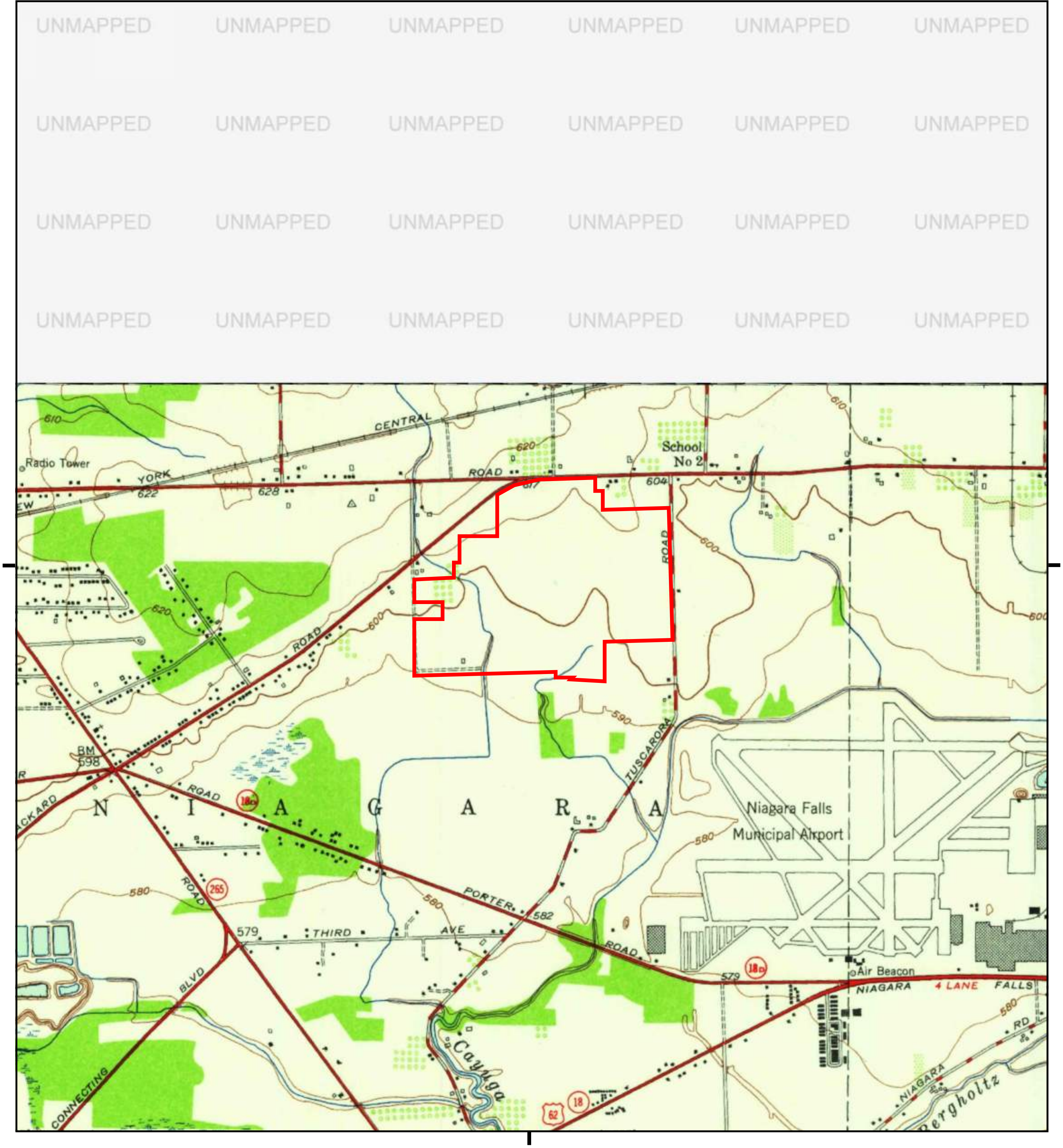


TP, Tonawanda West, 1950, 7.5-minute
N, Ransomville, 1950, 7.5-minute

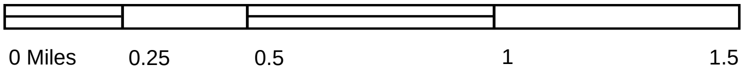
SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

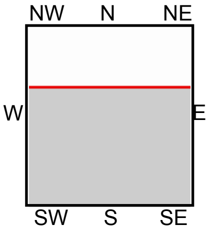
Historical Topo Map

1948



This report includes information from the following map sheet(s).



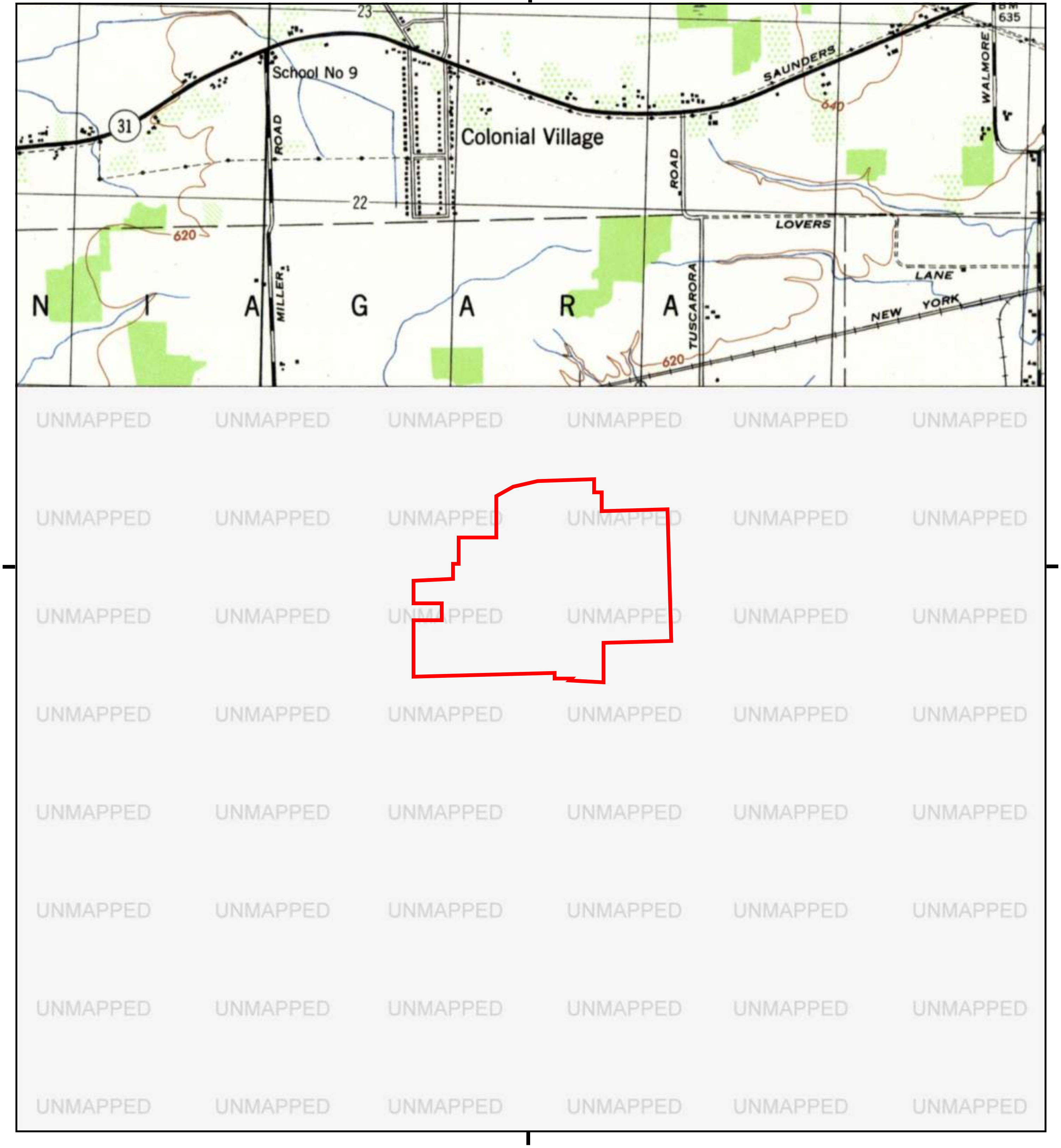


TP, Tonawanda West, 1948, 7.5-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

Historical Topo Map

1946



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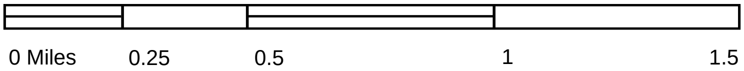
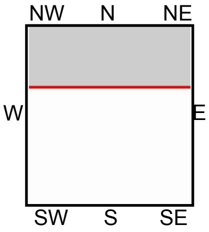


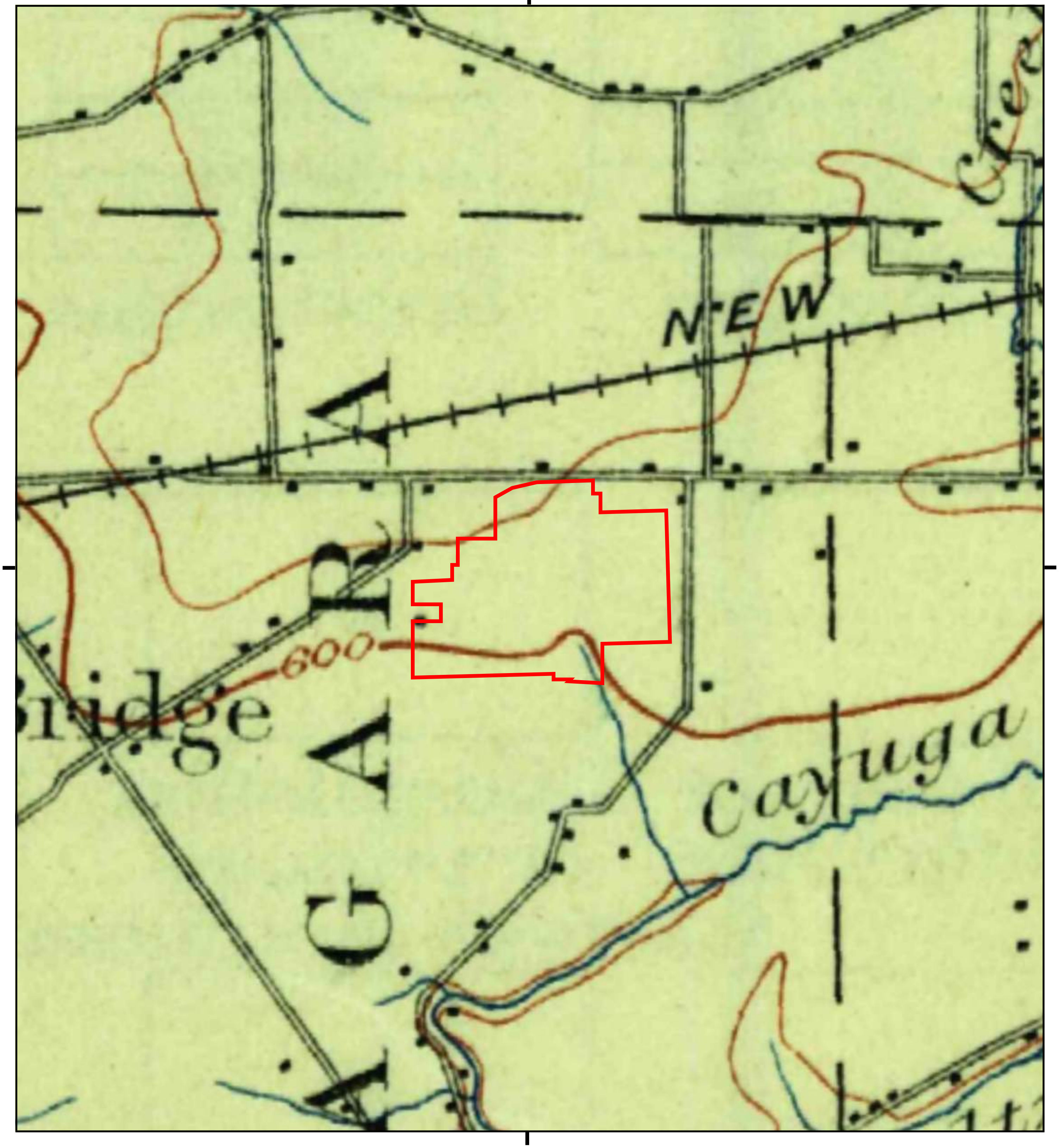


N, RANSOMEVILLE, 1946, 7.5-minute

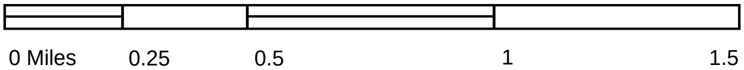
SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

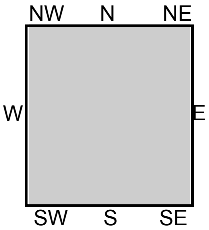
Historical Topo Map

1913



This report includes information from the following map sheet(s).



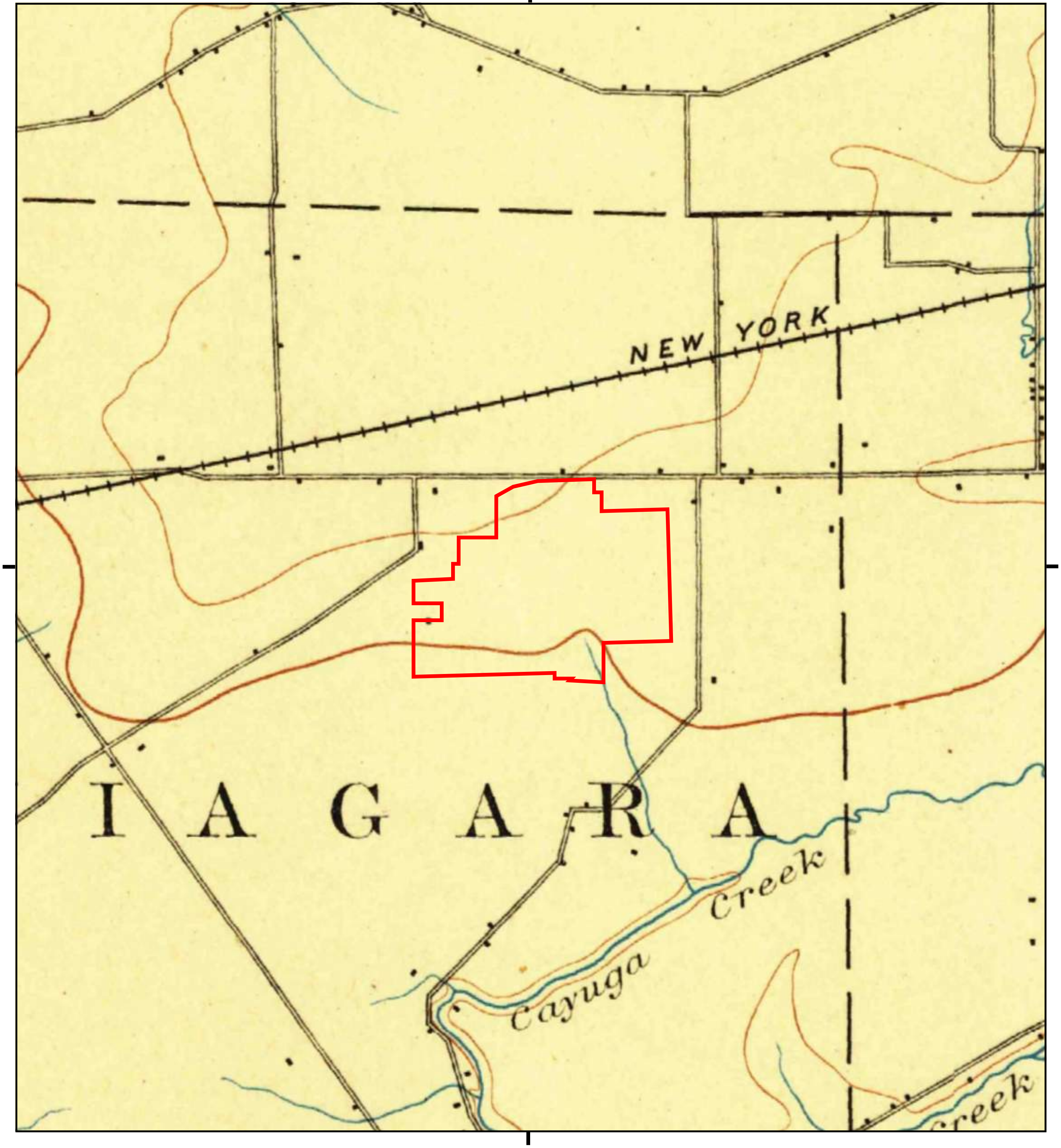


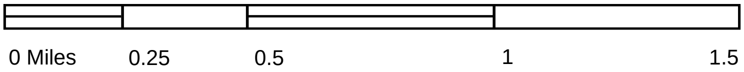
TP, Niagara, 1913, 30-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

Historical Topo Map

1901





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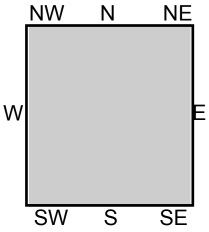
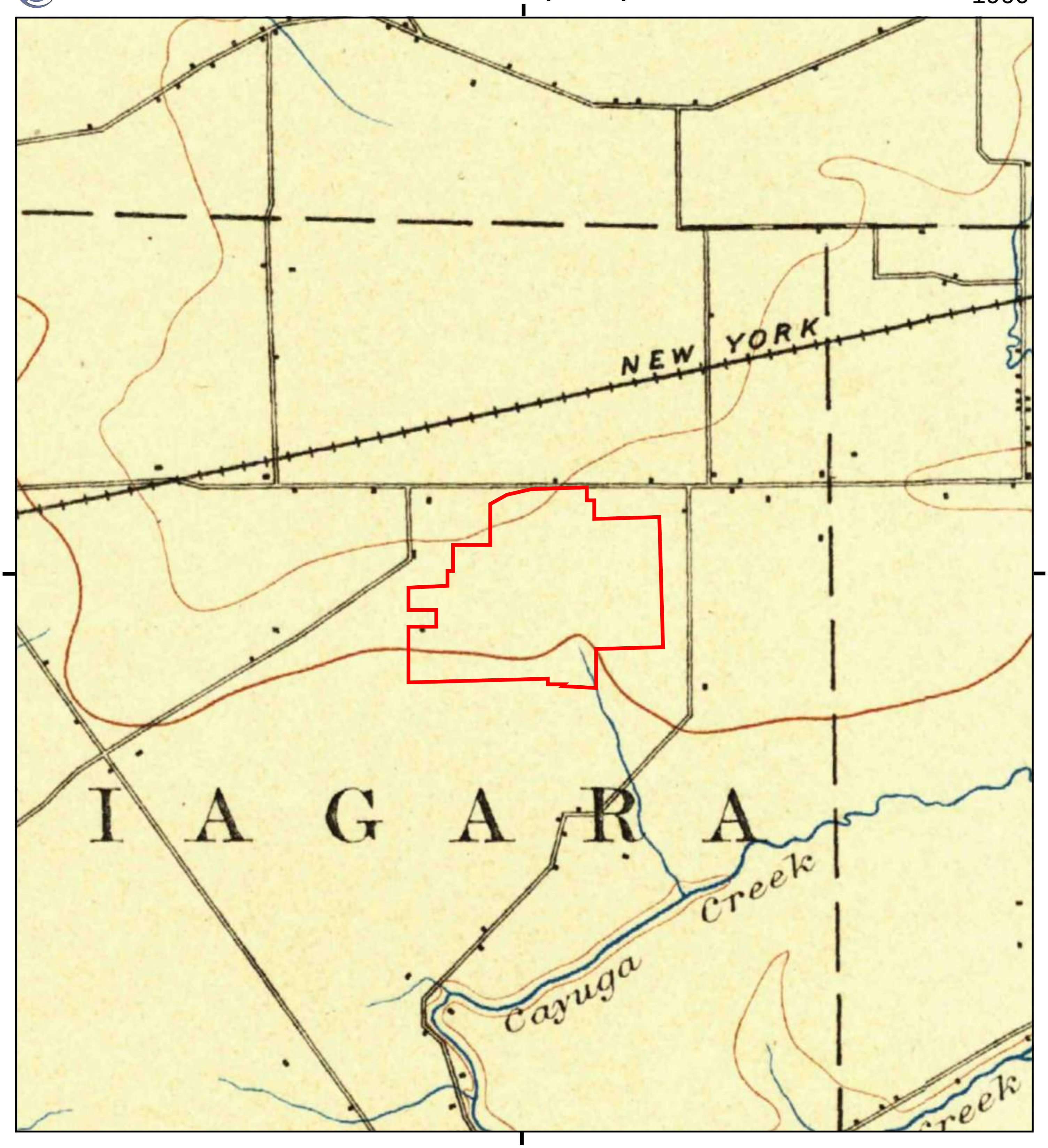


TP, Tonawanda, 1901, 15-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

Historical Topo Map

1900



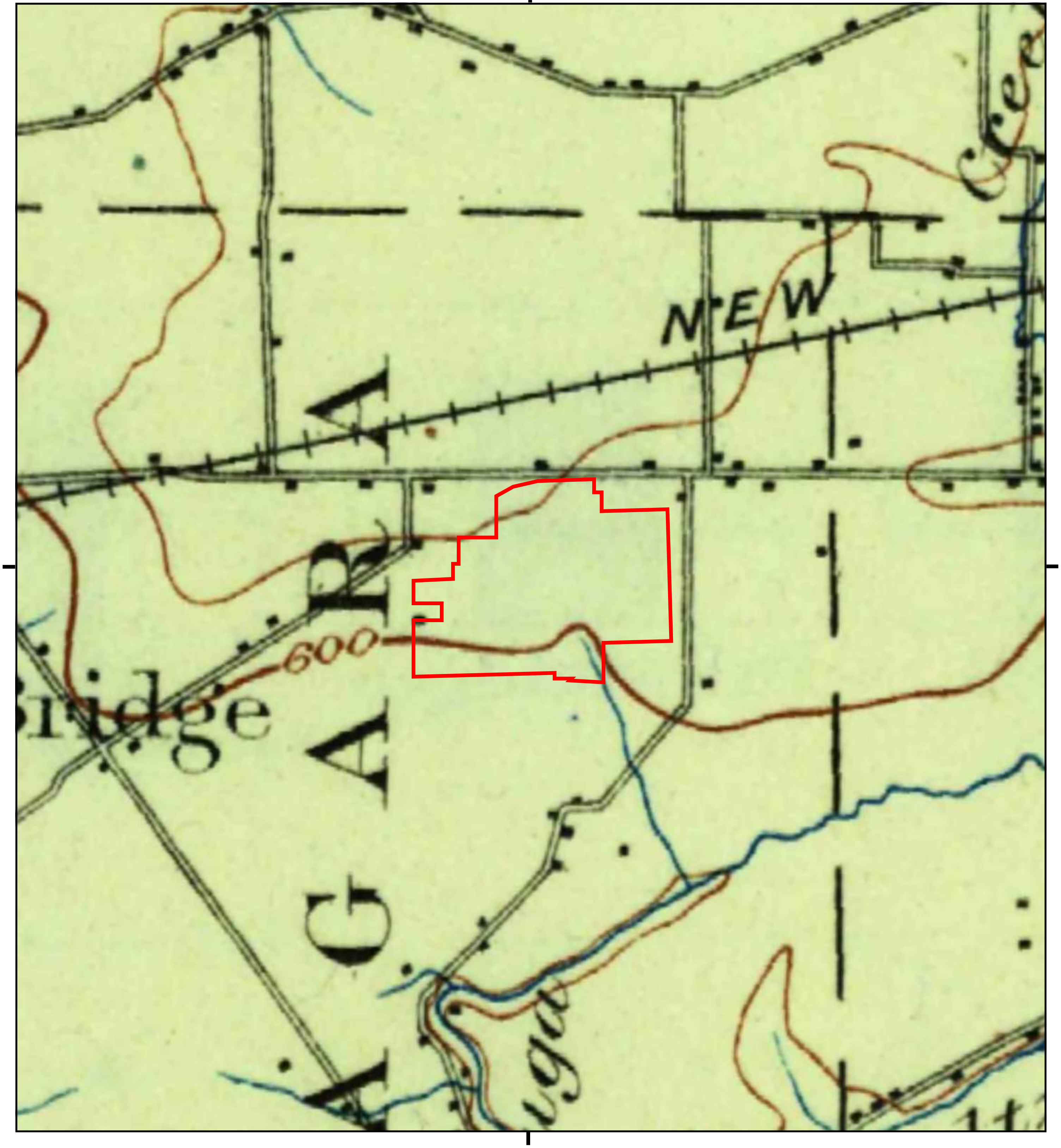
This report includes information from the following map sheet(s).

TP, Tonawanda, 1900, 15-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

Historical Topo Map

1899



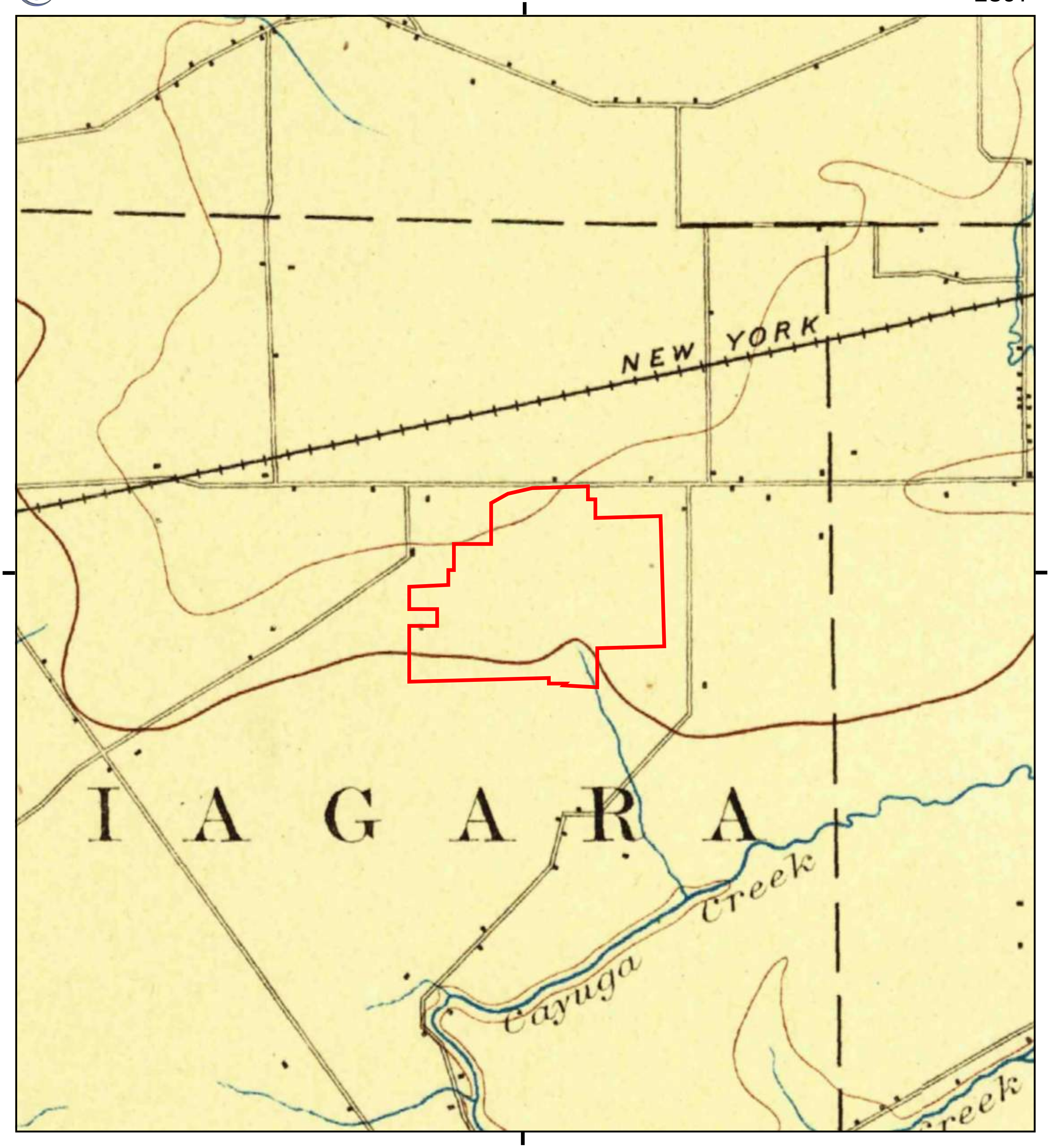
This report includes information from the following map sheet(s).

TP, Niagara, 1899, 30-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

Historical Topo Map

1897



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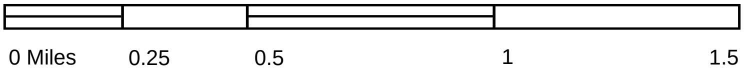
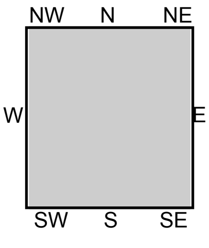
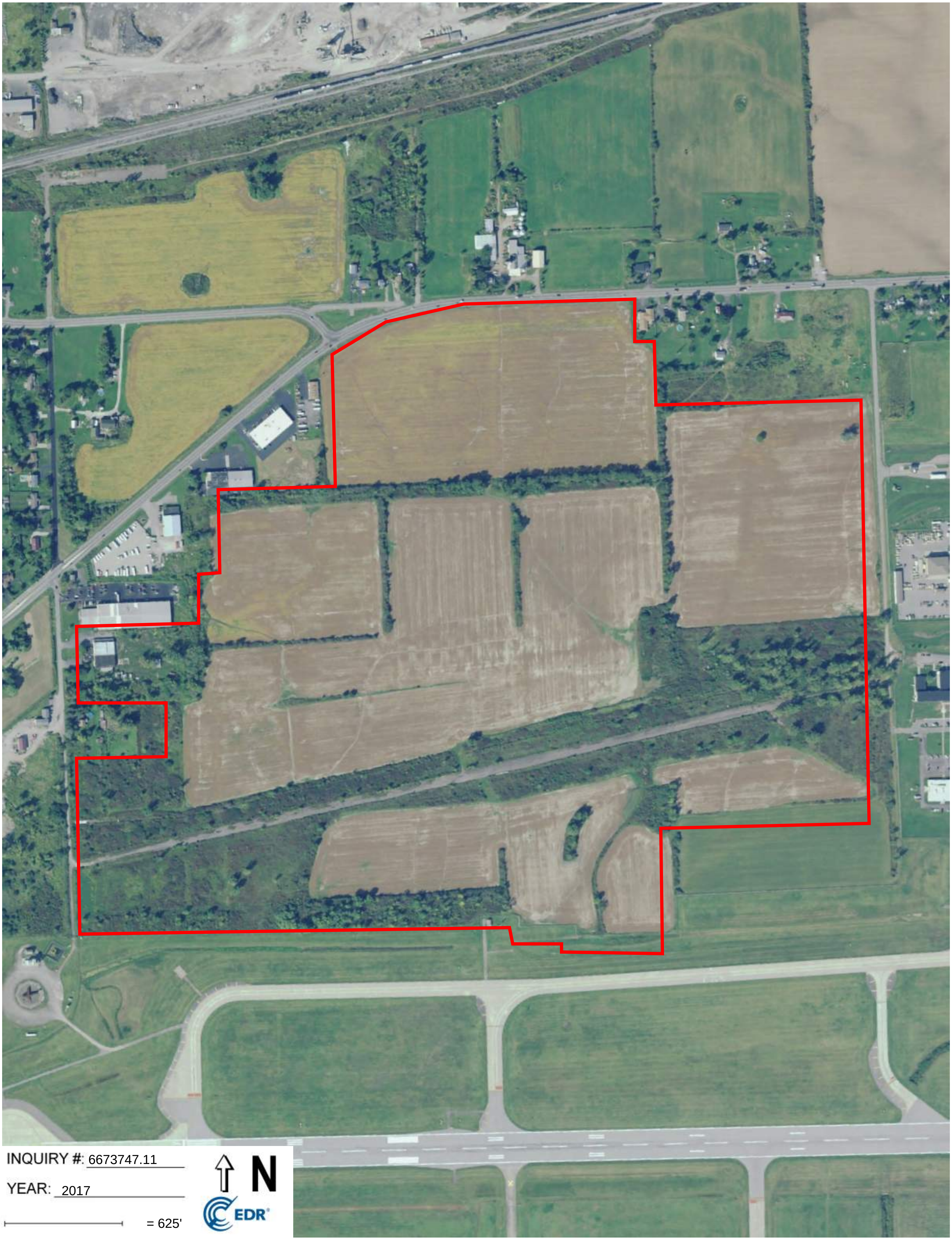




TP, Tonawanda, 1897, 15-minute

SITE NAME: Niagara
ADDRESS: 8995 Lockport Road
Niagara Falls, NY 14304
CLIENT: Langan Environmental Services

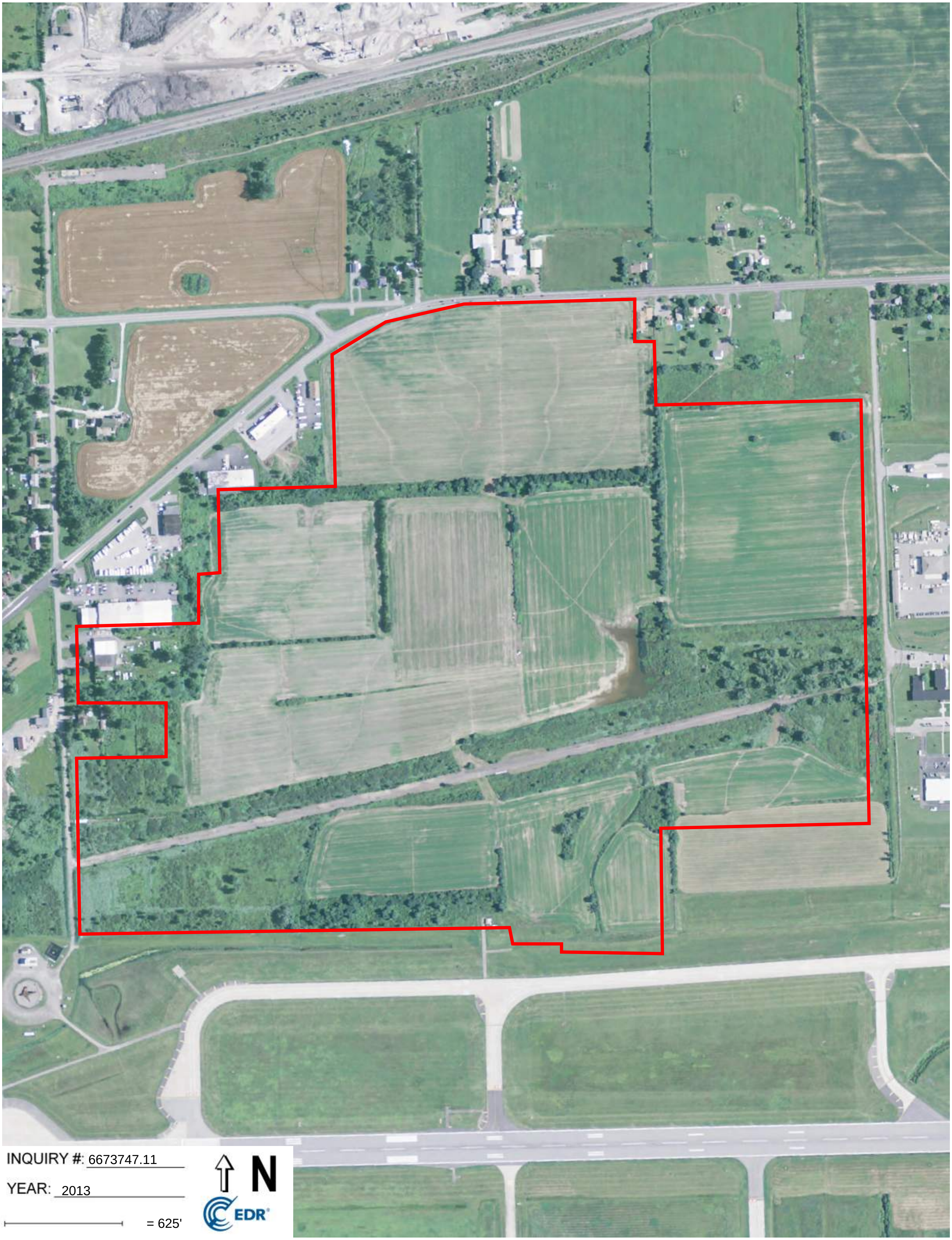


INQUIRY #: 6673747.11

YEAR: 2017

N

= 625'



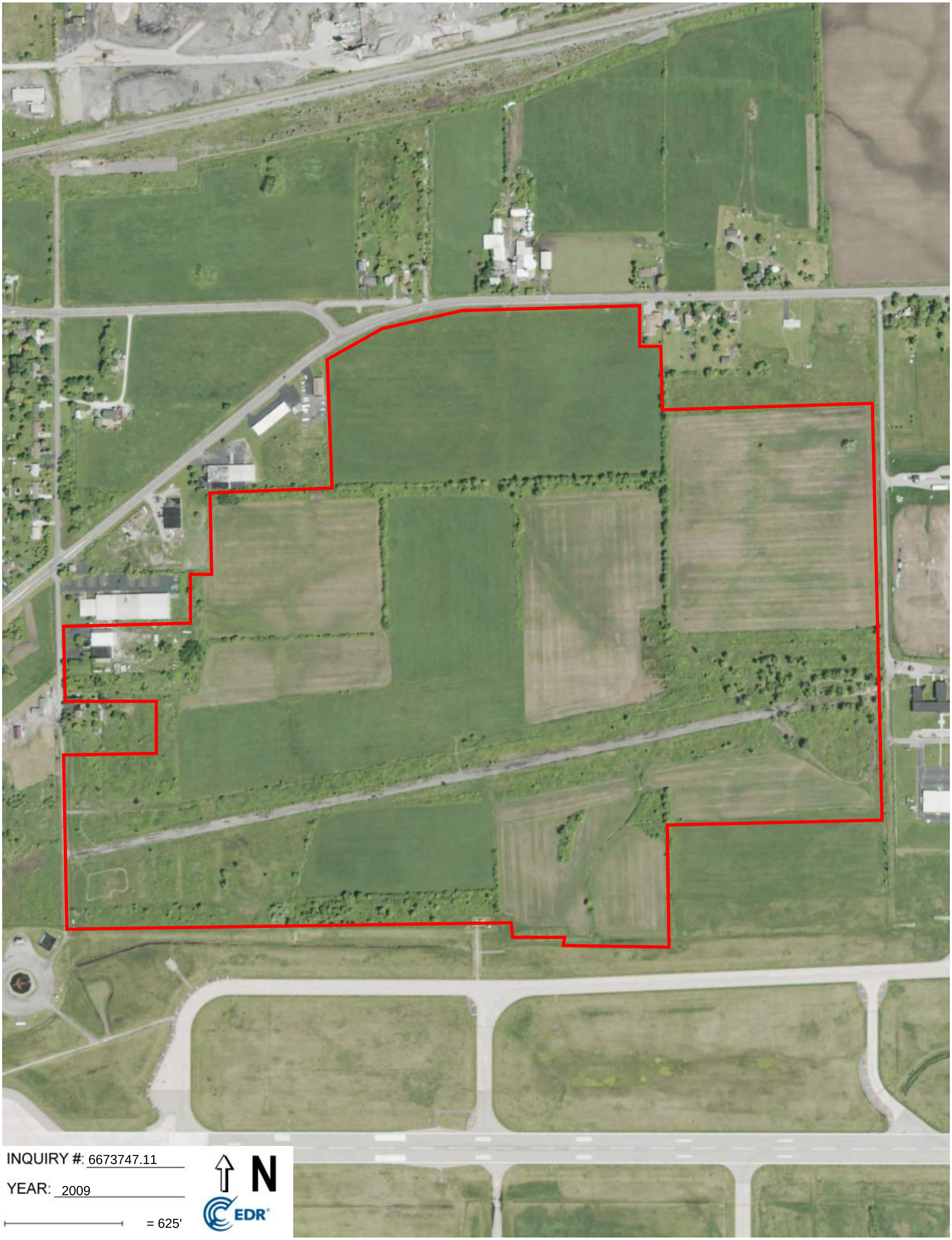
INQUIRY #: 6673747.11

YEAR: 2013

= 625'

N

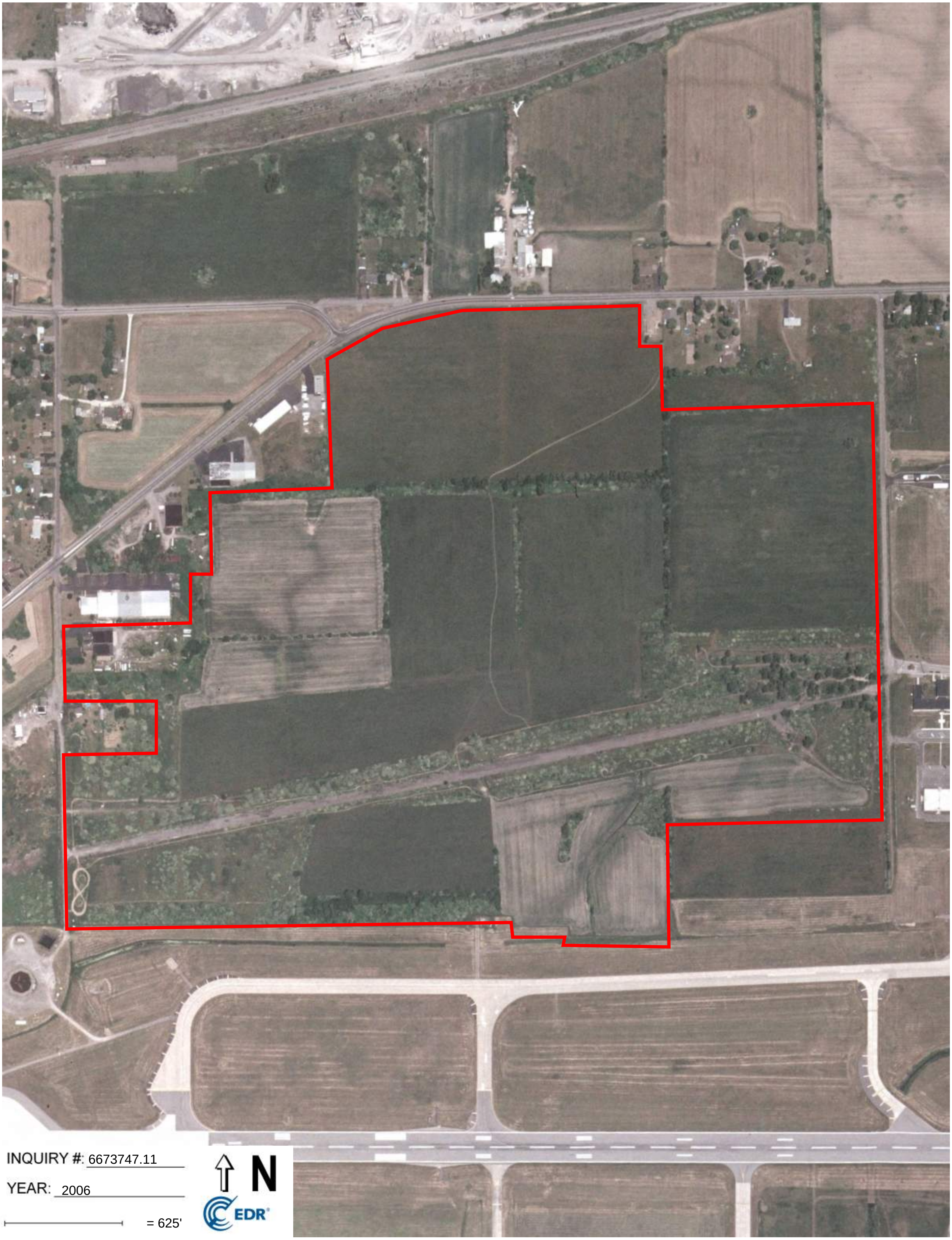
EDR



INQUIRY #: 6673747.11

YEAR: 2009

= 625'



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YEAR: 2006

= 625'

INQUIRY #: 6673747.11

YEAR: 1995

= 625'

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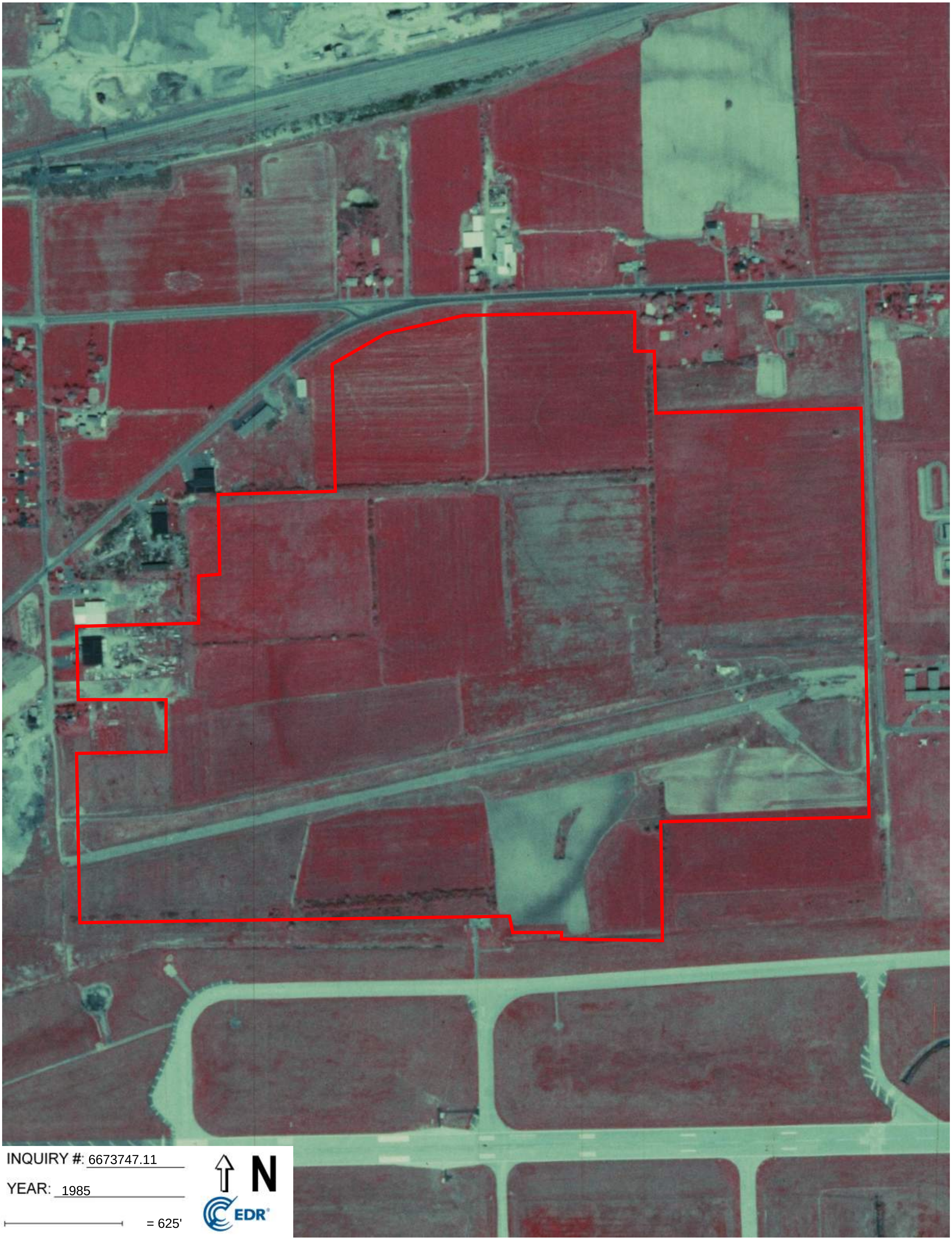
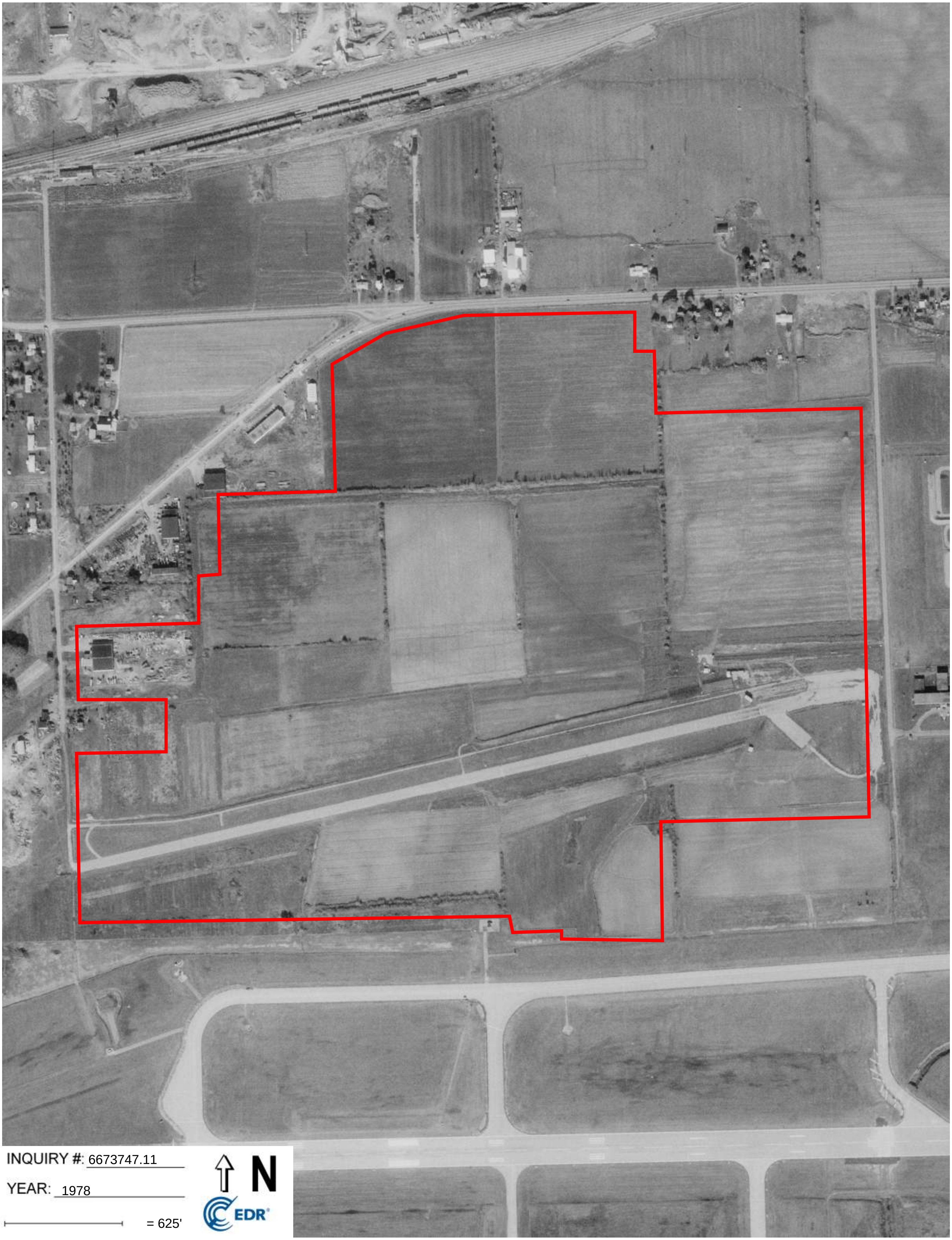


INQUIRY #: 6673747.11

YEAR: 1985

= 625'

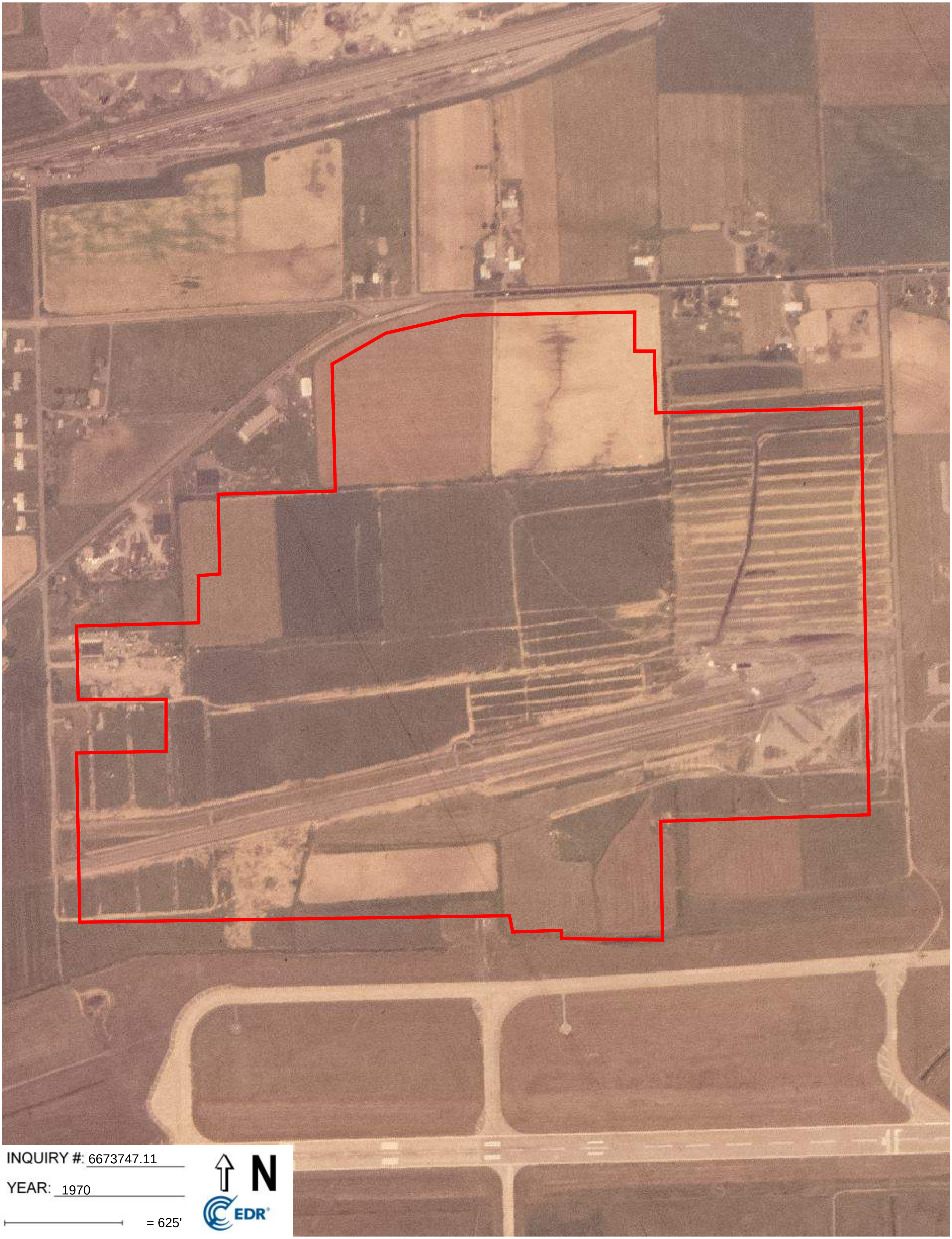
N



INQUIRY #: 6673747.11

YEAR: 1978

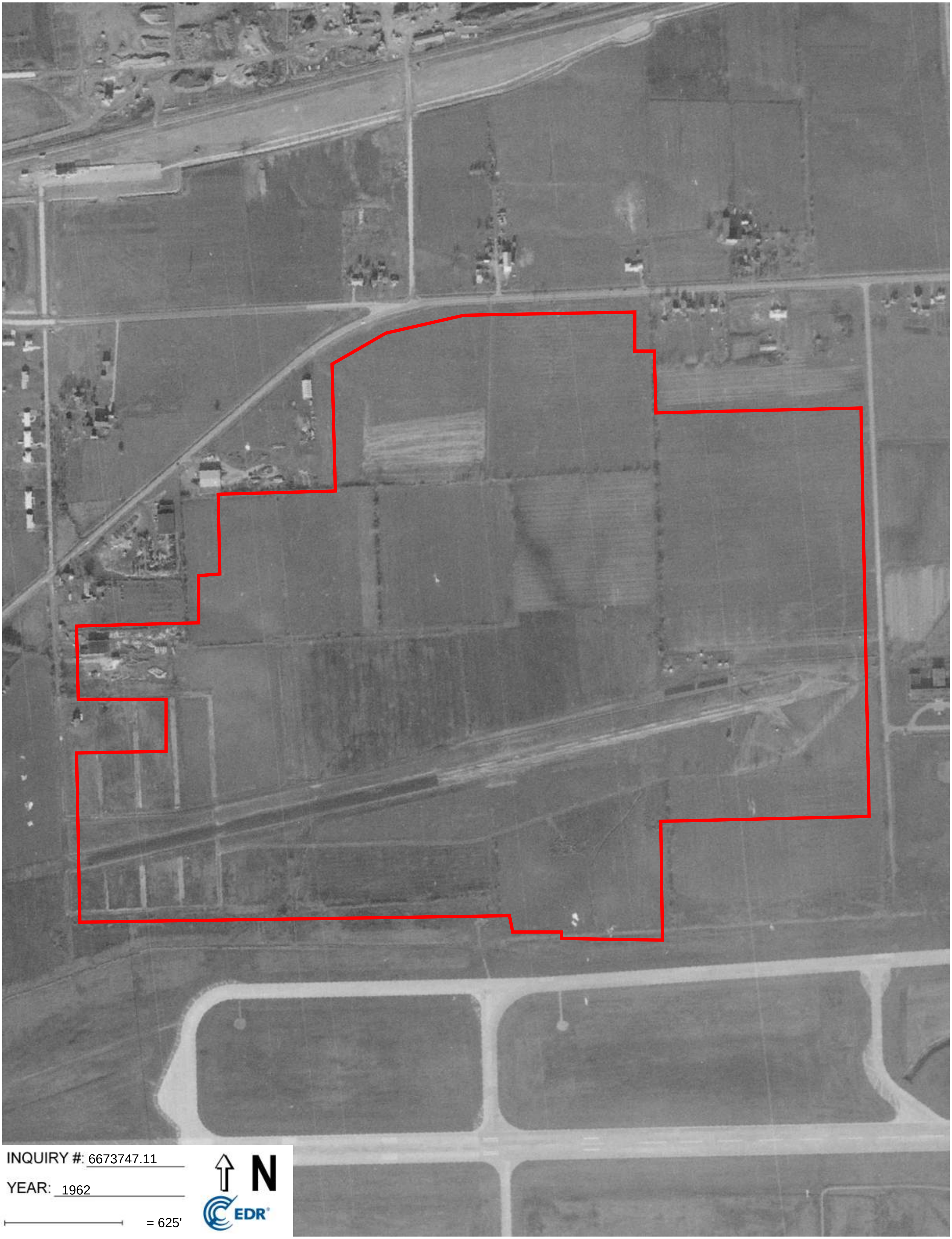
= 625'



INQUIRY #: 6673747.11

YEAR: 1970

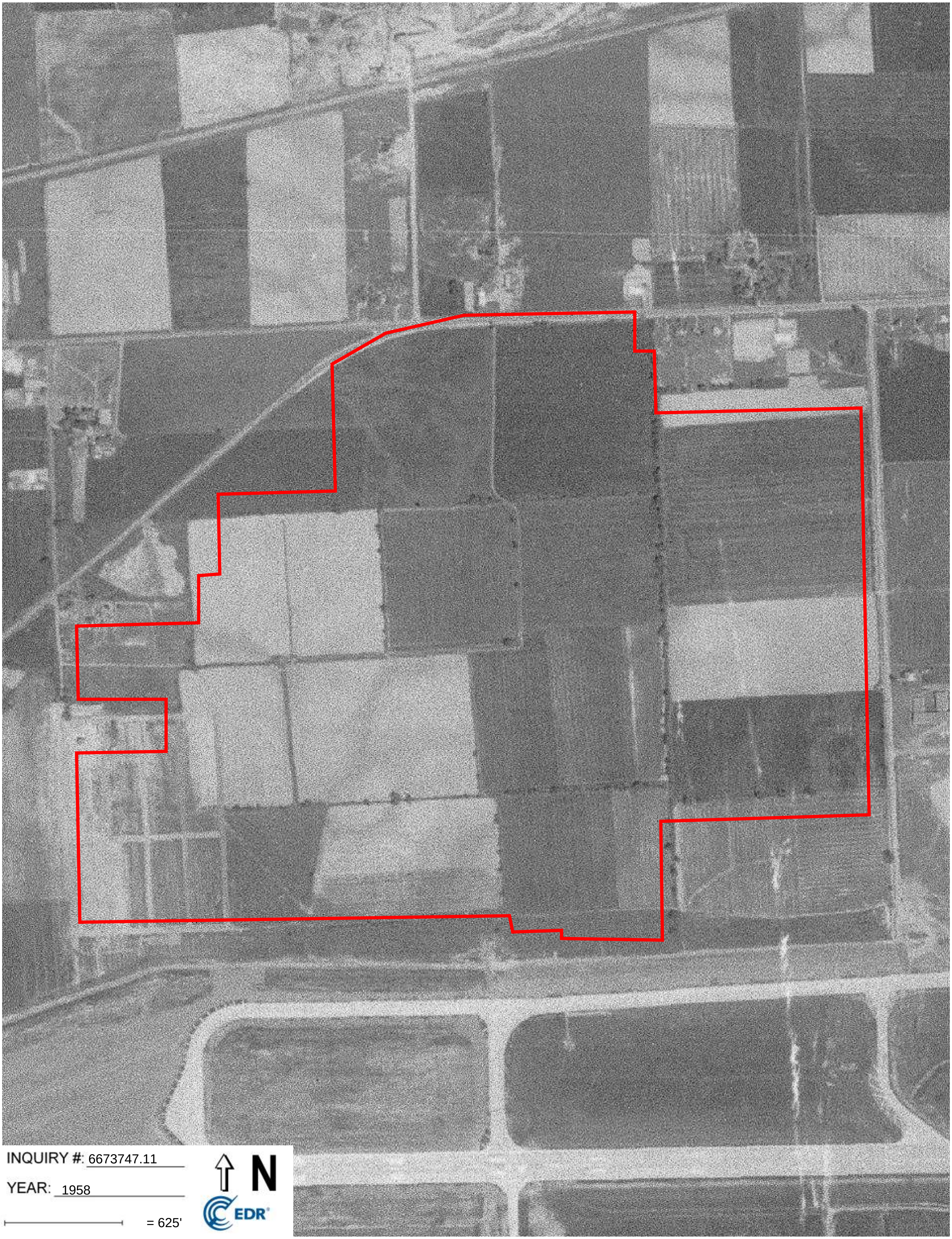
= 625'



INQUIRY #: 6673747.11

YEAR: 1962

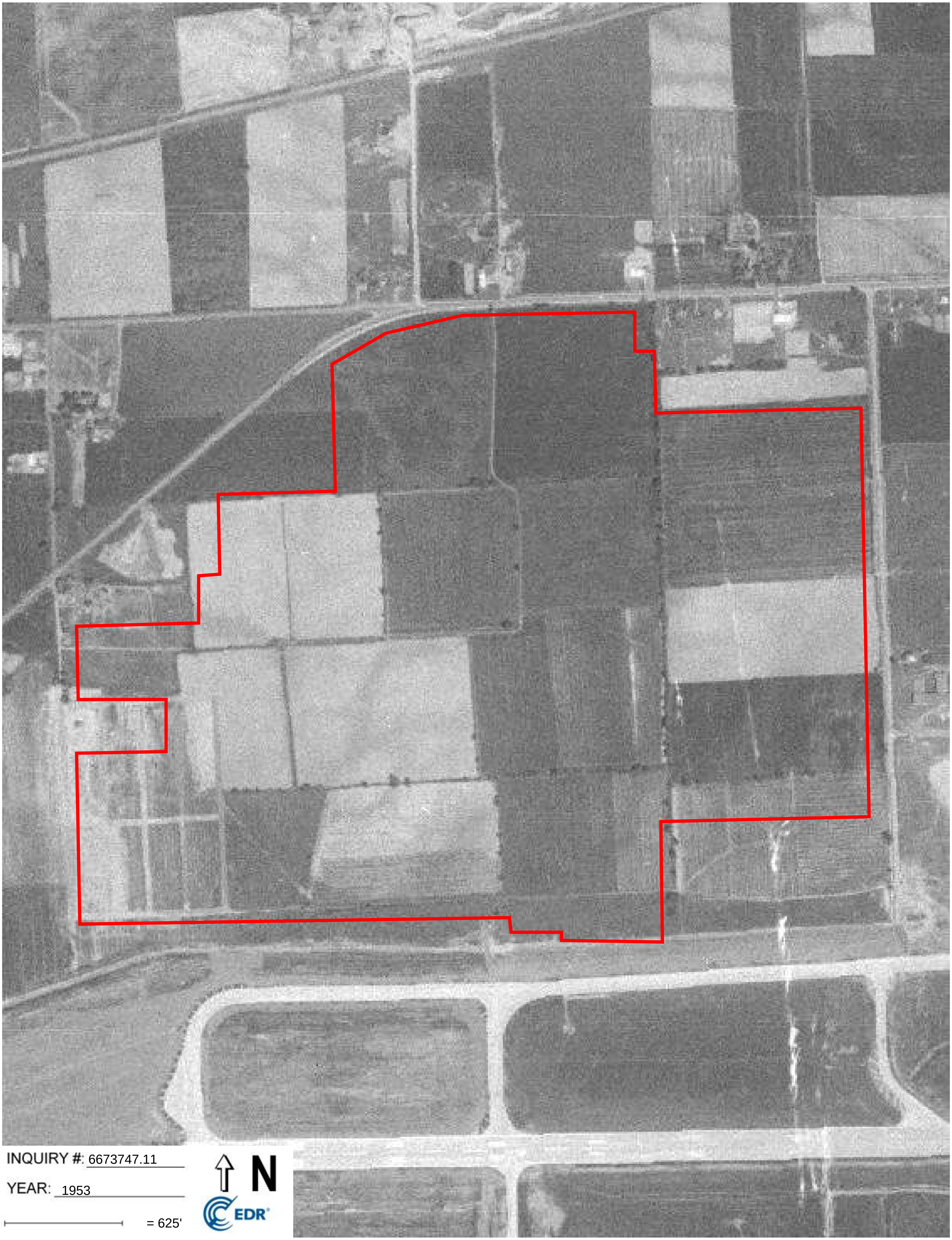
= 625'



INQUIRY #: 6673747.11

YEAR: 1958

= 625'



INQUIRY #: 6673747.11

YEAR: 1953

= 625'

INQUIRY #: 6673747.11

YEAR: 1938

= 625'

APPENDIX B

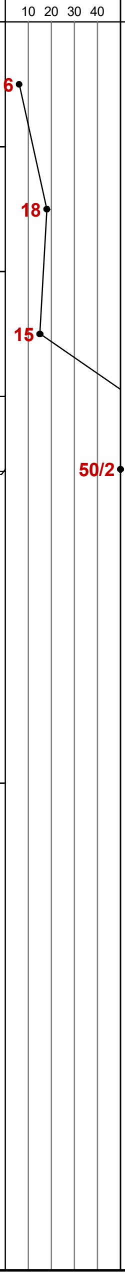
LANGAN BORING LOGS

LANGAN

Log of Boring **LB-01** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 605 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 11/30/21	Date Finished 11/30/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 12.2 ft	Rock Depth 7.2 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples: Disturbed 4	Undisturbed - / Core 1
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.): First ▽ 5	Completion ▼ N/A / 24 HR. ▽ 2.2
Casing Hammer N/A / Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan Delude	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer Chris Steiding	
Sampler Hammer Automatic / Weight (lbs) 140	Drop (in) 30		

Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+605.0	Dark brown silty CLAY, some f-c sand, trace root fibers (moist)[TOPSOIL]		0	S-1A S-1B	SS	14	WOH 2 4 5	6	S-1 at 0ft q_u=3.50 tsf
+603.8	Reddish brown silty CLAY, trace f-m sand, trace root fibers (moist) Reddish brown silty CLAY, trace f-c sand, trace fine gravel (moist) ▽		1 2 3	S-2	SS	24	5 9 9 12	18	S-2 at 2ft q_u=3.75 tsf
+601.0	Reddish brown sandy CLAY, some silt, trace fine gravel (wet) ▽		4 5	S-3	SS	24	4 7 8 9	15	Augered to 4.0ft. S-3 at 4ft q_u=3.00 tsf
	Reddish brown silty CLAY, some f-c sand, some f-c gravel (wet)		6 7	S-4	SS	14	5 6 50/2	50/2	S-4 at 6ft
+597.8	Dark gray DOLOSTONE ; fine grained; fresh; close fracture spacing; fractures near horizontal; rock quality poor	25:41	8 9 10 11 12	C-1	NX Core	REC=41"/60" =68%	RQD=23"/60" =38%		Augered to 7.2ft. Auger refusal at 7.2ft. C-1 at 7.2ft
+592.8	Bottom of boring at 12ft		13 14 15 16 17 18 19 20						Bottom of Boring at 12.2ft. Borehole left open for 24 hour to check water level. Boring backfilled with auger cuttings to grade.

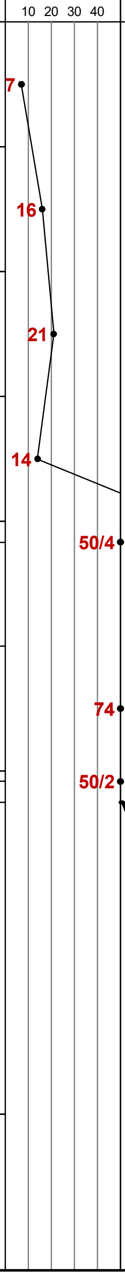


LANGAN

Log of Boring **LB-02** Sheet 1 of 2

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 604 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started / Date Finished	12/1/21 / 12/1/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth / Rock Depth	22.5 ft / 12.5 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 7; Undisturbed -; Core 2
Casing Diameter (in) N/A; Casing Depth (ft) N/A		Water Level (ft.)	First ▽ 6; Completion ▼ N/A; 24 HR. ▼
Casing Hammer N/A; Weight (lbs) N/A; Drop (in) N/A		Drilling Foreman	Dan Delude
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Chris Steiding
Sampler Hammer Automatic; Weight (lbs) 140; Drop (in) 30			

Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+604.0			0						
+603.7	Dark brown silty CLAY, trace f-c sand, trace root fibers (wet)[TOPSOIL]			S-1A	SS	15	2		S-1 at 0ft q_u=2.50 tsf
	Dark brown to brown silty CLAY, trace f-c sand, trace root fibers (moist)		1	S-1B			3 4 5	7	
	Reddish brown silty CLAY, trace f-c sand, trace root fibers (moist)		2–3	S-2	SS	16	4 6 10 11	16	S-2 at 2ft q_u=3.00 tsf
	Reddish brown silty CLAY, trace f-c sand, trace fine gravel (moist)		4–5	S-3	SS	24	5 8 13 12	21	Augered to 4.0ft. S-3 at 4ft q_u=3.75 tsf
+598.0 ▽	Reddish brown sandy CLAY, some silt, trace f-m gravel (wet)		6–7	S-4	SS	10	7 8 6 5	14	S-4 at 6ft
+596.0	Dark gray fine-coarse GRAVEL, some f-c sand, trace rock fragments, trace clay, trace silt (wet) [TILL]		8–9	S-5	SS	2	50/4	50/4	Augered to 8.0ft. S-5 at 8ft.
	Dark gray fine-coarse GRAVEL, some silt, some f-c sand, trace clay (wet) [TILL]		10–11	S-6	SS	24	20 31 43 13	74	Augered to 10.0ft. S-6 at 10ft
	No Recovery		12	S-7	SS	0	50/2	50/2	Augered to 12.0ft. S-7 at 12ft
+591.5	Dark gray DOLOSTONE ; fine grained; fresh; very close to moderate fracture spacing; fractures near horizontal; rock quality fair [BEDROCK]	1:59 1:54 2:11 4:42 11:21	13–17	C-1	NX Core	REC=48"/60" =80%	RQD=30"/60" =50%		Augered to 12.5ft. Auger refusal encountered at 12.5ft. C-1 at 12.5ft. Brown wash. Hand-held sample breaks with a hammer. Small pores observed throughout core run.
	Dark gray DOLOSTONE ; fine grained; fresh; very close to moderate fracture spacing; fractures near horizontal; rock quality fair [BEDROCK]	1:40 3:47	18–19	C-2	NX Core	REC=60"/60" =100%	RQD=60"/60" =100%		C-2 at 17.5ft. Brown wash. Hand-held sample breaks with a hammer. Small pores observed throughout core run.
			20						



LANGAN

Log of Boring **LB-02** Sheet 2 of 2

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 604 (NAVD88)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Sample Data Number	Sample Data Type	Sample Data Recov. (in)	Sample Data Penetr. resist BL/6in	Sample Data N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
▨	+584.0		2:14	20						
▨		Dark gray DOLOSTONE ; fine grained; fresh; very close to moderate fracture spacing; fractures near horizontal; rock quality fair [BEDROCK]	2:04	21	C-2	NX Core				
▨			2:31	22						
	+581.5	Bottom of boring at 22.5ft								Bottom of Boring at 22.5ft. Boring backfilled with auger cuttings to grade.
				23						
				24						
				25						
				26						
				27						
				28						
				29						
				30						
				31						
				32						
				33						
				34						
				35						
				36						
				37						
				38						
				39						
				40						
				41						
				42						
				43						
				44						
				45						

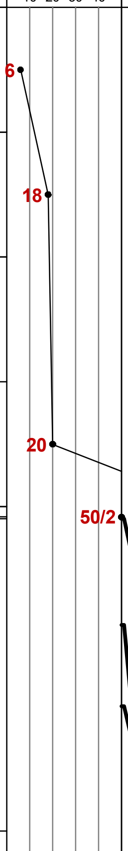
LANGAN

Log of Boring **LB-03(OW)** Sheet 1 of 1

Project: Project Fifi/Niagara,NY		Project No.: 190071801	
Location: Lockport Rd & Packard Rd		Elevation and Datum: el +603.5 604 (NAVD88)	
Drilling Company: SJB Services, Inc.		Date Started: 12/1/21	Date Finished: 12/1/21
Drilling Equipment: Track-mounted Diedrich d-50		Completion Depth: 13.2 ft	Rock Depth: 8.2 ft
Size and Type of Bit: 4-1/4 inch HSA		Number of Samples: Disturbed 4 / Undisturbed 1	Core 1
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.): First ▽ N/E / Completion ▼ N/A	24 HR. ▽
Casing Hammer: N/A / Weight (lbs): N/A	Drop (in): N/A	Drilling Foreman: Dan Delude	
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer: Chris Steiding	
Sampler Hammer: Automatic / Weight (lbs): 140	Drop (in): 30		

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+604.0 +603.7	Dark brown clayey SILT, some f-c sand, trace root fibers (wet)[TOPSOIL]		0	S-1A	SS	11	1 3	6	S-1 at 0ft q_u=2.75 tsf
		Brown silty CLAY, trace f-m sand, trace root fibers (moist)		1	S-1B			3 7		
		Reddish brown silty CLAY, trace f-m sand (moist)		2	S-2	SS	15	4 8 10 7	18	S-2 at 2ft q_u=3.00 tsf
		Reddish brown silty CLAY, trace f-m sand (moist)		4	U-1	ST	14			Augered to 4.0ft. U-1 at 4ft Shelby tube taken from 8:33 to 8:53. Only pushed 1.4ft. q_u=4.25 tsf
	+598.0	Mottled reddish brown to gray silty CLAY, trace f-c sand, trace fine gravel (moist) [TILL]		6	S-3	SS	24	8 10 10 10	20	Augered to 6.0ft. S-3 at 6ft q_u=4.50 tsf
		Dark gray medium-coarse GRAVEL (moist) [TILL]		7						
	+595.8			8	S-4	SS	1	50/2	50/2	Augered to 8.0ft. S-4 at 8ft Augered to 8.2ft. Auger refusal encountered at 8.2ft.
		Dark gray DOLOSTONE ; fine grained; fresh; very close to moderate fracture spacing; fractures near horizontal; rock quality very poor [BEDROCK]	4:05 3:08 4:19 3:54 3:14	9–13	C-1	NQ CORE	REC=38"/60" =63%	RQD=11"/60" =18%		C-1 at 8.2ft. Brown wash. Cannot scratch surface with a knife to hand-held sample breaks with a hammer. High angle fracture at 9.9ft Lost water return.
	+590.8	Bottom of boring at 13.2ft		13						Bottom of Boring at 13.2ft. Observation well installed. Refer to well installation log for more information.

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



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LANGAN

Log of Boring **LB-04** Sheet 1 of 1

Project: Project Fifi/Niagara,NY
Project No.: 190071801
Location: Lockport Rd & Packard Rd
Elevation and Datum: el +603.5 603 (NAVD88)
Drilling Company: SJB Services, Inc.
Date Started: 12/2/21
Date Finished: 12/2/21
Drilling Equipment: Track-mounted Diedrich d-50
Completion Depth: 16.5 ft
Rock Depth: 11.5 ft
Size and Type of Bit: 4-1/4 inch HSA
Number of Samples: Disturbed 6 Undisturbed - Core 1
Casing Diameter (in): N/A
Casing Depth (ft): N/A
Water Level (ft.): First ▽ 6 Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A Weight (lbs): N/A Drop (in): N/A
Drilling Foreman: Dan Delude
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel
Field Engineer: Chris Steiding
Sampler Hammer: Automatic Weight (lbs): 140 Drop (in): 30

Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+603.0 +602.6	Dark brown clayey SILT, some f-c sand, trace root fibers (wet)[TOPSOIL]		0	S-1A	SS	12	1 2		S-1 at 0ft q_u=2.50 tsf
	Brown to reddish brown silty CLAY, trace f-m sand, trace root fibers (moist)		1	S-1B			3 5	5	
	Reddish brown silty CLAY, trace f-c sand, trace fine gravel (moist)		2 3	S-2	SS	18	3 6 9 10	15	S-2 at 2ft q_u=4.50 tsf
	Brown to reddish brown silty CLAY, trace f-c sand (moist)		4 5	S-3	SS	24	3 7 8 7	15	Augered to 4.0ft. S-3 at 4ft q_u=4.50 tsf
+597.0	▽ Reddish brown sandy CLAY, some silt, trace f-m gravel (wet) [TILL]		6 7	S-4	SS	24	9 8 8 8	16	S-4 at 6ft q_u=.75 tsf
	Dark gray fine-coarse GRAVEL, trace f-c sand, trace silt (wet) [TILL]		8 9	S-5	SS	15	10 20 50/3	50/3	Augered to 8.0ft. S-5 at 8ft
	Dark gray coarse GRAVEL, trace f-m sand, trace silt (wet) [TILL]		10 11	S-6	SS	1	50/2	50/2	Augered to 10.0ft. S-6 at 10ft
+591.5	Dark gray DOLOSTONE ; fine grained; fresh; close to moderate fracture spacing; fractures near horizontal; rock quality good [BEDROCK]	1:34 1:21 1:58 2:23 3:43	12 13 14 15 16	C-1	NX Core	REC=60"/60" =100%	RQD=45"/60" =75%		Augered to 11.5ft. Auger refusal encountered at 11.5ft. C-1 at 11.5ft. Brown wash. Cannot scratch surface with a knife to hand-held sample breaks with a hammer. Pores observed throughout core run.
+586.5	Bottom of boring at 16.5ft		17 18 19 20						Bottom of Boring at 16.5ft. Boring backfilled with auger cuttings to grade.

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Log of Boring **LB-05** Sheet 1 of 1

Project: Project Fifi/Niagara,NY	Project No.: 190071801
Location: Lockport Rd & Packard Rd	Elevation and Datum: el +603.5 603 (NAVD88)
Drilling Company: SJB Services, Inc.	Date Started: 12/1/21 ; Date Finished: 12/2/21
Drilling Equipment: Track-mounted Diedrich d-50	Completion Depth: 17.2 ft ; Rock Depth: 7.2 ft
Size and Type of Bit: 4-1/4 inch HSA	Number of Samples: Disturbed 4 ; Undisturbed - ; Core 2
Casing Diameter (in): N/A ; Casing Depth (ft): N/A	Water Level (ft.): First ▽ 6 ; Completion ▼ N/A ; 24 HR. ▼
Casing Hammer: N/A ; Weight (lbs): N/A ; Drop (in): N/A	Drilling Foreman: Dan Delude
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	
Sampler Hammer: Automatic ; Weight (lbs): 140 ; Drop (in): 30	Field Engineer: Chris Steiding

Elev. (ft) +603.0	Sample Description	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
602.8	Dark brown SILT, some clay, some f-c sand, trace root fibers (wet)[TOPSOIL]		0	S-1A	SS	9	WOH		S-1 at 0ft q_u=2.75 tsf
	Mottled orangish brown to brown silty CLAY, trace f-m sand (moist)		1	S-1B			2 4 5	6	
	Reddish brown silty CLAY, trace f-c sand (moist)		2	S-2	SS	14	5 8 12 15	20	S-2 at 2ft q_u=4.50 tsf
	Reddish brown silty CLAY, trace f-c sand, trace f-c gravel (moist) ▽		4	S-3	SS	24	8 7 9 12	16	Augered to 4.0ft. S-3 at 4ft q_u=4.00 tsf
597.0	Reddish brown silty CLAY, some f-c sand, trace f-c gravel (wet) [TILL]		6	S-4A S-4B	SS	15	8 5 50/3	50/3	S-4 at 6ft
596.0	Reddish brown to dark gray fine-coarse GRAVEL, some silt, some f-c sand, trace clay (wet) [WTHD ROCK] Dark gray DOLOSTONE ; fine grained; fresh; very close to moderate fracture spacing; fractures near horizontal; rock quality very poor [WTHD ROCK]	2:20 2:24 1:14 1:59 1:48	7	C-1	NX Core	REC=25"/60" =42%	RQD=9"/60" =15%		Augered to 7.2ft. Auger refusal encountered at 7.2ft. C-1 at 7.2ft. Brown wash. Cannot scratch surface with a knife to hand-held sample breaks with a hammer. Pores observed throughout core run. Tool drop between 10.4 and 11.0ft. Lost water return.
590.8	Dark gray DOLOSTONE ; fine grained; fresh; close to moderate fracture spacing; fractures near horizontal; rock quality very poor [BEDROCK]	1:58 1:56 2:04 1:27 1:27	12	C-2	NX Core	REC=44"/60" =73%	RQD=32"/60" =53%		C-2 at 12.2ft. Hand-held sample breaks with a hammer. Pores observed throughout core run.
585.8	Bottom of boring at 17.2ft		17						Bottom of Boring at 17.2ft. Boring backfilled with auger cuttings to grade.

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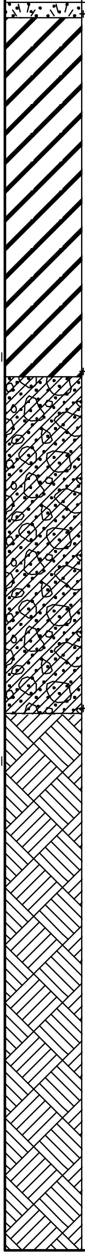
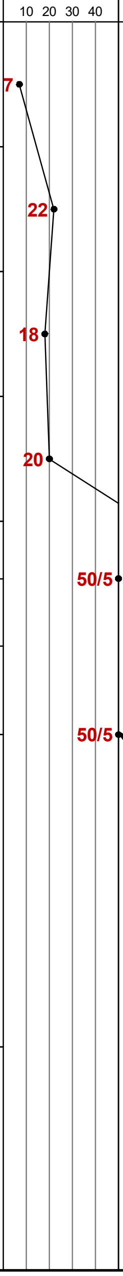
Log of Boring **LB-06** Sheet 1 of 2

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 602 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/7/21 Date Finished 12/7/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 21.4 ft Rock Depth 11.4 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples: Disturbed 6; Undisturbed -; Core 2
Casing Diameter (in) N/A; Casing Depth (ft) N/A	Water Level (ft.): First ▽ 6; Completion ▼ N/A; 24 HR. ▼
Casing Hammer N/A; Weight (lbs) N/A; Drop (in) N/A	Drilling Foreman Dan Delude
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer Natalie Mottl
Sampler Hammer Automatic; Weight (lbs) 140; Drop (in) 30	



Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0 +601.8	Brown SILT, trace clay, trace fine sand, trace roots (moist)[TOPSOIL] Brown to brown CLAY, trace m-f sand, trace roots (moist)	0.0		0	S-1A S-1B	SS	10	1 2 5 6	7	S-1 at 0ft
	Brown to brown CLAY (moist)	0.0		2	S-2	SS	13	4 9 13 12	22	S-2 at 2ft
	Brown to brown CLAY (moist)	0.0		4	S-3	SS	7	6 8 10 7	18	Drill to 4.0ft. Easy drilling. Reddish Brown to brown clayey dry to moist cuttings. S-3 at 4ft
+596.0	▽ Gray to brown fine GRAVEL, some clay, some m-f sand (wet) [TILL]	0.0		6	S-4	SS	12	9 7 13 12	20	S-4 at 6ft
	Brown gravelly CLAY, some m-f sand (wet) [TILL]	0.1		8	S-5	SS	6	11 50/5	50/5	Drill to 8.0ft. Easy drilling. Reddish brown moist clayey cuttings to 7.5 ft. Medium hard to hard drilling at 7.5 ft. S-5 at 8ft
	Brown gravelly CLAY, some m-f sand (wet) [TILL]	0.1		10	S-6	SS	6	19 9 50/5	50/5	Drill to 10.0ft. Medium hard to very hard drilling. Brown wet clayey gravelly cuttings. S-6 at 10ft Drill to 11.4ft. Auger refusal and change to rock coring. C-1 at 11.42ft
+590.6	Gray DOLOMITE; fine to coarse grained; slightly to moderately weathered; extremely close to moderate fracture spacing; fractures moderately dipping to near horizontal; rock quality good; slight porosity throughout [BEDROCK]		2:55 2:51 2:27 2:40 3:52	12 13 14 15 16	C-1	NX Core	REC=51"/60" =85%	RQD=37"/60" =62%		
	Dark gray to gray DOLOMITE; fine to medium grained; fresh to slightly; very close to close fracture spacing; fractures shallow dipping to near horizontal; rock quality excellent; fresh to slight weathered, very slight porosity [BEDROCK]		1:02 1:28 1:26	17 18 19 20	C-2	NX Core	REC=59"/60" =98%	RQD=48"/60" =80%		C-2 at 16.42ft



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Log of Boring **LB-06** Sheet 2 of 2

Project	Project No.
Project Fifi/Niagara,NY	190071801
Location	**Elevation and Datum**
Lockport Rd & Packard Rd	el +603.5 602 (NAVD88)

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
▨	+582.0			1:16	20	C-2	NX Core				
				1:20	21						
	+580.6	Bottom of boring at 21.4ft									Bottom of boring at 21.42ft Boring backfilled with auger cuttings to grade.
					22						
					23						
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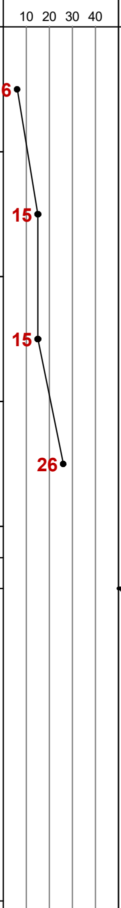
Log of Boring **LB-07** Sheet 1 of 1

Project: Project Fifi/Niagara,NY		Project No.: 190071801	
Location: Lockport Rd & Packard Rd		Elevation and Datum: el +603.5 602 (NAVD88)	
Drilling Company: SJB Services, Inc.		Date Started: 12/2/21	Date Finished: 12/2/21
Drilling Equipment: Track-mounted Diedrich d-50		Completion Depth: 14 ft	Rock Depth: N/E
Size and Type of Bit: 4-1/4 inch HSA		Number of Samples: Disturbed 5; Undisturbed -; Core 1	
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.): First ▽ N/E; Completion ▼ N/A; 24 HR. ▼	
Casing Hammer: N/A	Weight (lbs): N/A; Drop (in): N/A	Drilling Foreman: Dan Delude	
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Chris Steiding	

Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0 +601.6	Dark brown silty CLAY, some f-c sand, trace fine gravel, trace root fibers (wet)[TOPSOIL]		0	S-1A	SS	13	1 2		S-1 at 0ft
	Brown to reddish brown silty CLAY, trace f-c sand, trace root fibers (moist)		1	S-1B			4 5	6	
	Reddish brown silty CLAY, trace f-c sand, trace fine gravel (moist)		2 3	S-2	SS	16	2 7 8 10	15	S-2 at 2ft q_u=4.25 tsf
	Mottled reddish brown to gray silty CLAY, trace f-c sand (moist)		4 5	S-3	SS	24	5 6 9 9	15	Augered to 4.0ft. S-3 at 4ft q_u=4.50 tsf
+596.0	Reddish brown silty CLAY, trace f-c sand, trace f-c gravel (moist) [TILL]		6 7	S-4	SS	24	10 12 14 15	26	S-4 at 6ft q_u=4.00 tsf
	Reddish brown silty CLAY, trace f-c sand, trace f-c gravel (moist) [TILL]		8	S-5	SS	6	50		Augered to 8.0ft. S-5 at 8ft q_u=3.50 tsf
+593.0	Dark gray DOLOSTONE ; fine grained; fresh; very close to close fracture spacing; fractures near vertical to near horizontal; rock quality very poor [WEATHERED ROCK]	1:26 1:23 2:05 2:46 2:49	9 10 11 12 13	C-1	NX Core	REC=56"/60" =93%	RQD=4"/60" =7%		Augered to 9.0ft. Auger refusal encountered at 9.0ft. C-1 at 9ft. Brown wash. Hand-held sample breaks with a hammer. Pores observed throughout core run. Vertical fractures between 9.0ft and 11.8ft
+588.0	? ? ? ? Bottom of boring at 14ft		14 15 16 17 18 19 20						Bottom of Boring at 14ft. Boring backfilled with auger cuttings to grade.



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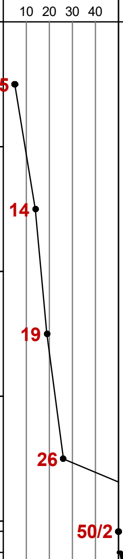
Log of Boring **LB-08** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 604 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started / Date Finished	12/2/21 / 12/3/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth / Rock Depth	13.5 ft / 8.5 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 5; Undisturbed -; Core 1
Casing Diameter (in)	N/A	Casing Depth (ft)	N/A
Casing Hammer	N/A	Weight (lbs) N/A	Drop (in) N/A
Water Level (ft.)	First ▽ 6	Completion ▼ N/A	24 HR. ▼
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Drilling Foreman	Dan Delude
Sampler Hammer	Automatic	Weight (lbs) 140; Drop (in) 30	Field Engineer: Chris Steiding

Elev. (ft)	Sample Description	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+604.0			0						
+603.5	Dark brown silty CLAY, some f-c sand, trace fine gravel, Trace root fibers (wet)[TOPSOIL]		0	S-1A S-1B	SS	11	WOH 2 3 5	5	S-1 at 0ft q_u=2.75 tsf
	Reddish brown silty CLAY, trace f-c sand, Trace root fibers (moist)		1						
	Mottled reddish brown to gray silty CLAY, trace f-c sand (moist)		2	S-2	SS	14	4 6 8 11	14	S-2 at 2ft q_u=3.50 tsf
+600.0	Mottled reddish brown to gray silty CLAY, trace f-c sand, trace fine gravel (moist) [TILL]		4	S-3	SS	24	7 8 11 12	19	Augered to 4.0ft. S-3 at 4ft q_u=4.50 tsf
	▽ Mottled reddish brown to gray silty CLAY, some f-c sand, trace f-m gravel (wet) [TILL]		6	S-4	SS	16	12 11 15 13	26	S-4 at 6ft
	Reddish brown silty CLAY, some f-c sand, trace f-c gravel (moist) [TILL]		8	S-5	SS	2	50/2	50/2	Augered to 8.0ft. S-5 at 8ft q_u=3.75 tsf Augered to 8.5ft. Auger refusal encountered at 8.5ft.
+595.5	Dark gray DOLOSTONE; fine grained; fresh; very close to close fracture spacing; fractures near horizontal; rock quality poor [WEATHERED ROCK]	2:12 1:54 1:57 3:21 2:11	8.5–13.5	C-1	NX Core	REC=42"/60" =70%	RQD=20"/60" =33%		C-1 at 8.5ft. Brown wash. Cannot scratch surface with a knife to hand-held sample breaks with a hammer. Pores observed throughout core run.
+590.5	? ? ? ? Bottom of boring at 13.5ft		13.5						Bottom of Boring at 13.5ft Boring backfilled with auger cuttings to grade.



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Log of Boring **LB-09(OW)** Sheet 1 of 1

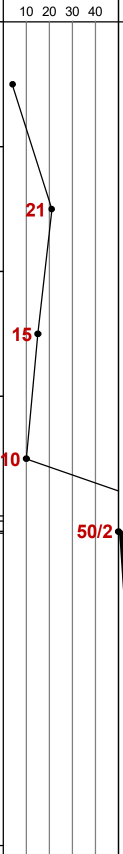
Project: Project Fifi/Niagara,NY
Project No.: 190071801
Location: Lockport Rd & Packard Rd
Elevation and Datum: el +603.5 601 (NAVD88)
Drilling Company: SJB Services, Inc.
Date Started: 12/6/21
Date Finished: 12/6/21
Drilling Equipment: Track-mounted Diedrich d-50
Completion Depth: 13.2 ft
Rock Depth: 8.2 ft
Size and Type of Bit: 4-1/4 inch HSA
Number of Samples: Disturbed 5 Undisturbed - Core 1
Casing Diameter (in): N/A
Casing Depth (ft): N/A
Water Level (ft.): First ▽ 4 Completion ▼ N/A 24 HR. ▽
Casing Hammer: N/A Weight (lbs): N/A Drop (in): N/A
Drilling Foreman: Dan Delude
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel
Field Engineer: Natalie Mottl
Sampler Hammer: Automatic Weight (lbs): 140 Drop (in): 30

Elev. (ft)	Sample Description
+601.0	
+600.7	Brown SILT, some clay, trace fine sand, some roots (wet)[TOPSOIL]
	Brown to reddish brown CLAY, trace fine sand (moist)
	Reddish brown to gray CLAY, some fine sand, yellow mottling on gray sandy clay lenses, very thin (moist)
+597.0	Reddish brown CLAY, trace m-f sand, trace fine gravel, moist to wet (moist) [TILL]
	Reddish brown CLAY, some fine gravel, trace m-f sand, moist to wet (moist) [TILL]
+592.6	No Recovery
	Dark gray to light gray DOLOMITE; medium to coarse grained; moderately; extremely close to close fracture spacing; fractures moderately dipping to near horizontal; rock quality fair; porous around 10 ft [WEATHERED ROCK]
+587.8	Bottom of boring at 13.2ft

Coring (min): 1:14, 1:37, 1:25, 1:40, 1:41

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-1A S-1B	SS	11	WOR WOH 4 5	
S-2	SS	15	4 11 10 16	21
S-3	SS	20	6 6 9 7	15
S-4	SS	17	5 5 5 50/5	10
S-5	SS	0	50/2	50/2
C-1	NX Core	REC=44"/60" =73%	RQD=19"/60" =32%	



Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

S-1 at 0ft

S-2 at 2ft

Drill to 4.0ft. Easy drilling. Reddisn Brown clayey to sandy dry to moist cuttings.
S-3 at 4ft

S-4 at 6ft

Drill to 8.0ft. Medium hard to hard drilling. Reddish Brown dlayey to sandy moist cuttings.
S-5 at 8ft
Auger refusal encountered at 8.2ft
C-1 at 8.2ft

Bottom of Boring at 13.2ft. Observation well installed. Refer to well installation log for more information.

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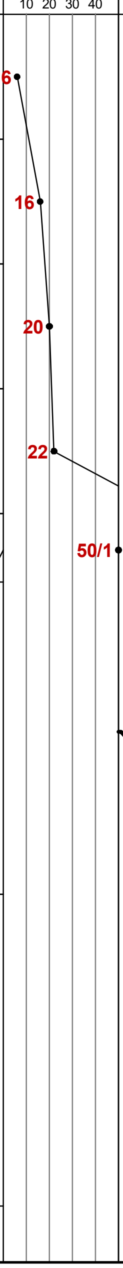
Log of Boring **LB-10** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 602 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started / Date Finished	12/3/21 / 12/3/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth / Rock Depth	19.1 ft / 9.1 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 5; Undisturbed -; Core 2
Casing Diameter (in)	N/A; Casing Depth (ft) N/A	Water Level (ft.)	First ∇ 7.5; Completion ▼ N/A; 24 HR. ⊻
Casing Hammer	N/A; Weight (lbs) N/A; Drop (in) N/A	Drilling Foreman	Dan Delude
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Field Engineer	Chris Steiding

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0 +601.7	Dark brown clayey SILT, some f-c sand, trace fine gravel, trace root fibers (wet) [TOPSOIL]	0		0	S-1A	SS	16	1 2	6	S-1 at 0ft q_u=2.50 tsf
	Mottled reddish brown to gray silty CLAY, trace medium sand, trace root fibers (moist)			1	S-1B			4 5		
	Mottled reddish brown to gray silty CLAY, trace f-m sand (moist)	0		2	S-2	SS	20	5 6 10 11	16	S-2 at 2ft q_u=3.00 tsf
	Mottled reddish brown to gray silty CLAY, trace f-m sand (moist)	0		4	S-3	SS	24	6 8 12 13	20	Augered to 4.0ft. S-3 at 4ft q_u=4.50 tsf
+596.0	Mottled reddish brown to gray silty CLAY, trace f-c sand, trace fine gravel (moist) [TILL]	0		6	S-4A	SS	24	9 10 12 11	22	S-4 at 6ft q_u=4.50 tsf
	∇ Reddish brown sandy CLAY, trace f-m gravel (wet) [TILL]			7	S-4B					
	Reddish brown sandy CLAY, some silt, trace f-m gravel (wet) [TILL]	0		8	S-5	SS	7	4 50/1	50/1	Augered to 8.0ft. S-5 at 8ft
+593.0	Dark gray DOLOSTONE ; fine grained; fresh; very close to moderate fracture spacing; fractures near horizontal; rock quality poor;[WEATHERED ROCK]		1:12 1:34 2:15 1:27 3:31	9	C-1	NX Core	REC=30"/60" =50%	RQD=20"/60" =33%		Augered to 9.1ft. Auger refusal encountered at 9.1ft. C-1 at 9.1ft Tool drop observed between 10.8 and 11.4 feet Lost water return. Tool drop observed between 12.5 and 13.2 feet
	Dark gray DOLOSTONE ; fine grained; fresh; very close to moderate fracture spacing; fractures near horizontal; rock quality poor; [WEATHERED ROCK]		5:19 4:58 4:52 5:28 4:45	14	C-2	NX Core	REC=45"/60" =75%	RQD=15"/60" =25%		C-2 at 14.1ft. Difficult to scratch surface with a knife to hand-held sample breaks with a hammer. Gypsum intrusion between 16.6 and 16.9 feet Bottom of Boring at 19.1ft Boring backfilled with auger cuttings to grade.
+582.9	? ? ? ? Bottom of boring at 19.1ft			19 20						



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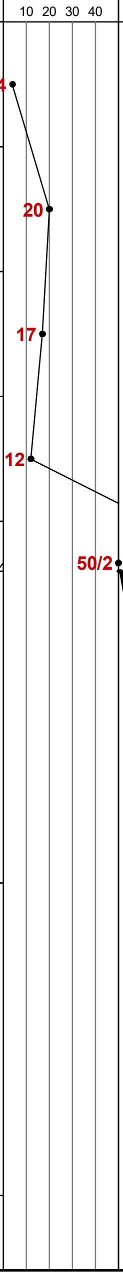
Log of Boring **LB-11** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 600 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/6/21 Date Finished 12/6/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 18.8 ft Rock Depth 8.8 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples: Disturbed 5; Undisturbed -; Core 2
Casing Diameter (in) N/A Casing Depth (ft) N/A	Water Level (ft.): First ▽ 6; Completion ▼ N/A; 24 HR. ▼
Casing Hammer N/A Weight (lbs) N/A Drop (in) N/A	Drilling Foreman Dan Delude
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer Natalie Mottl
Sampler Hammer Automatic Weight (lbs) 140 Drop (in) 30	

Depth Scale	Elev. (ft)	Sample Description	Coring (min)	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
0	+600.0 +599.5	Brown SILT, trace clay, trace fine sand, some roots (moist) [TOPSOIL] Reddish brown to brown CLAY, trace fine sand (moist)		S-1A S-1B	SS	11	WOH 2 2 5	4	S-1 at 0ft
2		Reddish brown to gray CLAY, trace fine sand (moist)		S-2	SS	15	2 8 12 12	20	S-2 at 2ft
4		Reddish brown to gray CLAY, trace fine sand (moist) ▽		S-3	SS	16	5 8 9 10	17	Drill to 4.0ft. Easy drilling. Reddish Brown clayey dry to moist cuttings. S-3 at 4ft
6	+594.0	Reddish brown to gray clayey SILT, some fine sand, some fine gravel (moist) [TILL]		S-4	SS	18	5 7 5 6	12	S-4 at 6ft Moddling in sample
8		Reddish brown to gray CLAY, some fine sand, some fine gravel (moist) [TILL]		S-5	SS	3	2 50/2	50/2	Drill to 8.0ft. Easy drilling. Reddish brown clayey to sandy moist cuttings. S-5 at 8ft
8.8	+591.2	Gray to dark gray DOLOMITE; medium to coarse grained; moderately to highly weathered; very close to close fracture spacing; fractures moderately dipping to near horizontal; rock quality poor; porous at about 12 ft; [WEATHERED ROCK]	2:14 1:50 1:49 2:18 2:25	C-1	NX Core	REC=37"/60" =62%	RQD=6.5"/60" =11%		Drill to 8.8ft. Medium hard to hard drilling. Reddish Brown clayey to sandy moist to wet cuttings. Switch to rock coring. C-1 at 8.8ft
13.8	+586.2	Gray to dark gray DOLOMITE; medium to coarse grained; slightly weathered; close to moderate fracture spacing; fractures shallow dipping to near horizontal; rock quality excellent; slightly porous at 16.3ft; [BEDROCK]	1:15 1:25 1:02 1:43 1:34	C-2	NX Core	REC=59"/60" =98%	RQD=55"/60" =92%		C-2 at 13.8ft
18.8	+581.2	Bottom of boring at 18.8ft							Bottom of boring at 18.8ft Boring backfilled with auger cuttings to grade.



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Log of Boring **LB-12** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 602 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started	12/6/21
		Date Finished	12/7/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth	14.7 ft
		Rock Depth	14.7 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 4 Undisturbed 1 Core 1
Casing Diameter (in)	N/A	Water Level (ft.)	First ▽ N/E Completion ▼ N/A 24 HR. ▼
Casing Depth (ft)	N/A		
Casing Hammer	N/A	Drilling Foreman	Dan Delude
Weight (lbs)	N/A		
Drop (in)	N/A		
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Natalie Mottl
Sampler Hammer	Automatic		
Weight (lbs)	140		
Drop (in)	30		

Elev. (ft)	Depth Scale	Sample Description	Coring (min)	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0	0	Reddish brown CLAY, trace silt, trace fine sand, trace roots (moist) [TOPSOIL]		S-1A	SS	13	2 3		S-1 at 0ft
+601.5	1	Reddish brown CLAY, trace fine sand (moist)		S-1B			6 10	9	
	2	Reddish brown CLAY (moist)		S-2	SS	14	3 7 8 11	15	S-2 at 2ft
	4	Reddish brown CLAY (moist)		U-1	ST	24			Drill to 4.0ft. Easy drilling. Reddish Brown clayey dry to moist cuttings. U-1 at 4ft
+596.0	6	Reddish brown CLAY, some m-f sand (moist)		S-3	SS	19	4 6 7 5	13	S-3 at 6ft
	8	Reddish brown to brown CLAY, some m-f sand, trace fine gravel (moist)		S-4	SS	12	2 2 8 50/2	10	Drill to 8.0ft. Easy drilling. Reddish Brown clayey to sandy moist to wet cuttings. S-4 at 8ft
+592.3	9.7	Dark gray DOLOMITE; fine to coarse grained; moderately weathered; extremely close to close fracture spacing; fractures shallow dipping to near horizontal; rock quality poor; [WEATHERED ROCK]	0:52 1:43 4:04 1:53 2:20	C-1	NX Core	REC=41"/60" =68%	RQD=17"/60" =28%		Auger refusal encountered at 9.7ft Change to rock coring. C-1 at 9.7ft
+587.3	14.7	Bottom of boring at 14.7ft							Bottom of boring at 14.7ft Boring backfilled with auger cutting to grade.

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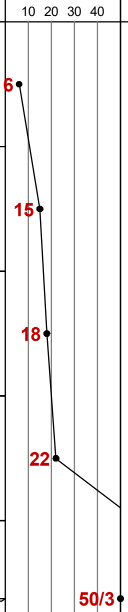
Log of Boring **LB-13** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 598 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/7/21	Date Finished 12/7/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 19.3 ft	Rock Depth 9.3 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples: Disturbed 5; Undisturbed -; Core 2	
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.): First ▽ N/E; Completion ▼ N/A; 24 HR. ▽	
Casing Hammer N/A; Weight (lbs) N/A; Drop (in) N/A		Drilling Foreman Dan Delude	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer Natalie Mottl	
Sampler Hammer Automatic; Weight (lbs) 140; Drop (in) 30			

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+598.0 +597.8	Brown SILT, trace clay, trace m-f sand (moist)[TOPSOIL]	0.2		0	S-1A			1 2		S-1 at 0ft
	Reddish brown to brown CLAY, some fine sand (moist)			1	S-1B	SS	9	4 7	6	
	Reddish brown to brown CLAY, some fine sand, thin gray fine sand lenses with coarse faint yellow mottling (moist)	0.0		2 3	S-2	SS	13	3 7 8 12	15	S-2 at 2ft
	Reddish brown to gray CLAY, trace fine sand, thin gray fine sand lenses with coarse faint yellow mottling (moist)	0.0		4 5	S-3	SS	22	4 8 10 12	18	Drill to 4.0ft. Easy drilling. Reddish brown moist clayey tosandy cuttings. S-3 at 4ft
	Reddish brown to gray CLAY, some fine sand, thin gray fine sand lenses with coarse faint yellow mottling (moist)	0.0		6 7	S-4	SS	24	13 11 11 12	22	S-4 at 6ft
	Brown to reddish brown CLAY, trace m-f sand (moist)	0.0		8 9	S-5	SS	14	7 8 50/3	50/3	Drill to 8.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft
+588.8	Dark gray to gray DOLOMITE; fine to medium grained; fresh to slightly; extremely close to close fracture spacing; fractured shallow dipping to near horizontal; rock quality fair; [BEDROCK]		1:25 0:58 1:17 1:11 1:08	10 11 12 13 14	C-1	NX Core	REC=32"/60" =53%	RQD=17"/60" =28%		Drill to 9.3ft. Auger refusal. Switch to rock coring. C-1 at 9.25ft
	Dark gray DOLOMITE; fine to medium grained; slightly to moderately weathered; extremely close to close fracture spacing; fractures moderately dipping to near horizontal; rock quality fair; [BEDROCK]		2:00 3:45 1:33 1:51 2:46	15 16 17 18 19	C-2	NX Core	REC=59"/60" =98%	RQD=17"/60" =28%		C-2 at 14.25ft
+578.8	Bottom of boring at 19.3ft			20						Boring backfilled with auger cuttings to grade.



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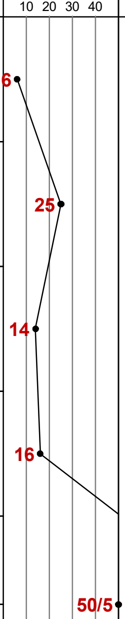
Log of Boring **LB-14(OW)** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 600 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started	12/14/21
		Date Finished	12/14/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth	14.4 ft
		Rock Depth	9.4 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 5 Undisturbed - Core 1
Casing Diameter (in)	N/A	Water Level (ft.)	First ▽ 7.5 Completion ▼ N/A 24 HR. ▼
Casing Depth (ft)	N/A		
Casing Hammer	N/A	Drilling Foreman	Dan/Mike
Weight (lbs)	N/A		
Drop (in)	N/A		
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Katherine Asciutto
Sampler Hammer	Automatic		
Weight (lbs)	140		
Drop (in)	30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+600.0										
+599.5	Grayish brown SILT, trace fine sand (moist) [TOPSOIL]	0.0		0	S-1A	SS	12	1 2		S-1 at 0ft
	Light brown to gray CLAY, trace fine sand (moist)			1	S-1B			4 6	6	
	Reddish brown CLAY, trace fine sand (moist)	0.0		2	S-2	SS	18	6 12 13 16	25	S-2 at 2ft
	Reddish brown CLAY, trace fine sand (moist)	0.0		4	S-3	SS	20	4 6 8 10	14	Drill to 4 feet. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
	Reddish brown CLAY, trace fine sand (moist)	0.0		6	S-4A	SS	10	7 8 8	16	S-4 at 6ft.
	▽ Reddish brown CLAY, trace fine sand (wet)			7	S-4B			5		Water encountered at 7.5 feet
	No Recovery			8	S-5	SS	0	4 3 50/5	50/5	Drill to 8.0ft. Easy drilling. Reddish brown clay moist/wet cuttings. S-5 at 8ft
+590.6	Dark gray porous DOLOMITE; fine to medium grained; slightly to moderately weathered; very close to moderate fracture spacing; fractures moderately dipping to near horizontal; rock quality good [BEDROCK]		2:03 2:00 2:01 2:02 2:00	10	C-1	NX Core	REC=54"/60" =90%	RQD=38"/60" =63%		Refusal encountered at 9.7ft. Start coring at 9.7ft
+585.6	Bottom of boring at 14.4ft			15						Install well - see log for details.



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Log of Boring **LB-15** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 598 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/7/21 Date Finished 12/10/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 17.9 ft Rock Depth 7.9 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples: Disturbed 4; Undisturbed -; Core 2
Casing Diameter (in) N/A Casing Depth (ft) N/A	Water Level (ft.): First ∇ 6; Completion ▼ N/A; 24 HR. ▼
Casing Hammer N/A Weight (lbs) N/A Drop (in) N/A	Drilling Foreman Dan Delude
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer Natalie Mottl
Sampler Hammer Automatic Weight (lbs) 140 Drop (in) 30	

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+598.0 +597.7	Black fine ASPHALT pieces, trace fine sand (dry)[ASPHALT]	0.1		0	S-1A	SS	11	33 16	21	S-1 at 0ft
+596.0	Gray coarse-fine SAND, trace silt, trace fine gravel (moist)[FILL]			1	S-1B			5 6		
	Reddish brown to gray CLAY, some fine sand, gray fine sand lenses with indistinct faint yellow mottling (moist)	0.1		2 3	S-2	SS	18	8 9 12 11	21	S-2 at 2ft
	Reddish brown to gray CLAY, some fine sand, trace fine gravel (moist)	0.0		4 5	S-3	SS	15	3 3 4 3	7	Drill to 4.0ft. Easy drilling. Reddish Brown clayey to sandy moist to dry cuttings. S-3 at 4ft
+591.5	∇ Reddish brown to gray CLAY, some fine sand, trace fine gravel (wet)			6	S-4A	SS	17	3 22	55	S-4 at 6ft
+590.1	Gray medium-fine SAND, some clay (wet) [TILL]			7	S-4B			33 50/5		
	Gray porous DOLOMITE; fine to medium grained; moderately; extremely close to close fracture spacing; fractures moderately dipping to near horizontal; rock quality fair [WTHD ROCK]		2:46 3:16 3:58 2:52 3:33	8 9 10 11 12	C-1	NX Core	REC=44"/60" =73%	RQD=19"/60" =32%		Drill to 7.9ft. Very hard drilling and auger refusal. Switch to rock coring. C-1 at 7.9ft
+580.1	Dark gray to gray DOLOMITE; fine to medium grained; moderately to highly weathered; extremely close to close fracture spacing; fractures shallow dipping to near horizontal; rock quality poor [WTHD ROCK]		2:44 3:44 2:18 2:46 2:05	13 14 15 16 17	C-2	NX Core	REC=36"/60" =60%	RQD=8"/60" =13%		C-2 at 12.9ft
	?——?——?——?									
	Bottom of boring at 17.9ft			18 19 20						Boring backfilled with auger cuttings to grade.

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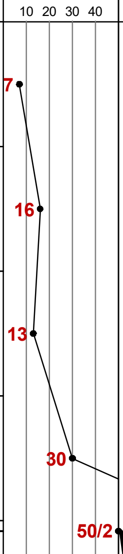
Log of Boring **LB-16** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 598 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started / Date Finished	12/10/21 / 12/10/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth / Rock Depth	13.2 ft / 8.2 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 5 / Undisturbed - / Core 1
Casing Diameter (in) / Casing Depth (ft)	N/A / N/A	Water Level (ft.)	First ▽ N/E / Completion ▼ N/A / 24 HR. ▽
Casing Hammer / Weight (lbs) / Drop (in)	N/A / N/A / N/A	Drilling Foreman	Dan Delude
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		
Sampler Hammer / Weight (lbs) / Drop (in)	Automatic / 140 / 30	Field Engineer	Natalie Mottl

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+598.0 +597.5	Brown SILT, trace m-f sand, trace roots (moist)[TOPSOIL] Reddish brown CLAY, trace fine sand (moist)	0.0		0	S-1A S-1B	SS	11	WOH 3 4 5	7	S-1 at 0ft
	Reddish brown CLAY, thin gray to reddish-brown fine sand lenses (moist)	0.6		2	S-2	SS	15	6 7 9 10	16	S-2 at 2ft
	Reddish brown CLAY, thin gray to reddish-brown fine sand lenses (moist)	0.0		4	S-3	SS	16	2 5 8 9	13	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
	Reddish brown CLAY (moist)	0.0		6	S-4A S-4B	SS	14	6 10 20 13	30	S-4 at 6ft
+590.8	Reddish brown clayey fine SAND, trace fine gravel (moist) [TILL]									
+589.7	No Recovery			8	S-5	SS	0	50/2	50/2	Drill to 8.0ft. Easy to medium drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft
	Dark gray porous DOLOMITE; fine to medium grained; slightly to moderately; extremely close to moderate fracture spacing; fractures shallow dipping to near horizontal; rock quality good [BEDROCK]		2:20 2:06 1:38 2:00 1:12		C-1	NX Core	REC=58"/60" =97%	RQD=38"/60" =63%		Drill to 8.2ft. Very hard drilling. Grinding. Auger refusal. Switch to rock coring. C-1 at 8.17ft
+584.8	Bottom of boring at 13.2ft			13						Boring backfilled with auger cuttings to grade.



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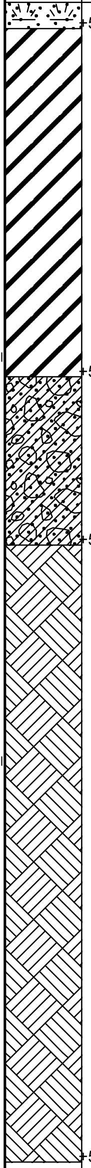
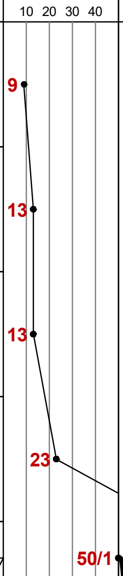
Log of Boring **LB-17** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 597 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started	12/10/21
		Date Finished	12/10/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth	18.6 ft
		Rock Depth	8.6 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 5 Undisturbed - Core 2
Casing Diameter (in)	N/A	Water Level (ft.)	First ∇ N/E Completion ▼ N/A 24 HR. ∇
Casing Depth (ft)	N/A	Drilling Foreman	Dan Delude
Casing Hammer	N/A		
Weight (lbs)	N/A		
Drop (in)	N/A		
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Natalie Mottl
Sampler Hammer	Automatic		
Weight (lbs)	140		
Drop (in)	30		



Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+597.0										
+596.6	Brown SILT, trace fine sand, trace roots (moist)[TOPSOIL]	0.1		0	S-1A	SS	15	WOH 3		S-1 at 0ft
	Reddish brown to tannish CLAY (moist)			1	S-1B			6 5	9	
	Reddish brown to tannish CLAY, thin reddish-brown to gray fine sand lenses (moist)	0.0		2 3	S-2	SS	13	2 6 7 12	13	S-2 at 2ft
	Reddish brown to tannish gray CLAY, thin reddish-brown to gray fine sand lenses (moist)	0.0		4 5	S-3	SS	22	6 6 7 8	13	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
+591.0	Reddish brown clayey fine SAND, trace fine gravel (moist) [TILL]	0.0		6 7	S-4	SS	17	12 11 12 11	23	S-4 at 6ft
	Reddish brown clayey fine SAND, trace fine gravel (moist) [TILL]	0.0		8	S-5	SS	4	3 50/1	50/1	Drill to 8.0ft. Perched groundwater between 6 and 8 ft. Easy drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft Drill to 8.6ft. Hard drilling and grinding. Auger refusal. Switch to rock coring. C-1 at 8.58ft
+588.3	Dark gray porous DOLOMITE; fine to medium grained; slightly to highly weathered; extremely close to moderate fracture spacing; fractures shallow dipping to near horizontal; rock quality good [BEDROCK]		2:03 1:56 1:20 2:06 1:17	9 10 11 12 13	C-1	NX Core	REC=50"/60" =83%	RQD=31"/60" =52%		
	Gray DOLOMITE; medium grained; slightly to highly weathered; extremely close to moderate fracture spacing; fractures shallow dipping to near horizontal; rock quality good [BEDROCK]		2:14 3:02 3:15 2:42 2:30	14 15 16 17 18	C-2	NX Core	REC=52"/60" =87%	RQD=42"/60" =70%		C-2 at 13.58ft
+578.4	Bottom of boring at 18.6ft			19 20						Boring backfilled with auger cuttings to grade.



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Log of Boring **LB-101E** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 612 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started / Date Finished	12/16/21 / 12/16/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth / Rock Depth	7.8 ft / 7.8 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 4; Undisturbed -; Core -
Casing Diameter (in)	N/A; Casing Depth (ft) N/A	Water Level (ft.)	First ∇ 6; Completion ▼ N/A; 24 HR. ▼
Casing Hammer	N/A; Weight (lbs) N/A; Drop (in) N/A	Drilling Foreman	Dan/Mike
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30	Field Engineer	Katherine Asciutto

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+612.0	Dark brown CLAY, trace fine sand (moist)[TOPSOIL]	0.0	0	S-1A	SS	14	1 2	5	S-1 at 0ft
	+611.5	Reddish brown CLAY, trace fine sand (moist)		1	S-1B			3 5		
		Reddish brown CLAY, trace fine sand, Light brown to gray sand lenses (moist)	0.0	2	S-2	SS	18	3 6 8 10	14	S-2 at 2ft
	+608.0	Reddish brown CLAY, trace fine sand, trace medium gravel (moist)	0.0	4	S-3	SS	15	5 7 6 6	13	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
		∇ Reddish brown CLAY, trace fine sand, trace medium gravel (wet)	0.0	6	S-4	SS	18	14 31 35 50/4	66	S-4 at 6ft
	+604.2	? ? ? ? Bottom of Boring at 7.83		8						Auger refusal at 7.83ft Boring backfilled with auger cuttings to grade.

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

N-Value scale: 10 20 30 40

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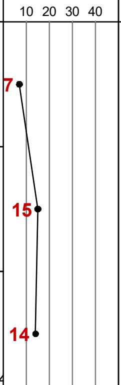
Log of Boring **LB-102** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 610 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/9/21 — Date Finished 12/9/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 10.8 ft — Rock Depth 5.8 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples — Disturbed 3 — Undisturbed - — Core 1
Casing Diameter (in) N/A — Casing Depth (ft) N/A	Water Level (ft.) — First ∇ 5.5 — Completion ▼ N/A — 24 HR. ▼
Casing Hammer N/A — Weight (lbs) N/A — Drop (in) N/A	Drilling Foreman Dan Delude
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer Natalie Mottl
Sampler Hammer Automatic — Weight (lbs) 140 — Drop (in) 30	

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+610.0										
+609.5	Brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0.0		0	S-1A	SS	13	1 3		S-1 at 0ft
	Reddish brown CLAY (moist)			1	S-1B			4 5	7	
	Reddish brown CLAY, thin gray sand lenses with indistinct yellow mottling (moist)	0.0		2–3	S-2	SS	12	3 7 8 14	15	S-2 at 2ft
	Reddish brown CLAY, trace fine sand, thin gray sand lenses with indistinct yellow mottling (moist)	0.0		4–5	S-3A	SS	19	6 7 7	14	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
+604.8	Reddish brown CLAY, trace fine sand, trace fine gravel (wet) [TILL] ∇				S-3B			50/2		
+604.1	Dark gray DOLOMITE; fine to medium grained; moderately to highly weathered; extremely close to close fracture spacing; fractures moderately dipping to near horizontal; rock quality good [BEDROCK]		2:07 2:25 1:55 2:30 2:06	6–10	C-1	NX Core	REC=52"/60" =87%	RQD=32"/60" =53%		Drill to 5.8ft. Medium hard to hard drilling. Auger refusal. Change to rock coring. C-1 at 5.75ft
+599.3	Bottom of boring at 10.75ft			11						Bottom of Boring at 10.75ft. Boring backfilled with auger cuttings to grade.



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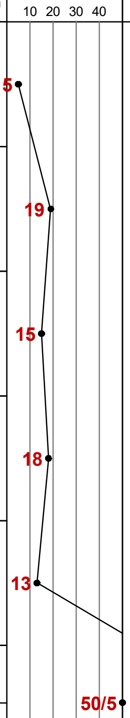
Log of Boring **LB-103** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 611 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started / Date Finished	12/9/21 / 12/9/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth / Rock Depth	11 ft / 11 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 6 / Undisturbed - / Core -
Casing Diameter (in)	N/A	Casing Depth (ft)	N/A
Water Level (ft.)	First ▽ 8 / Completion ▼ N/A / 24 HR. ▼		
Casing Hammer	N/A	Weight (lbs) N/A	Drop (in) N/A
Drilling Foreman	Dan Delude		
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		
Field Engineer	Natalie Mottl		
Sampler Hammer	Automatic	Weight (lbs) 140	Drop (in) 30

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale
+611.0	Brown SILT, trace fine sand, trace roots (moist)[TOPSOIL]	0.0	0
+610.5	Reddish brown CLAY (moist)		1
	Reddish brown CLAY, thin gray fine sand lenses (moist)	0.0	2
	Reddish brown to brown CLAY, thin gray fine sand lenses (moist)	0.0	4
+605.0	Reddish brown clayey fine SAND, trace fine gravel (moist) [TILL]	0.0	6
	▽ Gray to brown gravelly CLAY, trace fine sand (wet) [TILL]	0.0	8
	Gray fine GRAVEL, trace clay (wet) [TILL]	0.0	10
+600.1	? ? ? ?		11
	Bottom of boring at 10.9ft		

Sample Data

Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)
S-1A S-1B	SS	11	WOH 2 3 4	5
S-2	SS	18	6 8 11 15	19
S-3	SS	19	6 7 8 14	15
S-4	SS	16	10 9 9 9	18
S-5	SS	9	5 6 7 30	13
S-6	SS	3	25 50/5	50/5



Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

S-1 at 0ft

S-2 at 2ft

Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings.
S-3 at 4ft

S-4 at 6ft

Drill to 8.0ft. Easy drilling. Reddish Brown clayey moist cuttings.
S-5 at 8ft

S-6 at 10ft

Auger refusal at 10.9ft. Medium hard to very hard drilling.
Boring backfilled with auger cuttings to grade.

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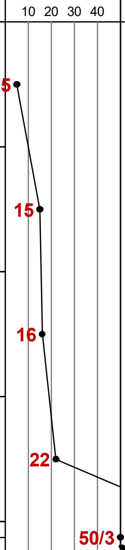
Log of Boring **LB-104** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 604 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started / Date Finished	12/8/21 / 12/9/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth / Rock Depth	8.4 ft / 8.4 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 5; Undisturbed -; Core -
Casing Diameter (in)	N/A; Casing Depth (ft) N/A	Water Level (ft.)	First ▽ 8; Completion ▼ N/A; 24 HR. ▼
Casing Hammer	N/A; Weight (lbs) N/A; Drop (in) N/A	Drilling Foreman	Dan Delude
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Natalie Mottl
Sampler Hammer	Automatic; Weight (lbs) 140; Drop (in) 30		

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+604.0 +603.5	Brown SILT, trace m-f sand, trace roots (moist) [TOPSOIL] Reddish brown to brown CLAY, trace fine sand (moist)	0.0	0–2	S-1A S-1B	SS	9	WOH 2 3 4	5	S-1 at 0ft
		Reddish brown to brown CLAY, thin gray sand lenses (moist)		2–4	S-2	SS	17	4 7 8 14	15	S-2 at 2ft
		No Recovery		4–6	S-3	SS	0	4 7 9 10	16	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
	+598.0	Reddish brown clayey fine SAND, trace fine gravel (moist) [TILL]	0.0	6–8	S-4	SS	8	7 10 12 8	22	S-4 at 6ft
	+595.8	Reddish brown clayey fine SAND, trace fine gravel (wet) [TILL] ▽	0.0	8	S-5	SS	1	50/3	50/3	Drill to 8.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft Drill to 8.4ft. Easy to hard drilling. Auger refusal at 8.4ft. Boring backfilled with auger cuttings to grade.
		Bottom of boring at 8.4ft								



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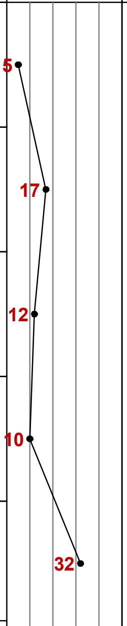
Log of Boring **LB-105E** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 607 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/16/21	Date Finished 12/16/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 9.9 ft	Rock Depth 9.9 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples	Disturbed 5 / Undisturbed - / Core -
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.)	First ▽ N/E / Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A / Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan/Mike	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer Katherine Asciutto	
Sampler Hammer Automatic / Weight (lbs) 140	Drop (in) 30		

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+607.0	Reddish brown CLAY, trace fine sand (moist)	0.0	0	S-1	SS	9	1 2 3 5	5	S-1 at 0ft
		Reddish brown CLAY, trace fine sand, Grey to light brown fine sand lenses (moist)	0.0	2	S-2	SS	18	3 7 10 11	17	S-2 at 2ft
		Reddish brown CLAY, trace fine sand, Grey to light brown fine san lenses (moist)	0.0	4	S-3	SS	24	2 5 7 9	12	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. Collect ENV sample from 4-5 feet.
	+601.0	Brownish red CLAY, trace fine sand, trace fine gravel (moist)	0.0	6	S-4	SS	14	4 6 4 3	10	
		No Recovery		8	S-5	SS	0	4 13 19 50/5	32	Drill to 8.0ft. Easy drilling. Reddish brown clay moist to wet cuttings. Auger refusal at 9.9ft
	+597.1	Bottom of Boring at 9.9ft		10						Bottom of Boring at 9.9ft Boring backfilled with auger cuttings.



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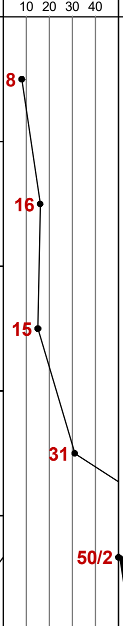
Log of Boring **LB-106** Sheet 1 of 1

Project: Project Fifi/Niagara,NY	Project No.: 190071801
Location: Lockport Rd & Packard Rd	Elevation and Datum: el +603.5 608 (NAVD88)
Drilling Company: SJB Services, Inc.	Date Started: 12/9/21 Date Finished: 12/9/21
Drilling Equipment: Track-mounted Diedrich d-50	Completion Depth: 8.7 ft Rock Depth: 8.7 ft
Size and Type of Bit: 4-1/4 inch HSA	Number of Samples: Disturbed 5 Undisturbed - Core -
Casing Diameter (in): N/A Casing Depth (ft): N/A	Water Level (ft.): First ▽ N/E Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A Weight (lbs): N/A Drop (in): N/A	Drilling Foreman: Dan Delude
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer: Natalie Mottl
Sampler Hammer: Automatic Weight (lbs): 140 Drop (in): 30	

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+608.0	Dark brown SILT, some m-f sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1A	SS	16	1 3		S-1 at 0ft
+607.4	Brown to reddish CLAY, trace fine sand (moist)		1	S-1B			5 5	8	
	Brown to reddish brown CLAY, trace fine sand, thin gray fine sand lenses (moist)	0.0	2 3	S-2	SS	14	4 7 9 12	16	S-2 at 2ft
+604.0	Reddish brown to tannish gray clayey fine SAND, trace fine gravel (moist) [TILL]	0.0	4 5	S-3	SS	24	6 6 9 8	15	Drill to 4.0ft. Easy drilling. Brown to reddish Brown clayey cuttings. S-3 at 4ft
	Reddish brown to gray CLAY, some fine gravel, trace m-f sand (moist) [TILL]	0.1	6 7	S-4	SS	12	7 12 19 8	31	S-4 at 6ft
	Gray fine GRAVEL, trace fine sand (dry) [TILL]	0.0	8	S-5	SS	2	27 50/2	50/2	Drill to 8.0ft. Easy drilling. Reddish Brown clayey cuttings. S-5 at 8ft Auger refusal at 8.67ft Boring backfilled with auger cuttings to grade.
+599.3	Bottom of boring at 8.7ft		9 … 20						



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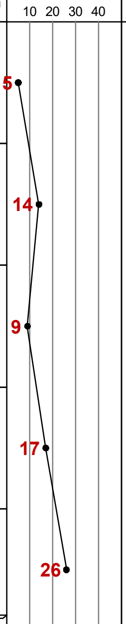
Log of Boring **LB-107** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 606 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/9/21	Date Finished 12/9/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 19.8 ft	Rock Depth 9.8 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples	Disturbed 5 / Undisturbed - / Core 2
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.)	First ▽ N/E / Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A	Weight (lbs) N/A / Drop (in) N/A	Drilling Foreman Dan Delude	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer Natalie Mottl	
Sampler Hammer Automatic	Weight (lbs) 140 / Drop (in) 30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+606.0 +605.7	Brown SILT, trace fine sand, some roots (moist)[TOPSOIL]	0.0		0	S-1A	SS	6	1		S-1 at 0ft
	Reddish brown CLAY (moist)			1	S-1B			2 3 5	5	
	Reddish gray CLAY, trace fine sand, thin gray fine sand lenses (moist)	0.1		2 3	S-2	SS	17	6 6 8 12	14	S-2 at 2ft
+602.0	Reddish brown CLAY, some fine sand, trace fine gravel (moist) [TILL]	0.0		4 5	S-3	SS	21	7 5 4 5	9	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
	Reddish brown CLAY, some fine sand, some fine gravel (moist) [TILL]			6 7	S-4	SS	13	7 9 8 11	17	S-4 at 6ft
	Reddish brown CLAY, some fine sand, some fine gravel (moist) [TILL]	0.0		8 9	S-5	SS	19	9 12 14 50/3	26	Drill to 8.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft
+596.3	Dark gray DOLOMITE; fine to medium grained; moderately to highly weathered; extremely close to close fracture spacing; fractures steeply dipping to shallow dipping; rock quality poor [WEATHERED ROCK]		2:02 4:22 3:44 2:39 2:29	10 11 12 13 14	C-1	NX Core	REC=26"/60" =43%	RQD=14"/60" =23%		Drill to 9.8ft. Hard drilling and auger refusal. Change to rock coring. C-1 at 9.75ft
+591.3	Dark gray DOLOMITE; fine to medium grained; slightly to moderately weathered; extremely close to moderate fracture spacing; fractures near vertical to near horizontal; rock quality good [BEDROCK]		6:58 6:51 7:17 8:08 6:29	15 16 17 18 19	C-2	NX Core	REC=60"/60" =100%	RQD=37"/60" =62%		C-2 at 14.75ft
+586.3	Bottom of boring at 19.75ft			20 20.5						Bottom of Boring at 19.75ft Boring backfilled with auger cuttings to grade.



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Log of Boring **LB-108E** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 603 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/16/21 Date Finished 12/16/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 7.5 ft Rock Depth 7.5 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples: Disturbed 4; Undisturbed -; Core -
Casing Diameter (in) N/A Casing Depth (ft) N/A	Water Level (ft.): First ▽ N/E; Completion ▼ N/A; 24 HR. ▼
Casing Hammer N/A Weight (lbs) N/A Drop (in) N/A	Drilling Foreman Dan/Mike
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer Katherine Asciutto
Sampler Hammer Automatic Weight (lbs) 140 Drop (in) 30	

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
▨	+603.0	Reddish brown CLAY, trace fine sand (dry)	0.0	0	S-1	SS	13	1 2 4 5	6	S-1 at 0ft
▨		Brownish red CLAY, trace fine sand, Light brown sand lenses (moist)	0.0	2	S-2	SS	10	4 8 10 16	18	S-2 at 2ft Collect ENV sample from 3-4 feet.
▩	+599.0	Brownish red CLAY, some fine-medium gravel, trace fine sand (moist) [TILL]	0	4	S-3	SS	4	10 9 7 7	16	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft.
▩		Brownish red CLAY, trace fine sand, trace fine-medium gravel (moist) [TILL]	0	6	S-4	SS	8	8 17 50/3	50/3	S-4 at 6ft
	+595.7	?—?—?—?		7						Auger refusal at 7.5ft. Boring backfilled with auger cuttings to grade.
		Bottom of boring at 7.3ft		8						

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

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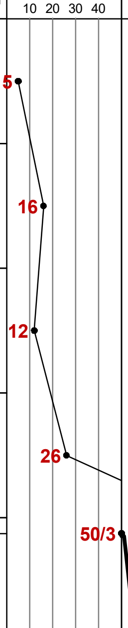
Log of Boring **LB-109E** Sheet 1 of 1

Project: Project Fifi/Niagara,NY
Project No.: 190071801
Location: Lockport Rd & Packard Rd
Elevation and Datum: el +603.5 605 (NAVD88)
Drilling Company: SJB Services, Inc.
Date Started: 12/16/21
Date Finished: 12/16/21
Drilling Equipment: Track-mounted Diedrich d-50
Completion Depth: 8.3 ft
Rock Depth: 8.3 ft
Size and Type of Bit: 4-1/4 inch HSA
Number of Samples: Disturbed 5 Undisturbed - Core -
Casing Diameter (in): N/A
Casing Depth (ft): N/A
Water Level (ft.): First ▽ 6 Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A Weight (lbs): N/A Drop (in): N/A
Drilling Foreman: Dan/Mike
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel
Field Engineer: Katherine Asciutto
Sampler Hammer: Automatic Weight (lbs): 140 Drop (in): 30

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+605.0	Dark brown CLAY, some fine sand, trace roots (moist) [TOPSOIL]	0.0	0	S-1	SS	8	1 2 3 5	5	S-1 at 0ft
+604.0	Brown CLAY, some fine sand (moist)		1						
	Reddish brown CLAY, trace fine sand, sand lenses (moist)	0.0	2	S-2	SS	18	3 7 9 11	16	S-2 at 2ft
			3						
	Reddish brown CLAY, trace fine sand (moist)	0.0	4	S-3	SS	24	3 5 7 8	12	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
			5						
+599.0	▽ Reddish brown silty CLAY, trace fine sand (wet) [TILL]	0.0	6	S-4	SS	18	6 12 14 9	26	
			7						
+596.7	No Recovery ? ? ? ?		8	S-5	SS	0	50/3	50/3	Drill to 8.0ft. Easy drilling. Reddish brown clay wet cuttings. S-4 at 6ft Auger refusal at 8.3ft Boring backfilled with auger cuttings to grade.
	Bottom of boring at 8.3ft		9						



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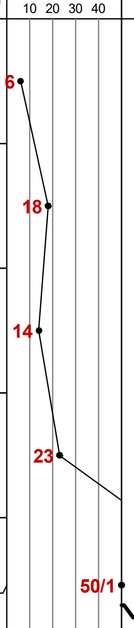
Log of Boring **LB-110** Sheet 1 of 1

Project: Project Fifi/Niagara,NY		Project No.: 190071801	
Location: Lockport Rd & Packard Rd		Elevation and Datum: el +603.5 606 (NAVD88)	
Drilling Company: SJB Services, Inc.		Date Started: 12/8/21	Date Finished: 12/8/21
Drilling Equipment: Track-mounted Diedrich d-50		Completion Depth: 9.4 ft	Rock Depth: 9.4 ft
Size and Type of Bit: 4-1/4 inch HSA		Number of Samples: Disturbed 5; Undisturbed -; Core -	
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.): First ▽ 8; Completion ▼ N/A; 24 HR. ▼	
Casing Hammer: N/A	Weight (lbs): N/A; Drop (in): N/A	Drilling Foreman: Dan Delude	
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer: Automatic	Weight (lbs): 140; Drop (in): 30	Field Engineer: Natalie Mottl	

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+606.0	Dark brown SILT, trace m-f sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1A	SS	13	WOH		S-1 at 0ft
	+605.4	Brown to reddish brown CLAY, trace roots (moist)		1	S-1B			1 5 5	6	
		Reddish brown to grayish tannish brown CLAY, trace c-m sand, trace gray fine sand lenses (moist)		2	S-2	SS	14	4 8 10 14	18	S-2 at 2ft
		Reddish brown to grayish tannish brown CLAY, trace fine sand, trace gray fine sand lenses (moist)	0.0	4	S-3	SS	22	4 6 8 8	14	Drill to 4.0ft. Easy drilling. Brown to reddish Brown clayey moist cuttings. S-3 at 4ft
		Reddish brown to grayish tannish brown CLAY, trace fine sand, trace gray fine sand lenses with yellow indistinct mottling (moist)	0.0	6	S-4A	SS	16	11 10 13	23	S-4 at 6ft
	+598.8	Brown to reddish brown clayey fine SAND, trace fine gravel (moist) [TILL] ▽			S-4B			22		
		Brown to reddish brown sandy CLAY, trace fine gravel (wet) [TILL]		8	S-5A	SS	7	3 15		Drill to 8.0ft. Easy drilling. Reddish Brown clayey to sandy moist cuttings. S-5 at 8ft
		Dark gray fine GRAVEL, some m-f sand (dry) [TILL]		9	S-5B			50/1	50/1	Auger refusal at 9.4ft Boring backfilled with auger cuttings to grade.
	+596.6	? ? ? ? Bottom of boring at 9.4ft								



Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

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Log of Boring **LB-111** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 608 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/8/21	Date Finished 12/8/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 6.6 ft	Rock Depth 6.6 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples: Disturbed 4	Undisturbed - / Core -
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.): First ▽ N/E	Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A	Weight (lbs) N/A / Drop (in) N/A	Drilling Foreman Dan Delude	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer Automatic	Weight (lbs) 140 / Drop (in) 30	Field Engineer Natalie Mottl	

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
608.0	Brown SILT, trace m-f sand, trace roots (moist) [TOPSOIL]	0.0	0	S-1A	SS	19	2 3		S-1 at 0ft
607.4	Tannish brown to reddish brown CLAY, trace fine sand (moist)		1	S-1B			6 9	9	
	Reddish brown to gray CLAY, trace fine sand (moist)	0.0	2	S-2	SS	13	6 11 12 14	23	S-2 at 2ft
	No Recovery		4	S-3	SS	0	8 5 50/5	50/5	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
602.6	No Recovery [Inferred TILL]		6	S-4	SS	0	50/3	50/3	Drill to 6.0ft. Easy to very hard drilling and grinding. Rod Chattering. S-4 at 6ft Drill to 6.6ft. Very hard drilling. Auger refusal at 6.6ft Boring backfilled with auger cuttings to grade.
601.4	Bottom of boring at 6.6ft								

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Log of Boring **LB-112** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 602 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/13/21 Date Finished 12/13/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 11.6 ft Rock Depth 11.6 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples: Disturbed 6; Undisturbed -; Core -
Casing Diameter (in) N/A Casing Depth (ft) N/A	Water Level (ft.): First ▽ N/E; Completion ▼ N/A; 24 HR. ▽
Casing Hammer N/A Weight (lbs) N/A Drop (in) N/A	Drilling Foreman Dan S.
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	
Sampler Hammer Automatic Weight (lbs) 140 Drop (in) 30	Field Engineer Natalie Mottl

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+602.0									
■	601.8	Black medium-coarse SAND, trace fine gravel (dry) [ASPHALT]	0.0	0	S-1A					S-1 at 0ft
▨		Reddish brown to tannish gray CLAY, trace fine sand (moist)		1	S-1B	SS	13	1 6 6 8	12	
▨		Reddish brown to tannish gray CLAY, trace roots (moist)	0.0	2	S-2	SS	10	3 6 8 10	14	S-2 at 2ft
▨		Reddish brown CLAY, thin gray to tan fine sand lenses (moist)	0.0	4	S-3	SS	21	4 6 10 11	16	Drill to 4.0ft. Easy drilling. Reddish Brown clayey cuttings. S-3 at 4ft
▒	596.0	Reddish brown medium-fine SAND, some clay, trace fine gravel (moist) [TILL]	0.0	6	S-4	SS	15	10 8 7 3	15	S-4 at 6ft
▒		Reddish brown to gray medium-fine SAND, trace clay, trace fine gravel (wet) [TILL]	0.0	8	S-5	SS	7	2 4 3 3	7	Drill to 8.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft. Perched groundwater at about 8ft
▒		Gray gravelly medium-fine SAND, trace clay (wet) [TILL]	0.0	10	S-6	SS	4	7 7 3 50/1	10	S-6 at 10ft
	590.4	Bottom of boring at 11.6ft		11.6						Drill to 11.6ft. Hard to very hard drilling and grinding. Auger refusal at 11.6ft Boring backfilled with auger cuttings to grade.

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Log of Boring **LB-113E(OW)** Sheet 1 of 1

Project: Project Fifi/Niagara,NY

Project No.: 190071801

Location: Lockport Rd & Packard Rd

Elevation and Datum: el +603.5 602 (NAVD88)

Drilling Company: SJB Services, Inc.

Date Started: 12/14/21

Date Finished: 12/14/21

Drilling Equipment: Track-mounted Diedrich d-50

Completion Depth: 6.9 ft

Rock Depth: 6.9 ft

Size and Type of Bit: 4-1/4 inch HSA

Number of Samples: Disturbed 4 Undisturbed - Core -

Casing Diameter (in): N/A

Casing Depth (ft): N/A

Water Level (ft.): First ▽ N/E Completion ▼ N/A 24 HR. ▽

Casing Hammer: N/A Weight (lbs): N/A Drop (in): N/A

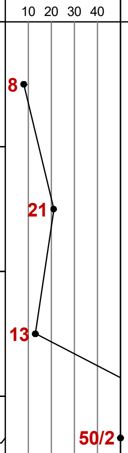
Drilling Foreman: Dan/Mike

Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel

Sampler Hammer: Automatic Weight (lbs): 140 Drop (in): 30

Field Engineer: Katherine Asciutto

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0	Dark brown SILT, trace f-m sand, Trace roots (moist)[TOPSOIL]	0.1	0	S-1A	SS	13	1		S-1 at 0ft
+601.5	Reddish brown to brown CLAY (moist)						4		
			1				4	8	
				S-1B			6		
	Reddish brown CLAY, trace fine sand (moist)	0.1	2	S-2	SS	15	5		S-2 at 2ft
							9		
			3				12	21	
							13		
	Reddish brown CLAY, trace fine sand (moist)	0.0	4	S-3A	SS	23	3		Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
							5		
+597.0	Reddish brown to brown fine SAND, some clay (moist) [TILL]		5				8	13	
				S-3B			8		
	Reddish brown to brown fine SAND, some clay (moist) [TILL]	0.0	6	S-4	SS	7	10		S-4 at 6ft
							50/2	50/2	
+595.1	Bottom of boring at 6.9ft		7						Drill to 6.9ft. Hard drilling. Augers refusal at 6.9ft. Bottom of Boring at 6.9ft. Observation well installed. Refer to well installation log for more information.
			8						
			9						
			10						
			11						
			12						
			13						
			14						
			15						
			16						
			17						
			18						
			19						
			20						



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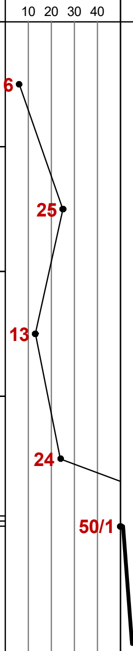
Log of Boring **LB-114** Sheet 1 of 1

Project: Project Fifi/Niagara,NY
Project No.: 190071801
Location: Lockport Rd & Packard Rd
Elevation and Datum: el +603.5 599 (NAVD88)
Drilling Company: SJB Services, Inc.
Date Started: 12/10/21
Date Finished: 12/10/21
Drilling Equipment: Track-mounted Diedrich d-50
Completion Depth: 8.1 ft
Rock Depth: 8.1 ft
Size and Type of Bit: 4-1/4 inch HSA
Number of Samples: Disturbed 5 Undisturbed - Core -
Casing Diameter (in): N/A
Casing Depth (ft): N/A
Water Level (ft.): First ▽ 6 Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A Weight (lbs): N/A Drop (in): N/A
Drilling Foreman: Dan Delude
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel
Field Engineer: Natalie Mottl
Sampler Hammer: Automatic Weight (lbs): 140 Drop (in): 30

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
599.0									
598.7	Brown SILT, trace fine sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1A	SS	11	WOH 2		S-1 at 0ft
	Reddish brown CLAY, trace fine sand (moist)		1	S-1B			4 5	6	
	Reddish brown CLAY, thin gray to reddish brown fine sand lenses (moist)	0.0	2	S-2	SS	16	7 11 14 17	25	S-2 at 2ft
	Reddish brown CLAY, trace fine sand, thin gray to tannish brown fine sand lenses (moist)	0.0	4	S-3	SS	19	4 6 7 6	13	Drill to 4.0ft. Easy drilling. Reddish Brown clayey cuttings. S-3 at 4ft
593.0	Reddish brown clayey coarse-fine SAND, some fine gravel (wet) [TILL] ▽	0.0	6	S-4A	SS	15	5 16 8	24	S-4 at 6ft
	Gray fine GRAVEL, trace clay, trace c-m sand (wet) [TILL]		7	S-4B			50/5		
590.9	No Recovery ? ? ? ?		8	S-5	SS	0	50/1	50/1	Drill to 8.0ft. Easy to hard drilling. Grinding at 8 ft. Reddish Brown clayey moist cuttings. S-5 at 8ft Drill to 8.1ft. Very hard drilling and grinding. Auger refusal at 8.1ft. Boring backfilling with auger cuttings to grade.
	Bottom of boring at 8.1ft								



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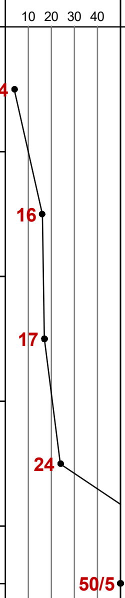
Log of Boring **LB-115** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 603 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started: 12/8/21	Date Finished: 12/8/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth: 9.7 ft	Rock Depth: 9.7 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed: 5 Undisturbed: - Core: -
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.)	First ▽ 7.5 Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A	Weight (lbs): N/A Drop (in): N/A	Drilling Foreman	Dan Delude
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Natalie Mottl
Sampler Hammer: Automatic	Weight (lbs): 140 Drop (in): 30		

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)
	+603.0		
	+602.5	Dark brown SILT, some clay, some m-f sand, some roots (moist) [TOPSOIL]	0.0
		Reddish red CLAY, trace fine sand (moist)	
		Reddish brown to gray CLAY (moist)	0.0
		Reddish brown to gray CLAY, trace fine sand (moist)	
		Reddish brown to gray CLAY, trace m-f sand, thin gray fine sand lenses (moist) ▽	
	+595.5	Reddish brown to gray CLAY, trace m-f sand, thin gray fine sand lenses (wet) [TILL]	
		Reddish brown to gray CLAY, trace m-f sand, trace fine gravel (wet) [TILL] ? ? ? ?	
	+594.1	Bottom of boring at 8.9ft	

Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
0–2	S-1A S-1B	SS	8	WOH 2 2 4	4	S-1 at 0ft
2–4	S-2	SS	12	5 7 9 12	16	S-2 at 2ft
4–6	S-3	SS	21	4 7 10 11	17	Drill to 4.0ft. Easy drilling. Brown to reddish Brown clayey moist to dry cuttings. S-3 at 4ft
6–8	S-4A S-4B	SS	24	10 13 11 10	24	S-4 at 6ft Some moddling in sample
8–9	S-5	SS	10	8 50/5	50/5	Drill to 8.0ft. Easy drilling. Reddish Brown clayey to sandy moist to wet cuttings. S-5 at 8ft Some moddling in sample Drill to 9.7ft. Auger refusal at 9.7ft Boring backfilled with auger cuttings to grade.



Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

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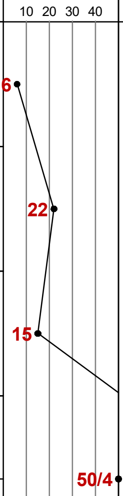
Log of Boring **LB-116** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 602 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started	12/8/21
		Date Finished	12/8/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth	7.8 ft
		Rock Depth	7.8 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 4 Undisturbed - Core -
Casing Diameter (in)	N/A	Water Level (ft.)	First ▽ 6 Completion ▼ N/A 24 HR. ▼
Casing Depth (ft)	N/A		
Casing Hammer	N/A	Drilling Foreman	Dan Delude
Weight (lbs)	N/A		
Drop (in)	N/A		
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Natalie Mottl
Sampler Hammer	Automatic		
Weight (lbs)	140		
Drop (in)	30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0	Brown SILT, trace clay, trace m-f sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1A	SS	12	1 2	6	S-1 at 0ft
+601.3	Reddish brown CLAY, trace fine sand (moist)		1	S-1B			4 4		
	Reddish brown CLAY, thin tan fine sand lenses (moist)	0.0	2 3	S-2	SS	16	6 11 11 12	22	S-2 at 2ft
+598.0	Reddish brown to gray CLAY, trace fine gravel, thin tan fine sand lenses with yellow mottling (moist) [TILL]	0	4 5	S-3	SS	23	4 6 9 10	15	Drill to 4.0ft. Easy drilling. Reddish Brown clayey cuttings. S-3 at 4ft
	▽ Reddish brown to brown clayey medium-fine SAND, trace fine gravel (wet) [TILL]	0.0	6 7	S-4	SS	13	9 8 50/4	50/4	S-4 at 6ft
+594.7	? ? ? ? Bottom of boring at 7.3ft		8 9						Drill to 7.8ft. Hard drilling. Auger refusal at 7.8ft Boring backfilled with auger cuttings to grade.



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Log of Boring **LB-117E** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 602 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started: 12/15/21	Date Finished: 12/15/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth: 9 ft	Rock Depth: 9 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed: 5 Undisturbed: - Core: -
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.)	First ▽ N/E Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A	Weight (lbs): N/A Drop (in): N/A	Drilling Foreman	Dan/Mike
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		
Sampler Hammer: Automatic	Weight (lbs): 140 Drop (in): 30	Field Engineer	Katherine Asciutto

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+602.0	Light brown to reddish brown CLAY, some fine sand (moist)	0.0	0	S-1	SS	18	2 3 3 5	6	S-1 at 0ft
		Reddish brown CLAY, trace fine sand, Light brown sand lenses (moist)	0.0	2	S-2	SS	14	2 6 9 12	15	S-2 at 2ft
		Reddish brown CLAY, trace fine sand, Grey to light brown sand lenses (moist)	0.0	4	S-3	SS	22	5 7 11 14	18	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
		Brownish red CLAY, trace fine sand (moist)	0.0	6	S-4	SS	24	9 11 12 11	23	S-4 at 6ft ENV sample collected at 6-7 feet
	+594.0	No Recovery [Inferred TILL]		8	S-5	SS	0	2 50/3	50/3	Drill to 8.0ft. Easy drilling. Reddish brown clay moist cuttings. S-5 at 8ft Auger refual at 9ft. Boring backfilled with auger cuttings to grade.
	+593.0	? ? ? ? Bottom of boring at 9ft		9						

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

N-Value scale: 10 20 30 40

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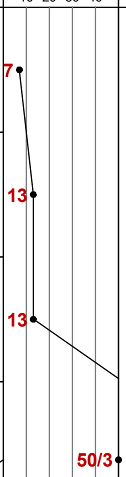
Log of Boring **LB-118E** Sheet 1 of 1

Project: Project Fifi/Niagara,NY		Project No.: 190071801	
Location: Lockport Rd & Packard Rd		Elevation and Datum: el +603.5 603 (NAVD88)	
Drilling Company: SJB Services, Inc.		Date Started: 12/15/21	Date Finished: 12/15/21
Drilling Equipment: Track-mounted Diedrich d-50		Completion Depth: 7.5 ft	Rock Depth: 7.5 ft
Size and Type of Bit: 4-1/4 inch HSA		Number of Samples: Disturbed 4	Undisturbed - Core -
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.): First ∇ 4	Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A Weight (lbs): N/A	Drop (in): N/A	Drilling Foreman: Dan/Mike	
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer: Katherine Asciutto	
Sampler Hammer: Automatic Weight (lbs): 140	Drop (in): 30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+603.0	Dark brown CLAY, trace fine sand, trace roots (moist) [TOPSOIL]	0.0	0	S-1	SS	12	2 3 4 5	7	S-1 at 0ft
+602.0	Dark reddish brown to brown CLAY, trace fine sand (moist)		1						
	Dark reddish brown CLAY, trace fine sand (moist)	0.0	2	S-2	SS	10	3 5 8 10	13	S-2 at 2ft
	Dark reddish brown CLAY, trace fine sand (wet) ∇	0.0	4	S-3	SS	20	4 7 6 9	13	Drill to 4.0ft. Easy drilling. Reddish brown moist cuttings S-3 at 4ft
	Dark reddish brown CLAY, trace fine sand (wet)		6	S-4	SS	10	5 6 50/3	50/3	S-4 at 6ft
+595.5	Bottom of boring at 7.5ft		7.5						Auger refusal at 7.5ft Boring backfilled with auger cuttings to grade.



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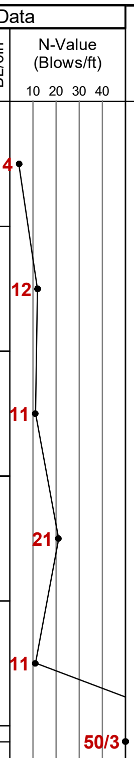
Log of Boring **LB-119** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 602 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/13/21	Date Finished 12/13/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 11.4 ft	Rock Depth 11.4 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples: Disturbed 6; Undisturbed -; Core -	
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.): First ▽ N/E; Completion ▼ N/A; 24 HR. ▼	
Casing Hammer N/A; Weight (lbs) N/A; Drop (in) N/A		Drilling Foreman Dan S.	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer Automatic; Weight (lbs) 140; Drop (in) 30		Field Engineer Natalie Mottl	

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0									
+601.7	Black coarse-medium SAND, trace silt (moist) [FILL]	0.1	0	S-1A	SS	12	3 1	4	S-1 at 0ft
	Brown to reddish brown CLAY, trace fine sand (moist)		1	S-1B			3 5		
	Reddish brown CLAY, thin gray to tan fine sand lenses (moist)	0.0	2	S-2	SS	10	3 5 7 9	12	S-2 at 2ft
	Reddish brown to gray CLAY, thin gray to tan fine sand lenses (moist)	0.0	4	S-3	SS	20	3 4 7 7	11	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
+596.0	Reddish brown clayey fine SAND, trace fine gravel (moist) [TILL]	0.0	6	S-4	SS	24	9 9 12 9	21	S-4 at 6ft
	Reddish brown clayey fine SAND, trace fine gravel (moist) [TILL]	0.0	8	S-5	SS	7	3 5 6 9	11	Drill to 8.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft
	No Recovery		10	S-6	SS	0	50/3	50/3	S-6 at 10ft
+590.6	? ? ? ?		11						
	Bottom of boring at 11.4ft		12						Drill to 11.4ft. Hard drilling and grinding. Auger refusal at 11.4ft. Boring backfilled with auger cuttings to grade.

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20



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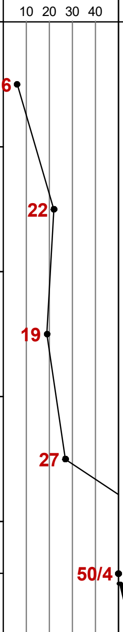
Log of Boring **LB-120** Sheet 1 of 1

Project: Project Fifi/Niagara,NY
Project No.: 190071801
Location: Lockport Rd & Packard Rd
Elevation and Datum: el +603.5 602 (NAVD88)
Drilling Company: SJB Services, Inc.
Date Started: 12/8/21
Date Finished: 12/8/21
Drilling Equipment: Track-mounted Diedrich d-50
Completion Depth: 9 ft
Rock Depth: 9 ft
Size and Type of Bit: 4-1/4 inch HSA
Number of Samples: Disturbed 5 | Undisturbed - | Core -
Casing Diameter (in): N/A
Casing Depth (ft): N/A
Water Level (ft.): First ▽ 8 | Completion ▼ N/A | 24 HR. ▼
Casing Hammer: N/A | Weight (lbs): N/A | Drop (in): N/A
Drilling Foreman: Dan Delude
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel
Field Engineer: Natalie Mottl
Sampler Hammer: Automatic | Weight (lbs): 140 | Drop (in): 30

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
602.0 601.7	Dark brown SILT, trace m-f sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1A	SS	8	1 2	6	S-1 at 0ft
	Reddish brown to grayish brown CLAY, some c-f sand (moist)		1	S-1B			4 5		
	Reddish brown to gray CLAY, trace fine sand, trace thin gray fine sand lenses (moist)	0.2	2	S-2	SS	12	10 10 12 15	22	S-2 at 2ft
	Reddish brown to gray CLAY, trace fine sand, trace thin gray fine sand lenses (moist)	0.3	4	S-3	SS	20	5 9 10 12	19	Drill to 4.0ft. Easy drilling. Brown clayey moist to dry cuttings. S-3 at 4ft
596.0	Reddish brown to gray CLAY, some fine sand, trace fine gravel, trace thin gray fine sand lenses (moist) [TILL]	0.2	6	S-4	SS	22	10 13 14 12	27	S-4 at 6ft
593.2	▽ Reddish brown CLAY, some fine gravel, trace m-f sand (wet) [TILL]	0.0	8	S-5	SS	3	5 50/4	50/4	Drill to 8.0ft. Easy drilling. Reddish Brown clayey to sandy moist to dry cuttings. S-5 at 8ft Drill to 9.0ft. Auger refusal at 9ft. Boring backfilled with auger cuttings to grade
	Bottom of boring at 8.8ft		9						



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Log of Boring **LB-121** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 598 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/13/21 Date Finished 12/13/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 8.2 ft Rock Depth 8.2 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples: Disturbed 5; Undisturbed -; Core -
Casing Diameter (in) N/A Casing Depth (ft) N/A	Water Level (ft.): First ▽ N/E; Completion ▼ N/A; 24 HR. ▼
Casing Hammer N/A Weight (lbs) N/A Drop (in) N/A	Drilling Foreman Dan S.
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer Natalie Mottl
Sampler Hammer Automatic Weight (lbs) 140 Drop (in) 30	

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+598.0 +597.5	Dark brown SILT, trace fine sand (moist) [TOPSOIL] Brown to reddish brown CLAY (moist)	0.0	0 1	S-1A S-1B	SS	13	1 4 4 5	8	S-1 at 0ft
		Reddish brown CLAY, thin gray to tan fine sand lenses (moist)	0.0	2 3	S-2	SS	12	4 7 9 11	16	S-2 at 2ft
		Reddish brown CLAY, trace fine sand, thin gray to tan fine sand lenses (moist)	0.0	4 5	S-3	SS	21	4 6 7 8	13	Drill to 4.0ft. Easy drilling. Reddishbrown to brown clayey moist cuttjngs. S-3 at 4ft
		Reddish brown CLAY, trace fine sand, thin gray to tan fine sand lenses (moist)	0.0	6 7	S-4	SS	24	7 10 13 13	23	S-4 at 6ft
	+589.8	No Recovery Bottom of boring at 8.2ft		8 9	S-5	SS	0	50/2	50/2	Drill to 8.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft Drill to 8.2ft. Hard drilling and grinding. Auger refusal at 8.2ft. Boring backfilled with auger cuttings to grade.
				10 11 12 13 14 15 16 17 18 19 20						

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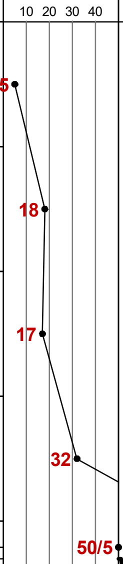
Log of Boring **LB-122** Sheet 1 of 1

Project Project Fifi/Niagara,NY			Project No. 190071801		
Location Lockport Rd & Packard Rd			Elevation and Datum el +603.5 596 (NAVD88)		
Drilling Company SJB Services, Inc.			Date Started 12/13/21	Date Finished 12/13/21	
Drilling Equipment Track-mounted Diedrich d-50			Completion Depth 13.6 ft	Rock Depth 8.6 ft	
Size and Type of Bit 4-1/4 inch HSA			Number of Samples	Disturbed 5	Undisturbed -
				Core 1	
Casing Diameter (in) N/A	Casing Depth (ft) N/A		Water Level (ft.)	First ∇ N/E	Completion ▼ N/A
				24 HR. ∇	
Casing Hammer N/A	Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan S.		
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			Field Engineer Natalie Mottl		
Sampler Hammer Automatic	Weight (lbs) 140	Drop (in) 30			

Elev. (ft)	Sample Description	PID Reading (ppm)	Coring (min)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+596.0				0						
+595.5	Brown SILT, trace m-f sand, some roots (moist) [TOPSOIL]	0.0		0	S-1A	SS	11	1 2	5	S-1 at 0ft
	Brown to reddish brown CLAY, trace fine sand (moist)			1	S-1B			3 5		
	Brown to reddish brown CLAY, trace fine sand (moist)	0.0		2	S-2	SS	16	5 8 10 12	18	S-2 at 2ft
	Reddish brown to brown CLAY, thin gray to tan fine sand lenses (moist)	0.0		4	S-3	SS	18	5 7 10 14	17	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
	Reddish brown to brown CLAY, thin gray to tan fine sand lenses (moist)	0.0		6	S-4	SS	19	11 14 18 34	32	S-4 at 6ft
+588.0	No Recovery [Inferred TILL]			8	S-5	SS	0	50/5	50/5	Drill to 8.0ft. Easy drilling. Reddish Brown clayey cuttings. S-5 at 8ft Drill to 8.6ft. Medium hard to hard drilling. Auger refusal at 8.6ft Switch to rock coring. C-1 at 8.6ft
+587.4	Dark gray porous DOLOMITE; fine grained; fresh to slightly; close to wide fracture spacing; fractures shallow dipping to near horizontal; rock quality excellent; [BEDROCK]		2:31 2:01 1:30 2:00 1:15	9–13	C-1	NX Core	REC=56"/60" =93%	RQD=53"/60" =88%		
+582.4	Bottom of Boring at 13.6ft			13.6						Bottom of boring at 13.6ft. Boring backfilled with auger cuttings to grade.



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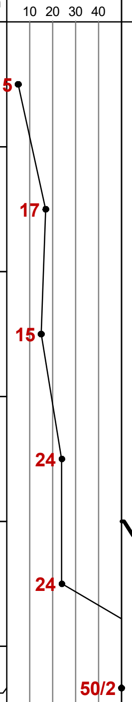
Log of Boring **LB-123** Sheet 1 of 1

Project: Project Fifi/Niagara,NY		Project No.: 190071801	
Location: Lockport Rd & Packard Rd		Elevation and Datum: el +603.5 597 (NAVD88)	
Drilling Company: SJB Services, Inc.		Date Started: 12/10/21	Date Finished: 12/10/21
Drilling Equipment: Track-mounted Diedrich d-50		Completion Depth: 10.7 ft	Rock Depth: 10.7 ft
Size and Type of Bit: 4-1/4 inch HSA		Number of Samples: Disturbed 6	Undisturbed - Core -
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.): First ▽ 8	Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A	Weight (lbs): N/A Drop (in): N/A	Drilling Foreman: Dan S.	
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer: Natalie Mottl	
Sampler Hammer: Automatic	Weight (lbs): 140 Drop (in): 30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+597.0 +596.7	Brown SILT, trace m-f sand, trace roots (moist)[TOPSOIL]	0.1	0	S-1A	SS	10	WOH 1	5	S-1 at 0ft
	Reddish brown to gray CLAY, trace roots (moist)		1	S-1B			4 4		
	Reddish brown to gray CLAY, trace m-f sand, trace roots (moist)	0.1	2	S-2	SS	19	6 8 9 10	17	S-2 at 2ft
	Reddish brown to tannish gray CLAY, gray fine sand lenses (moist)	0.0	4	S-3	SS	20	5 6 9 10	15	Drill to 4.0ft. Easy drilling. Reddish Brown clayey cuttings. S-3 at 4ft
	Reddish brown to tannish gray CLAY, gray fine sand lenses (moist)	0.0	6	S-4	SS	21	11 11 13 11	24	S-4 at 6ft Drill to 8.0ft. Easy drilling. Reddish Brown moist clayey cuttings.
+589.0	▽ Reddish brown sandy CLAY, some f-c gravel (wet) [TILL]	0.0	8	S-5	SS	15	6 10 14 18	24	S-5 at 8ft. Perched groundwater around 8 to 10 ft.
	Reddish brown clayey medium-fine SAND, trace fine gravel (moist) [TILL]	0.0	10	S-6	SS	2	23 50/2	50/2	S-6 at 10ft Drill to 10.7ft. Hard drilling and grinding. Auger refusal at 10.7ft. Boring backfilled with auger cuttings to grade.
+586.3	Bottom of Boring at 10.7ft		11						
			12						
			13						
			14						
			15						
			16						
			17						
			18						
			19						
			20						



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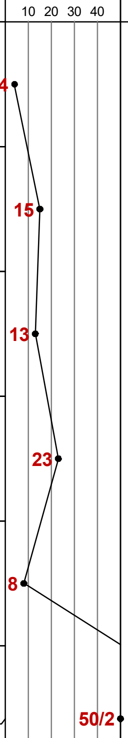
Log of Boring **LB-124** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 600 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started: 12/13/21	Date Finished: 12/13/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth: 11.5 ft	Rock Depth: 11.5 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed: 6 Undisturbed: - Core: -
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.)	First ▽ 10 Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A	Weight (lbs): N/A Drop (in): N/A	Drilling Foreman	Dan S.
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Natalie Mottl
Sampler Hammer: Automatic	Weight (lbs): 140 Drop (in): 30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+600.0	Dark brown SILT, trace m-f sand, trace roots (moist)[TOPSOIL]	0.1	0	S-1A S-1B	SS	11	WOH 1 3 5	4	S-1 at 0ft
+599.3	Brown CLAY, trace fine sand (moist)		1						
	Reddish brown CLAY (moist)	0.0	2	S-2	SS	14	3 6 9 10	15	S-2 at 2ft
	Reddish brown to tannish gray CLAY, trace m-f sand, trace roots (moist)	0.0	4	S-3	SS	22	4 5 8 10	13	Drill to 4.0ft. Easy drilling. Reddish brown silty, clayey cuttings. S-3 at 4ft
	Reddish brown to tannish gray medium-fine SAND, some clay, trace fine gravel (moist)	0.0	6	S-4	SS	18	10 11 12 12	23	S-4 at 6ft
	Reddish brown to tannish gray medium-fine SAND, some clay, trace fine gravel (moist)	0.0	8	S-5	SS	11	3 4 4 6	8	Drill to 8.0ft. Easy drilling. Reddish Brown clayey cuttings. S-5 at 8ft
+590.0	Dark gray fine GRAVEL, some c-m sand, trace clay (wet) [TILL] ▽	0.0	10	S-6	SS	12	29 38 50/2	50/2	S-6 at 10ft. Perched groundwater at about 10 ft
+588.5	Bottom of Boring at 11.5ft		11.5						Drill to 11.5ft. Hard drilling and grinding. Auger refusal at 11.5ft. Boring backfilled with auger cuttings to grade.



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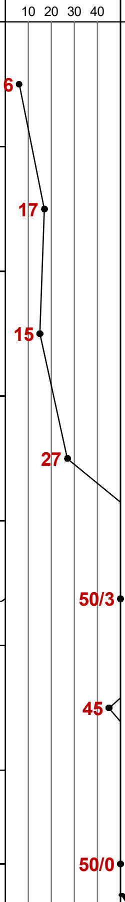
Log of Boring **LB-125** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 604 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/8/21 · Date Finished 12/8/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 13.5 ft · Rock Depth 13.5 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples · Disturbed 7 · Undisturbed - · Core -
Casing Diameter (in) N/A · Casing Depth (ft) N/A	Water Level (ft.) · First ∇ 10 · Completion ▼ N/A · 24 HR. ▼
Casing Hammer N/A · Weight (lbs) N/A · Drop (in) N/A	Drilling Foreman Dan Delude
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	
Sampler Hammer Automatic · Weight (lbs) 140 · Drop (in) 30	Field Engineer Natalie Mottl

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+604.0	Dark brown SILT, trace fine sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1A	SS	16	WOH 3	6	S-1 at 0ft
+603.3	Brown CLAY, some fine sand (moist)		1	S-1B			3 5		
	Reddish brown to brown CLAY, trace fine sand, thin gray fine sandy clay lenses with indistinct yellow mottling (moist)		2	S-2	SS	12	2 7 10 15	17	S-2 at 2ft
	Reddish brown to brown CLAY, trace fine sand, thin gray fine sandy clay lenses with indistinct yellow mottling (moist)	0.0	4	S-3	SS	21	5 7 8 12	15	Drill to 4.0ft. Easy drilling. Reddish Brown clayey moist cuttings. S-3 at 4ft
	Reddish brown to brown gravelly CLAY, some fine sand (moist)	0.0	6	S-4	SS	15	13 14 13 10	27	S-4 at 6ft
+596.0	Gray to brown GRAVEL, some clay, some c-f sand (moist) [TILL]		8	S-5	SS	7	10 13 50/3	50/3	Drill to 8.0ft. Easy to medium hard drilling. Reddish Brown clayey moist cuttings. S-5 at 8ft
	∇ Grayish brown to gray gravelly medium-fine SAND, some clay (wet) [TILL]		10	S-6	SS	16	14 20 25 23	45	Drill to 10.0ft. Easy to hard drilling. Brown clayey to sandy moist cuttings. S-6 at 10ft
+590.5	No Recovery ? ? ?		13.5	S-7	SS	0	50/0	50/0	Drill to 13.5ft. Groundwater at 11ft. Hard drilling. Auger refusal at13.5ft. S-7 at 13.5ft Boring backfilled with auger cuttings to grade.
	Bottom of boring at 13.5ft								



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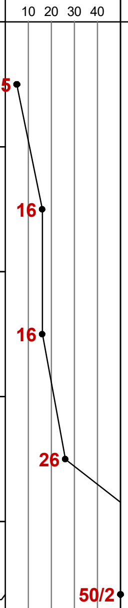
Log of Boring **LB-126E(OW)** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 602 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/16/21	Date Finished 12/16/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 9.2 ft	Rock Depth 9.2 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples: Disturbed 5	Undisturbed - / Core -
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.): First ▽ 8	Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A	Weight (lbs) N/A / Drop (in) N/A	Drilling Foreman Dan/Mike	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer Automatic	Weight (lbs) 140 / Drop (in) 30	Field Engineer Katherine Asciutto	

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0	Dark brown SILT, trace fine sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1	SS	13	1 2 3 6	5	S-1 at 0ft
+601.0	Brown to reddish CLAY, trace fine sand (moist)		1						
	Reddish brown CLAY, fine sand lenses (moist)	0.0	2	S-2	SS	14	4 7 9 12	16	S-2 at 2ft
	Reddish brown CLAY, trace fine sand with light brown sand lenses (moist)	0.0	4	S-3	SS	18	4 7 9 11	16	Drill to 4.0ft. Easy drilling. Reddish brown clay moist soil cuttings. S-3 at 4ft
	Reddish brown CLAY, trace fine sand with light brown sand lenses (moist)	0.0	6	S-4	SS	20	11 13 13 14	26	S-4 at 6ft
+594.0	▽ Reddish brown CLAY, trace fine sand, trace rock fragments (wet) [TILL]	0.0	8	S-5	SS	7	1 2 50/2	50/2	Drill to 8.0ft. Easy drilling. Reddish brown clay wet cuttings. S-5 at 8ft Auger refusal encountered at 9.2ft. Well installed - see log for details.
+592.8	Bottom of boring at 9.2ft		9						



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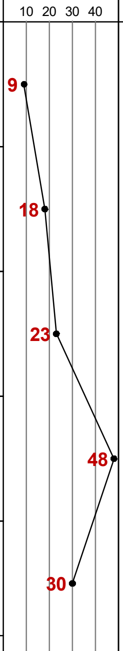
Log of Boring **LB-127E(OW)** Sheet 1 of 1

Project Project Fifi/Niagara,NY	Project No. 190071801
Location Lockport Rd & Packard Rd	Elevation and Datum el +603.5 602 (NAVD88)
Drilling Company SJB Services, Inc.	Date Started 12/15/21 | Date Finished 12/15/21
Drilling Equipment Track-mounted Diedrich d-50	Completion Depth 10 ft | Rock Depth 10 ft
Size and Type of Bit 4-1/4 inch HSA	Number of Samples: Disturbed 5 | Undisturbed - | Core -
Casing Diameter (in) N/A | Casing Depth (ft) N/A	Water Level (ft.): First ∇ N/E | Completion ▼ N/A | 24 HR. ▼
Casing Hammer N/A | Weight (lbs) N/A | Drop (in) N/A	Drilling Foreman Dan/Mike
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer
Sampler Hammer Automatic | Weight (lbs) 140 | Drop (in) 30	Katherine Asciutto

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+602.0 +601.5	Dark black coarse SAND and ASPHALT pieces (moist)[ASPHALT]	0.0	0	S-1A	SS	6	10 5	9	S-1 at 0ft
	Light brown to reddish brown CLAY, trace fine sand, Grey sand lenses (moist)		1	S-1B			4 6		
	Light brown to reddish brown CLAY, trace fine sand (moist)	0.0	2	S-2	SS	10	3 5 13 16	18	S-2 at 2ft
	Reddish brown CLAY, trace fine sand, with grey sand lenses (dry)	0.0	4	S-3	SS	20	7 10 13 20	23	Drill to 4.0ft. Easy drilling. Reddish brown clay dry cuttings. S-3 at 4ft
	Reddish brown CLAY, trace fine sand, with grey sand lenses (dry)	0.0	6	S-4	SS	22	21 25 23 24	48	S-4 at 6ft
	Reddish brownish CLAY, with fine sand lenses (moist)	0.0	8	S-5	SS	20	6 10 20 50/4	30	Drill to 8.0ft. Easy drilling. Reddish brown clay dry cuttings. S-5 at 8ft
+592.0	Bottom of boring at 10ft		10						Drill to 10.0ft. Moderate drilling. Reddish brown clay dry cuttings. Well installed - see log for details.

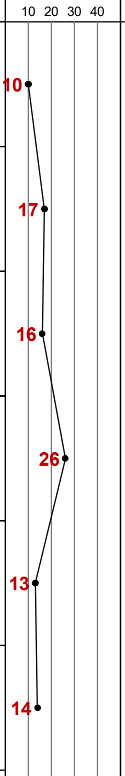


Log of Boring **LB-128E** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 600 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/15/21	Date Finished 12/15/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 12.5 ft	Rock Depth 12.5 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples	Disturbed 6 / Undisturbed - / Core -
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.)	First ▽ 2 / Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A	Weight (lbs) N/A / Drop (in) N/A	Drilling Foreman Dan/Mike	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer Automatic	Weight (lbs) 140 / Drop (in) 30	Field Engineer Katherine Asciutto	

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale
+600.0	Dark black fine-medium SAND, some ASPHALT pieces (moist)[ASPHALT]	0.0	0
+599.5	Dark gray to light gray CLAY, some fine sand (moist)		
	▽		
	Dark black medium-coarse SAND, some coarse gravel (wet) Light brown to reddish brown CLAY, trace fine sand (wet)	0.0	2
	Reddish brown CLAY, trace fine sand, with grey sand lenses (moist)	0.0	4
	Reddish brown CLAY, trace fine sand, with grey sand lenses (moist)	0.0	6
	Reddish brown CLAY, trace fine sand, with grey sand lenses (wet)	0.0	8
+590.0	Reddish brown CLAY, some rock fragments, trace fine sand (moist) [TILL]	0.0	10
+587.5	?—?—?—?		12.5
	Bottom of boring at 12.5ft		

Depth	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
0	S-1A S-1B	SS	8	9 6 4 3	10	S-1 at 0ft
2	S-2A S-2B	SS	7	4 7 10 12	17	S-2 at 2ft
4	S-3	SS	16	4 7 9 12	16	Drill to 4.0ft. Easy drilling. Coarse gravel (wet - likely perched water) and reddish brown moist clay cuttings. S-3 at 4ft
6	S-4	SS	20	12 12 14 15	26	S-4 at 6ft Collect Env sample at 7-8ft.
8	S-5	SS	24	4 5 8 7	13	Drill to 8.0ft. Easy drilling. Reddish brown moist cuttings. S-5 at 8ft
10	S-6	SS	18	3 7 7 12	14	S-6 at 10ft. Drill to 12.5ft. Auger refusal encountered at 12.5ft. Boring backfilled with auger cuttings to grade.



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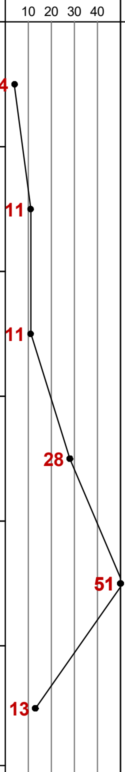
Log of Boring **LB-129E(OW)** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 598 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started	12/15/21
		Date Finished	12/15/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth	11.9 ft
		Rock Depth	11.9 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 6 Undisturbed - Core -
Casing Diameter (in)	N/A	Water Level (ft.)	First ▽ N/E Completion ▼ N/A 24 HR. ▼
Casing Depth (ft)	N/A		
Casing Hammer	N/A	Drilling Foreman	Dan/Mike
Weight (lbs)	N/A		
Drop (in)	N/A		
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Katherine Asciutto
Sampler Hammer	Automatic		
Weight (lbs)	140		
Drop (in)	30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+598.0	Dark brown fine SAND, trace clay (moist)[TOPSOIL]	0.0	0	S-1A	SS	10	2		S-1 at 0ft
+597.5	Black to dark brown CLAY, some m-c sand (moist)		1				2 2	4	
				S-1B			3		
	Reddish brown CLAY, trace f-m sand, with gray sand lenses (moist)	0.0	2	S-2	SS	12	2 5 6 9	11	S-2 at 2ft
	Reddish brown CLAY, trace f-m sand, with gray sand lenses (moist)	0.0	4	S-3	SS	20	3 4 7 9	11	Drill to 4.0ft. Easy drilling. Reddish brown moist soil cuttings. S-3 at 4ft
	Reddish brown CLAY, trace f-m sand, with gray sand lenses (moist)	0	6	S-4	SS	20	10 14 14 14	28	S-4 at 6ft. Collect ENV sample from 6-8 feet bgs.
+590.0	Reddish brown CLAY, trace fine sand (wet) [TILL] Dark gray CLAY (wet) [TILL]	0.0	8	S-5A	SS	2	4 9	51	Drill to 8.0ft. Easy drilling. Reddish brown moist cuttings. S-5 at 8ft
				S-5B			42 44		
	No Recovery		10	S-6	SS	0	3 6 7 50/5	13	Drill to 10.0ft. Hard drilling. Reddish brown wet cuttings. S-6 at 10ft
+586.1	? ? ? ?								Refusal encountered at 11.6ft. Install well - see log for details.
	Bottom of boring at 11.9ft								



Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

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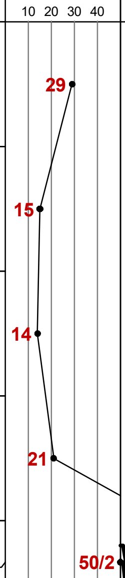
Log of Boring **LB-130E** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 598 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/15/21	Date Finished 12/15/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 8.7 ft	Rock Depth 8.7 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples: Disturbed 5	Undisturbed - / Core -
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.): First ▽ N/E	Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A / Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan/Mike	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		Field Engineer Katherine Asciutto	
Sampler Hammer Automatic / Weight (lbs) 140	Drop (in) 30		

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+598.0									
+597.5	Dark black coarse SAND, some ASPHALT pieces [ASPHALT]	20.7	0	S-1A	SS	6	34 21	29	S-1 at 0ft. Collect env sample from 0-2 feet.
	Dark black to dark gray fine SAND, trace concrete, trace clay, trace coarse gravel (dry)		1	S-1B			8 4		
	Reddish brown CLAY, trace fine sand (moist)	0.0	2 3	S-2	SS	2	5 7 8 10	15	S-2 at 2ft
	Reddish brown CLAY, trace fine sand, trace fine gravel (moist)	0.1	4 5	S-3	SS	6	4 6 8 9	14	Drill to 4.0ft. Easy drilling. Reddish brown moist cuttings. S-3 at 3ft
	Reddish brown CLAY, trace fine sand (moist)	0.0	6 7	S-4	SS	24	8 9 12 20	21	S-4 at 6ft
	No Recovery	0.0	8	S-5	SS	0	7 50/2	50/2	Drill to 8.0ft. Easy drilling. Reddish brown moist cuttings. S-5 at 8ft Auger and spoon refusal encountered at 8.4ft Boring backfilled with auger cuttings to grade.
+589.3	Bottom of boring at 8.7ft		9 10 11 12 13 14 15 16 17 18 19 20						



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Log of Boring **LB-131E** Sheet 1 of 1

Project Project Fifi/Niagara,NY			Project No. 190071801		
Location Lockport Rd & Packard Rd			Elevation and Datum el +603.5 595 (NAVD88)		
Drilling Company SJB Services, Inc.			Date Started 12/14/21		Date Finished 12/14/21
Drilling Equipment Track-mounted Diedrich d-50			Completion Depth 10.6 ft		Rock Depth 10.6 ft
Size and Type of Bit 4-1/4 inch HSA			Number of Samples	Disturbed 6	Undisturbed - / Core -
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Level (ft.)	First ▽ N/E	Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A	Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan/Mike		
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel					
Sampler Hammer Automatic	Weight (lbs) 140	Drop (in) 30	Field Engineer Katherine Asciutto		

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
■	+595.0 +594.5	Black medium-fine SAND, some fine ASPHALT pieces (moist)[ASPHALT]	0.0	0	S-1	SS	6	17 10 3 3	13	S-1 at 0ft
▨		Reddish brown to grayish brown CLAY, trace fine sand, Thin gray lenses (moist)		1						
▨		Reddish brown to grayish brown CLAY, trace fine sand, Thin gray lenses (moist)	0.0	2	S-2	SS	10	6 6 9 10	15	S-2 at 2ft
▨		Reddish brown to grayish brown CLAY, trace fine sand, Thin gray lenses (moist)	0.0	4	S-3	SS	17	4 5 7 8	12	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
▨		Reddish brown to grayish brown CLAY, trace fine sand (moist)		6	S-4	SS	3	10 13 11 11	24	S-4 at 6ft. Collect grab env sample at 7.5ft.
▨		Reddish brown CLAY, trace fine sand (moist)	0.0	8	S-5	SS	7	4 5 7 8	12	Drill to 8.0ft. Easy drilling. Reddish brown clay moist cuttings. S-5 at 8ft
▨	+584.5	No Recovery ? ? ? ?		10	S-6	SS	0	2 50/1	50/1	Auger refusal encountered at 10.5ft Boring backfilled with auger cuttings to grade.
		Bottom of boring at 10.5ft		11						

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

N-Value (Blows/ft): 10 20 30 40

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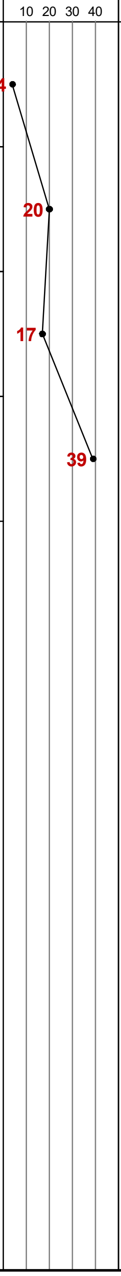
Log of Boring **LB-201(OW)** Sheet 1 of 1

Project Project Fifi/Niagara,NY			Project No. 190071801		
Location Lockport Rd & Packard Rd			Elevation and Datum el +603.5 612 (NAVD88)		
Drilling Company SJB Services, Inc.			Date Started 12/16/21	Date Finished 12/16/21	
Drilling Equipment Track-mounted Diedrich d-50			Completion Depth 8 ft	Rock Depth 8 ft	
Size and Type of Bit 4-1/4 inch HSA			Number of Samples	Disturbed 4	Undisturbed -
					Core -
Casing Diameter (in) N/A		Casing Depth (ft) N/A	Water Level (ft.)	First ▽ N/E	Completion ▼ N/A
					24 HR. ▽
Casing Hammer N/A	Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan/Mike		
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			Field Engineer Katherine Asciutto		
Sampler Hammer Automatic	Weight (lbs) 140	Drop (in) 30			

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+612.0	Brown SILT, trace fine sand, trace roots (moist)[TOPSOIL]	0	0	S-1	SS	14	1 2 2 5	4	S-1 at 0ft
	+611.0	Brown to reddish brown CLAY, trace fine sand (moist)		1						
		Reddish brown CLAY, trace fine sand, trace fine gravel (moist)	0.0	2 3	S-2	SS	12	5 8 12 12	20	S-2 at 2ft
		Reddish brown CLAY, trace fine sand, with grey to light brown sand lenses (moist)	0.0	4 5	S-3	SS	24	5 7 10 13	17	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
	+606.0	Reddish brown CLAY, trace fine sand, trace f-c gravel (moist) [TILL]	0.0	6 7	S-4	SS	20	12 17 22 37	39	S-4 at 6ft
	+604.0	? ? ? ? Bottom of boring at 8ft		8						Refusal encountered at 8.0ft. Install ENV monitoring well.



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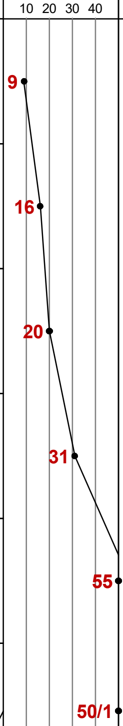
Log of Boring **LB-202(OW)** Sheet 1 of 1

Project: Project Fifi/Niagara,NY		Project No.: 190071801	
Location: Lockport Rd & Packard Rd		Elevation and Datum: el +603.5 611 (NAVD88)	
Drilling Company: SJB Services, Inc.		Date Started: 12/16/21	Date Finished: 12/16/21
Drilling Equipment: Track-mounted Diedrich d-50		Completion Depth: 11.1 ft	Rock Depth: 11.1 ft
Size and Type of Bit: 4-1/4 inch HSA		Number of Samples: Disturbed 6	Undisturbed - Core -
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.): First ▽ 8	Completion ▼ N/A 24 HR. ▽
Casing Hammer: N/A	Weight (lbs): N/A Drop (in): N/A	Drilling Foreman: Dan/Mike	
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer: Automatic	Weight (lbs): 140 Drop (in): 30	Field Engineer: Katherine Asciutto	

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+611.0	Brown SILT, trace fine sand, trace roots (moist)[TOPSOIL]	0.0	0	S-1	SS	12	1 3 6 8	9	S-1 at 0ft
+610.0	Reddish brown CLAY, trace fine sand (moist)		1						
	Reddish brown CLAY, trace fine sand, Light brown sand lenses (moist)	0.0	2	S-2	SS	12	4 6 10 14	16	S-2 at 2ft
+607.0	Reddish brown CLAY, trace fine sand, trace f-c gravel, with light brown sand lenses (moist) [TILL]	0.0	4	S-3	SS	7	5 8 12 13	20	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
	Reddish brown CLAY, trace fine sand, trace fine gravel, with light brown sand lenses (moist) [TILL]	0.0	6	S-4	SS	15	9 13 18 12	31	S-4 at 6ft Collect ENV sample from 7-8 feet.
	▽ Reddish brown CLAY, trace fine sand, trace f-c gravel (wet) [TILL]	0.0	8	S-5	SS	6	7 13 42 21	55	Drill to 8.0ft. Easy to moderate drilling. Reddish brown clay moist to wet cuttings. S-5 at 8ft
	Reddish brown CLAY, trace fine sand, trace f-c gravel (wet) [TILL]	0.0	10	S-6	SS	6	9 15 50/1	50/1	S-6 at 10ft Refusal encountered at 11.0ft with auger. Install ENV monitoring well.
+600.0	? ? ? ? Bottom of boring at 11ft		11						



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Log of Boring **LB-203(OW)** Sheet 1 of 1

Project Project Fifi/Niagara,NY			Project No. 190071801		
Location Lockport Rd & Packard Rd			Elevation and Datum el +603.5 591 (NAVD88)		
Drilling Company SJB Services, Inc.			Date Started 12/14/21	Date Finished 12/14/21	
Drilling Equipment Track-mounted Diedrich d-50			Completion Depth 12 ft	Rock Depth 12 ft	
Size and Type of Bit 4-1/4 inch HSA			Number of Samples	Disturbed	Undisturbed -	Core
Casing Diameter (in) N/A	Casing Depth (ft) N/A		Water Level (ft.)	First ▽ 8.5	Completion ▼ N/A	24 HR. ▼
Casing Hammer N/A	Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan/Mike		
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			Field Engineer Katherine Asciutto		
Sampler Hammer Automatic	Weight (lbs) 140	Drop (in) 30			

MATERIAL SYMBOL	Elev. (ft)	Sample Description	Depth Scale	Sample Data Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+591.0	Dark brown CLAY, some silt, trace sand, trace roots (moist) [TOPSOIL]	0	S-1	SS	11			SPT sampling not compelted. S-1 at 0ft
	+590.0	Brown CLAY, trace sand (moist)	1						
		Light brown silty CLAY (moist)	2	S-2	SS	12			S-2 at 2ft
		Reddish brown silty CLAY (moist)	4	S-3	SS	24			Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
		Reddish brown silty CLAY (moist)	6	S-4	SS	24			S-4 at 6ft
		Reddish brown silty CLAY (wet) ▽	8	S-5	SS	24			Drill to 8.0ft. Easy drilling. Reddish brown clay moist cuttings. S-5 at 8ft Water encountered
		Reddish brown silty CLAY (wet)	10	S-6	SS	9			S-6 at 10ft
	+579.9	? ? ? ? Bottom of boring at 11.1ft	11						Auger refusal at 11.1 ft. Install ENV monitoring well.
			12						
			13						
			14						
			15						
			16						
			17						
			18						
			19						
			20						

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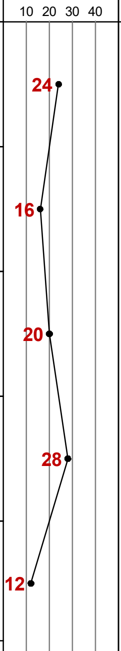
Log of Boring **LB-204(OW)** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 591 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started: 12/17/21	Date Finished: 12/17/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth: 10 ft	Rock Depth: 10 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed: 5 Undisturbed: - Core: -
Casing Diameter (in): N/A	Casing Depth (ft): N/A	Water Level (ft.)	First ▽ 8 Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A	Weight (lbs): N/A Drop (in): N/A	Drilling Foreman	Dan/Mike
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel		
Sampler Hammer: Automatic	Weight (lbs): 140 Drop (in): 30	Field Engineer	Katherine Asciutto

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
■	+591.0 +590.5	Dark black SAND, some ASPHALT pieces (dry)[ASPHALT]	2.3	0	S-1A	SS	12	20 15	24	S-1 at 0ft
▨		Dark brown to reddish brown CLAY, trace fine sand (moist)	0.0	1	S-1B			9 7		
▨		Light brown to reddish brown CLAY, trace fine sand (moist)	0.0	2 3	S-2	SS	12	4 7 9 8	16	S-2 at 2ft
▨		Reddish brown CLAY, trace fine sand, with grey sand lenses (moist)	0.0	4 5	S-3	SS	22	5 8 12 16	20	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
▨		Reddish brown CLAY, trace fine sand, with grey sand lenses (moist)	0.0	6 7	S-4	SS	24	9 13 15 17	28	S-4 at 6ft
▨		▽ Reddish brown CLAY, trace fine sand, with grey sand lenses (wet)	0.0	8 9	S-5	SS	22	4 5 7 50/5	12	S-5 at 8ft
	+581.0	Bottom of boring at 10.5ft		10 11						Auger and spoon refusal encountered at 10.0ft. Install ENV monitoring well.
				12						
				13						
				14						
				15						
				16						
				17						
				18						
				19						
				20						



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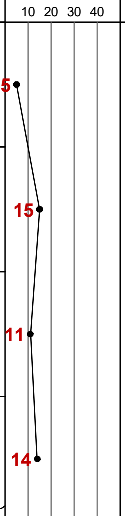
Log of Boring **LB-205** Sheet 1 of 1

Project	Project Fifi/Niagara,NY	Project No.	190071801
Location	Lockport Rd & Packard Rd	Elevation and Datum	el +603.5 594 (NAVD88)
Drilling Company	SJB Services, Inc.	Date Started	12/17/21
		Date Finished	12/17/21
Drilling Equipment	Track-mounted Diedrich d-50	Completion Depth	8 ft
		Rock Depth	8 ft
Size and Type of Bit	4-1/4 inch HSA	Number of Samples	Disturbed 4; Undisturbed -; Core -
Casing Diameter (in)	N/A	Water Level (ft.)	First ▽ 6; Completion ▼ N/A; 24 HR. ▼
Casing Depth (ft)	N/A	Drilling Foreman	Dan/Mike
Casing Hammer	N/A	Weight (lbs) N/A	Drop (in) N/A
Sampler	2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel	Field Engineer	Katherine Asciutto
Sampler Hammer	Automatic	Weight (lbs) 140	Drop (in) 30

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+594.0	Dark brown CLAY, trace fine sand (moist)[TOPSOIL]	0.0	0	S-1A	SS	14	1 2	5	S-1 at 0ft
+593.5	Reddish brown to brown CLAY (moist)		1	S-1B			3 3		
	Reddish brown to brown CLAY, trace fine sand (moist)	0.0	2	S-2	SS	13	4 6 9 9	15	S-2 at 2ft
	Reddish brown CLAY, trace fine sand, with light brown sand lenses (moist)	0.0	4	S-3	SS	24	5 5 6 8	11	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft
+588.0	▽ Reddish brown CLAY, trace fine sand, trace f-c gravel (wet) [TILL]	0.0	6	S-4	SS	12	8 8 6 50/3	14	S-4 at 6ft
+586.0	? ? ? ? Bottom of boring at 8.5ft		8						Auger and spoon refusal encountered at 7.8ft. Boring backfilled with auger cuttings to grade.



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Log of Boring **LB-206** Sheet 1 of 1

Project: Project Fifi/Niagara,NY
Project No.: 190071801
Location: Lockport Rd & Packard Rd
Elevation and Datum: el +603.5 597 (NAVD88)
Drilling Company: SJB Services, Inc.
Date Started: 12/17/21
Date Finished: 12/17/21
Drilling Equipment: Track-mounted Diedrich d-50
Completion Depth: 4.4 ft
Rock Depth: 4.4 ft
Size and Type of Bit: 4-1/4 inch HSA
Number of Samples: Disturbed 3 Undisturbed - Core -
Casing Diameter (in): N/A
Casing Depth (ft): N/A
Water Level (ft.): First ∇ 4 Completion ▼ N/A 24 HR. ▼
Casing Hammer: N/A Weight (lbs): N/A Drop (in): N/A
Drilling Foreman: Dan/Mike
Sampler: 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel
Sampler Hammer: Automatic Weight (lbs): 140 Drop (in): 30
Field Engineer: Katherine Asciutto

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+597.0									
░		Dark brown to reddish brown CLAY, trace fine sand, trace roots (moist) [TOPSOIL]	0.0	0	S-1	SS	8	1 3 3 4	6	S-1 at 0ft
▨	+595.0	Reddish brown CLAY, trace fine sand, with light brown fine sand lenses (moist)	0.0	2	S-2	SS	12	2 5 8 8	13	S-2 at 2ft
	+592.8	No Recovery ∇		4	S-3	SS	0	50/2	50/2	Drill to 4.0ft. Easy drilling. Reddish brown clay moist cuttings. S-3 at 4ft Auger and spoon refusal encountered at 4.2ft. Boring backfiled with auger cuttings to grade.
		Bottom of boring at 4.2ft								

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

LANGAN

Log of Boring **LB-207(OW)** Sheet 1 of 1

Project Project Fifi/Niagara,NY		Project No. 190071801	
Location Lockport Rd & Packard Rd		Elevation and Datum el +603.5 600 (NAVD88)	
Drilling Company SJB Services, Inc.		Date Started 12/17/21	Date Finished 12/17/21
Drilling Equipment Track-mounted Diedrich d-50		Completion Depth 6 ft	Rock Depth 6 ft
Size and Type of Bit 4-1/4 inch HSA		Number of Samples	Disturbed 3 / Undisturbed - / Core -
Casing Diameter (in) N/A	Casing Depth (ft) N/A	Water Level (ft.)	First ▽ 7 / Completion ▼ N/A / 24 HR. ▼
Casing Hammer N/A / Weight (lbs) N/A	Drop (in) N/A	Drilling Foreman Dan/Mike	
Sampler 2-inch-diameter split spoon; Shelby Tube; NQ Core Barrel			
Sampler Hammer Automatic / Weight (lbs) 140	Drop (in) 30	Field Engineer Katherine Asciutto	

Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
+600.0	Dark brown CLAY, trace fine sand (moist)[TOPSOIL]	0.0	0	S-1A	SS	8	1		S-1 at 0ft
599.5	Dark brown CLAY, trace fine sand, with brown to light brown sand lenses (moist)		1				5 7	12	
				S-1B			9		
	Dark brown CLAY, trace fine sand, with brown to light brown sand lenses (moist)	2.4	2	S-2	SS	13	4 6 10 11	16	S-2 at 2ft
	Dark brown CLAY (wet)	0.0	4	S-3	SS	14	3 2 2 50/5	4	Drill to 4.0ft. Easy drilling. Dark brown clay moist cuttings. S-3 at 4ft
594.1	Bottom of boring at 5.9ft		6						Auger and spoon refusal encountered at 6.0ft. Install ENV monitoring well.

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

N-Value scale: 10 20 30 40

APPENDIX C

GROUNDWATER OBSERVATION
WELL LOGS

WELL CONSTRUCTION SUMMARY

Well No. LB-03 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 604 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED**	12/1/2021 **DATE FINISHED** 12/1/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan S.
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Chris Steiding

METHOD OF INSTALLATION

Boring LB-03(OW) was advance to about 13.2ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 2ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings.

METHOD OF WELL DEVELOPMENT

N/A

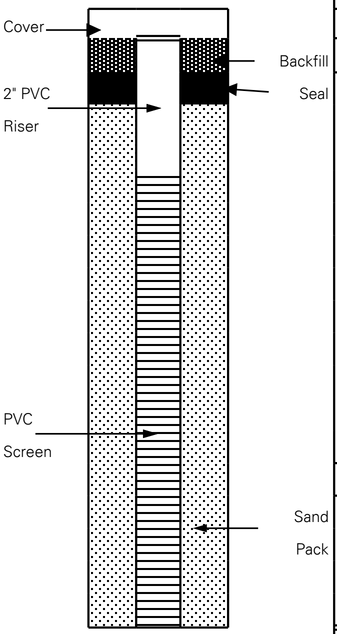
TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	DEPTH (ft)
TOP OF CASING	el. 607.2	-3.2
TOP OF BACKFILL	el. 604	0
TOP OF SEAL	el. 601	3
TOP OF FILTER	el. 599	5
TOP OF SCREEN	el. 597	7
BOTTOM OF BORING	el. 590.8	13.2

SCREEN LENGTH 5ft.

SLOT SIZE .1in.

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
Topsoil	0.3
Clay	8.0
Weathered Rock	8.2
Bedrock	13.2

GROUNDWATER ELEVATIONS

DATE	ELEVATION	DEPTH TO WATER (ft)
12/27/2021	600.60	3.40
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-08 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 603 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/2/2021	**DATE FINISHED** 12/3/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan S.
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Chris Steidling

METHOD OF INSTALLATION

Boring LB-08(OW) was advance to about 13.5ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 2ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings.

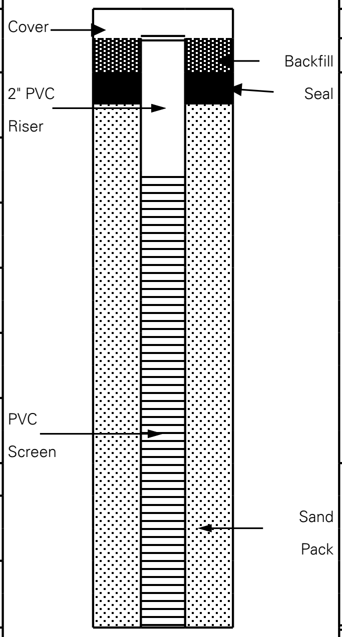
METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

TOP OF CASING	**ELEVATION**	**DEPTH (ft)**
el.	606.4	-3.4
TOP OF BACKFILL	**ELEVATION**	**DEPTH (ft)**
el.	603	0
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)**
el.	598.5	4.5
TOP OF FILTER	**ELEVATION**	**DEPTH (ft)**
el.	596.5	6.5
TOP OF SCREEN	**ELEVATION**	**DEPTH (ft)**
el.	594.5	8.5
BOTTOM OF BORING	**ELEVATION**	**DEPTH (ft)**
el.	589.5	13.5
SCREEN LENGTH	5ft.	
SLOT SIZE	.1in.	

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
Silt	0.5
Clay	8.5
Bedrock	13.5

GROUNDWATER ELEVATIONS

DATE	ELEVATION	DEPTH TO WATER (ft)
12/27/2021	597.10	5.90
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)
DATE	ELEVATION	DEPTH TO WATER (ft)

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-09 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 600.4 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/6/2021	**DATE FINISHED** 12/6/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan S.
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Natalie Mottl

METHOD OF INSTALLATION

Boring LB-09(OW) was advance to about 13.2ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings.

METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

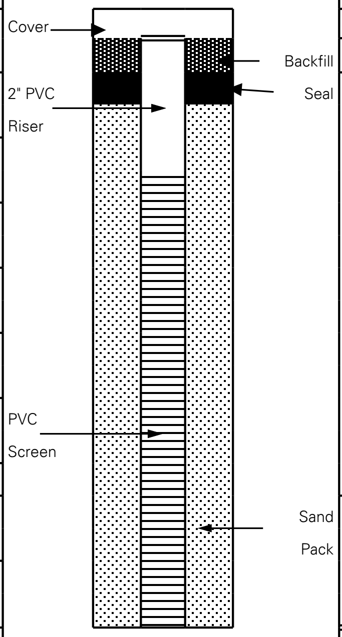
	ELEVATION	**DEPTH (ft)**
TOP OF CASING	el. 603.4	-3
TOP OF BACKFILL	el. 600.4	0
TOP OF SEAL	el. 596.4	4
TOP OF FILTER	el. 594.4	6
TOP OF SCREEN	el. 593.4	7
BOTTOM OF BORING	el. 587.2	13.2

SCREEN LENGTH	5ft.
SLOT SIZE	.1in.

GROUNDWATER ELEVATIONS

DATE	ELEVATION	DEPTH TO WATER (ft)
12/27/2021	597.80	2.60

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
Topsoil	0.3
Clay	
Bedrock	8.2 13.2

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-14 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 601.2 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/14/2021	**DATE FINISHED** 12/14/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-14(OW) was advance to about 14.4ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings.

METHOD OF WELL DEVELOPMENT

N/A

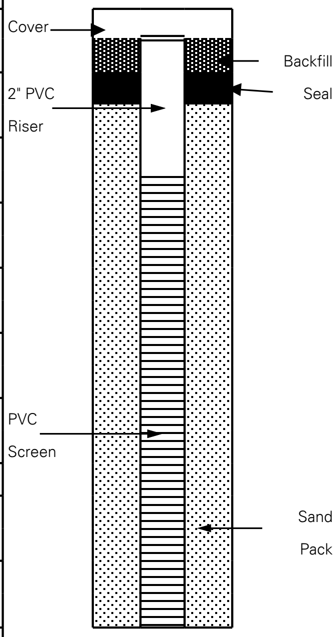
TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	**DEPTH (ft)**
TOP OF CASING	el. 604.4	-3.2
TOP OF BACKFILL	el. 601.2	0
TOP OF SEAL	el. 597.4	3.8
TOP OF FILTER	el. 595.4	5.8
TOP OF SCREEN	el. 594.4	6.8
BOTTOM OF BORING	el. 586.8	14.4

SCREEN LENGTH 5ft.

SLOT SIZE .1in.

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	**DEPTH (FT)**
Ground Surface	0.0
Silt	0.4
Clay	9.4
Bedrock	14.4

GROUNDWATER ELEVATIONS

DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
12/27/2021	599.10	2.10

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-113 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 602 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/14/2021	**DATE FINISHED** 12/14/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-113(OW) was advance to about 6.7ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 0.7 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed. A gaurd pipe was installed over the PVC stickup.

METHOD OF WELL DEVELOPMENT

N/A

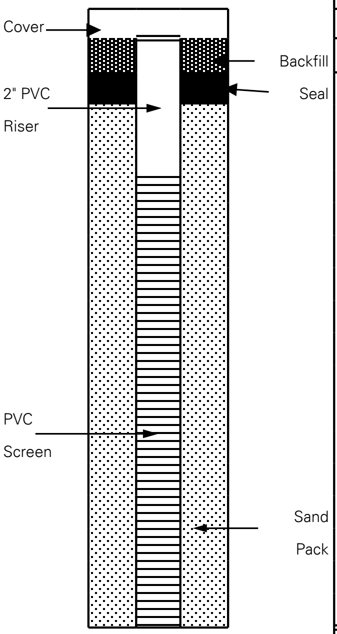
TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	DEPTH (ft)
TOP OF CASING	el. 605.2	-3.2
TOP OF BACKFILL	el. 602	0
TOP OF SEAL	el. 602	0
TOP OF FILTER	el. 601.3	0.7
TOP OF SCREEN	el. 600.3	1.7
BOTTOM OF BORING	el. 595.3	6.7

SCREEN LENGTH 5ft.

SLOT SIZE .1in.

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
Topsoil	0.4
Clay	6.7

GROUNDWATER ELEVATIONS

DATE	ELEVATION	DEPTH TO WATER (ft)
12/27/2021	597.70	4.30

LANGAN

WELL CONSTRUCTION SUMMARY
Well No. LB-126 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 601.5 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/16/2021	**DATE FINISHED** 12/16/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-126(OW) was advance to about 9.2ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings. A gaurd pipe was installed over the PVC stickup.

METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	**DEPTH (ft)**
TOP OF CASING	el. 604.7	-3.2
TOP OF BACKFILL	el. 601.5	0
TOP OF SEAL	el. 600.3	1.2
TOP OF FILTER	el. 598.3	3.2
TOP OF SCREEN	el. 597.3	4.2
BOTTOM OF BORING	el. 592.3	9.2

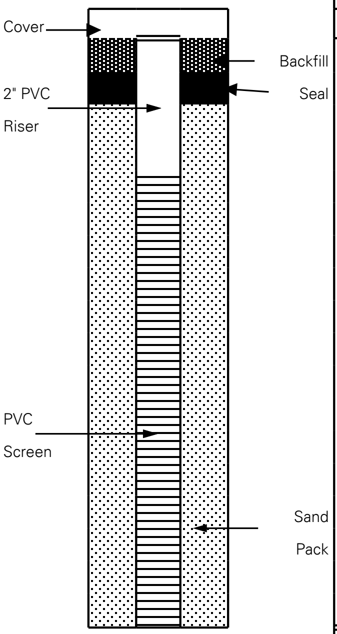
SCREEN LENGTH 5ft.

SLOT SIZE .1in.

GROUNDWATER ELEVATIONS

DATE	ELEVATION	DEPTH TO WATER (ft)
12/27/2021	600.10	1.40

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
Clay	9.2

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-127 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 601 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED**	12/15/2021 **DATE FINISHED** 12/15/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-127(OW) was advance to about 9.8ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings. A gaurd pipe was installed over the PVC stickup.

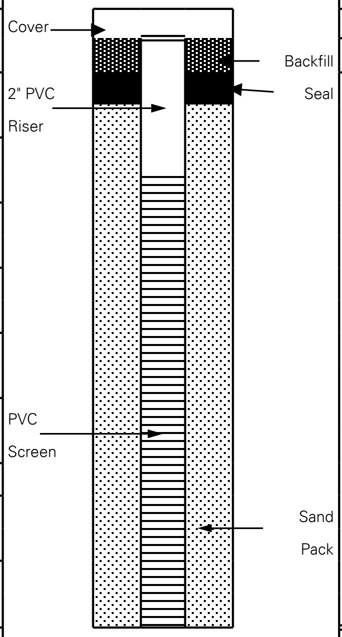
METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	**DEPTH (ft)**
TOP OF CASING	el. 604.1	-3.1
TOP OF BACKFILL	el. 601	0
TOP OF SEAL	el. 599.2	1.8
TOP OF FILTER	el. 597.2	3.8
TOP OF SCREEN	el. 596.2	4.8
BOTTOM OF BORING	el. 591.2	9.8
SCREEN LENGTH	5ft.	
SLOT SIZE	.1in.	

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	**DEPTH (FT)**
Ground Surface	0.0
Asphalt	0.4
Clay	9.8

GROUNDWATER ELEVATIONS

DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
12/27/2021	N/A	Dry
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**

LANGAN

WELL CONSTRUCTION SUMMARY
Well No. LB-129 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 598 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/15/2021	**DATE FINISHED** 12/15/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-129(OW) was advance to about 11.6ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings. A gaurd pipe was installed over the PVC stickup.

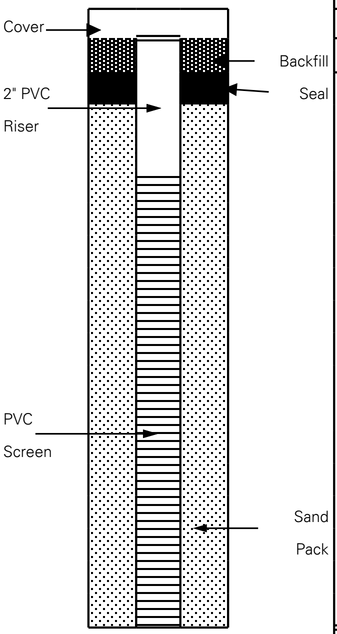
METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

TOP OF CASING	**ELEVATION**	**DEPTH (ft)**
el.	601.3	-3.3
TOP OF BACKFILL	**ELEVATION**	**DEPTH (ft)**
el.	598	0
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)**
el.	594.4	3.6
TOP OF FILTER	**ELEVATION**	**DEPTH (ft)**
el.	592.4	5.6
TOP OF SCREEN	**ELEVATION**	**DEPTH (ft)**
el.	591.4	6.6
BOTTOM OF BORING	**ELEVATION**	**DEPTH (ft)**
el.	586.4	11.6
SCREEN LENGTH	5ft.	
SLOT SIZE	.1in.	

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	**DEPTH (FT)**
Ground Surface	0.0
Topsoil	0.4
Clay	11.6
Bedrock	

GROUNDWATER ELEVATIONS

DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
12/27/2021	593.30	4.70
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**

LANGAN

WELL CONSTRUCTION SUMMARY
Well No. LB-201 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 612 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/16/2021	**DATE FINISHED** 12/16/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-201(OW) was advance to about 8ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed. A gaurd pipe was installed over the PVC stickup.

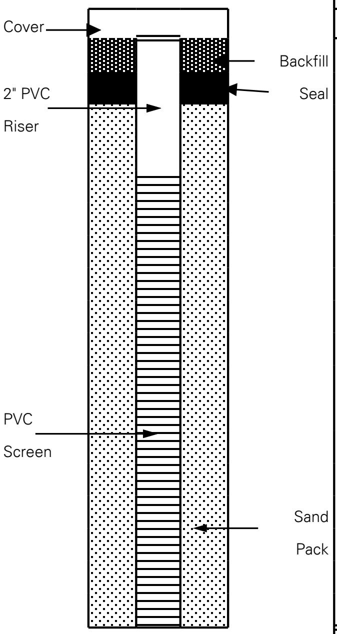
METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	**DEPTH (ft)**
TOP OF CASING	el. 615.3	-3.3
TOP OF BACKFILL	el. 612	0
TOP OF SEAL	el. 612	0
TOP OF FILTER	el. 611	1
TOP OF SCREEN	el. 609	3
BOTTOM OF BORING	el. 604	8
SCREEN LENGTH	5ft.	
SLOT SIZE	.1in.	

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	**DEPTH (FT)**
Ground Surface	0.0
Clay	8.0

GROUNDWATER ELEVATIONS

DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
12/27/2021	609.60	2.40
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-202 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 610 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/16/2021	**DATE FINISHED** 12/16/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-202(OW) was advance to about 11.1ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings. A gaurd pipe was installed over the PVC stickup.

METHOD OF WELL DEVELOPMENT

N/A

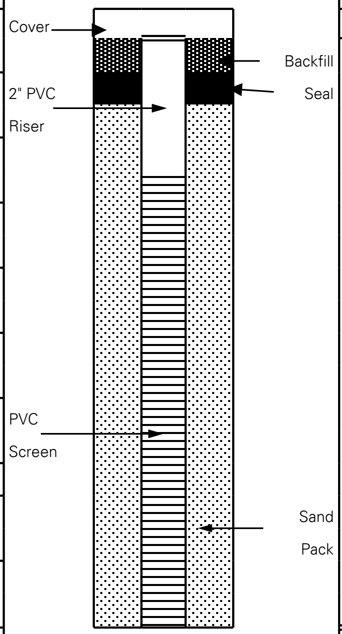
TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	**DEPTH (ft)**
TOP OF CASING	el. 612.7	-2.7
TOP OF BACKFILL	el. 610	0
TOP OF SEAL	el. 606.9	3.1
TOP OF FILTER	el. 604.9	5.1
TOP OF SCREEN	el. 603.9	6.1
BOTTOM OF BORING	el. 598.9	11.1

SCREEN LENGTH 5ft.

SLOT SIZE .1in.

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	**DEPTH (FT)**
Ground Surface	0.0
Clay	11.1

GROUNDWATER ELEVATIONS

DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
12/27/2021	607.50	2.50

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-203 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 591 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/14/2021	**DATE FINISHED** 12/14/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-203(OW) was advance to about 12ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings. A gaurd pipe was installed over the PVC stickup.

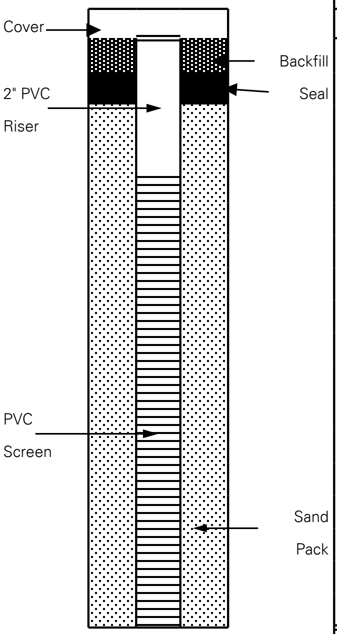
METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

	ELEVATION	DEPTH (ft)
TOP OF CASING	el. 593.7	-2.7
TOP OF BACKFILL	el. 591	0
TOP OF SEAL	el. 587	4
TOP OF FILTER	el. 585	6
TOP OF SCREEN	el. 584	7
BOTTOM OF BORING	el. 579	12
SCREEN LENGTH	5ft.	
SLOT SIZE	.1in.	

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
Clay	12.0

GROUNDWATER ELEVATIONS

DATE	ELEVATION	DEPTH TO WATER (ft)
12/27/2021	588.90	2.10

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-204 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 591.5 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/17/2021	**DATE FINISHED** 12/17/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-204(OW) was advance to about 9.9ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1ft above the screen as the augers were removed. A 2 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed and the remaining of the borehole was backfilled with auger cuttings. A gaurd pipe was installed over the PVC stickup.

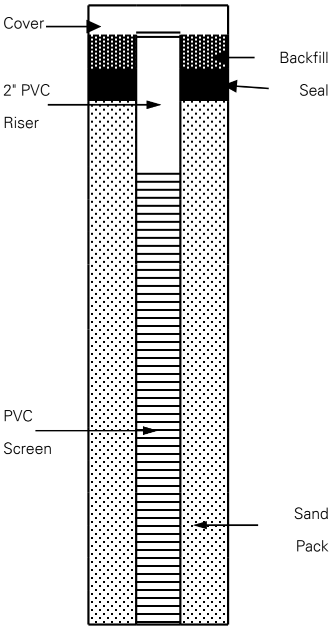
METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

TOP OF CASING	**ELEVATION**	**DEPTH (ft)**
el.	594.5	-3
TOP OF BACKFILL	**ELEVATION**	**DEPTH (ft)**
el.	591.5	0
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)**
el.	589.6	1.9
TOP OF FILTER	**ELEVATION**	**DEPTH (ft)**
el.	587.6	3.9
TOP OF SCREEN	**ELEVATION**	**DEPTH (ft)**
el.	586.6	4.9
BOTTOM OF BORING	**ELEVATION**	**DEPTH (ft)**
el.	581.6	9.9
SCREEN LENGTH	5ft.	
SLOT SIZE	.1in.	

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	DEPTH (FT)
Ground Surface	0.0
Asphalt	0.4
Clay	9.9

GROUNDWATER ELEVATIONS

DATE	ELEVATION	DEPTH TO WATER (ft)
12/27/2021	589.50	2.00
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
DATE	**ELEVATION**	**DEPTH TO WATER (ft)**

LANGAN

WELL CONSTRUCTION SUMMARY

Well No. LB-207 (OW)

PROJECT	Project Fifi/Niagara/NY	**PROJECT NO.**	190071801
LOCATION	Lockport Rd & Packard Rd	**ELEVATION AND DATUM**	Approx. 599 NAVD88
DRILLING AGENCY	SJB Services, Inc.	**DATE STARTED** 12/17/2021	**DATE FINISHED** 12/17/2021
DRILLING EQUIPMENT	Track-mounted Deidrich d-50	**DRILLER**	Dan/Mike
SIZE AND TYPE OF BIT	4in Hollow Stem Auger	**INSPECTOR**	Katherine Asciutto

METHOD OF INSTALLATION

Boring LB-207(OW) was advance to about 9.9ft with 4-1/4" HSA. The screen and riser for well was placed into the borehole. FilPro #2 sand was poured around the pipe to 1.25ft above the screen as the augers were removed. A 0.75 foot seal of 3/8" Bentonite Chips was placed. The rest of the augers were removed. A gaurd pipe was installed over the PVC stickup.

METHOD OF WELL DEVELOPMENT

N/A

TYPE OF CASING	PVC	**DIAMETER**	2in.	**TYPE OF BACKFILL MATERIAL**	Auger cuttings
TYPE OF SCREEN	PVC	**DIAMETER**	2in.	**TYPE OF SEAL MATERIAL**	3/8" Bentonite Chips
BOREHOLE DIAMETER	4-1/4"			**TYPE OF FILTER MATERIAL**	FilPro #2 sand

		ELEVATION	**DEPTH (ft)**
TOP OF CASING	el.	602.2	-3.2
TOP OF BACKFILL	el.	599	0
TOP OF SEAL	el.	599	0
TOP OF FILTER	el.	598.25	0.75
TOP OF SCREEN	el.	598.1	0.9
BOTTOM OF BORING	el.	593.1	5.9

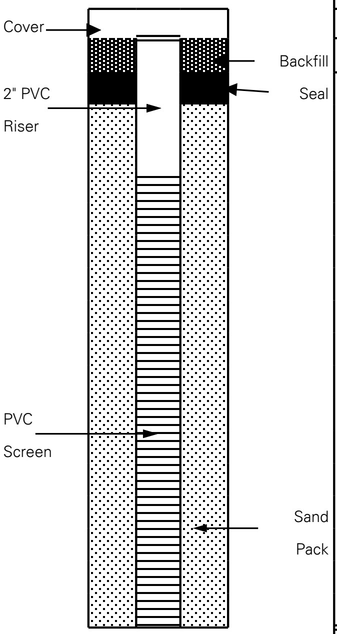
SCREEN LENGTH 5ft.

SLOT SIZE .1in.

GROUNDWATER ELEVATIONS

DATE	**ELEVATION**	**DEPTH TO WATER (ft)**
12/27/2021	593.60	5.40

WELL DETAILS



SUMMARY SOIL CLASSIFICATION	**DEPTH (FT)**
Ground Surface	0.0
Asphalt	0.3
Clay	5.9

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APPENDIX D

LANGAN TEST PIT LOGS

LOG OF TEST PIT TP-01

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021	
LOCATION Niagara Falls, NY	ELEVATION Approx 600 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 6 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl	

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+600.0	Dark brown fine sandy CLAY, trace silt, trace roots (wet) [TOPSOIL]	0			
	+599.0	Brown clayey fine SAND, granular structure (moist)	1			
	+598.5	Brown to reddish brown CLAY, trace fine sand, blocky structure (moist)	2			
	+597.0	Brown to reddish brown CLAY, trace fine sand, coarse light grey to yellowish brown mottling in thin sand layers, blocky structure (moist)	3 4 5			
	+594.0	? ? ? ? End of test pit at 6'-0"	6 7 8 9 10 11 12 13 14 15			Excavator refusal at 6'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

LANGAN

LOG OF TEST PIT TP-02

Sheet 1 of 1

PROJECT NAME: Niagara Warehouse
PROJECT NUMBER: 190071801
DATE: 11/18/2021
LOCATION: Niagara Falls, NY
ELEVATION: Approx 603 ft. (NAVD88)
EXCAVATION CONTRACTOR: Mark Cerrone, Inc.
DEPTH: 9.5 ft
WATER LEVEL - First: 8.5 ft ∇
WATER LEVEL - Completion: - ▼
EQUIPMENT: Komatsu 138 Excavator
FOREMAN: Doug
LANGAN PERSONNEL: Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
▒	+603.0	Dark brown CLAY, some medium to fine sand, trace roots, trace silt (wet) [TOPSOIL]	0 1			
▨	+601.8	Brown to reddish brown CLAY, some fine sand, gray sand lens, blocky structure (moist)	2 3 4 5 6			
▩	+596.0	Brown to reddish brown clayey coarse to fine SAND, some coarse to fine gravel, trace cobbles, granular structure (moist) [TILL] ∇	7 8 9			Groundwater encountered at 8'-6"
	+593.5	? ? ? ? End of test pit at 9'-6"	10 11 12 13 14 15			Excavator refusal at 9'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

LANGAN

LOG OF TEST PIT TP-03

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 604 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First N/E ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+604.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0 1			
	+602.8	Brown to reddish brown CLAY, some fine sand, gray sand lens, blocky structure (moist)	2 3 4 5			
	+598.5	Brown to reddish brown clayey coarse to fine SAND, some coarse to fine gravel, trace cobbles, granular structure (moist) [TILL]	6			
	+597.0	? ? ? ? End of test pit at 7'-0"	7 8 9 10 11 12 13 14 15			Excavator refusal at 7'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-04

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 604 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 10 ft	WATER LEVEL - First 9.5 ft ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+604.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
	+603.0	Brown to reddish brown CLAY, trace fine sand, blocky to platey structure (moist)	1			
			2			
			3			
			4			
			5			
			6			
			7			
	+596.0	Brown fine sandy CLAY, some fine gravel, trace cobbles, granular structure (moist) [TILL]	8			
			9			
		▽ Brown fine sandy CLAY, some fine gravel, trace cobbles, granular structure (wet) [TILL]				Groundwater encountered at 9'-6"
	+594.0	End of test pit at 10'-0"	10			Excavator refusal at 10'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
			11			
			12			
			13			
			14			
			15			

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LOG OF TEST PIT TP-05

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 601 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8 ft	WATER LEVEL - First 8 ft ∇ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+601.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
	+600.0	Brown to reddish brown CLAY, trace fine sand, blocky structure (moist)	1			
			2			
			3			
			4			
			5			
			6			
			7			
	+593.6	Brown to reddish brown CLAY, trace fine sand, trace coarse to fine gravel, trace cobbles, blocky structure (moist) [TILL] ∇				
	+593.0	? ? ? ?	8			Encountered groundwater at 8' Excavator refusal at 8'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
		End of test pit at 8'-0"				
			9			
			10			
			11			
			12			
			13			
			14			
			15			

LANGAN

LOG OF TEST PIT TP-06

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 603 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First 7 ft ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
⁙	+603.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
▨	+602.0	Brown to reddish brown CLAY, trace fine sand, trace roots, blocky structure (moist)	1 2 3 4			
▨	+598.5	Brown to reddish brown SAND, some clay, trace fine gravel, granular structure (moist) [TILL]	5 6			
	+596.0	? ? ? ? ▽ End of test pit at 7'-0"	7 8 9 10 11 12 13 14 15			Encountered groundwater at 7' Excavator refusal at 7'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-07

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 602 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9 ft	WATER LEVEL - First 9 ft ∇	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
░	+602.0	Brown fine sandy CLAY, trace silt, trace roots (wet) [TOPSOIL]	0 1			
▨	+600.5	Brown to reddish brown CLAY, some medium to fine sand, block structure (moist)	2 3 4 5 6 7			
▒	+594.5	Brown clayey coarse to fine SAND, trace coarse to fine gravel, granular structure (moist) [TILL]	8			
	+593.0	? ? ? ? ∇ End of test pit at 9'-0"	9 10 11 12 13 14 15			Encountered groundwater at 9' Excavator refusal at 9'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

LANGAN

LOG OF TEST PIT TP-08

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 602 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9.5 ft	WATER LEVEL - First 9.5 ft ∇ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+602.0	Brown medium to fine clayey SAND, trace silt, trace roots (wet) [TOPSOIL]	0			
	+600.5	Brown to reddish brown CLAY, trace fine sand, blocky to platey structure (moist)	1.5			
	+595.5	Brown medium to fine SAND, some clay, trace fine gravel, granular structure (moist) [TILL]	6.5			
	+592.5	? ? ? ? ∇ End of test pit at 9'-6"	9.5			Encountered groundwater at 9'-6" Excavator refusal at 9'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

LANGAN

LOG OF TEST PIT TP-09

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 599 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7.5 ft	WATER LEVEL - First 6.5 ft ▽ WATER LEVEL - Completion 7.5 ft ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+599.0	Brown clayey fine SAND, trace silt, trace roots (wet) [TOPSOIL]	0 1			
	+597.8	Brown to reddish brown CLAY, trace fine sand, blocky to platy structure (moist)	2 3 4 5			
	+593.0	Reddish brown clayey fine SAND, trace coarse to fine gravel (wet) [TILL] ▽	6 7			Perched groundwater encountered at 6-6"
	+591.5	? ? ? ? ▼ End of test pit at 7'-6"	8 9 10 11 12 13 14 15			Encountered groundwater at 7'-6" Excavator refusal at 7'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

LOG OF TEST PIT TP-10

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/18/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 599 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8 ft	WATER LEVEL - First 5.0 ft ▽ WATER LEVEL - Completion 8 ft ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+599.0	Brown fine sandy CLAY, trace roots (wet) [TOPSOIL]	0			
	+597.8	Brown to reddish brown CLAY, some fine sand, blocky structure (moist)		S-1	BAG	
	+594.0	▽ Reddish brown fine sandy CLAY, trace coarse to fine gravel, blocky to granular structure (wet) [TILL]	5	S-2	BAG	Perched groundwater encountered at 5'-0"
	+591.0	▼ End of test pit at 8'-0"	8			Encountered groundwater at 8' Excavator refusal at 8'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
			15			

LANGAN

LOG OF TEST PIT TP-11

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 601 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8.5 ft	WATER LEVEL - First N/E ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+601.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
	+600.0	Brown to reddish brown CLAY, some fine sand, blocky structure (moist)	1			
			2			
			3			
			4			
	+596.0	Reddish brown clayey medium to fine SAND, trace coarse to fine gravel, trace cobbles, granular structure (moist) [TILL]	5			
			6			
			7			
			8			
	+592.5	? ? ? ? End of test pit at 8'-6"	9			Excavator refusal at 8'-6" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
			10			
			11			
			12			
			13			
			14			
			15			

LANGAN

LOG OF TEST PIT TP-12

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 604 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9.5 ft	WATER LEVEL - First 9.5 ft ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+604.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
	+603.2	Brown to reddish brown CLAY, trace fine sand, blocky structure (moist)	1 2 3 4			
	+599.5	Brown to reddish brown to gray CLAY, trace fine sand, blocky structure, yellow coarse mottling on the gray clay lenses (moist)	5			
	+598.0	Brown clayey fine SAND, trace coarse to fine gravel, trace cobbles (moist) [TILL]	6 7 8 9			
	+594.5	? ? ? ? ▽ End of test pit at 9'-6"	10 11 12 13 14 15			Groundwater encountered at 9'-6" Excavator refusal at 9'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-13

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 610 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8 ft	WATER LEVEL - First N/E ▽
		WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+610.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
	+608.8	Brown to reddish brown CLAY, some fine sand, blocky to granular structure (moist)	1 2 3 4			
	+605.0	Brown clayey medium to fine SAND, trace coarse to fine gravel, trace cobbles, granular structure (moist) [TILL]	5 6 7			
	+602.0	? ? ? ? End of test pit at 8'-0"	8 9 10 11 12 13 14 15			Excavator refusal at 8'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-14

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/19/2021	
LOCATION Niagara Falls, NY	ELEVATION Approx 608 ft. (NAVD88)			
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8.5 ft	WATER LEVEL - First N/E ▽		WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl	

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+608.0	Brown fine sandy CLAY, trace silt, trace roots (moist) [TOPSOIL]	0			
	+606.7	Brown to reddish brown CLAY, trace fine sand, blocky structure (moist)				
	+601.0	Brown clayey medium to fine SAND, trace coarse to fine gravel (moist) [TILL]				
	+599.5	? ? ? ? End of test pit at 8'-6"				Excavator refusal at 8'-6" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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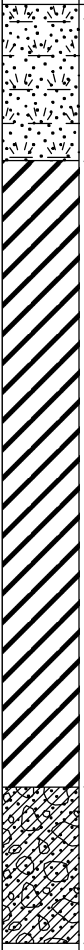
LOG OF TEST PIT TP-15

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 611 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9 ft	WATER LEVEL - First 9 ft ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl



ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
+611.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
+609.5	Brown to reddish brown to gray CLAY, trace fine sand, blocky structure (moist)				
+603.5	Brown clayey medium to fine SAND, trace coarse to fine gravel, granular structure (moist) [TILL]				
+602.0	? ? ? ? ▽ End of test pit at 9'-0"	9			Encountered groundwater at 9'-0" Excavator refusal at 9'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
		15			

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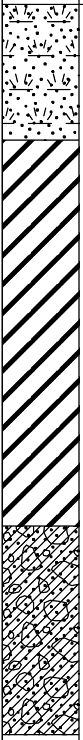
LOG OF TEST PIT TP-16

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 613 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First 7 ft ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl



Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	 Type	REMARKS
	+613.0	Brown fine sandy CLAY, trace silt, trace roots (moist) [TOPSOIL]	0 1			
	+611.7	Brown to reddish brown CLAY, trace fine sand, thin gray clay lenses with coarse yellowing mottling, blocky structure (moist)	2 3 4			
	+608.0	Brown clayey fine SAND, trace coarse to fine gravel, granular to blocky structure (moist) [TILL]	5 6			
	+606.0	? ? ? ? ▽ End of test pit at 7'-0"	7 8 9 10 11 12 13 14 15			Encountered groundwater at 7'-0" Excavator refusal at 7'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-17

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 606 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
▨	+606.0	Brown clayey fine SAND, trace silt, trace roots (moist) [TOPSOIL]	0 1			
▨	+604.5	Brown to reddish brown CLAY, trace fine sand, thin gray clay lenses with coarse yellow mottling, blocky structure (moist)	2 3 4 5			
▨	+600.0	Reddish brown clayey medium to fine SAND, trace coarse to fine gravel, trace cobbles (moist) [TILL]	6			
	+599.0	? ? ? ? End of test pit at 7'-0"	7 8 9 10 11 12 13 14 15			Excavator refusal at 7'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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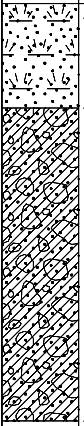
LOG OF TEST PIT TP-18

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 600 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 4 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl



Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+600.0	Brown clayey fine SAND, trace silt, trace roots (moist) [TOPSOIL]	0	S-1	BAG	
	+599.0	Brown to reddish brown clayey coarse to fine SAND, some coarse to fine gravel, trace cobbles, granular structure (moist) [TILL]	1			
			2			
			3	S-2	BAG	
	+596.0	? ? ? ? End of test pit at 4'-0"	4			Excavator refusal at 4'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
			5			
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			

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LOG OF TEST PIT TP-19

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 593 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 11 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+593.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
	+592.0	Brown to reddish brown CLAY, trace fine sand, blocky structure (moist)	1 2 3 4	S-1	BAG	
	+588.5	Reddish brown to gray CLAY, trace fine sand, thin gray clay lenses with coarse yellow mottling, platey to blocky structure (moist)	5 6 7 8 9	S-2	BAG	
	+583.0	Reddish brown SAND, some clay, trace fine gravel, granular structure (moist) [TILL]	10			
	+582.0	? ? ? ? End of test pit at 11'-0"	11 12 13 14 15			Excavator refusal at 11'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-20

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 596 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8.5 ft	WATER LEVEL - First N/E ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
░	+596.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0 1			
▨	+594.7	Brown to reddish brown to gray CLAY, trace medium to fine sand, blocky structure (moist)	2			
▨	+593.0	Reddish brown to gray CLAY, trace fine sand, thin gray clay lenses with coarse yellow mottling, platey structure (moist)	3 4 5 6 7 8			
	+587.5	? ? ? ? End of test pit at 8'-6"	9 10 11 12 13 14 15			Excavator refusal at 8'-6" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-21

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 11/19/2021	
LOCATION Niagara Falls, NY	ELEVATION Approx 597 ft. (NAVD88)			
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9 ft		WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl	

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
⁙	+597.0	Brown fine sandy CLAY, trace silt, trace roots (moist) [TOPSOIL]	0			
▨	+595.0	Brown to reddish brown to gray CLAY, some fine sand, coarse yellow mottling on gray clay lenses, blocky structure (moist)	2			
▩	+589.5	Reddish brown clayey medium to fine SAND, trace fine gravel, granular structure (moist) [TILL]				
	+588.0	? ? ? ? End of test pit at 9'-0"	9			Excavator refusal at 9'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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LOG OF TEST PIT TP-22

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 11/19/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 595 ft. (NAVD88)	

EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9.5 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl	

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+595.0	Brown fine sandy CLAY, trace roots, trace silt (moist) [TOPSOIL]	0			
	+594.0	Brown to reddish brown to gray CLAY, trace fine sand, coarse yellow mottling on gray clay lenses, blocky to platey structure (moist)	1 2 3 4 5 6			
	+588.0	Reddish brown coarse to fine SAND, some clay, trace coarse to fine gravel, trace cobbles, granular structure (moist) [TILL]	7 8 9			
	+585.5	? ? ? ? End of test pit at 9'-6"	10 11 12 13 14 15			Excavator refusal at 9'-6" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-23

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 610 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First N/E ▽
		WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+610.0	Dark brown fine sandy SILT, trace clay (moist) [TOPSOIL]	0			
	+609.0	Reddish brown CLAY, thin gray to tan fine sand lenses (moist)	1			
			2			
			3			
			4			
			5			
	+604.5	Reddish brown medium to fine SAND, some clay, trace fine gravel (moist) [TILL]				
			6			
	+603.0	? ? ? ? End of test pit at 7'-0"	7			Excavator refusal at 7'-0" - assumed top of rock No groundwater encountered. Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade.
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			

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LOG OF TEST PIT TP-24

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 612 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First 6.8 ft ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+612.0	Dark brown SILT, trace fine sand (moist) [TOPSOIL]	0			
	+610.8	Reddish brown to gray CLAY, some fine sand (moist)	1			
	+608.0	Reddish brown medium to fine SAND, some clay, trace fine gravel (moist) [TILL]	4			
		▽				Groundwater encountered at 6'-9"
	+605.0	? ? ? ?	7			Excavator refusal at 7'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
		End of test pit at 7'-0"	15			

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

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LOG OF TEST PIT TP-25

Sheet 1 of 1

PROJECT NAME: Niagara Warehouse
PROJECT NUMBER: 190071801
DATE: 12/15/2021
LOCATION: Niagara Falls, NY
ELEVATION: Approx 605 ft. (NAVD88)
EXCAVATION CONTRACTOR: Mark Cerrone, Inc.
DEPTH: 9 ft
WATER LEVEL - First: N/E ▽
WATER LEVEL - Completion: - ▼
EQUIPMENT: Komatsu 138 Excavator
FOREMAN: Doug
LANGAN PERSONNEL: Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
	+605.0	Dark brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0			
	+604.2	Reddish brown CLAY, trace fine sand (moist)	1			
			2			
			3			
			4			
			5			
	+599.0	Reddish brown to brown medium to fine SAND, trace clay, trace coarse to fine gravel (moist) [TILL]	6			
			7			
			8			
	+596.0	? ? ? ? End of test pit at 9'-0"	9			Excavator refusal at 9'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
			10			
			11			
			12			
			13			
			14			
			15			

LOG OF TEST PIT TP-26

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 602 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8 ft	WATER LEVEL - First 7.8 ft ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
▨	+602.0	Dark brown fine sandy SILT, trace roots (moist) [TOPSOIL]	0			
▨	+601.0	Reddish brown CLAY, trace fine sand (moist)	1			
▨	+597.0	Reddish brown medium to fine SAND, trace clay, trace coarse to fine gravel (moist) [TILL] ▽	5			Groundwater encountered at 7'-9"
	+594.0	? ? ? ? End of test pit at 8'-0"	8			Excavator refusal at 8'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

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LOG OF TEST PIT TP-27

Sheet 1 of 1

PROJECT NAME: Niagara Warehouse
PROJECT NUMBER: 190071801
DATE: 12/14/2021
LOCATION: Niagara Falls, NY
ELEVATION: Approx 606 ft. (NAVD88)
EXCAVATION CONTRACTOR: Mark Cerrone, Inc.
DEPTH: 5.5 ft
WATER LEVEL - First: N/E ▽
WATER LEVEL - Completion: - ▼
EQUIPMENT: Komatsu 138 Excavator
FOREMAN: Doug
LANGAN PERSONNEL: Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
⁘	+606.0	Brown to dark brown SILT, some fine sand, trace roots (moist) [TOPSOIL]	0 1			
▨	+604.7	Reddish brown CLAY, trace fine sand, thin gray to tan fine sand lenses (moist)	2 3 4			
▩	+601.0	Reddish brown to brown medium to fine SAND, trace clay, trace fine gravel (moist) [TILL]	5			
	+600.5	End of test pit at 5'-6"	6 7 8 9 10 11 12 13 14 15			Excavator refusal at 5'-6" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-28

Sheet 1 of 1

PROJECT NAME Niagara Warehouse		PROJECT NUMBER 190071801		DATE 12/14/2021
LOCATION Niagara Falls, NY		ELEVATION Approx 603 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.		DEPTH 9 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator		FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
▨	+603.0	Dark brown SILT, some medium to fine sand, trace roots (moist) [TOPSOIL]	0			
▨	+602.0	Reddish brown CLAY, some fine sand (moist)	1			
▨	+597.0	Reddish brown to gray medium to fine SAND, some clay, trace coarse to fine gravel, trace cobbles (moist) [TILL]	6			
	+594.0	? ? ? ? End of test pit at 9'-0"	9			Excavator refusal at 9'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

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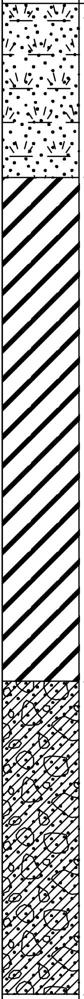
LOG OF TEST PIT TP-29

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 600 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9.5 ft	WATER LEVEL - First N/E ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl



Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+600.0	Dark brown to brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0 1			
	+598.3	Reddish brown CLAY, trace fine sand, thingray to tan fine sand lenses (moist)	2 3 4 5 6			
	+593.5	Reddish brown to brown medium to fine SAND, trace clay, trace coarse to fine gravel (moist) [TILL]	7 8 9			
	+590.5	? ? ? ? End of test pit at 9'-6"	10 11 12 13 14 15			Excavator refusal at 9'-6" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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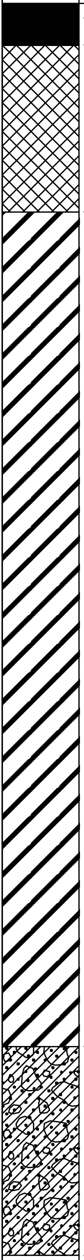
LOG OF TEST PIT TP-30

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/14/2021	
LOCATION Niagara Falls, NY	ELEVATION Approx 596 ft. (NAVD88)			
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 12 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼	
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl	



ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
+596.0	Black coarse to medium SAND, some fine gravel (moist)	0			
+595.6	[ASPHALT]				
	Gray to brown medium to fine SAND, trace fine gravel, trace silt (moist) [FILL]	1			
+594.0	Reddish brown to gray CLAY, trace fine sand, thin gray fine sand lenses with yellow mottling (moist)	2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
+586.0	Reddish brown to brown medium to fine SAND, trace fine gravel, trace clay (moist) [TILL]	10			
		11			
+584.0	? ? ? ?	12			Excavator refusal at 12'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
	End of test pit at 12'-0"	13			
		14			
		15			

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LOG OF TEST PIT TP-31

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 597 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9.25 ft	WATER LEVEL - First 7.5 ft ∇	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+597.0	Dark gray to dark brown coarse to fine SAND, some silt, some roots,l trace fine gravel (moist) [TOPSOIL]	0			
	+595.2	Reddish brown CLAY, thing gray to tan fine sand lenses (moist)	2			
	+589.5	∇ Reddish brown medium to fine SAND, trace clay, trace fine gravel (wet) [TILL]	8			Groundwater encountered at 7'-6"
	+587.8	? ? ? ? End of test pit at 9'-3"	10			Excavator refusal at 9'-3" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

LANGAN

LOG OF TEST PIT TP-32

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 595 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 10 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+595.0	Dark brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0			
	+593.5	Reddish brown to gray CLAY, thin gray to tan fine sand lenses (moist)				
	+585.0	? ? ? ?	10			Excavator refusal at 10'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
		End of test pit at 10'-0"				

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

LANGAN

LOG OF TEST PIT TP-33

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 599 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 6.5 ft	WATER LEVEL - First 1 ft ∇
		WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
■	+599.0	Black coarse to fine GRAVEL, trace coarse to medium sand (moist) [ASPHALT]	0			
▩	+598.7	Brown to black clayey medium to fine SAND, trace fine gravel (moist) [FILL] ∇	1			Perched groundwater encountered in a thin layer of fine gravel on south wall of test pit at 1'-0"
▨	+597.0	Reddish brown CLAY, trace fine sand (moist)	2 3 4 5 6			
	+592.5	? ? ? ? End of test pit at 6'-6"	7 8 9 10 11 12 13 14 15			Excavator refusal at 6'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-34

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 598 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8.5 ft	WATER LEVEL - First N/E ∇ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE		REMARKS
				Number	Type	
▒	+598.0	Dark brown SILT, some medium to fine sand, some roots (moist) [TOPSOIL]	0 1			
▨	+596.0	Reddish brown CLAY (moist)	2 3 4 5			
▩	+592.5	Reddish brown to brown medium to fine SAND, trace fine gravel, trace clay (moist) [TILL]	6 7 8			
	+589.5	? ? ? ? End of test pit at 8'-6"	9 10 11 12 13 14 15			Excavator refusal at 8'-6" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-35

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/15/2021	
LOCATION Niagara Falls, NY	ELEVATION Approx 606 ft. (NAVD88)			
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First N/E ▽		WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl	

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+606.0	Dark brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0			
	+605.3	Reddish brown CLAY, trace fine sand (moist)				
	+601.5	Reddish brown to brown medium to fine SAND, trace clay, trace fine gravel (moist) [TILL]				
	+599.0	? ? ? ? End of test pit at 7'-0"	7			Excavator refusal at 7'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

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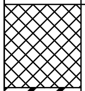
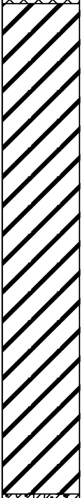
LOG OF TEST PIT TP-36

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 602 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9.5 ft	WATER LEVEL - First 9.5 ft ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+602.0	Black to dark gray medium to fine SAND, trace roots, trace fine gravel (moist) [FILL]	0			
	+601.2	Reddish brown to gray CLAY, thin gray fine sand lenses (moist)	1 2 3 4 5			
	+596.5	Reddish brown to brown medium to fine SAND, some clay, trace fine gravel, boulder (moist) [TILL]	6 7 8 9			
	+592.5	? ? ? ? ▽ End of test pit at 9'-6"	10 11 12 13 14 15			Groundwater encountered at 9'-6" Excavator refusal at 9'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-37

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 602 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 10 ft	WATER LEVEL - First 9.5 ft ∇ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
▨	+602.0	Black to dark gray medium to fine SAND, trace roots, trace fine gravel (moist) [FILL]	0			
▨	+601.2	Reddish brown CLAY (moist)	1 2 3 4 5 6 7			
▨	+594.0	Reddish brown to brown medium to fine SAND, some clay, trace coarse to fine gravel (moist) [TILL] ∇	8 9			Groundwater encountered at 9'-6"
	+592.0	? ? ? ? End of test pit at 10'-0"	10 11 12 13 14 15			Excavator refusal at 10'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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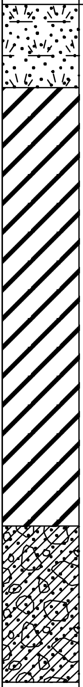
LOG OF TEST PIT TP-38

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 605 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 6.5 ft	WATER LEVEL - First 6 ft ∇	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl



Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+605.0	Dark brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0			
	+604.2	Reddish brown to gray CLAY, trace fine sand (moist)	1 2 3 4			
	+600.0	Reddish brown to brown medium to fine SAND, trace clay, trace fine gravel (moist) [TILL] ∇	5 6			Groundwater encountered at 6'
	+598.5	? ? ? ? End of test pit at 6'-6"	7 8 9 10 11 12 13 14 15			Excavator refusal at 6'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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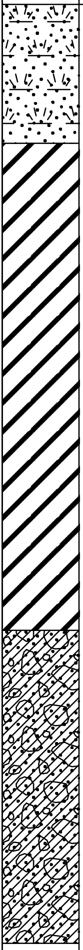
LOG OF TEST PIT TP-39

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 607 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9 ft	WATER LEVEL - First N/E ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl



Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+607.0	Dark brown SILT, trace roots, trace fine sand (moist) [TOPSOIL]	0			
	+605.7	Reddish brown CLAY, trace medium to fine sand, thin gray fine sand and clay lenses (moist)				
	+601.0	Reddish brown to brown medium to fine SAND, some clay, trace coarse to fine gravel (moist) [TILL]				
	+598.0	? ? ? ? End of test pit at 9'-0"	9			Excavator refusal at 9'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

Depth Scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

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LOG OF TEST PIT TP-40

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 604 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8 ft	WATER LEVEL - First 7 ft ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+604.0	Dark brown SILT, trace roots (moist) [TOPSOIL]	0 1			
	+602.8	Reddish brown CLAY, trace fine sand, thin gray fine sand lenses	2 3 4 5 6			
	+597.0	▽ Reddish brown medium to fine SAND, trace coarse to fine gravel, trace clay (wet) [TILL]	7			Groundwater encountered at 7'-0"
	+596.0	? ? ? ? End of test pit at 8'-0"	8 9 10 11 12 13 14 15			Excavator refusal at 8'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-41

Sheet 1 of 1

PROJECT NAME Niagara Warehouse		PROJECT NUMBER 190071801		DATE 12/15/2021
LOCATION Niagara Falls, NY		ELEVATION Approx 603 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.		DEPTH 8.5 ft	WATER LEVEL - First 8 ft ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator		FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+603.0	Dark brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0			
	+601.7	Reddish brown to gray CLAY, trace fine sand (moist)	1 2 3			
	+599.0	Reddish brown to brown medium to fine SAND, some coarse to fine gravel, trace clay, trace cobbles (moist) [TILL]	4 5 6 7 8 ▽			Groundwater encountered at 8'
	+594.5	? ? ? ? End of test pit 8'-6"	9 10 11 12 13 14 15			Excavator refusal at 8'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-42

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 604 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First 6.5 ft ∇ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
░	+604.0	Dark brown SILT, some medium to fine sand, trace roots (moist) [TOPSOIL]	0			
▨	+603.2	Reddish brown CLAY, thin gray sand and clay lenses (moist)	1 2 3 4 5			
▩	+598.5	Reddish brown to brown medium to fine SAND, some clay, trace fine gravel (wet) [TILL] ∇	6			Groundwater encountered at 6'-6"
	+597.0	?—?—?—? End of test pit at 7'-0"	7 8 9 10 11 12 13 14 15			Excavator refusal at 7'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-43

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 601 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8 ft	WATER LEVEL - First N/E ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
▨	+601.0	Dark brown SILT, trace sand, trace roots (moist) [TOPSOIL]	0			
▨	+600.3	Reddish brown CLAY, trace fine sand (moist)				
			1			
			2			
			3			
			4			
			5			
▨	+595.0	Reddish brown medium to fine SAND, some clay, trace fine gravel (moist) [TILL]	6			
			7			
	+593.0	? ? ? ?	8			Excavator refusal at 8'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
		End of test pit at 8'-0"				
			9			
			10			
			11			
			12			
			13			
			14			
			15			

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LOG OF TEST PIT TP-44

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 598 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9.5 ft	WATER LEVEL - First N/E ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+598.0	Dark brown SILT, trace fine sand, trace roots (moist) [TOPSOIL]	0			
	+596.8	Reddish brown CLAY, trace fine sand (moist)	1 2 3			
	+594.5	Reddish brown to gray medium to fine SAND, some coarse to fine gravel, trace clay (moist) [TILL]	4 5 6 7 8 9			
	+588.5	? ? ? ? End of test pit at 9'-6"	10 11 12 13 14 15			Excavator refusal at 9'-6" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-45

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 611 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8 ft	WATER LEVEL - First N/E ▽
		WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
⁘	+611.0	Dark brown SILT, some medium to fine sand, trace roots (moist) [TOPSOIL]	0 1			
▨	+609.8	Gray to reddish brown CLAY, some fine sand, thin gray to tan sand lenses (moist)	2 3 4			
▩	+606.0	Reddish brown medium to fine SAND, some clay, trace fine gravl (moist) [TILL]	5 6 7			
	+603.0	? ? ? ? End of test pit at 8'-0"	8 9 10 11 12 13 14 15			Excavator refusal at 8'-0" - assumed top of rock No groundwater encountered Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-46

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/14/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 600 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 8.5 ft	WATER LEVEL - First 7.5 ft ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
■	+600.0	Black coarse to fine gravel, trace coarse to medium sand (moist) [ASPHALT]	0			
▩	+599.7	Gray to brown coarse to fine SAND, some fine gravel (wet) [FILL]	1			
▨	+598.7	Reddish brown CLAY, thin gray fine sand lenses with yellow mottling (moist)	2 3 4 5 6 7			
▦	+592.5	▽ Reddish brown clayey coarse to fine SAND (moist to wet) [TILL]	8			Groundwater encountered at 7.5'
	+591.5	? ? ? ? End of test pit at 8'-6"	9 10 11 12 13 14 15			Excavator refusal at 8'-6" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade

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LOG OF TEST PIT TP-47

Sheet 1 of 1

PROJECT NAME: Niagara Warehouse
PROJECT NUMBER: 190071801
DATE: 12/15/2021
LOCATION: Niagara Falls, NY
ELEVATION: Approx 602 ft. (NAVD88)
EXCAVATION CONTRACTOR: Mark Cerrone, Inc.
DEPTH: 10 ft
WATER LEVEL - First: 9.5 ft ∇
WATER LEVEL - Completion: - ▼
EQUIPMENT: Komatsu 138 Excavator
FOREMAN: Doug
LANGAN PERSONNEL: Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
▨	+602.0	Dark brown medium to fine sandy SILT, trace roots (moist) [TOPSOIL]	0			
▨	+599.0	Reddish brown CLAY (moist)	3			
▨	+594.0	Reddish brown medium to fine SAND, trace fine gravel, trace clay (wet) [TILL] ∇	8			Groundwater encountered at 9'-6"
	+592.0	?—?—?—?	10			Excavator refusal at 10'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
		End of test pit at 10'-0"				

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LOG OF TEST PIT TP-48

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801	DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 603 ft. (NAVD88)	
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 7 ft	WATER LEVEL - First 6.5 ft ▽ WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug	LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+603.0	Dark brown SILT, some fine sand, trace roots (moist) [TOPSOIL]	0			
	+602.2	Reddish brown CLAY, thin gray sand lenses (moist)	1			
			2			
			3			
			4			
			5			
	+597.5	Reddish brown SAND, trace clay, trace coarse to fine gravel (wet) [TILL]	6			
		▽				Groundwater encountered at 6'-6"
	+596.0	? ? ? ?	7			Excavator refusal at 7'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
		End of test pit at 7'-0"	8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			

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LOG OF TEST PIT TP-49

Sheet 1 of 1

PROJECT NAME Niagara Warehouse	PROJECT NUMBER 190071801		DATE 12/15/2021
LOCATION Niagara Falls, NY	ELEVATION Approx 603 ft. (NAVD88)		
EXCAVATION CONTRACTOR Mark Cerrone, Inc.	DEPTH 9 ft	WATER LEVEL - First 8.5 ft ▽	WATER LEVEL - Completion - ▼
EQUIPMENT Komatsu 138 Excavator	FOREMAN Doug		LANGAN PERSONNEL Natalie Mottl

Symbol	ELEV (feet)	DESCRIPTION	Depth Scale	SAMPLE Number	SAMPLE Type	REMARKS
	+603.0	Dark brown fins sandy SILT, trace roots (moist) [TOPSOIL]	0			
	+602.0	Reddish brown to gray CLAY, trace fine sand, thin gray fine sand lenses with yellow mottling (moist)	1			
			2			
			3			
			4			
			5			
	+597.0	Reddish brown medium to fine SAND, trace clay, trace coarse to fine gravel (moist to wet) [TILL]	6			
			7			
			8			
		▽				Groundwater encountered at 8'-6"
	+594.0	? ? ? ? End of test pit at 9'-0"	9			Excavator refusal at 9'-0" - assumed top of rock Backfill with excavated material in 1' to 2' lifts and tamped with excavator bucket to existing grade
			10			
			11			
			12			
			13			
			14			
			15			

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APPENDIX E

TEST PIT PHOTOGRAPHS

 Photo 1: TP-01	 Photo 2: TP-02
 Photo 3: TP-03	 Photo 4: TP-04

 Photo 5: TP-05	 Photo 6: TP-06
 Photo 7: TP-07	 Photo 8: TP-08

Photo 9: TP-09

Photo 10: TP-10

Photo 11: TP-11

Photo 12: TP-12

 Photo 13: TP-13	 Photo 14: TP-14
 Photo 15: TP-15	 Photo 16: TP-16

Photo 17: TP-17

Photo 18: TP-18

Photo 19: TP-19

Photo 20: TP-20

Photo 21: TP-21

Photo 22: TP-22

Photo 23 TP-23

Photo 24: TP-24

 Photo 25: TP-25	 Photo 26: TP-26
 Photo 27: TP-27	 Photo 28: TP-28

Photo 29: TP-29

Photo 30: TP-30

Photo 31: TP-31

Photo 32: TP-32

 Photo 33: TP-33	 Photo 34: TP-34
 Photo 35: TP-35	 Photo 36: TP-36

Photo 37: TP-37

Photo 38: TP-38

Photo 39: TP-39

Photo 40: TP-40

 Photo 41: TP-41	 Photo 42: TP-42
 Photo 43: TP-43	 Photo 44: TP-44

Photo 45: TP-45

Photo 46: TP-46

Photo 47: TP-47

Photo 48: TP-48

Photo 49: TP-49

APPENDIX F

LABORATORY TESTING RESULTS

Table 1. Results of Atterberg Limits Tests

Boring	Sample No.	Sample Depth (ft)	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Material Layer
LB-03	U-1	4-5.4'	21.7	47	21	28	Clay
LB-06	S-3	4-6'	24.7	46	21	25	Clay
LB-12	U-1	4-6'	27.3	44	20	24	Clay
LB-15	S-2	2-4'	27.1	46	21	25	Clay
LB-17	S-3	4-6'	22.5	39	18	21	Clay
LB-102	S-3A	4-6'	23.6	43	20	23	Clay
LB-110	S-2	2-4'	21.6	36	18	18	Clay
LB-114	S-3	4-6'	25.9	45	20	25	Clay
LB-121	S-2	2-4'	25.1	52	20	32	Clay
LB-123	S-3	4-6'	25.5	51	22	29	Clay
LB-128	S-3	4-6'	24.7	44	20	24	Clay
LB-01	S-3	4-6'	14.7	18	14	4	Till
LB-07	S-4	6-8'	26	37	19	18	Till
LB-11	S-4	6-8'	10	16	13	3	Till
LB-109	S-4	6-8'	10.9	16	13	3	Till

Table 1. Results of Grain-Size Analysis

Boring	Sample No.	Sample Depth (ft)	Moisture Content (%)	% Fines: <#200 sieve (%)	Material Layer
LB-02	S-6	10-12'	8.4	17.2	Till
LB-04	S-5	8-10'	4.1	4.9	Till
LB-06	S-4	6-8'	9	17.5	Till
LB-123	S-5	8-10'	8.6	40	Till
LB-125	S-5	8-10'	6	24.3	Till

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Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **December 23, 2021**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-1
Page 1 of 1

SJB Sample Number: 21-712
Sample Location: LB-01, S-3: 4' – 6'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
14.7 %	18	14	4

SJB Sample Number: 21-713
Sample Location: LB-02, S-6: 10' – 12'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock

Moisture Content = 8.4 %

ASTM D-422: Particle Size Analysis of Soils

Sieve Size	***Percent Passing***
1"	100.0
¾"	93.7
½"	77.2
⅜"	68.8
¼"	59.5
#4	52.1
#10	37.3
#20	28.7
#40	25.4
#100	22.6
#200	17.2

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Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **December 23, 2021**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-1
Page 2 of 2

SJB Sample Number: 21-714
Sample Location: LB-04, S-5: 8' – 10'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock

Moisture Content = 4.2 %

ASTM D-422: Particle Size Analysis of Soils

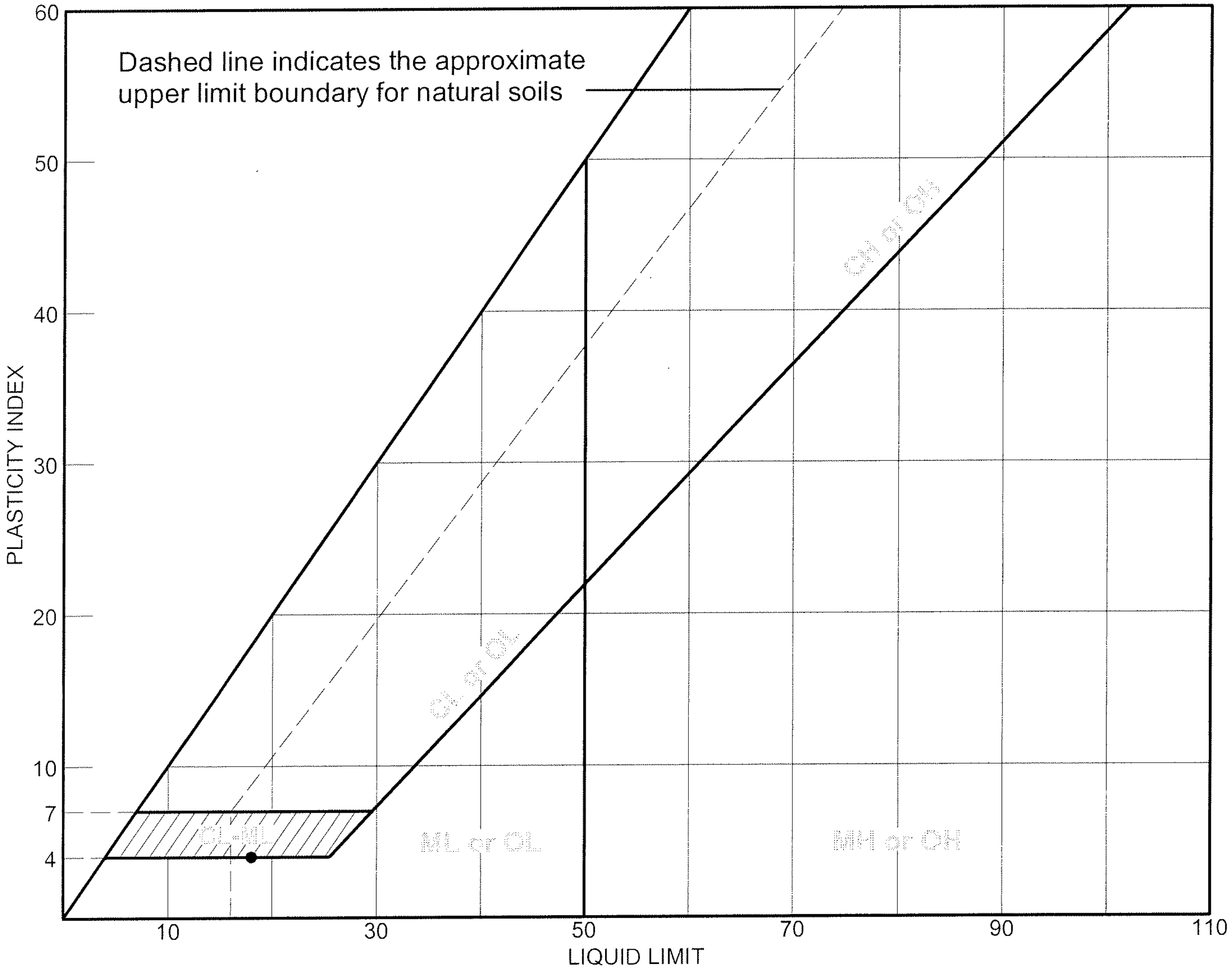
Sieve Size	*Percent Passing*
1 ½"	100.0
1"	68.1
¾"	36.9
½"	16.0
³/₈"	13.7
¼"	10.9
#4	10.8
#10	8.5
#20	7.0
#40	6.4
#100	5.8
#200	4.9

SJB Sample Number: 21-715
Sample Location: LB-07, S-4: 6' - 8'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
26.0 %	37	19	18

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-01	S-3	4' - 6'	14.7 %	14	18	4	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

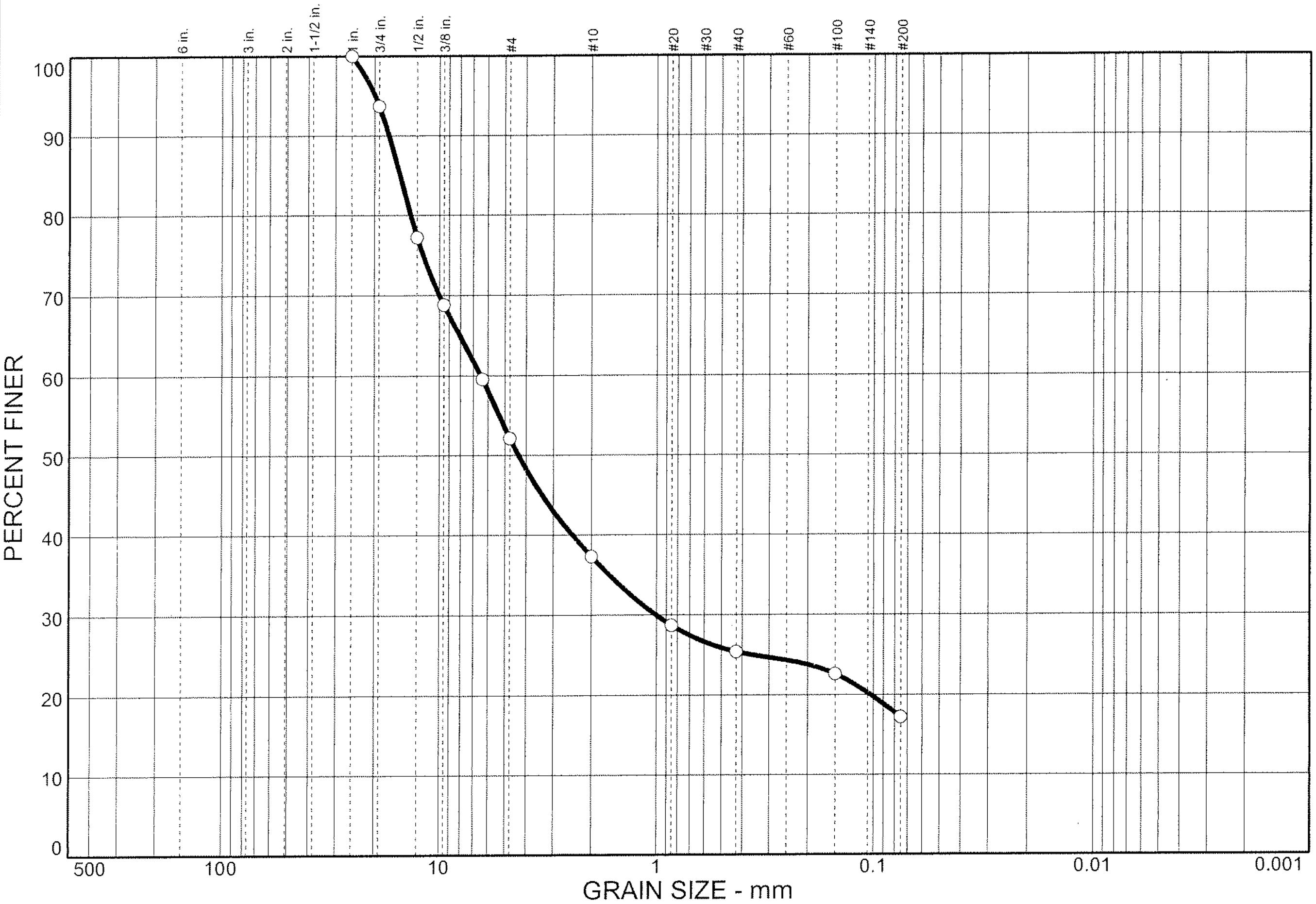
Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

Plate

Particle Size Distribution Report ASTM D-422



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	47.9	34.9	17.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
.75 in.	93.7		
.5 in.	77.2		
.375 in.	68.8		
.25 in.	59.5		
#4	52.1		
#10	37.3		
#20	28.7		
#40	25.4		
#100	22.6		
#200	17.2		

* (no specification provided)

Soil Description

LB-02, S-6: 10' - 12'

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 15.3 D_{60}= 6.48 D_{50}= 4.34
D_{30}= 1.00 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

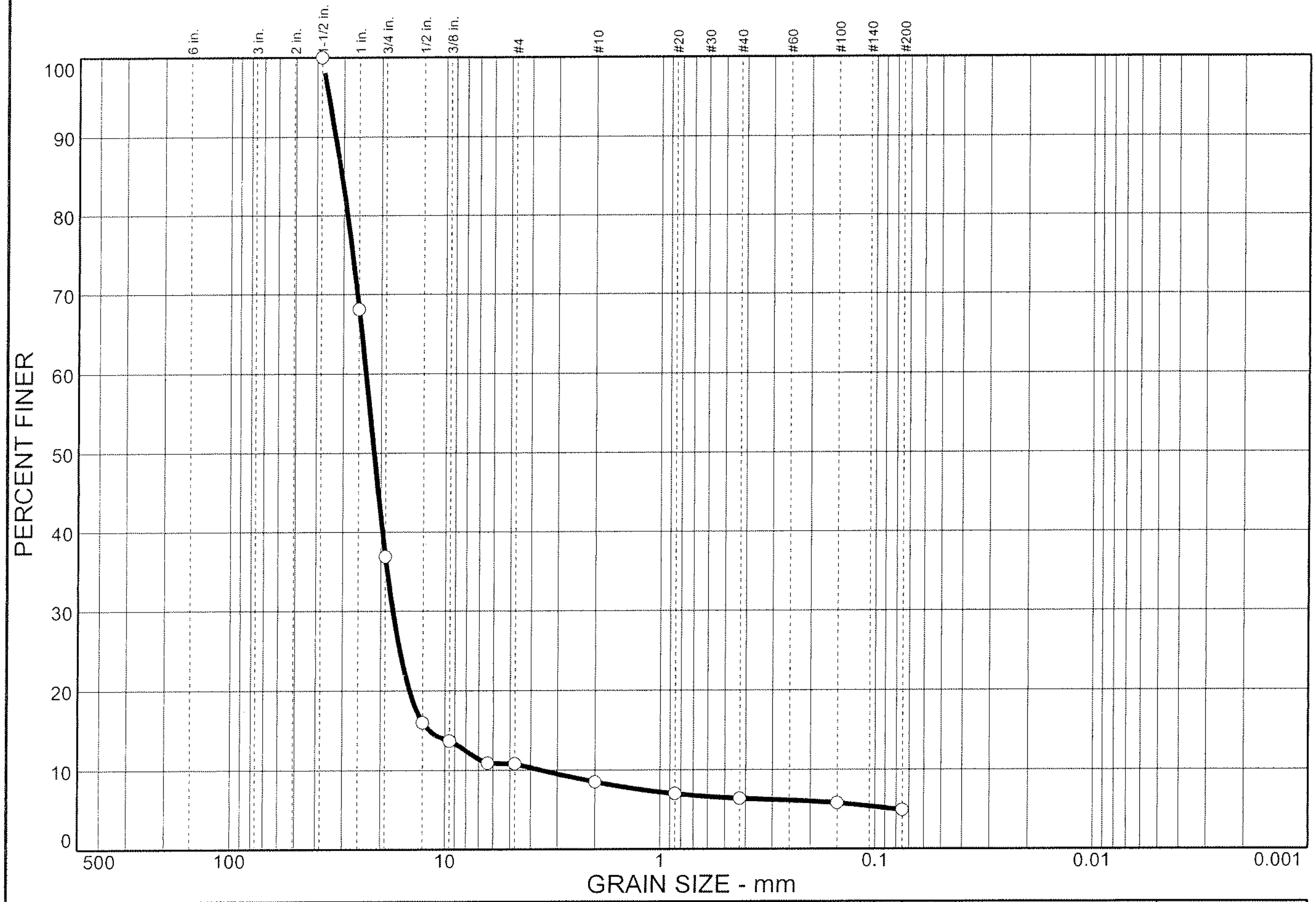
LTR-1
SAMPLE NUMBER: 21-713

Sample No.: S-6 **Source of Sample:** LB-02 **Date:** 12-23-2021
Location: LB-02, S-6: 10' - 12' **Elev./Depth:** 10' - 12'

SJB SERVICES, INC.

Client: LANGAN ENGINEERING
Project: PROJECT FIFI (#190071801)
Project No: BD-21-084 **Plate**

Particle Size Distribution Report ASTM D-422



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	89.2	5.9	4.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	68.1		
.75 in.	36.9		
.5 in.	16.0		
.375 in.	13.7		
.25 in.	10.9		
#4	10.8		
#10	8.5		
#20	7.0		
#40	6.4		
#100	5.8		
#200	4.9		

* (no specification provided)

Soil Description

LB-04, S-5: 8' - 10'

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 30.7 D_{60}= 23.6 D_{50}= 21.6
D_{30}= 17.5 D_{15}= 11.8 D_{10}= 3.58
C_u= 6.59 C_c= 3.65

Classification

USCS= AASHTO=

Remarks

LTR-1
SAMPLE NUMBER: 21-714

Sample No.: S-5 **Source of Sample:** LB-04 **Date:** 12-23-2021
Location: LB-04, S-5: 8' - 10' **Elev./Depth:** 8' - 10'

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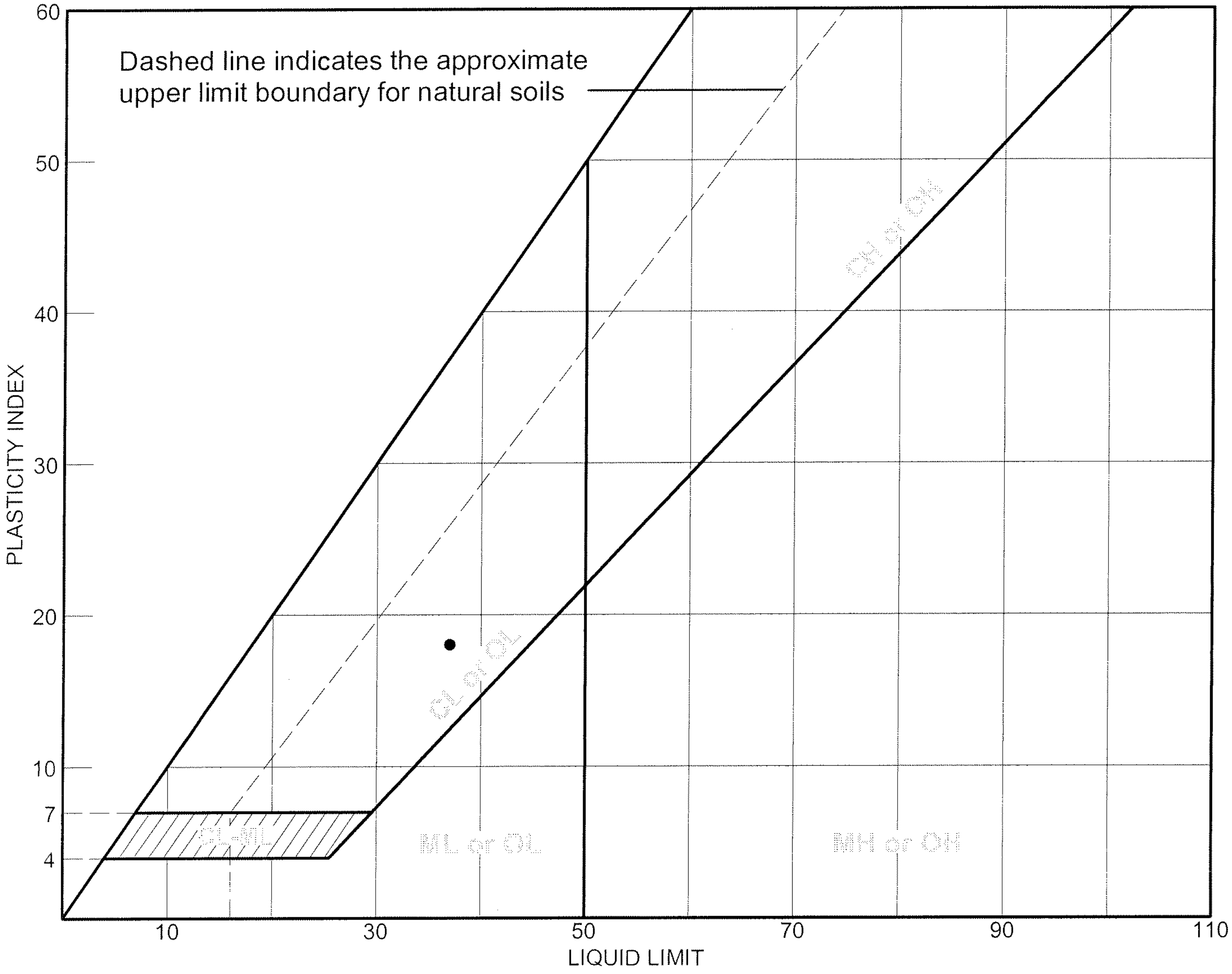
Project No: BD-21-084 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-07	S-4	6' - 8'	26.0 %	19	37	18	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

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Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **January 18, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-4
Page 1 of 3

SJB Sample Number: 22-047
Sample Location: LB-06, S-3: 4' – 6'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
24.7 %	46	21	25

SJB Sample Number: 22-048
Sample Location: LB-06, S-4: 6' – 8'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock

Moisture Content = 9.0 %

ASTM D-422: Particle Size Analysis of Soils

Sieve Size	***Percent Passing***
1 ½"	100.0
1"	68.4
¾"	51.0
½"	48.1
³/₈"	44.1
¼"	38.0
#4	34.9
#10	28.3
#20	25.2
#40	24.3
#100	23.1
#200	17.5

Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**
CLIENT: **Langan Engineering**
DATE: **January 18, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-4
Page 2 of 3

SJB Sample Number: 20-049
Sample Location: LB-11, S-4: 6' – 8'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
10.0 %	16	13	3

SJB Sample Number: 22-050
Sample Location: LB-15, S-2: 2' - 4'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
27.1 %	46	21	25

SJB Sample Number: 22-051
Sample Location: LB-102, S-3A: 4' – 6'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
23.6 %	43	20	23

SJB Sample Number: 22-052
Sample Location: LB-110, S-2: 2' - 4'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
21.6 %	36	18	18

Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **January 18, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-4
Page 3 of 3

SJB Sample Number: 22-053
Sample Location: LB-17, S-3: 4' – 6'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
22.5 %	39	18	21

SJB Sample Number: 22-054
Sample Location: LB-125, S-5: 8' – 10'

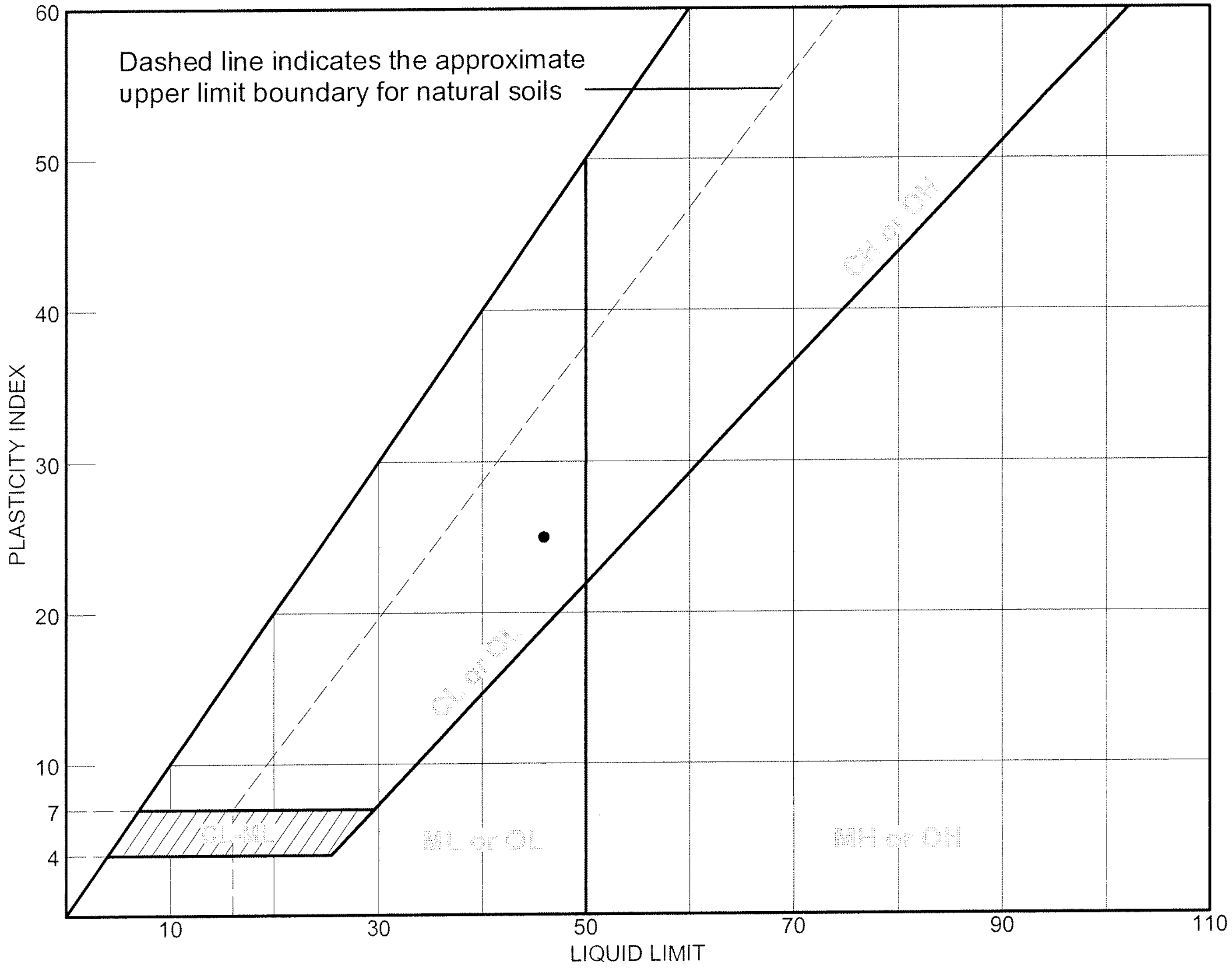
ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock

Moisture Content = 6.0 %

ASTM D-422: Particle Size Analysis of Soils

Sieve Size	***Percent Passing***
1 ½"	100.0
1"	65.2
¾"	60.7
½"	60.7
³/₈"	55.8
¼"	49.8
#4	47.7
#10	41.7
#20	36.8
#40	33.9
#100	29.4
#200	24.3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-06	S-3	4' - 6'	24.7 %	21	46	25	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

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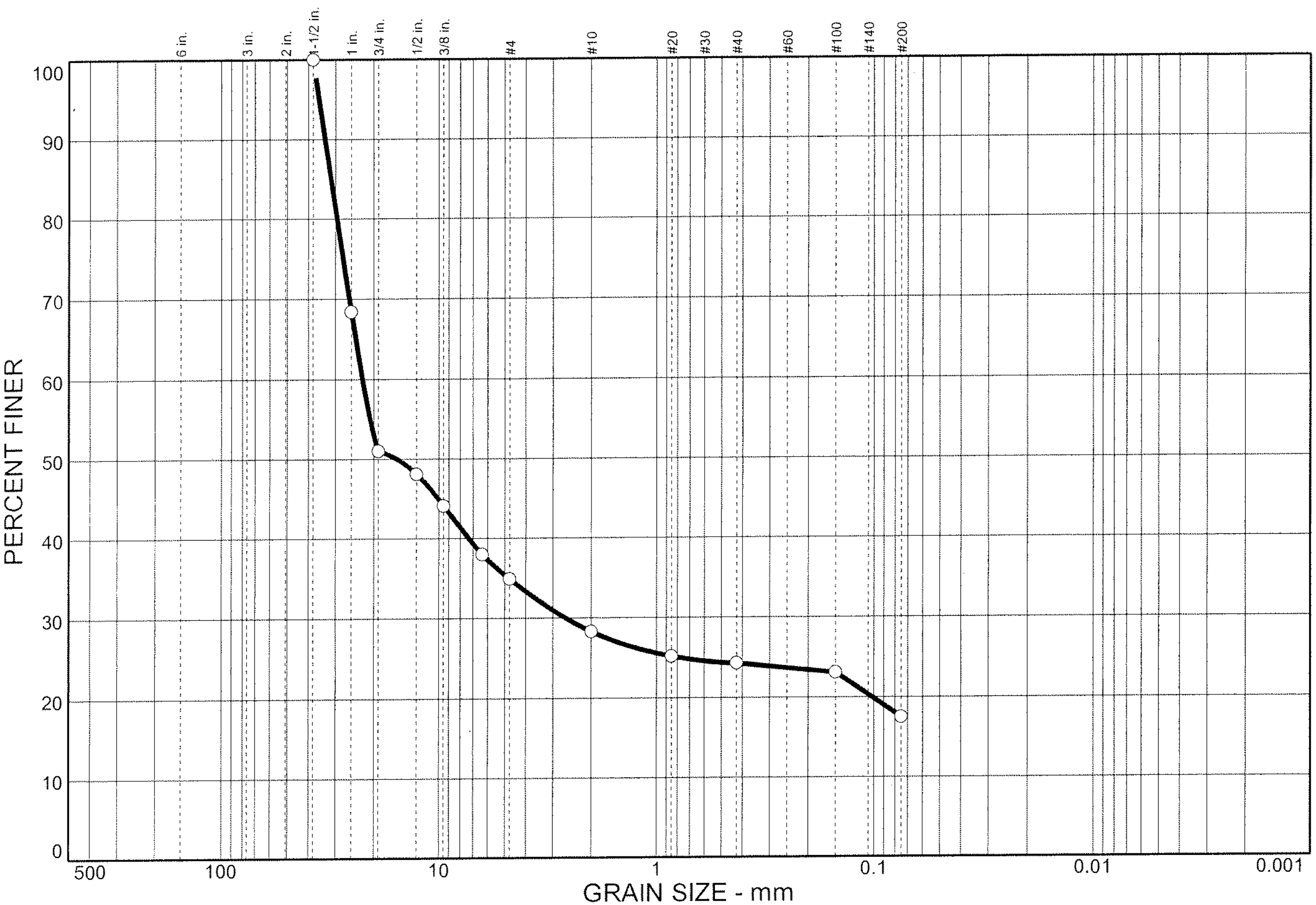
Particle Size Distribution Report ASTM D-422



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	65.1	17.4	17.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	68.4		
.75 in.	51.0		
.5 in.	48.1		
.375 in.	44.1		
.25 in.	38.0		
#4	34.9		
#10	28.3		
#20	25.2		
#40	24.3		
#100	23.1		
#200	17.5		

* (no specification provided)

Soil Description

LB-06, S-4: 6' - 8'

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 31.5 D_{60}= 22.6 D_{50}= 15.7
D_{30}= 2.62 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

LTR-4
SAMPLE NUMBER: 22-048

Sample No.: S-4 **Source of Sample:** LB-06 **Date:** 1-18-2022
Location: LB-06, S-4: 6' - 8' **Elev./Depth:** 6' - 8'

SJB SERVICES, INC.

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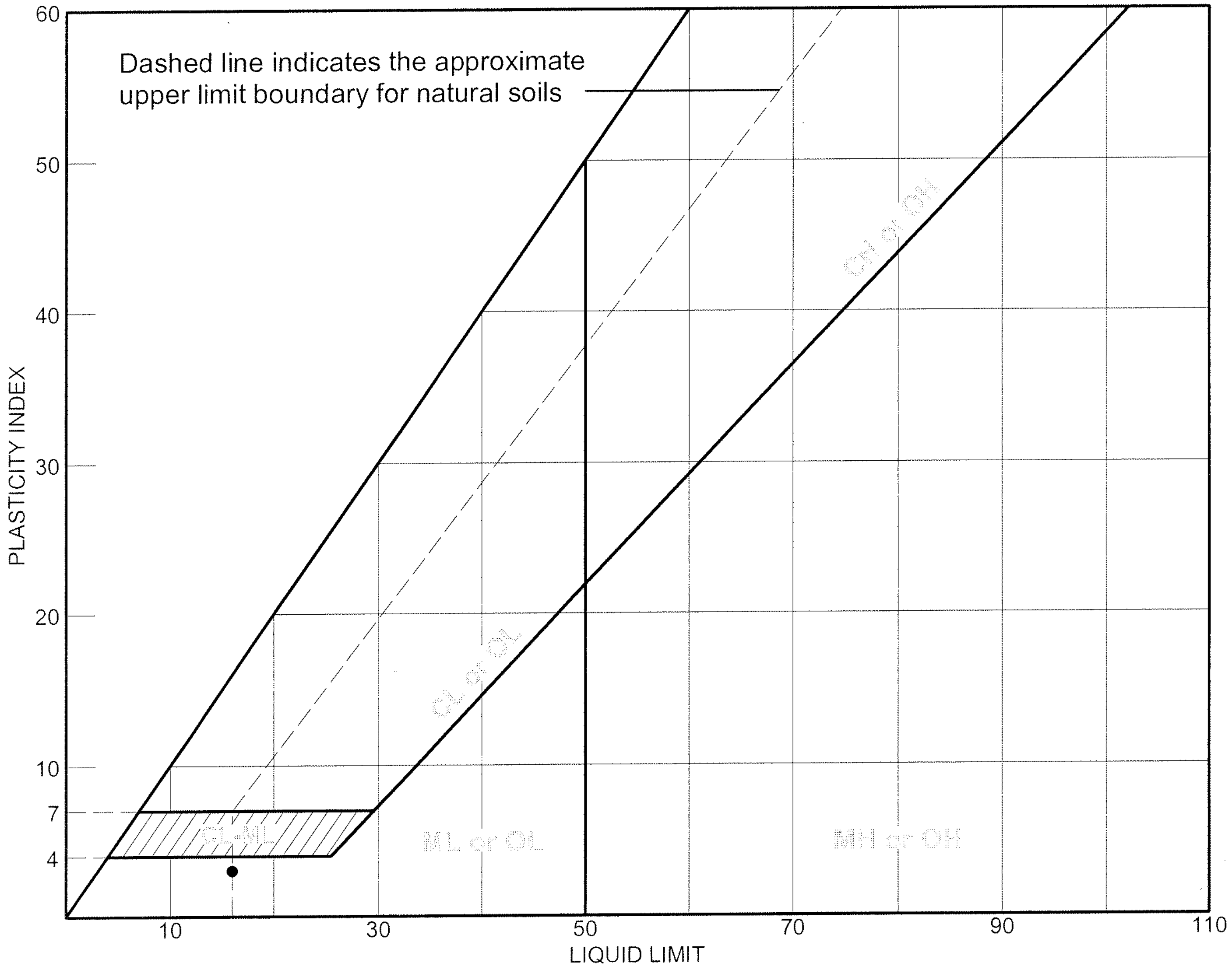
Project: PROJECT FIFI (#190071801)
Project No: BD-21-084 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-11	S-4	6' - 8'	10.0 %	13	16	3	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

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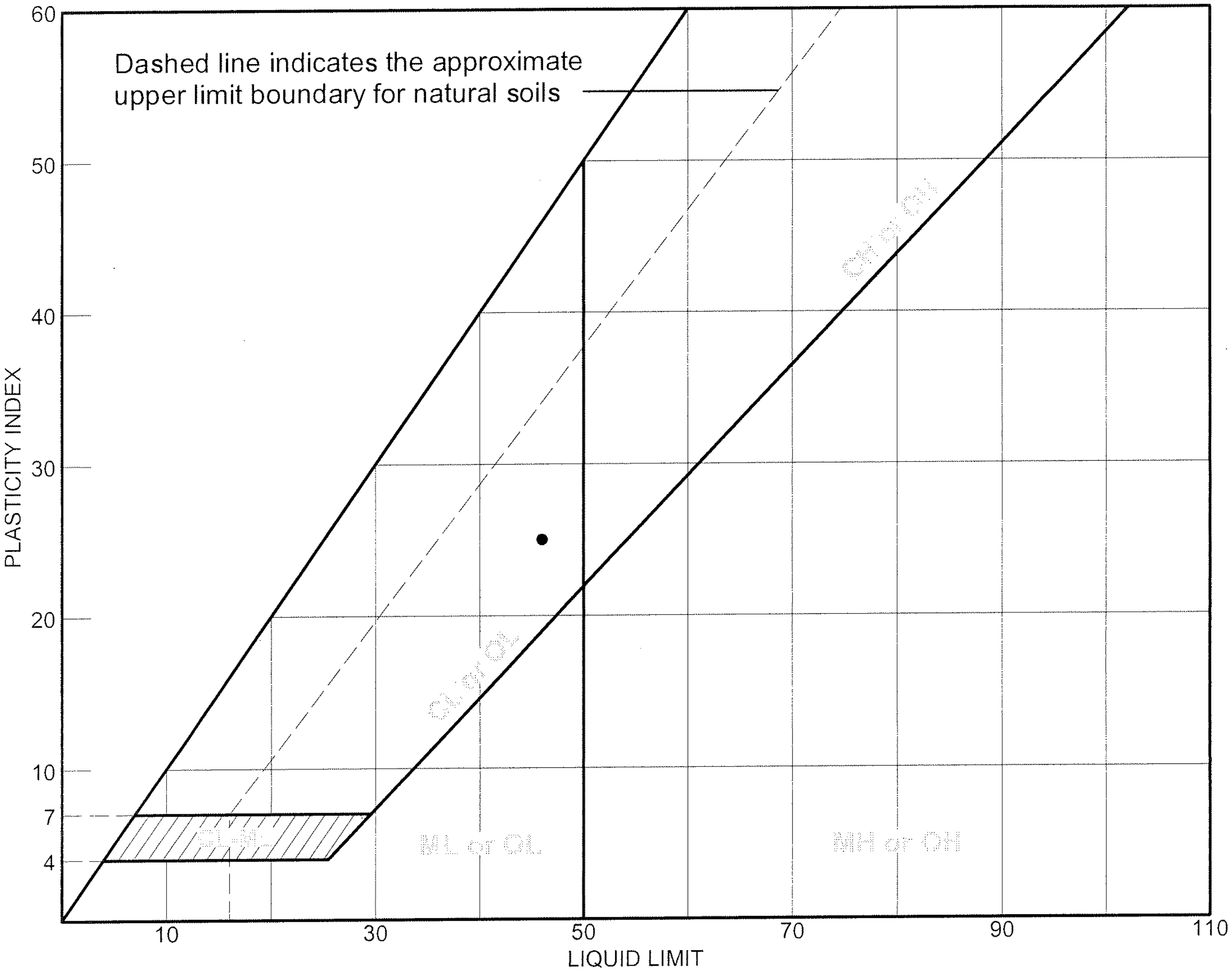
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-15	S-2	2' - 4'	27.1 %	21	46	25	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

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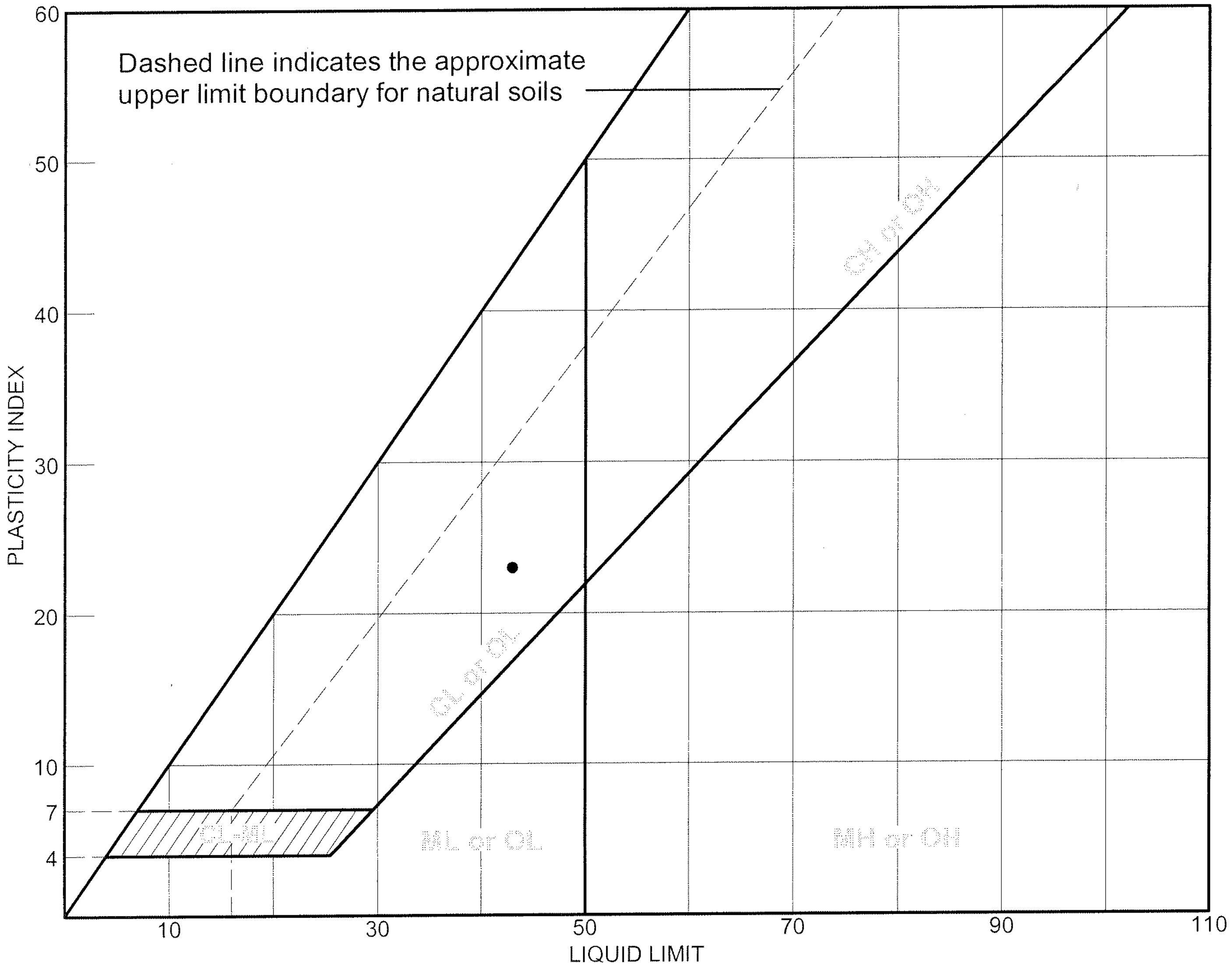
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-102	S-3A	4' - 6'	23.6 %	20	43	23	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

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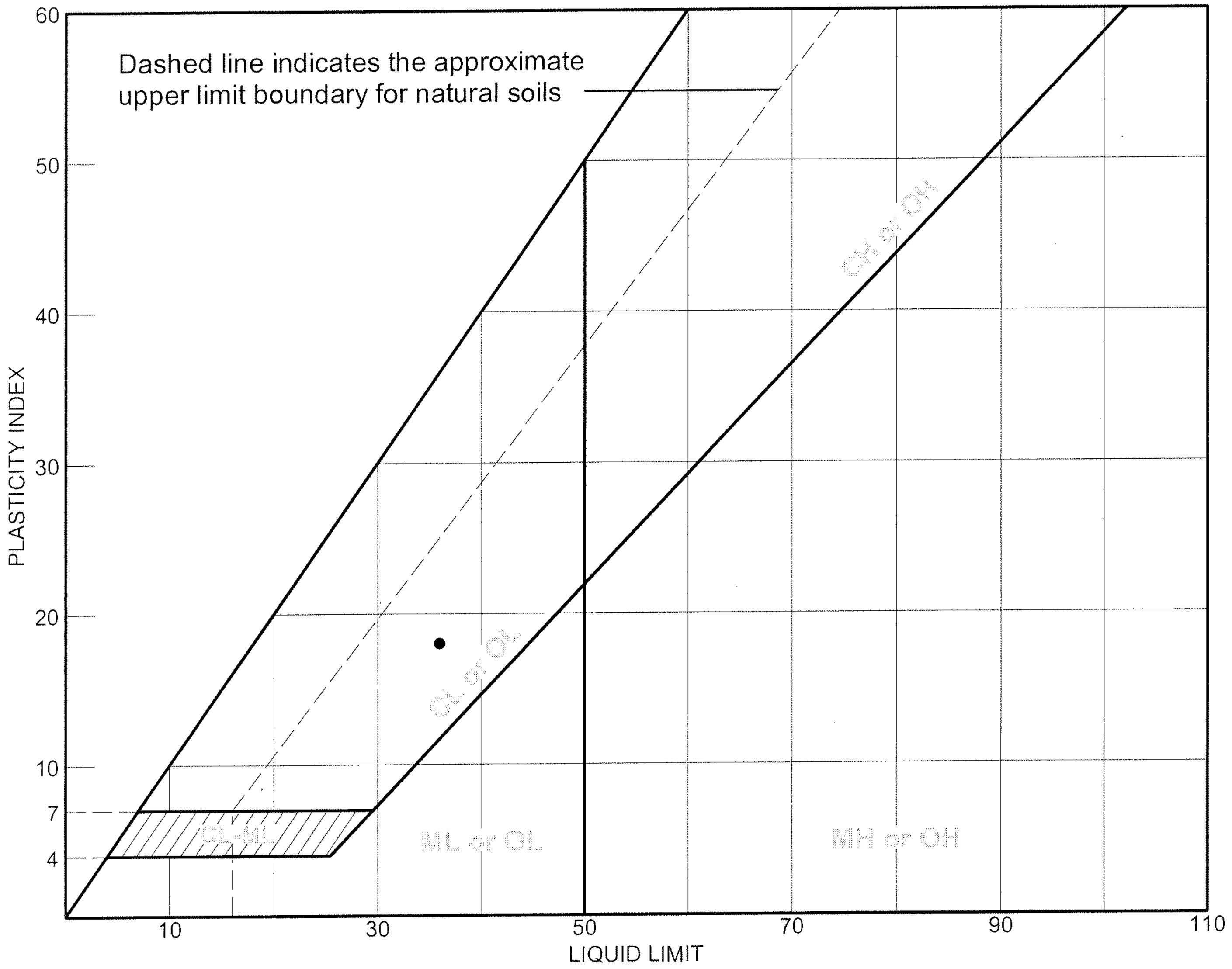
LIQUID AND PLASTIC LIMITS TEST REPORT



Dashed line indicates the approximate upper limit boundary for natural soils

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-110	S-2	2' - 4'	21.6 %	18	36	18	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

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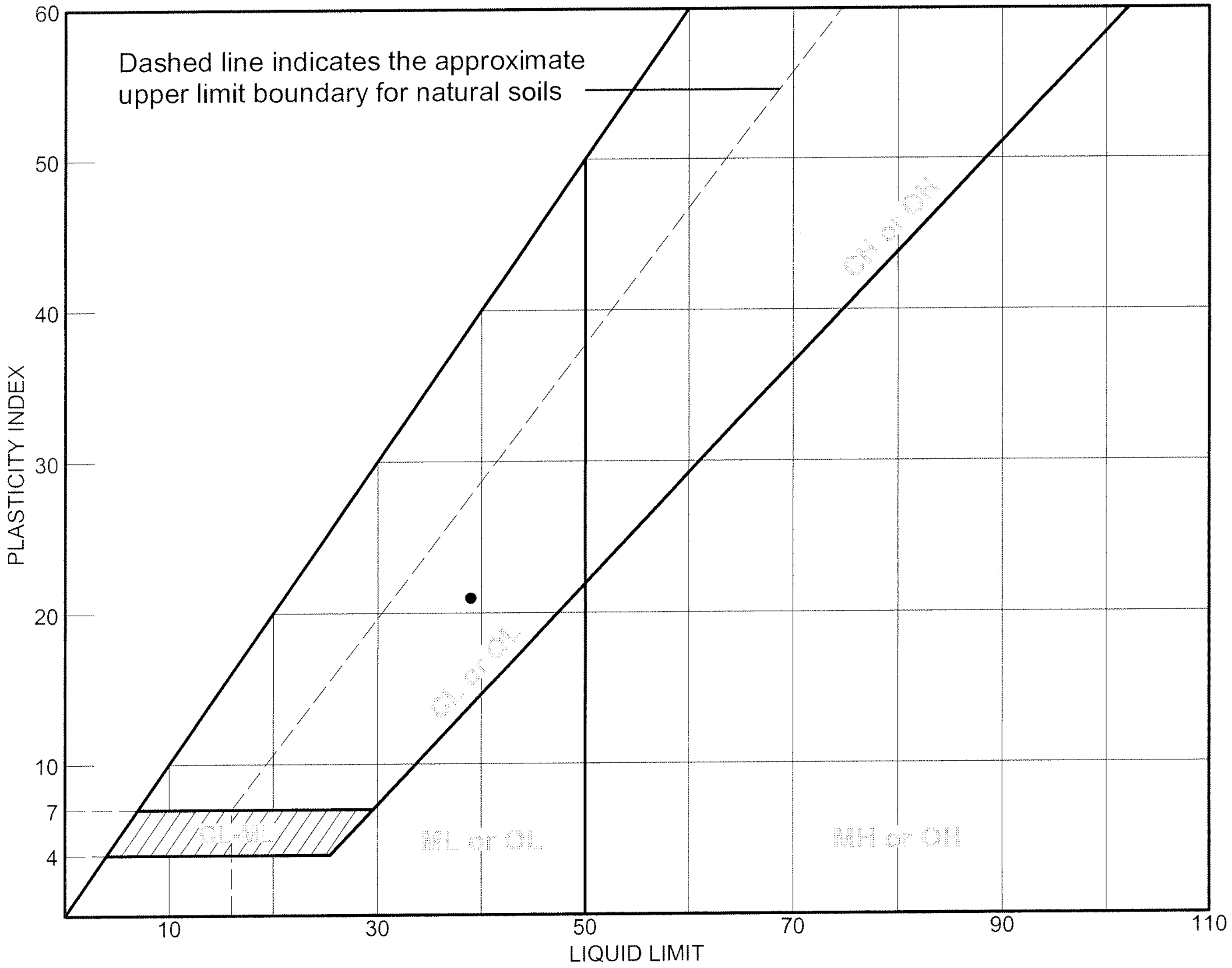
LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-17	S-3	4' - 6'	22.5 %	18	39	21	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

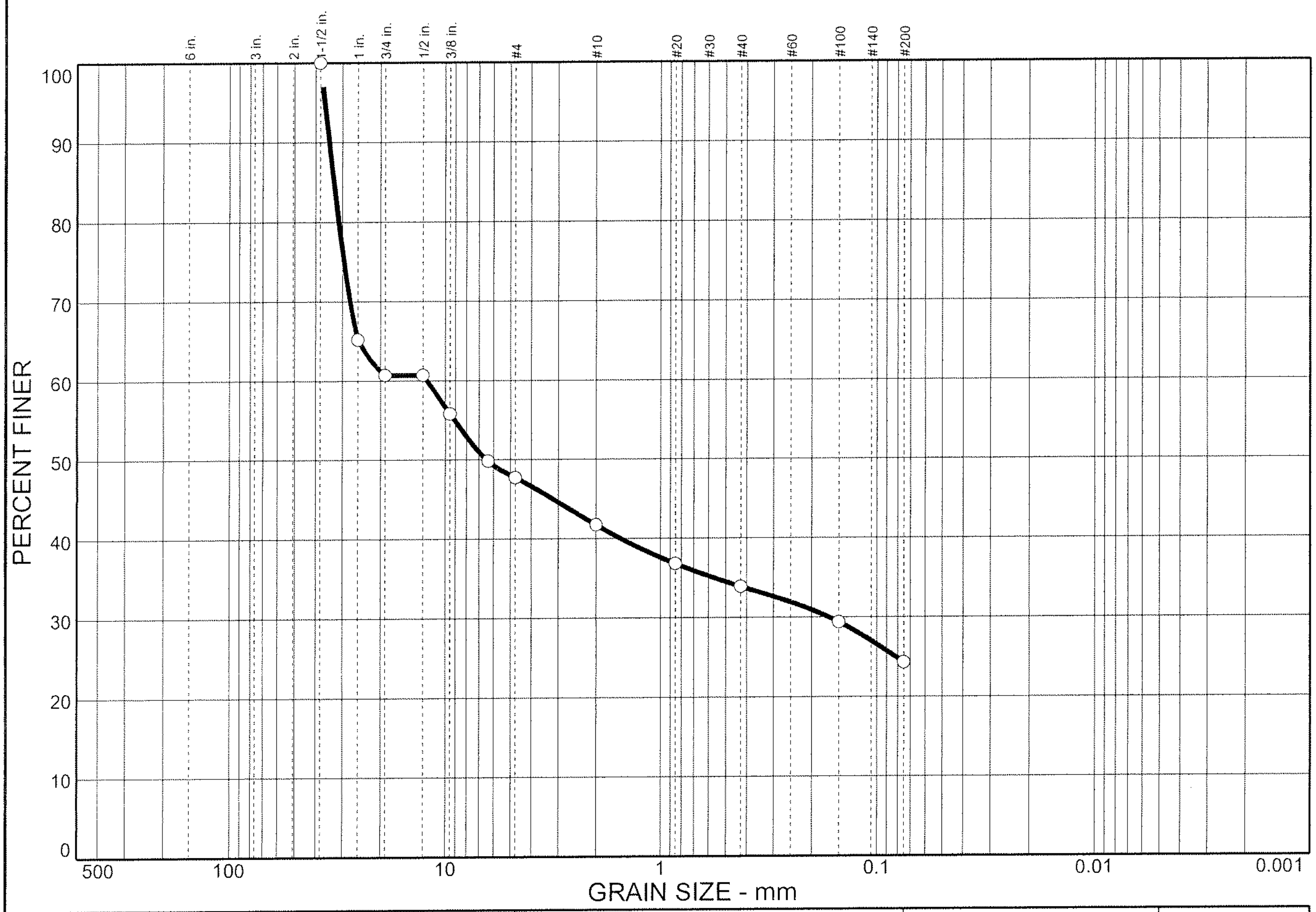
Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

Plate

Particle Size Distribution Report ASTM D-422



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	52.3	23.4	24.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	65.2		
.75 in.	60.7		
.5 in.	60.7		
.375 in.	55.8		
.25 in.	49.8		
#4	47.7		
#10	41.7		
#20	36.8		
#40	33.9		
#100	29.4		
#200	24.3		

* (no specification provided)

Soil Description

LB-125, S-5: 8' - 10'

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 33.0 D_{60}= 12.2 D_{50}= 6.47
D_{30}= 0.166 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

LTR-4
SAMPLE NUMBER: 22-054

Sample No.: S-5 **Source of Sample:** LB-125 **Date:** 1-18-2022
Location: LB-125, S-5: 8' - 10' **Elev./Depth:** 8' - 10'

SJB SERVICES, INC.

Client: LANGAN ENGINEERING
Project: PROJECT FIFI (#190071801)
Project No: BD-21-084 **Plate**

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Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **January 19, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-5
Page 1 of 3

SJB Sample Number: 22-056
Sample Location: LB-128, S-3: 4' – 6'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
24.7 %	44	20	24

SJB Sample Number: 22-057
Sample Location: LB-121, S-2: 2' - 4'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
25.1 %	52	20	32

SJB Sample Number: 22-058
Sample Location: LB-123, S-3: 4' – 6'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
25.5 %	51	22	29

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Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **January 19, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-5
Page 2 of 3

SJB Sample Number: 22-059
Sample Location: LB-123, S-5: 8' – 10'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock

Moisture Content = 8.6 %

ASTM D-422: Particle Size Analysis of Soils

Sieve Size	***Percent Passing***
1 ½"	100.0
1"	86.1
¾"	86.1
½"	82.8
³/₈"	81.9
¼"	77.8
#4	74.7
#10	67.1
#20	60.9
#40	56.8
#100	49.1
#200	40.4

Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **January 19, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-5
Page 3 of 3

SJB Sample Number: 20-060
Sample Location: LB-114, S-3: 4' - 6'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

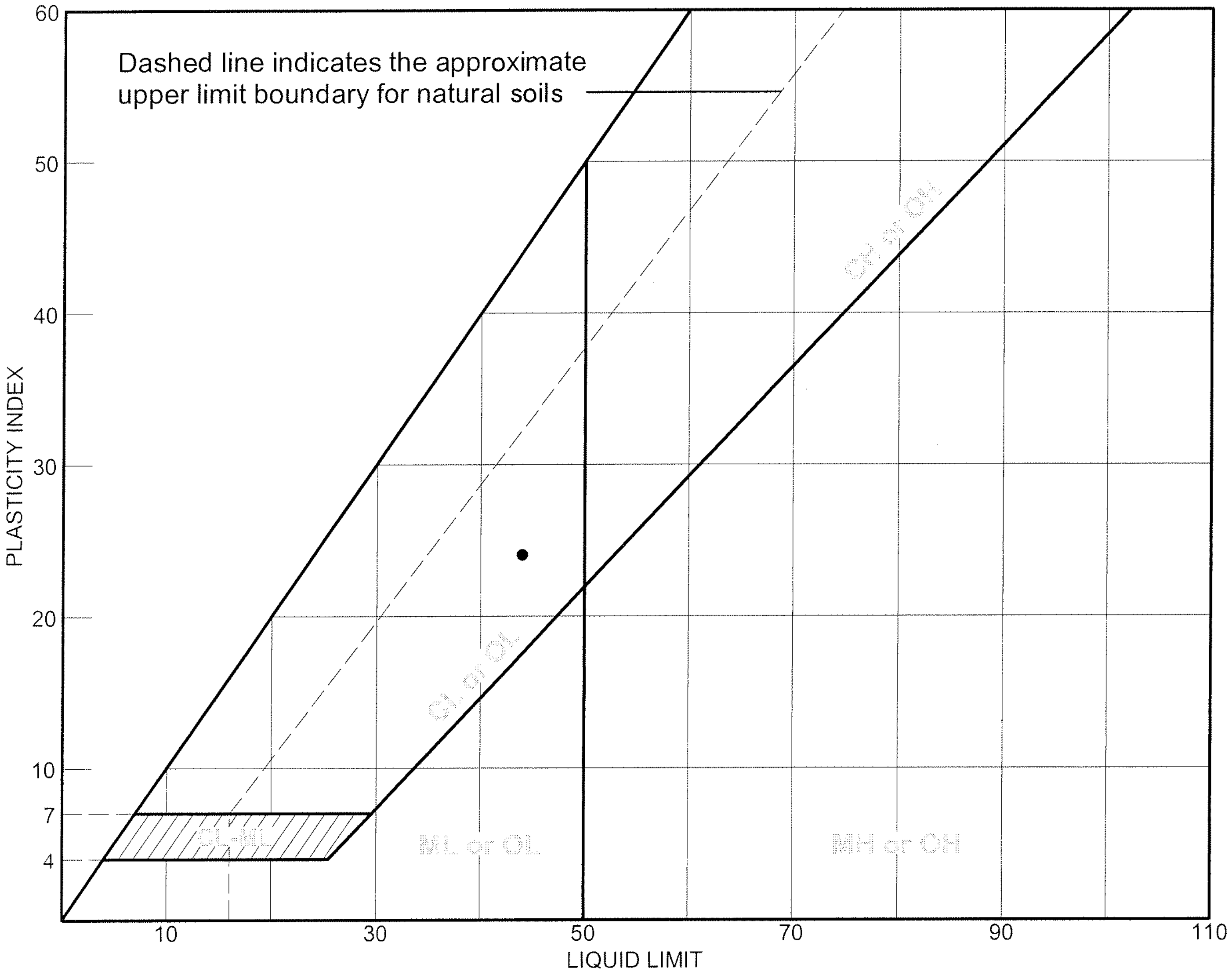
Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
25.9 %	45	20	25

SJB Sample Number: 22-061
Sample Location: LB-109, S-4: 6' – 8'

ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
10.9 %	16	13	3

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-128	S-3	4' - 6'	24.7 %	20	44	24	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

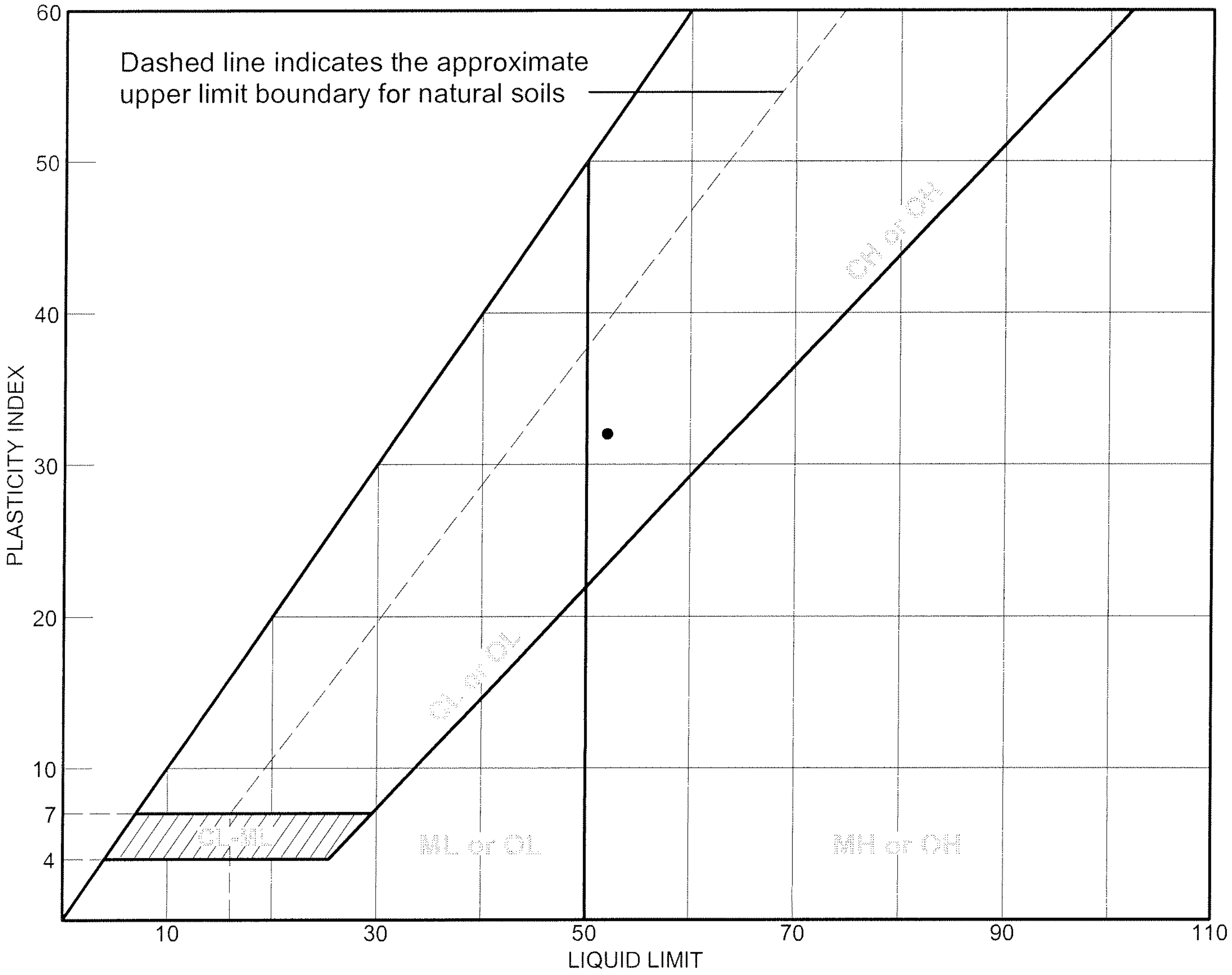
Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

Plate

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-121	S-2	2' - 4'	25.1 %	20	52	32	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

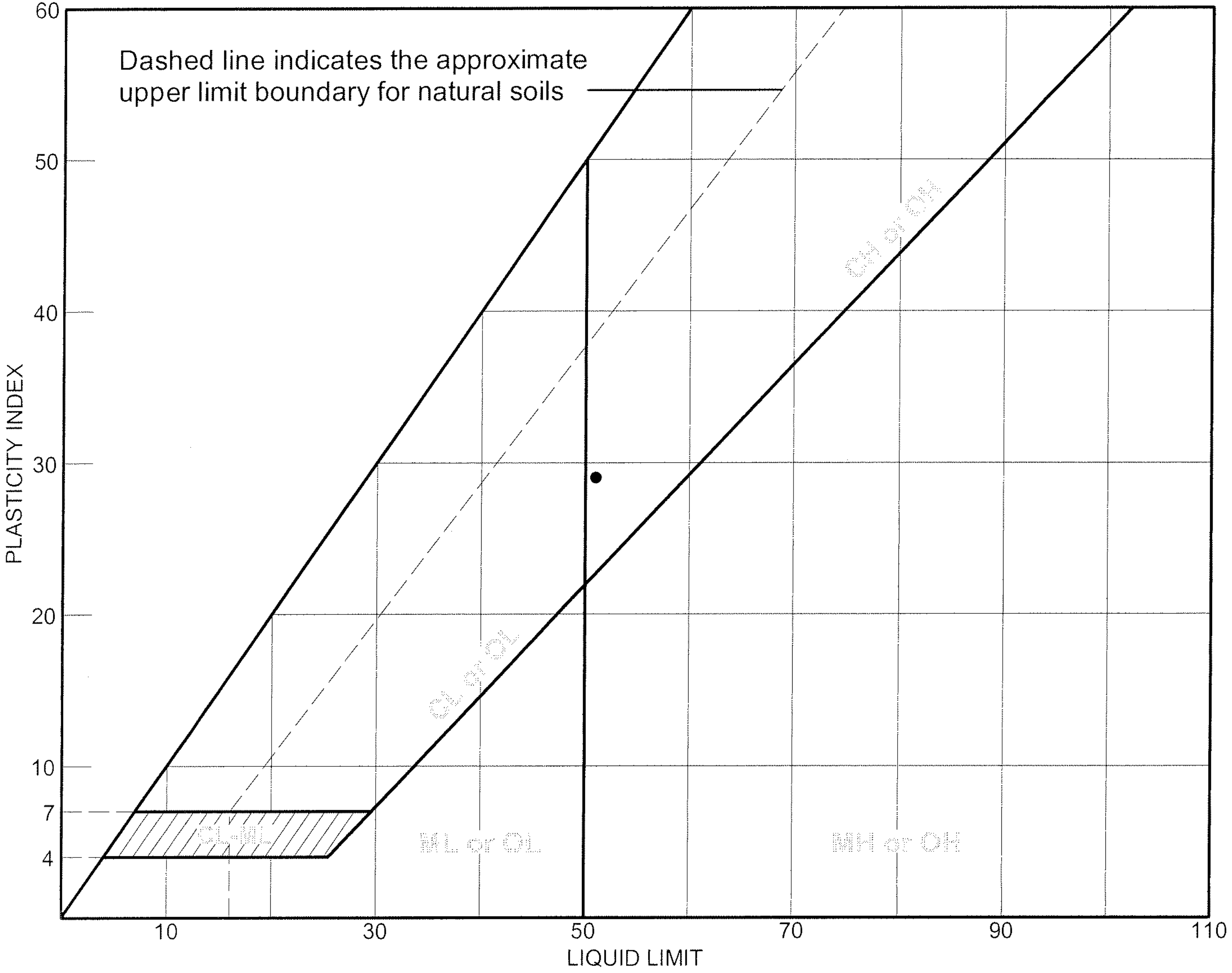
Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

Plate

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-123	S-3	4' - 6'	25.5 %	22	51	29	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

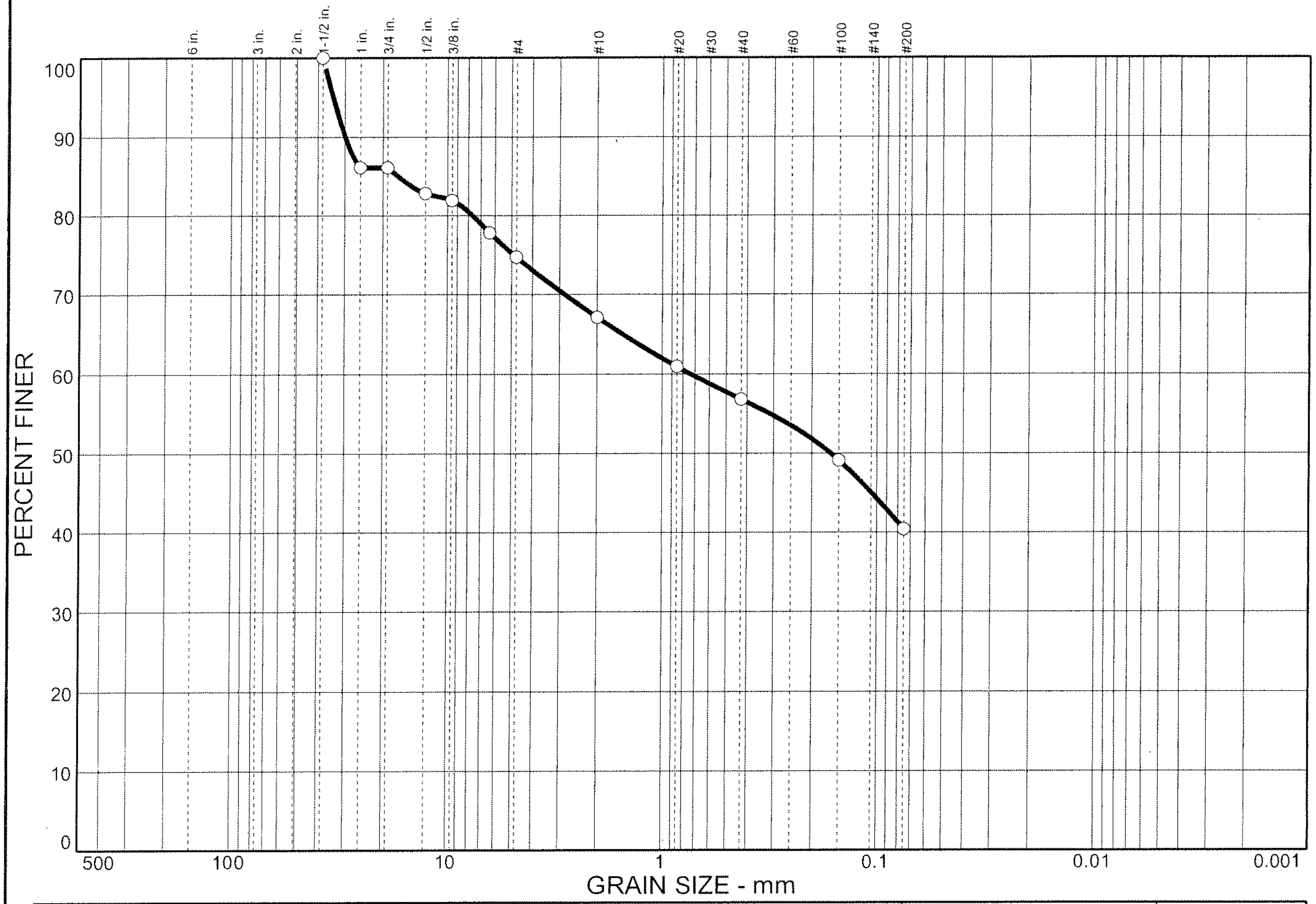
Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

Plate

Particle Size Distribution Report ASTM D-422



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	25.3	34.3	40.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5 in.	100.0		
1 in.	86.1		
.75 in.	86.1		
.5 in.	82.8		
.375 in.	81.9		
.25 in.	77.8		
#4	74.7		
#10	67.1		
#20	60.9		
#40	56.8		
#100	49.1		
#200	40.4		

* (no specification provided)

Soil Description

LB-123, S-5: 8' - 10'

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 17.1 D_{60}= 0.736 D_{50}= 0.164
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

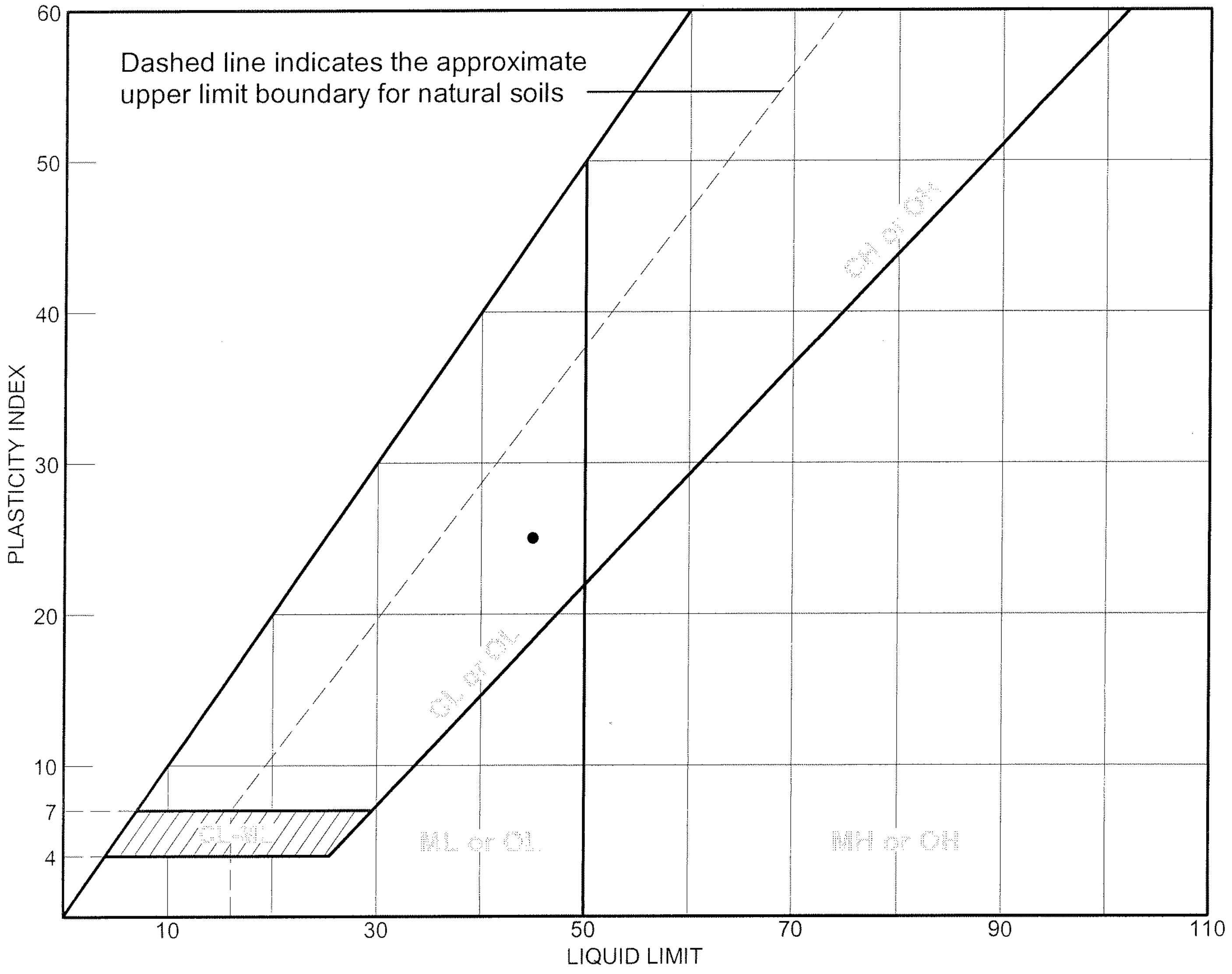
LTR-5
SAMPLE NUMBER: 22-059

Sample No.: S-5 **Source of Sample:** LB-123 **Date:** 1-19-2022
Location: LB-123, S-5: 8' - 10' **Elev./Depth:** 8' - 10'

SJB SERVICES, INC.

Client: LANGAN ENGINEERING
Project: PROJECT FIFI (#190071801)
Project No: BD-21-084 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-114	S-3	4' - 6'	25.9 %	20	45	25	

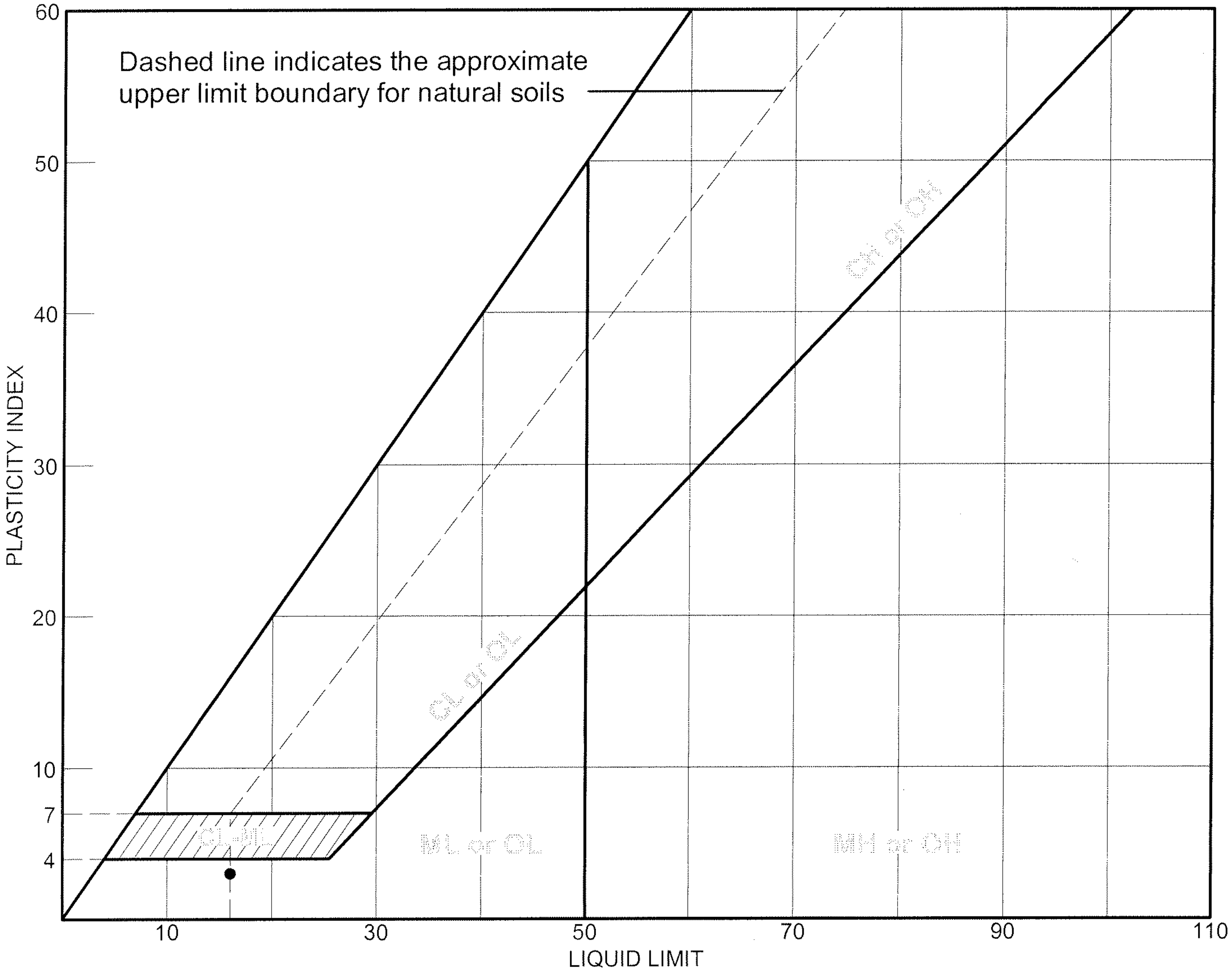
LIQUID AND PLASTIC LIMITS TEST REPORT

SJB
SERVICES, INC.

Client: LANGAN ENGINEERING
Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084 **Plate**

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-109	S-4	6' - 8'	10.9 %	13	16	3	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

Plate

Western New York Office
5167 South Park Avenue
Hamburg, NY 14075
Phone: (716) 649-8110
Fax: (716) 649-8051

Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **January 7, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-2
Page 1 of 1

SJB Sample Number: 21-714
Sample Location: LB-03, U-1: 4' – 5.4'

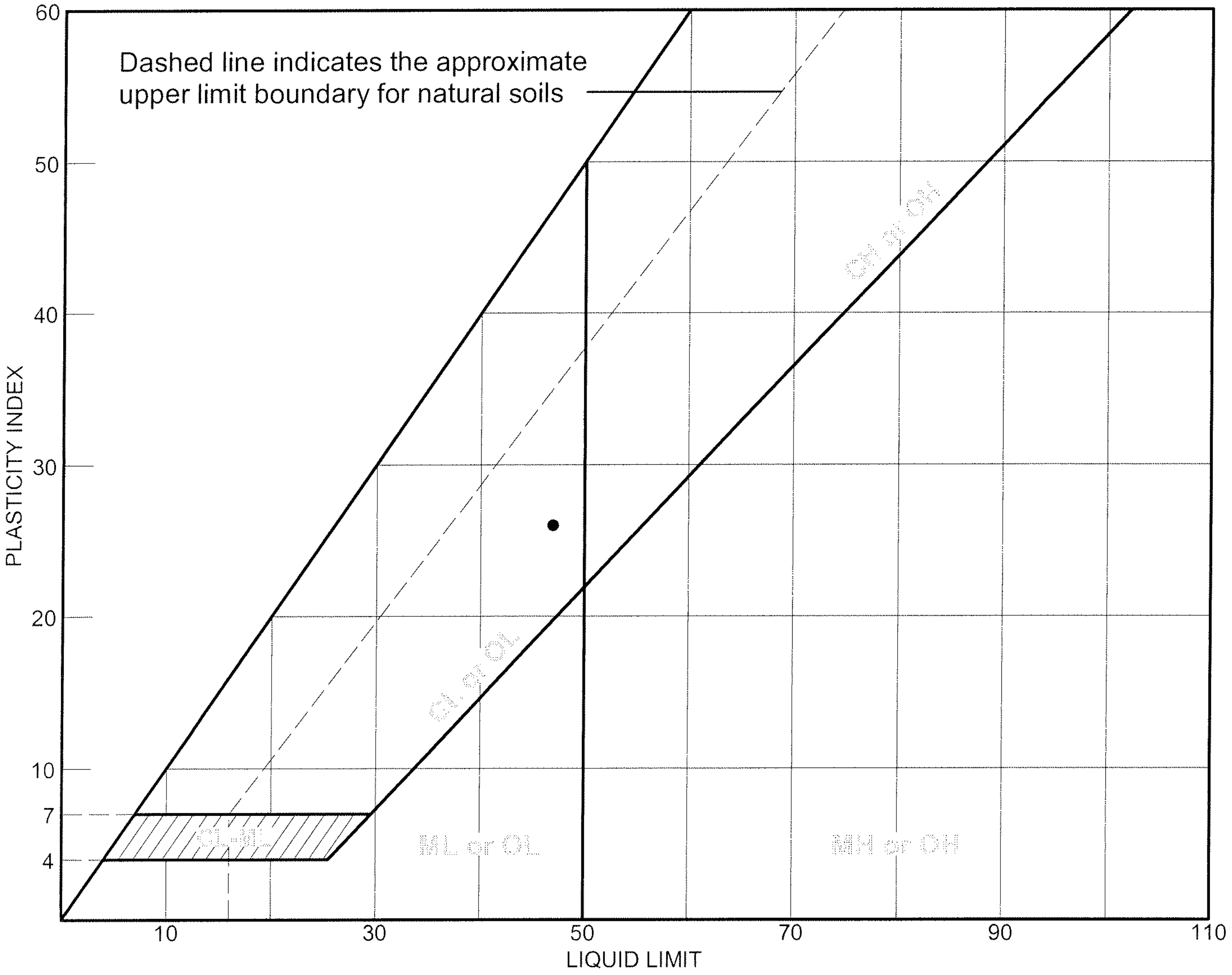
ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
21.7 %	47	21	26

ASTM D-2435
One-Dimensional Consolidation Properties of Soils Using Incremental Loading

Refer to attached sheets for test results

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-03	U-1	4' - 5.4'	21.7 %	21	47	26	

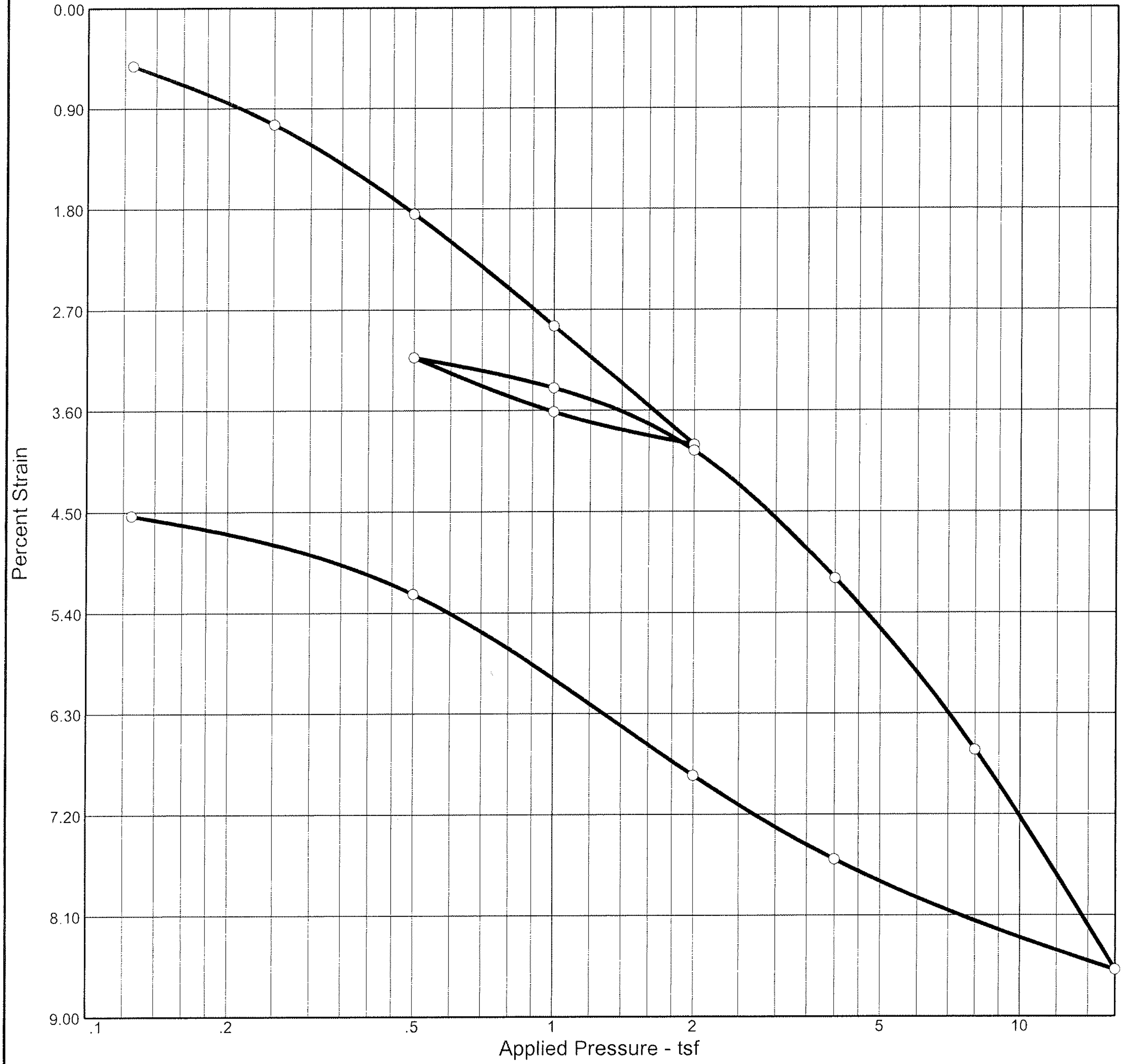
LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

Client: LANGAN ENGINEERING
Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084 **Plate**

ASTM D-2435: ONE DIMENSIONAL CONSOLIDATION REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
111.2 %	21.7 %	107.9	47	26	2.70		1.56	0.10				0.526

MATERIAL DESCRIPTION	USCS	AASHTO
LB-03, U-1: 4' - 5.4'		

Project No. BD-21-084 **Client:** LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Location: LB-03, U-1: 4' - 5.4'

ASTM D-2435: ONE DIMENSIONAL CONSOLIDATION REPORT

SJB SERVICES, INC.

Remarks:

SAMPLE NUMBER: 21-714

Plate

SERVICES, INC.

Western New York Office
5167 South Park Avenue
Hamburg, NY 14075
Phone: (716) 649-8110
Fax: (716) 649-8051

Laboratory Test Report

PROJECT: **Project Fifi (#190071801)**

CLIENT: **Langan Engineering**

DATE: **January 7, 2022**

PROJECT NO.: BD-21-084
REPORT NO.: LTR-3
Page 1 of 1

SJB Sample Number: 21-717
Sample Location: LB-12, U-1: 4' – 6'

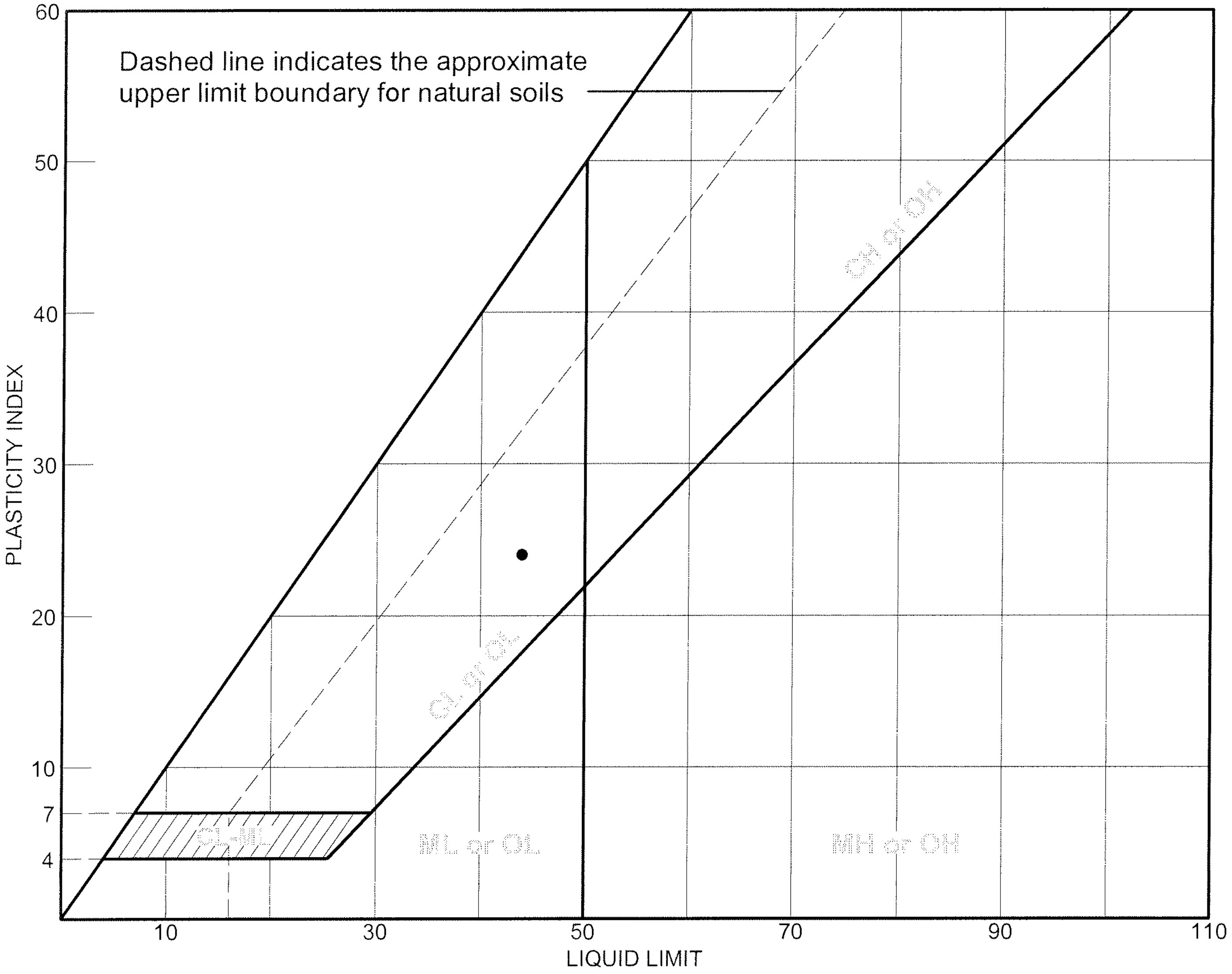
ASTM D-2216:Laboratory Determination of Water (Moisture) Content of Soil &Rock
ASTM D-4318: Liquid Limit, Plastic Limit, and Plasticity Index of Soil

Moisture Content	Liquid Limit	Plastic Limit	Plasticity Index
27.3 %	44	20	24

ASTM D-2435
One-Dimensional Consolidation Properties of Soils Using Incremental Loading

Refer to attached sheets for test results

LIQUID AND PLASTIC LIMITS TEST REPORT



SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●	LB-12	U-1	4' - 6'	27.3 %	20	44	24	

LIQUID AND PLASTIC LIMITS TEST REPORT

SJB SERVICES, INC.

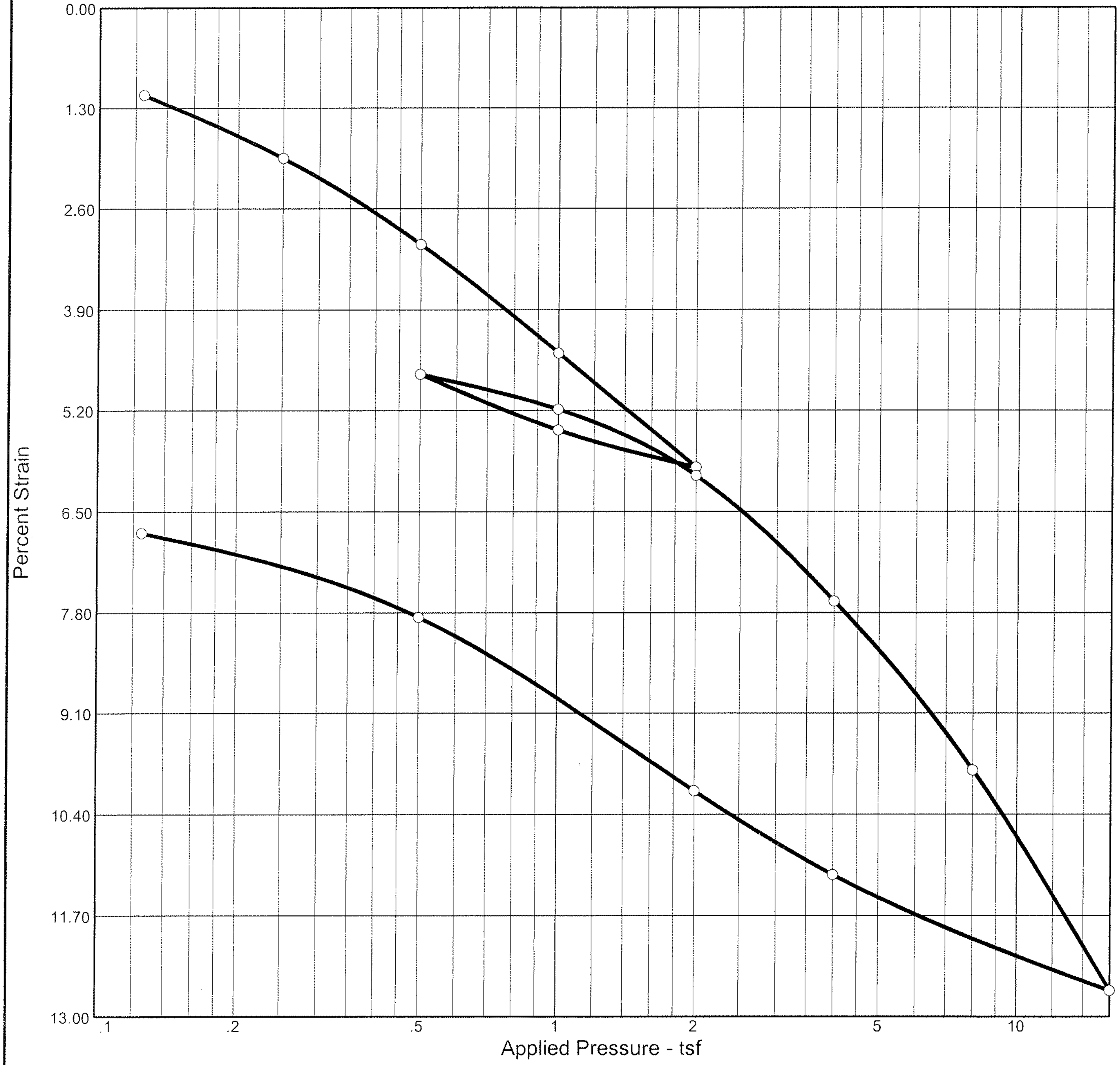
Client: LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Project No.: BD-21-084

Plate

ASTM D-2435: ONE DIMENSIONAL CONSOLIDATION REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Heave %	e_o
Sat.	Moist.											
96.1 %	27.3 %	95.1	44	24	2.7		8.26	0.17				0.768

MATERIAL DESCRIPTION	USCS	AASHTO
LB-12, U-1: 4' - 6'		

Project No. BD-21-084 **Client:** LANGAN ENGINEERING

Project: PROJECT FIFI (#190071801)

Location: LB-12, U-1: 4' - 6'

Remarks:

SAMPLE NUMBER: 21-717

ASTM D-2435: ONE DIMENSIONAL CONSOLIDATION REPORT

SJB SERVICES, INC.

Plate

APPENDIX G

GEOPHYSICAL TESTING RESULTS

GEOPHYSICAL ENGINEERING SURVEY REPORT

Project Fifi
Packard Road & Lockport Road,
Niagara Falls, New York 14304

NOVA PROJECT NUMBER:
22-2527

DATED:
January 18, 2022

PREPARED FOR:

LANGAN

Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511-6107
www.Langan.com

PREPARED BY:

NOVA
GEOPHYSICAL
ENGINEERING
Subsurface Mapping Solutions
56-01 Marathon Parkway # 765
Douglaston, New York 11362
347-556-7787 (PHONE)
718-261-1527(FAX)
www.nova-gsi.com

NOVA GEOPHYSICAL SERVICES
SUBSURFACE MAPPING SOLUTIONS
5601 Marathon Parkway #765, Douglaston, New York 11362
Ph. 347.556.7787 E: info@novagsi.com
www.novagsi.com

January 18, 2022

Taylor Sisti, PE
Senior Staff Engineer
LANGAN
Direct: 203.784.3067
Mobile: 203.695.4133
E: tsisti@langan.com

Re: Geophysical Engineering Survey (GES) Report
Project Fifi
Packard Road & Lockport Road
Niagara Falls, New York 14304

Dear Ms. Sisti,

Nova Geophysical Services (NOVA) is pleased to provide the findings of the geophysical engineering survey (GES) at the above referenced project site: Packard Road & Lockport Road, Niagara Falls, New York (the “Site”)

NOVA performed a geophysical engineering survey (GES) consisting of an Electrical Resistivity Imaging (ERI) survey on December 13th & 14th, 2021. The purpose of this survey was to identify the depth of bedrock throughout the site.

INTRODUCTION TO GEOPHYSICAL ENGINEERING SURVEY (GES)

The equipment selected for this investigation was a Syscal R1 Dual Channel Resistivity Meter with a 64 to 80 electrode cable. A consumer grade GPS unit was used to locate the ends of the collected ERI lines

The survey area consisted of portions of open field, asphalt, and overgrown vegetation. Brush clearing was not performed prior to the GES. Geophysical data was collected where accessible.

ERI GEOPHYSICAL METHOD

Site conditions typical of developed settings presented challenges for ERI data acquisition. Conventional electrodes were used to acquire the ERI data. These electrodes consist of a metal stake that is driven into the ground to allow for current injection into the subsurface. A survey configuration optimal for targeting depths between 5 and 40 ft. was used. Survey configurations varied between 64 and 80 electrodes.

Two ERI lines were collected at the time of the GES. Line A utilized a 10-foot electrode spacing, 80 electrodes, and a line length of 790 feet. Line B utilized a 15-foot electrode spacing, 64 electrodes, and a line length of 945 feet. The end of the ERI line locations were recorded using a consumer grade GPS

Electrode contact resistance (the total resistance between the electrodes that limits the current flow) was assessed following each line deployment. High contact resistances (greater than 10 kohm) can significantly reduce the current injected and decrease data quality. Electrodes were serviced as needed by watering the electrodes with a high salinity or low salinity solution until an acceptable contact resistance was achieved.

ERI DATA PROCESSING

Pre-processing Raw data (described by an apparent resistivity) were first filtered based on some key data acquisition parameters using Iris Instruments proprietary data processing software Prosys. The same initial filtering criteria were used for all datasets:

- Removal of negative apparent resistivities
- Removal of measurements with stacking error greater than 5%
- Removal of outliers based on apparent resistivity values
- Removal of measurements with extremely high geometric factor (K) (<|8000|

This resulted in ~ 5-15% being removed in this step, suggesting very high data quality, especially for surveys within a developed area, which is considered a geophysically noisy environment

All datasets were inverted to produce a 2D model of the estimated resistivity structure along each line. The approach models 3D current flow for a resistivity distribution that varies along the line and with depth but is constant in the direction perpendicular to the line. The topography of the land surface is incorporated into the modeling. This is the established approach for processing resistivity imaging data acquired on a line of electrodes. It is important to appreciate the limitations of the 2D assumption as the Earth is inherently three dimensional. The 2D assumption is well suited to modeling the Earth when the assumptions are reasonably well met by reality. An example could include imaging the cross-sectional structure of a buried river channel that will be continuous in the direction perpendicular to the line. However, the 2D assumption can result in unrealistic model structures when applied at complex sites where resistivity varies in all dimensions. In addition to ground-truthing, another way to have confidence that the 2D assumption is a reasonable approximation is if 2D inversions of closely spaced parallel lines contain similar features and/or if inversions of intersecting lines show a high level of consistency. As shown later, this was the case for the imaging performed in this survey.

A conventional smoothness constraint was used to force the inversion to find a model that is geologically reasonable at the expense of more detailed model structure. This constraint is necessary as otherwise multiple (often unrealistically rough) resistivity structures can fit the data equally well. The smoothness constraint results in a smooth model of resistivity structure that is more likely to represent a blurred version of subsurface reality. Accurate assignment of data weights in the inversion is necessary to avoid over or under fitting this smooth model structure (if data weights are estimated as too low, unrealistic model structure results; if data weights are estimated as too high, the model structure is unnecessarily smooth, and information is excluded). The careful assessment of reciprocal errors ensured that measurements were correctly weighted in the inversion.

PHYSICAL SETTINGS

NOVA observed the following physical conditions at the time of the survey.

Weather: Rain, Overcast

Temperature: 50° F

Surface: Mud, Standing Water

ERI RESULTS

Survey Parameters: An electrical resistivity imaging (ERI) survey was conducted throughout the site. The depth to bedrock across the foundation of the future building was the primary target.

Limitations: The geophysical noise level was low throughout the site. As with all surfaces based geophysical methods the accuracy of the results decreases as depth increases. Two highly resistive materials near each other (ex. fill and bedrock) will appear to be one anomaly and targets can appear to be “smeared” due to the smoothness constraint of the inversion algorithm. Significant access issues were experienced at the time of the survey. NOVA was unable to utilize a car on the site due to ground conditions. Additionally, equipment breakdown reduced the number of lines collected at the time of the GES.

A-priori Information: Boring logs in the vicinity of the two collected survey lines were provided to NOVA to assist with da interpretation and ground truth.

Analysis: The processed data were inverted to produce subsurface images of electrical properties. Detailed examples of 2D inverted images are presented in ERI Data showing a conductive layer (Greenish) over a moderately resistive layer (greenish/yellowish and below that a highly resistive one (Reddish) in contact at a relatively uniform depth across both lines.

The results of the geophysical engineering survey (GES) identified the following at the project site. A graphical interpretation is provided in ERI Data:

- Two resistivity images are provided per line. The top image for each line is a focused inversion of 10 feet below ground surface (BGS) and the bottom image is a full depth inversion of approximately 30 to 40 feet BGS.
- A conductive near surface layer was identified throughout the ERI lines at approximately 2 to 6 feet below ground surface. This is suspected to represent a saturated clay layer at the near surface. The approximate bottom of the layer is shown as a dashed purple line in ERI Data.
- A deeper highly resistive layer at approximately 7 to 12 feet is visible in both ERI lines. This layer is interpreted to be bedrock. The top of this layer is shown as a dashed blue line in the ERI Data.
- A layer with resistive areas interspersed with more conductive areas is suspected to be related to a till layer between the interpreted near surface clay layer and the deeper bedrock. This layer is between the dashed blue line and the dashed purple line in the ERI Data.
- Line B contains a resistive anomaly at a depth of approximately 20 ft BGS that is suspected to be an inversion artifact reducing the data quality beneath this depth.

If you have any questions, please do not hesitate to contact the undersigned.

Sincerely,

NOVA Geophysical Services

Levent Eskicakit, P.G., E.P.

Project Manager

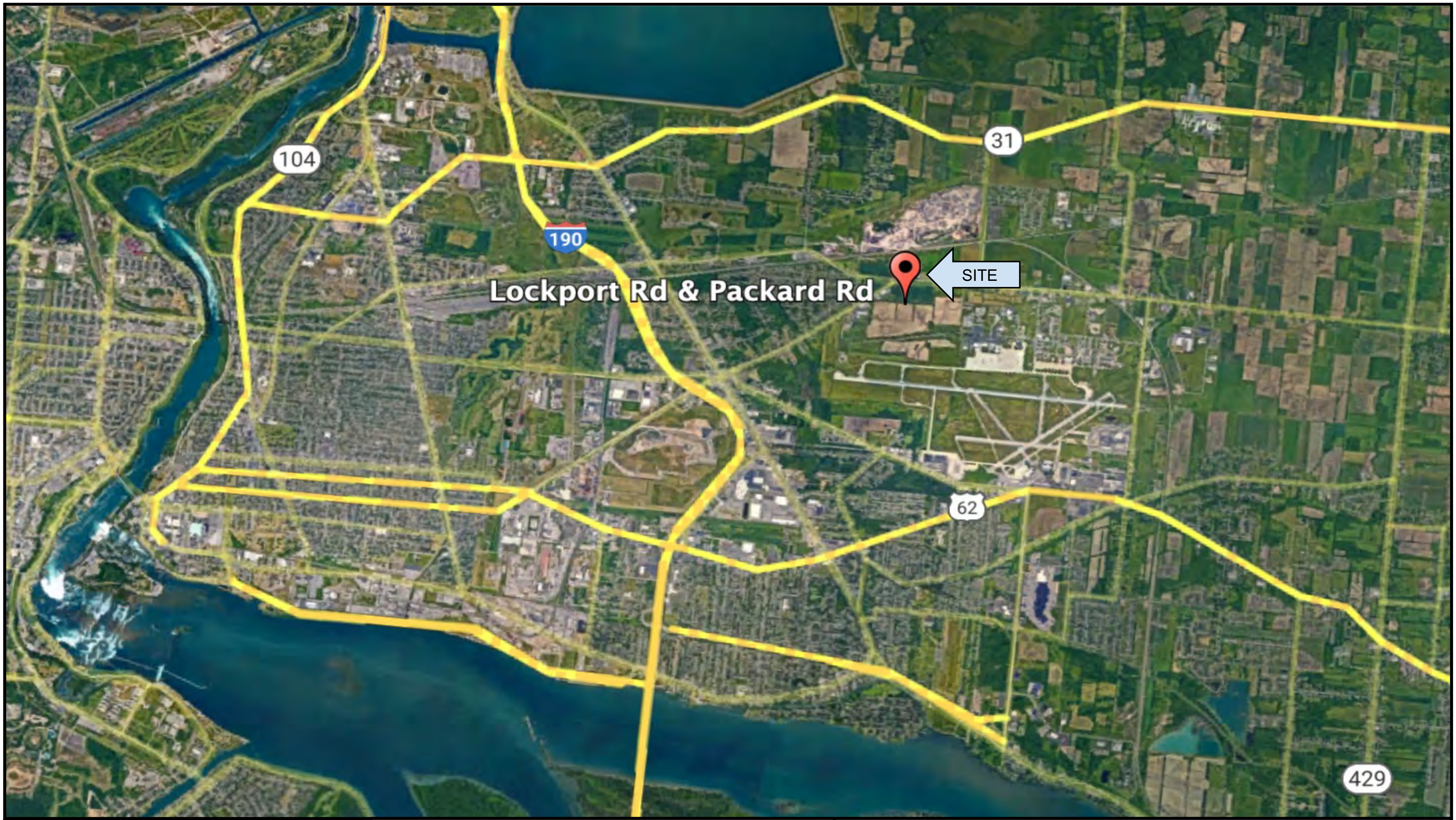
Attachments:

Location Map

Geophysical (ERI) Data

Survey Plan

Geophysical Images



NOVA
Geophysical Services
Subsurface Mapping Solutions
56-01 Marathon Parkway, # 765
Douglaston, New York 11362
Phone (347) 556-7787 * Fax (718) 261-1527
www.novagsi.com

LOCATION MAP

SITE:	**Project Fifi** Packard Road & Lockport Road, Niagara Falls, New York 14304
CLIENT:	Langan
DATE:	December 14th & 15th, 2021
AUTH:	Chris Steinley

LEGEND

NOVA
Geophysical Services
Subsurface Mapping Solutions
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Douglaston, New York 11362
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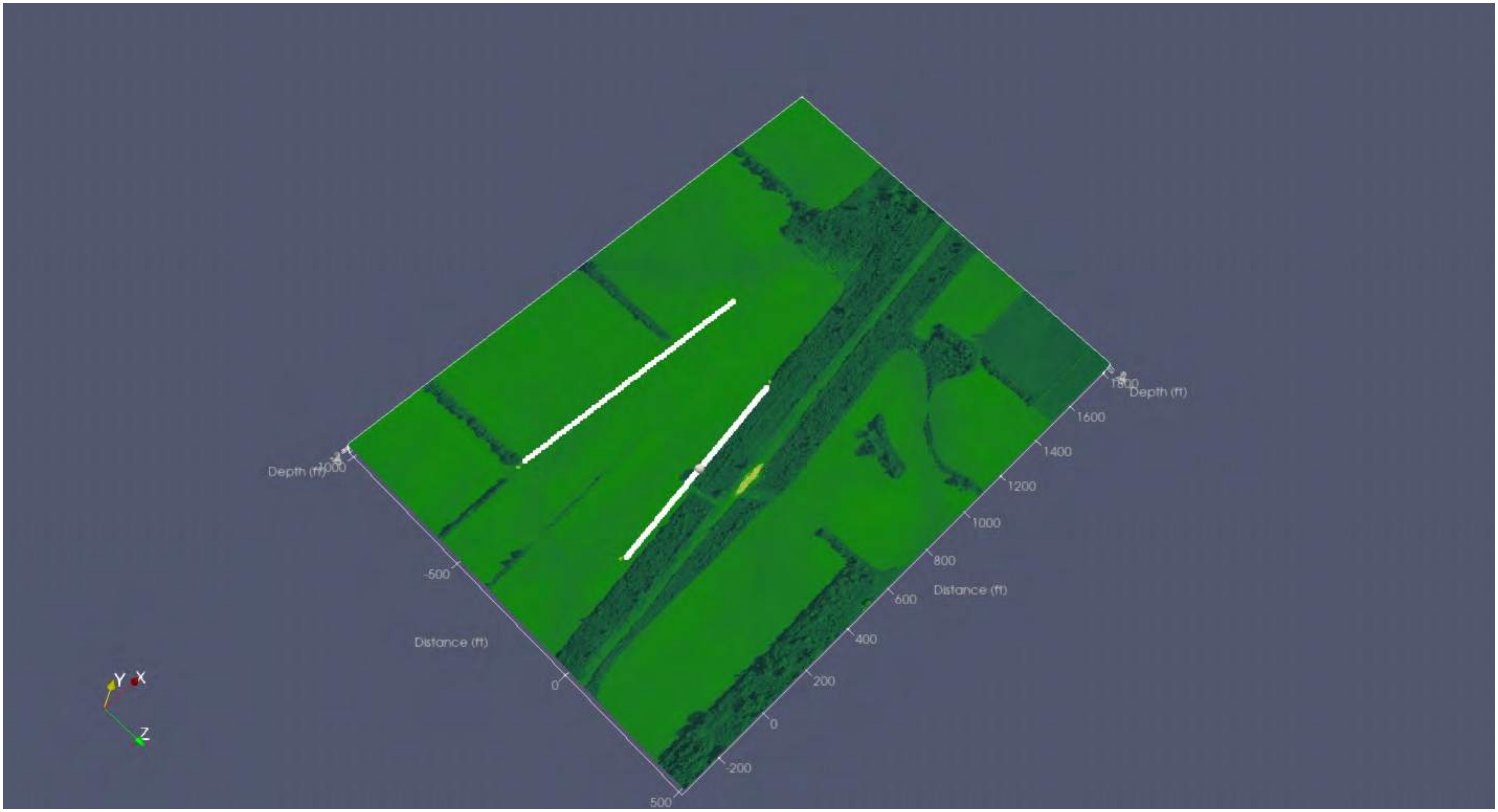
www.novagsi.com

SURVEY PLAN

SITE:	**Project Fifi** Packard Road & Lockport Road, Niagara Falls, New York 14304
CLIENT:	Langan
DATE:	December 14th & 15th, 2021
AUTH:	Chris Steinley

LEGEND

🟥	Survey Area
⋱	ERT Line



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ERI Lines (A & B)

SITE: **Project Fifi**
Packard Road & Lockport Road,
Niagara Falls, New York 14304

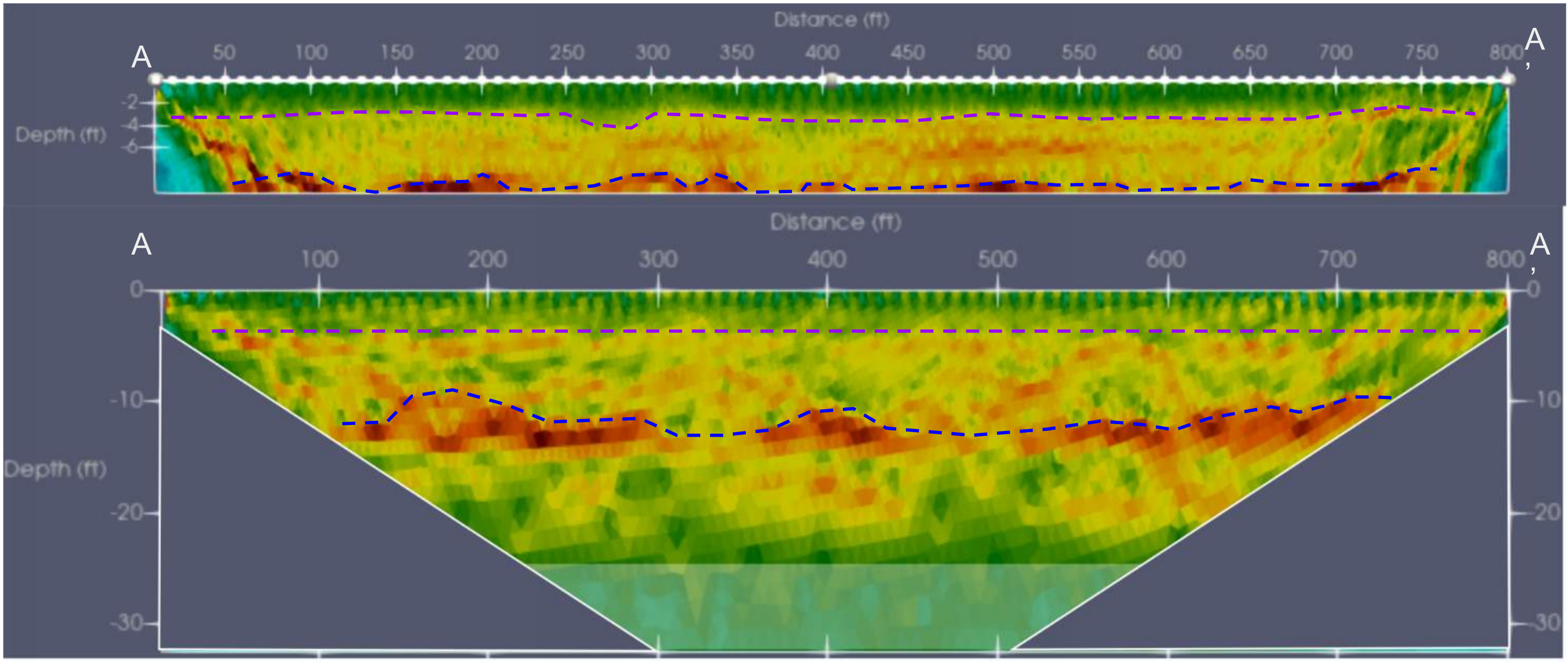
CLIENT: Langan

DATE: December 14th & 15th, 2021

AUTH: Chris Steinley

LEGEND

╲ ERI Lines



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Douglaston, New York 11362
Phone (347) 556-7787 * Fax (718) 261-1527
www.novagsi.com

ERI Data - Line A

SITE: **Project Fifi**
Packard Road & Lockport Road,
Niagara Falls, New York 14304

CLIENT: Langan

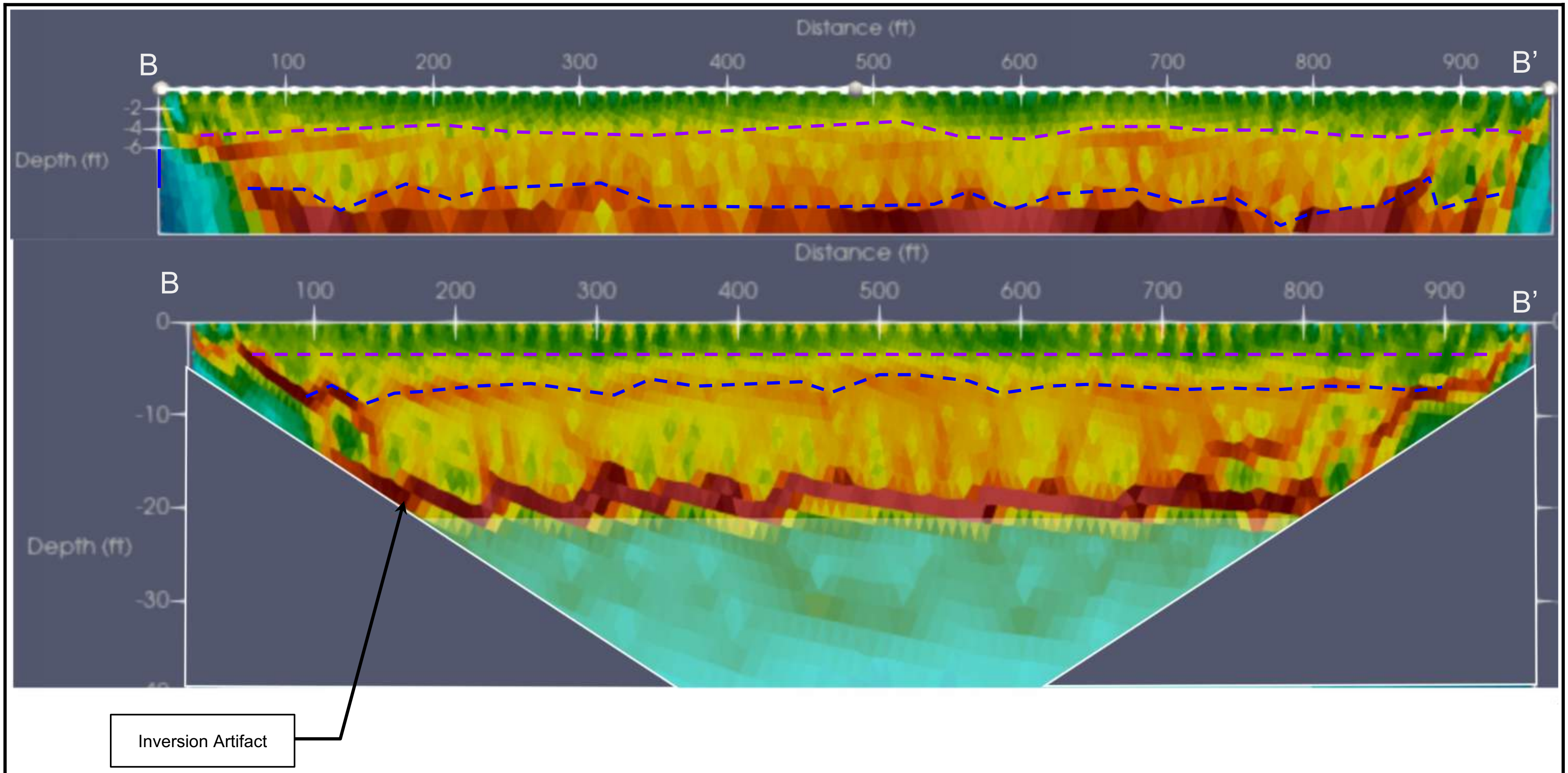
DATE: December 14th & 15th, 2021

AUTH: Chris Steinley

LEGEND

Top of Bedrock

Top of Till



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Douglaston, New York 11362
Phone (347) 556-7787 * Fax (718) 261-1527
www.novagsi.com

ERI Data - Line B

SITE: **Project Fifi**
Packard Road & Lockport Road,
Niagara Falls, New York 14304

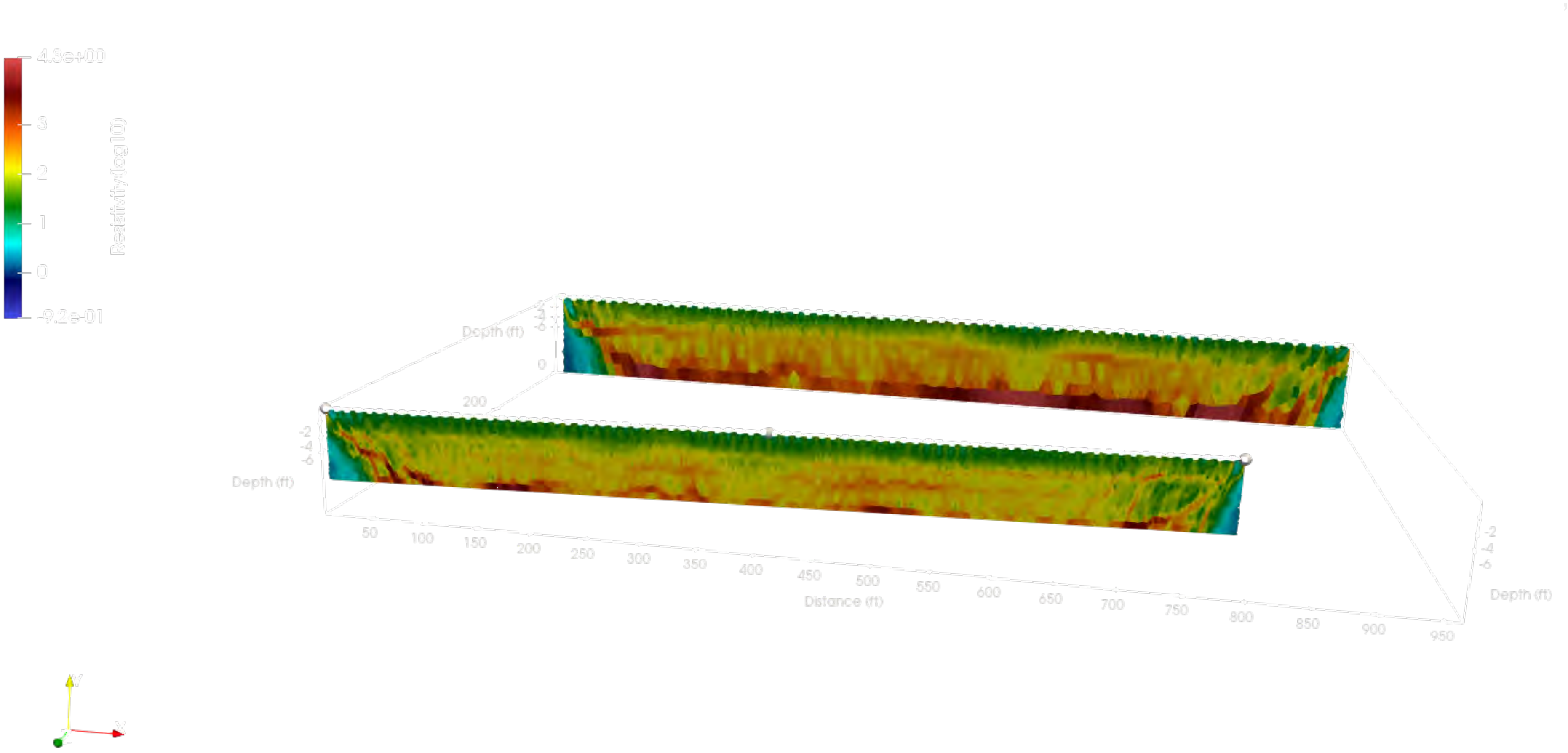
CLIENT: Langan

DATE: December 14th & 15th, 2021

AUTH: Chris Steinley

LEGEND

- Top of Bedrock
- Top of Till



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56-01 Marathon Parkway, # 765
Douglaston, New York 11362
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www.novagsi.com

ERI Lines Cross Sections (A & B)

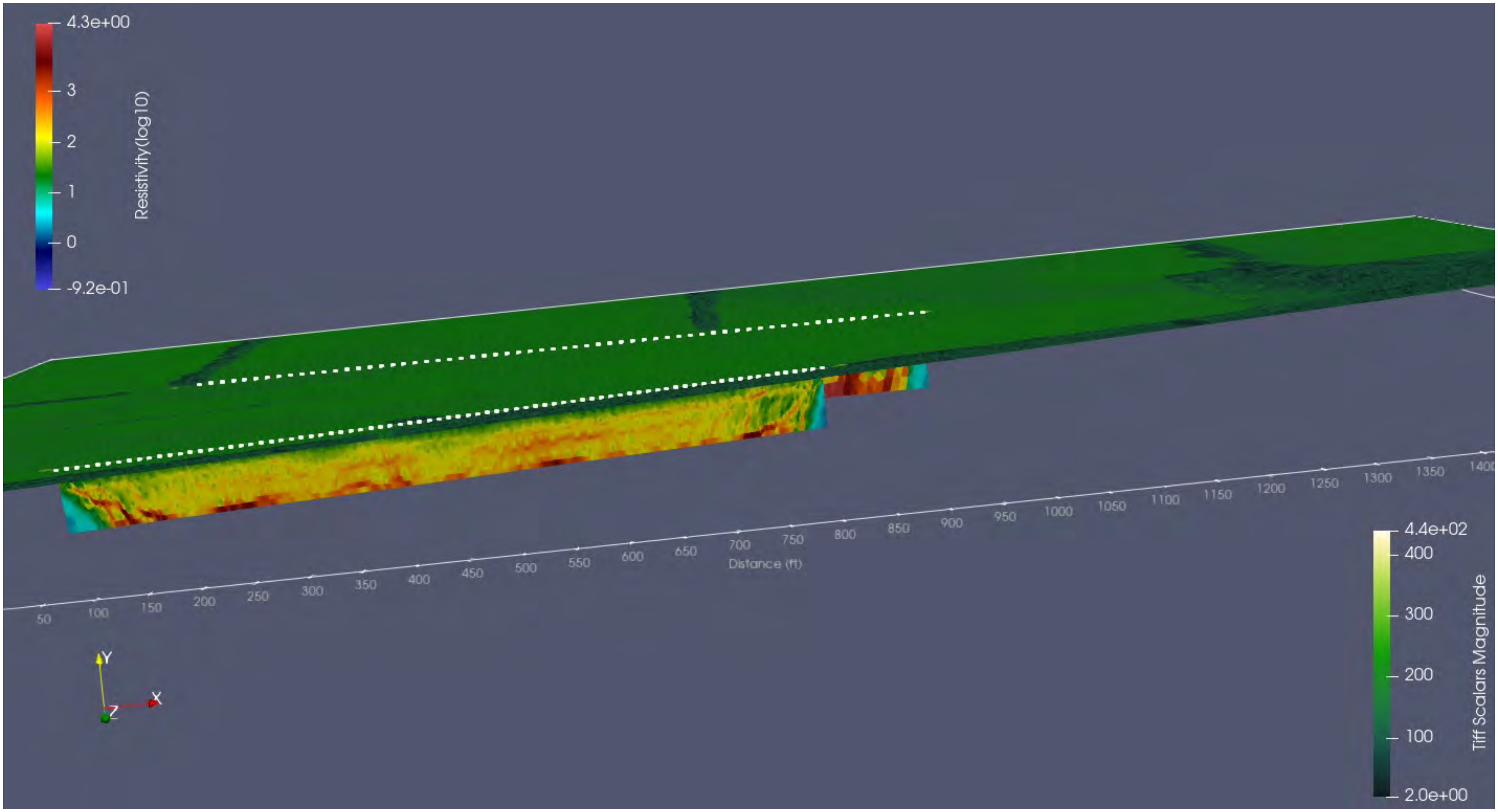
SITE: **Project Fifi**
Packard Road & Lockport Road,
Niagara Falls, New York 14304

CLIENT: Langan

DATE: December 14th & 15th, 2021

AUTH: Chris Steinley

LEGEND



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www.novagsi.com

ERI Lines Cross Sections (A)

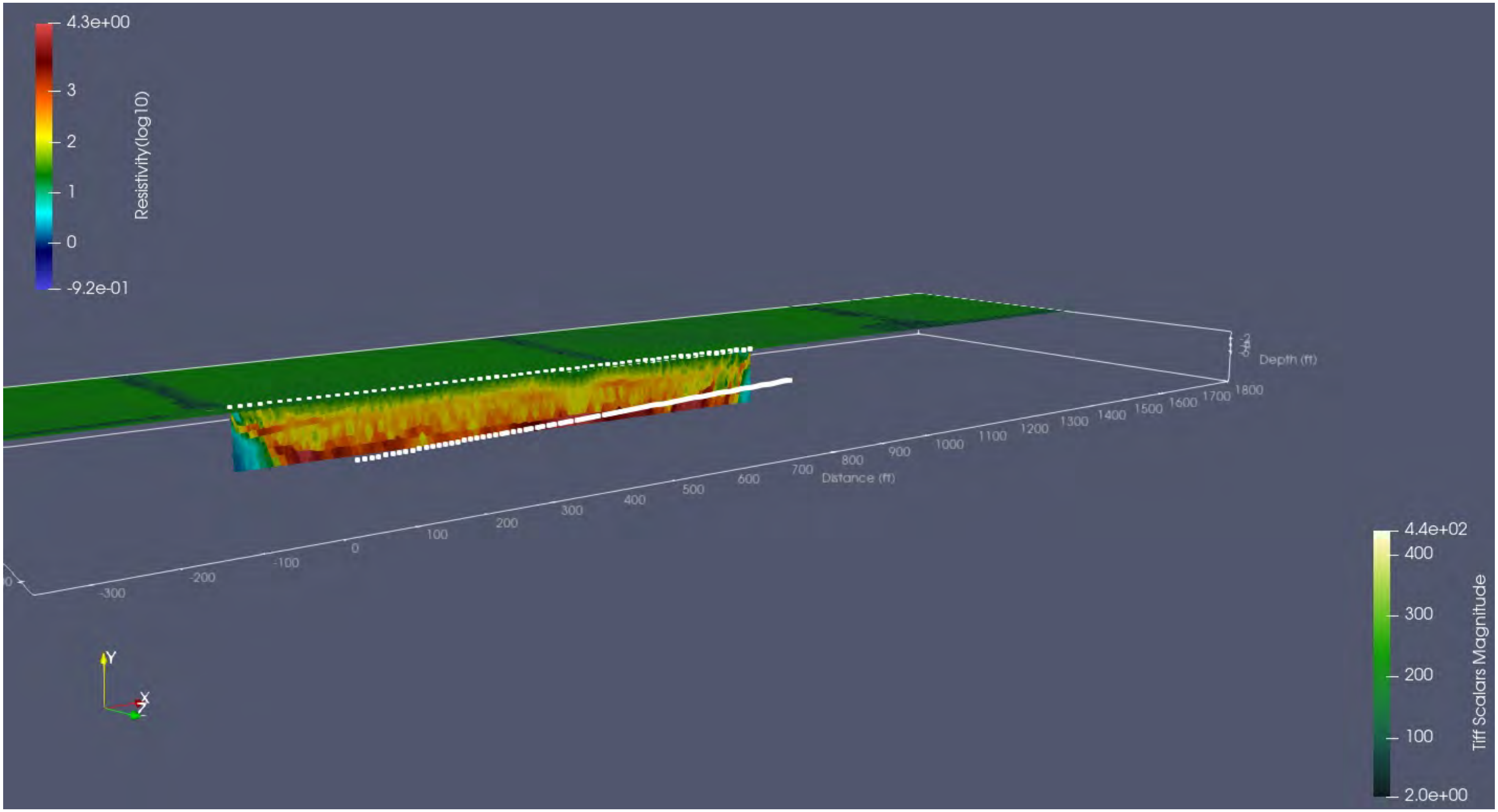
SITE: **Project Fifi**
Packard Road & Lockport Road,
Niagara Falls, New York 14304

CLIENT: Langan

DATE: December 14th & 15th, 2021

AUTH: Chris Steinley

LEGEND



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Geophysical Services
Subsurface Mapping Solutions
56-01 Marathon Parkway, # 765
Douglaston, New York 11362
Phone (347) 556-7787 * Fax (718) 261-1527
www.novagsi.com

ERI Lines Cross Section (B)

SITE: **Project Fifi**
Packard Road & Lockport Road,
Niagara Falls, New York 14304

CLIENT: Langan

DATE: December 14th & 15th, 2021

AUTH: Chris Steinley

LEGEND

GEOPHYSICAL IMAGES

Project Fifi

Packard Road & Lockport Road,
Niagara Falls, New York 14304
December 14th & 15th, 2021

GEOPHYSICAL IMAGES

Project Fifi
Packard Road & Lockport Road,
Niagara Falls, New York 14304
December 14th & 15th, 2021

Site Map: **https://caltopo.com/m/41VUN**

Line A:
Start: 43.11495, -78.96211
End: 43.11537, -78.95918
Electrodes: 80
Spacing: 10 feet
Conditions: Mud, Standing Water

Line B:
Start: 43.11648, -78.95869
End: 43.11657, -78.96220
Electrodes: 64
Spacing: 15 feet
Conditions: Mud, Standing water, Rain

Line C:
See link at top for approximate start and end points
Electrodes: 64
Spacing: 10 feet
Conditions: Mud, Rain

General Site Notes for interpretations:

Ground Conditions: Ground saturated, mud, standing water

Topographic changes across the site are minimal.

Some electrodes were in standing water

Rs values were less than 2 across the site and generally less than 1.

Bedrock Groundtruths between 4 feet and 14 feet bgs (from conversations with langan personnel.) If Langan can provide all of their boring logs with coordinates for the survey area it would be helpful for us to fill out our data and for ground truth purposes.

Photos: https://photos.app.goo.gl/2ARFQTTyJC5okDTj8 (Tolga might have more)

APPENDIX H

PAVEMENT DESIGN

Project Information:

Project Title: Project Fifi
Project Town: Niagara
Project State: NY
Client: J2B

Project No.: 190071801
Performed By: TDS
Date: 1/19/2021

Design Information:

- Design Life: 20 years
- Initial Servicibility (Po): 4.2
- Terminal Servicibility Index (TSI): 2.5
- Servicibility (Po - TSI): 1.7

- Reliability Factor (R): 0.90
- Standard Deviation (Sd): 0.45
- Direction Distribution Factor (Do): 1.00
- Lane Distribution Factor (Dl): 1.00

- Soil Description: Clay
- USCS Symbol: CL
- California Bearing Ratio (CBR): 7
- Resilent Modulus (MR): 10500 PSI

CBR Based on: Estimated Value
**MR = CBR*1,500*

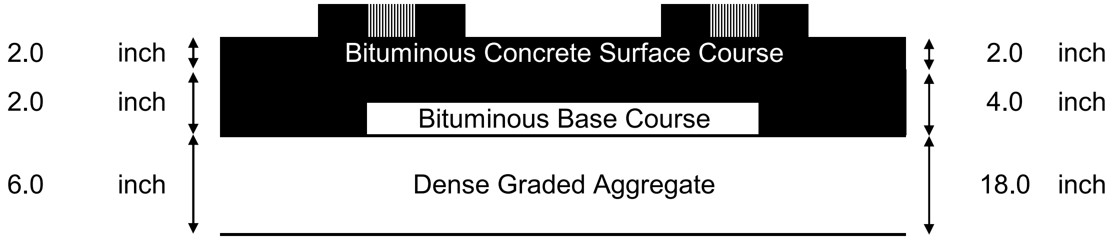
Summary of Results

Standard Section

Design ESAL: 59,242

Heavy Duty Section

Design ESAL: 7,542,004



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Project	Drawing Title	Project No.	Drawing No.
Project Fifi Niagara NY	Pavement Design Summary Sheet	190071801	P.01
		Date 1/19/2021	
		Scale Not to Scale	
		Drawn By TDS	Sheet 1 of 4

Calculate Equivalent 18-kip Single Axle Loading (ESALs)

Equivalent Single Axle Loads per Vehicle

			Load Equivalency Factors:		
○	***Typical Car:***			Calculated ESALs	
(S)	Front Single Axle:	2 kips	LEF = 0.0004	(1 axle)(0.0004)+(1 axle)(0.0004) =	**0.00209 /car**
(S)	Rear Single Axle:	2 kips	LEF = 0.0004		
○	***Typical Light Duty Van***			Calculated ESALs	
(S)	Front Single Axle:	6 kips	LEF = 0.025	(1 axle)(0.025)+(1 axle)(0.025) =	**0.05 /truck**
(S)	Truck Rear Axle:	6 kips	LEF = 0.025		
○	***Typical Truck and Trailer:***			Calculated ESALs	
(S)	Front Single Axle:	8 kips	LEF = 0.047	(Front axle)(0.047)+(Rear axle)(0.96)	
(S)	Truck Rear Axle:	32 kips	LEF = 0.96	+(Trailer Tandem)(0.96))&) =	**1.97 /truck**
(T)	Trailer Axle:	32 kips	LEF = 0.96		

(S) = single axle, (T) = Tandem, (3) = Triple Ax 10

Traffic Loading ○ Design Life: 20 years (From Sheet P.01)

Standard Pavement Section

Vehicle Types	Current Traffic	Growth Factors	Design Traffic	ESAL Factor	Design ESAL
Passenger Cars	2000	2% 24.30	17,737,080	0.00209	37,070
Light Trucks	50	2% 24.30	443,427	0.05	22,171

Standard Design ESAL: **59,242**

Heavy Duty Pavement Section

Vehicle Types	Current Traffic	Growth Factors	Design Traffic	ESAL Factor	Design ESAL
Passenger Cars	2000	2% 24.30	17,737,080	0.00209	37,070
Light Trucks	50	2% 24.30	443,427	0.05	22,171
Heavy Trucks	350	4% 29.78	3,804,150	1.967	7,482,762

Heavy Duty Design ESAL: **7,542,004**

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Project	Drawing Title	Project No.	Drawing No.
Project Fifi Niagara NY	ESAL Calculation	190071801	P.02
		Date 1/19/2021	
		Scale Not to Scale	
		Drawn By TDS	Sheet 2 of 4

Design Information (from P.01):

- Reliability Factor (R): 0.90
- Standard Deviation (Sd): 0.45
- Resilent Modulus (MR): 10.5
- Servicibility (Po - TSI): 1.7

Traffic Information (from P.02):

- Standard ESALs (W18): 59,242
  - *(millions)* 0.059
- Heavy Duty ESALs (W18): 7,542,004
  - *(millions)* 7.54

From Nomograph:

Design Structural Number (SN)

Standard Section:

2.0 →

Heavy Duty Section:

4.2 →

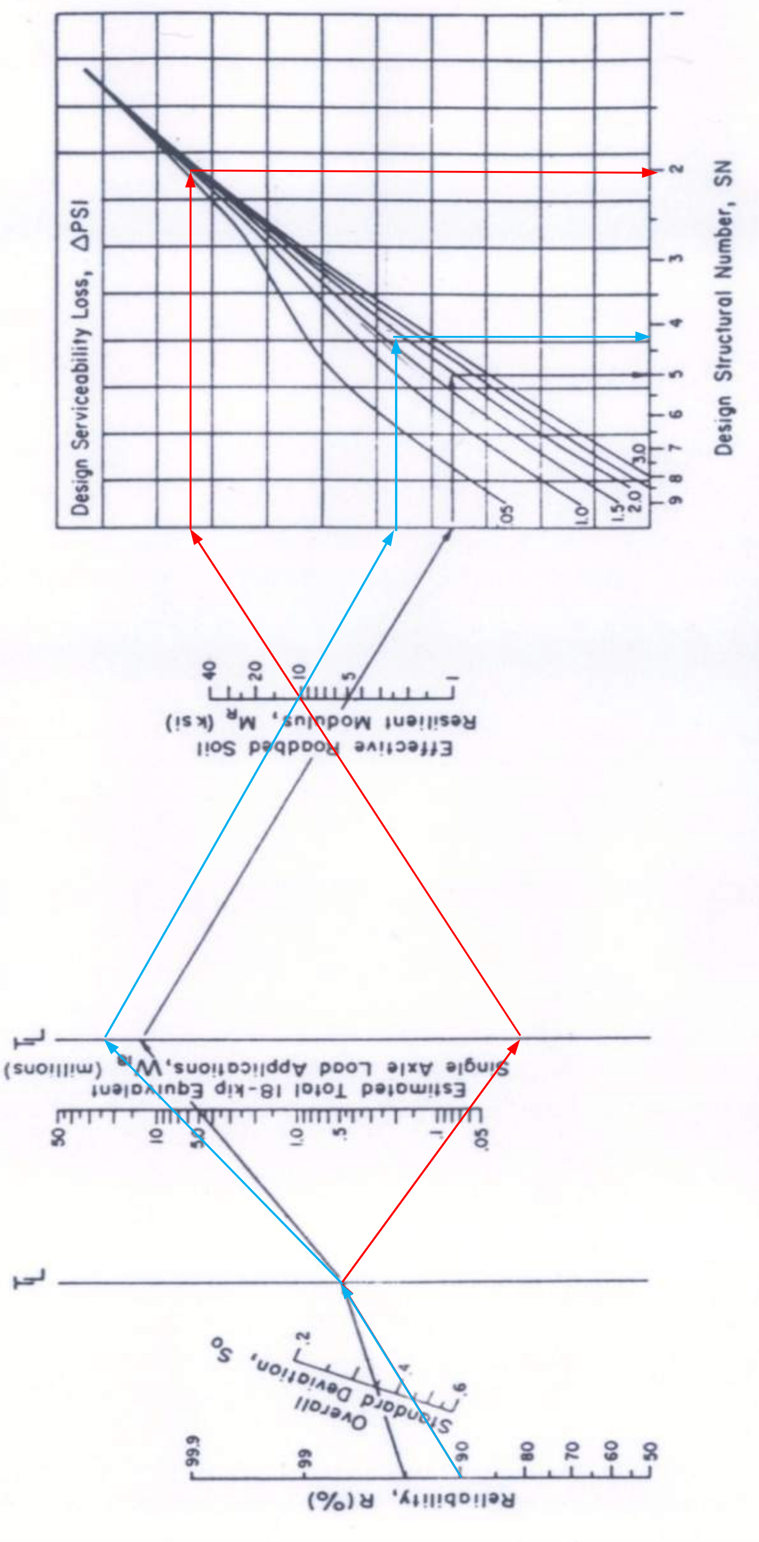

Figure 11.25 Design chart for flexible pavements based on mean values for each input (1 ksi = 6.9 MPa). (From the *AASHTO Guide for Design of Pavement Structures.* Copyright 1986. American Association of State Highway and Transportation Officials, Washington, DC. Used by permission.)

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Project Project Fifi Niagara NY	Drawing Title AASHTO Flexible Pavement Nomograph	Project No. 190071801	Drawing No. P.03
		Date 1/19/2021	
		Scale As Shown	
		Drawn By TDS	Sheet 3 of 4

Flexible Pavement Section Calculation:

Structural Number:
SN = D1(a1)+D2(a2)+D3(a3)

Standard Section:

Material	Spec	Thickness (inch)		Layer Strength		SN
Bituminuous Concrete Surface Course	Class 2	D1	2.0	a1	0.44	0.88
Bituminuous Concrete Binder Course	Class 1	D2	2.0	a2	0.40	0.80
Dense Graded Aggregate	Subbase	D3	6.0	a3	0.11	0.66

Calculated Structural Number for Section: **2.34**
Check Calculated SN is > Design SN: OK
Design Light Duty Structural Number SN: 2 (from P.03)

Heavy Duty Section:

Material	Spec	Thickness (inch)		Layer Strength		SN
Bituminuous Concrete Surface Course	Class 2	D1	2.0	a1	0.44	0.88
Bituminuous Concrete Binder Course	Class 1	D2	4.0	a2	0.40	1.60
Dense Graded Aggregate	Subbase	D3	18.0	a3	0.11	1.98

Calculated Structural Number for Section: **4.46**
Check Calculated SN is > Design SN: OK
Design Heavy Duty Structural Number SN: 4.2 (from P.03)

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Project	Drawing Title	Project No.	Drawing No.
Project Fifi Niagara NY	Flexible Pavement Section Calculation	190071801	P.04
		Date: 1/19/2021	
		Scale: As Shown	
		Drawn By: TDS	Sheet 4 of 4

INPUT

STANDARD DUTY PAVEMENT

W18 = 59,242 ESAL
R = 0.95
Sd = 0.35
DPSI = 2.0

f'c = 4000 psi
Ec = 57,000 (f'c)^0.5
Ec = 3.60E+06 psi

S'c = 569 psi (Modulus of rupture - assumed)
J = 3.8 (load transfer coefficient)
Cd = 1.0 (drainage coefficient - assumed)
k = 160 pci
K = 241 lbf/in^3 (values from Table P.1)
for 10 inches of subbase

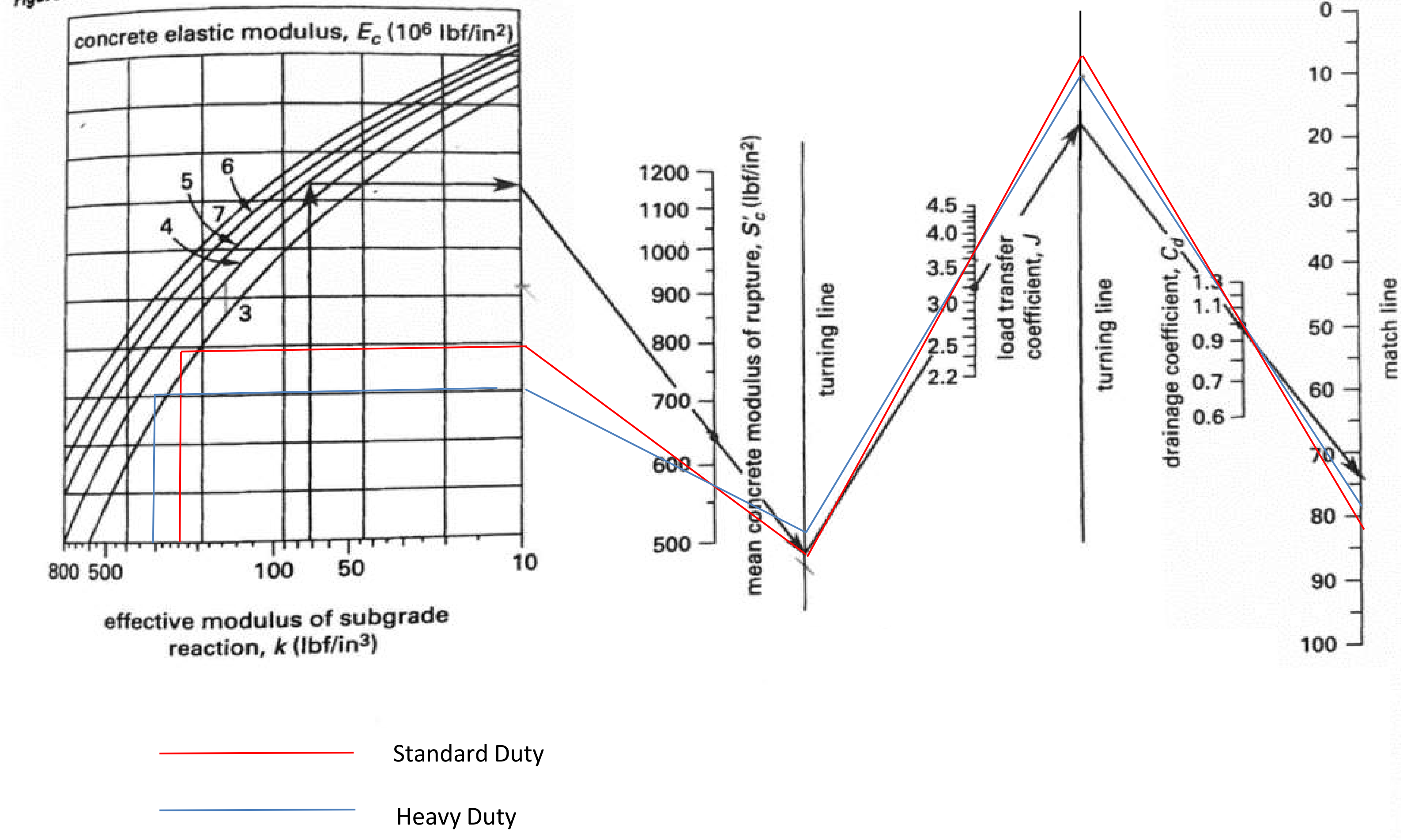
HEAVY DUTY PAVEMENT

W18 = 7,542,004 ESAL
R = 0.95
Sd = 0.35
DPSI = 2.0

f'c = 4000 psi
Ec = 57,000 (f'c)^0.5
Ec = 3.60E+06 psi

S'c = 569 psi (Modulus of rupture - assumed)
J = 3.8 (load transfer coefficient)
Cd = 1.0 (drainage coefficient - assumed)
k = 160 pci
K = 304 lbf/in^3 (values from Table P.1)
for 14 inches of subbase

Figure 77.2 *AASHTO Design Chart for Rigid Pavement**



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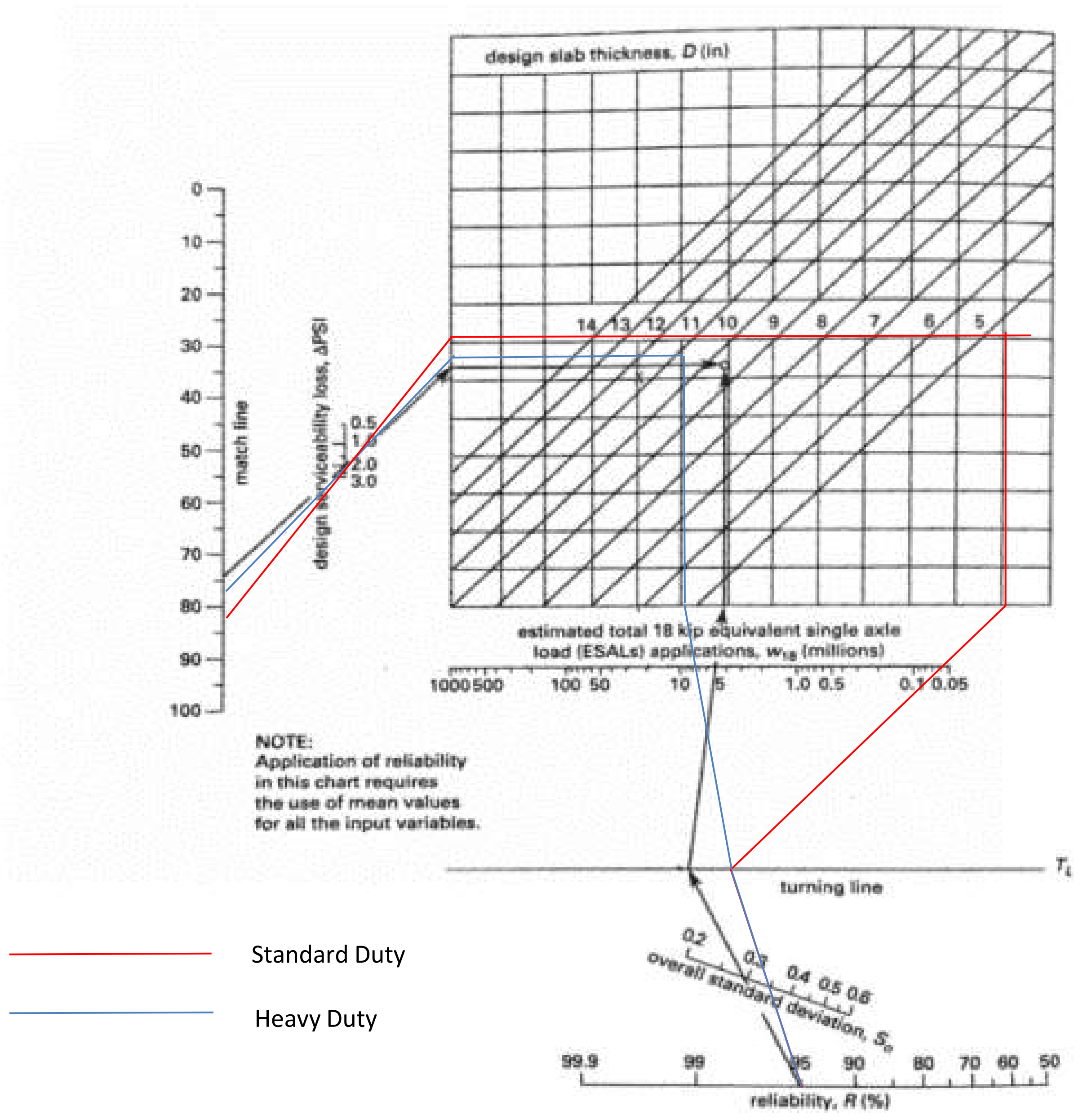
Project	Drawing Title	Project No.	Drawing No.
Project Fifi Town of Niagara NY	Pavement Design Summary Sheet	190071801	I.01
		Date 2/7/2022	
		Scale Not to Scale	Sheet 1 of 2
		Drawn By TDS	



Standard Duty

5 Concrete Thickness (in)
8 Subbase Thickness (in)

Heavy Duty

11 Concrete Thickness (in)
11 Subbase Thickness (in)

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Project	Drawing Title	Project No.	Drawing No.
Project Fifi Town of Niagara NY	Pavement Design Summary Sheet	190071801	I.02
		Date: 2/7/2022	
		Scale: Not to Scale	
		Drawn By: TDS	Sheet 2 of 2

Exhibit B

OSTERGAARD
ACOUSTICAL
ASSOCIATES

EVALUATION OF SITE SOUND EMISSIONS

PROPOSED DISTRIBUTION FACILITY
Town of Niagara, New York

Prepared for:	**Langan**
Prepared by:	**Benjamin C. Mueller, P.E.** bmueller@acousticalconsultant.com
Reviewed by:	**Daniel J. Young** dyoung@acousticalconsultant.com
Date:	**15 February 2022**
OAA File:	**4515A**

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TABLE OF CONTENTS

INTRODUCTION

Ostergaard Acoustical Associates (OAA) was retained to analyze projected potential sound emissions from a proposed e-commerce storage and distribution facility planned for construction in the Town of Niagara, Niagara County, New York. The Site is approximately 218 acres, currently used as farmland and located on a parcel southeast of the intersection of Lockport Road and Packard Road, just north of the Niagara Falls International Airport ("Site"). Plans call for the construction of a storage and distribution facility in the central portion of the Site with truck docks on three sides. This report addresses the on-site noise radiated from this project to off-site nearby potentially noise-sensitive residential receptors.

The purpose of this sound study is to analyze future Site sound emissions for comparison with applicable code limits and to evaluate the potential for noise complaints. Evaluations were carried out by Ostergaard Acoustical Associates (OAA) and included conducting a 24-hour sound level monitoring survey at two locations. There is no New York State noise code; however, the New York State Department of Environmental Conservation (DEC) does have guidelines for assessing and mitigating noise impacts. The Town of Niagara has a noise code that addresses sound qualitatively but does not provide specific code limits. Sound produced by the Site will comprise steady sound from rooftop HVAC equipment as well as intermittent sound from truck and car[1] movements.

Work by OAA was overseen by Benjamin C. Mueller, P.E., with assistance from OAA Staff Engineer Daniel J. Young. The representatives at Langan helping coordinate this project are Mike Finan, P.E. and Christina M. Zolezi, P.E.

SITE AND VICINITY

Figure 1 is an aerial image obtained from Google Earth showing the Site outlined in red. Figure 1 also shows ambient survey locations, which are discussed in a subsequent section. The Site currently comprises farmland in the HI (Heavy Industry) zone. Our understanding of zoning/land uses in the area is as follows:

- ☐ Bordering the Site to the northeast are single-family residential properties fronting on Lockport Road in the B-1 (Business - 1) zone. Additional single-family residences are

---

[1] Note that throughout this report, the term "car" collectively refers to personal passenger vehicles including automobiles, vans, pick-ups, or SUVs. The term "truck" refers to heavy trucks such as over-the-road or line-haul trucks.

located across Lockport Road in the B-1 and R-1 (Residential - 1) zones. Farther north is a railroad right-of-way and a quarry in the HI zone.

- East of the Site, across Tuscarora Road, is the Niagara Falls Air Reserve Station in the LI zone.

- Abutting the Site to the south is the Niagara Falls International Airport in the LI zone. Residences and commercial properties are beyond, however, these are significantly far enough from the Site as to not be of concern with respect to potential sound impacts.

- Bordering the Site to the west is a single-family residence and multiple industrial and commercial properties fronting on Haseley Drive and Packard Road in the LI zone. Beyond Packard Road to the northwest is a dense single-family residential neighborhood in the R-1 zone; this community is over 1,000 feet away from on-site activity.

Plans call for the construction of a rectangular building, with an approximately 650,000 square-footprint, positioned in the northeast portion of the Site. Heavy truck docks are located along the west, south, and east sides of the building. Trailer parking is outboard of these docks. Personnel parking is segregated from the truck court and located on the east side of the building. The Site will be served by three northern driveways and one eastern driveway. The primary truck driveway will be to the north at the intersection of Lockport Road and Packard Road. A secondary truck access is provided to the east on Tuscarora Road. This secondary truck access will primarily be used for emergencies or during peak seasonal days. Personnel vehicles can use all four driveways to access the Site.

Site specific traffic counts indicate that Site activity is expected at all times of the day. Personnel vehicle activity is concentrated during employee shift changes. Heavy truck activity avoids these shift change times and is dispersed throughout all hours of the day. The nighttime operations are of most concern since this is typically when residential receptors are most sensitive and code limits are more stringent.

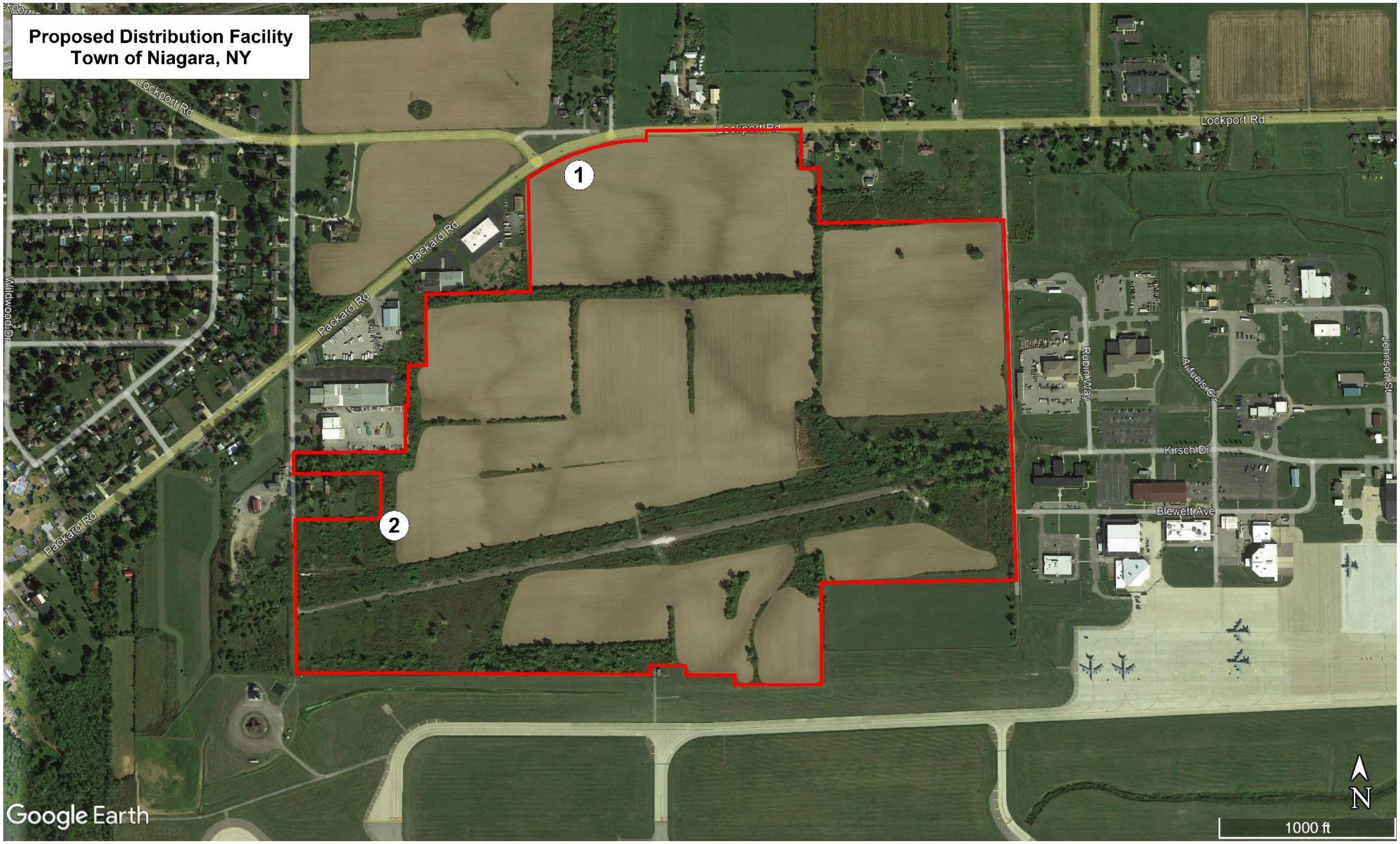


Figure 1 — Google Earth image showing the proposed distribution facility Site and vicinity in the Town of Niagara, NY. The Site property line is outlined in red. Ambient sound survey Locations also shown.

REGULATIONS/GOALS

When developing a project of this type, it is appropriate to consider how sound from the facility will likely be received, especially by noise-sensitive receptors. Sound produced by a distribution facility is characterized by motor vehicle activity, such as idling and vehicle movement, as well as steady HVAC equipment. These sound sources were evaluated and compared to applicable noise code limits. As a general practice, when motor vehicles are on-site, they are considered part of a Site's sound emissions; when vehicles are on public roads, they are not. The goal of the sound study is to minimize the Site's acoustical impact on the surrounding area.

The Town of Niagara Code of Ordinances discusses noise in Chapter 179: Noise, Unreasonable. This code discusses noise in a qualitative manner and does not provide any regulatory limits. The code generally prohibits the creation of unreasonable noise between the hours of 2300-to-0700. Unreasonable noise is defined as any sound which creates a noise disturbance, which annoys, disturbs, injures, or endangers the reasonable quiet, comfort or repose of a reasonable person of normal sensitivities or health or safety of others. Unreasonable noise is also defined as sound that is audible on property being used for residential purposes at a point more than 100 feet from the real property boundary line. The code specifically prohibits the activity of loading and unloading as to project a sound across a real property line and cause a noise disturbance, during the hours of 2100-to-0600. Also, listed as enumerated exceptions are noises of safety signals and warning devices. There are no Niagara County codes regarding noise.

New York State Vehicle and Traffic (VAT) Law states that all motor vehicles must have a muffler and must be below specific sound limits at a distance of 50 feet. Specifically, vehicles over 10,000 pounds must not exceed 86 dB(A) at speeds of 35 mph or less nor exceed 90 dB(A) at speeds above 35 mph. There are also limits for lighter weight vehicles and motorcycles. Overall, these State limits are generally easy to meet with modern, well-maintained vehicles. The New York State Department of Environmental Conservation (DEC) has a policy "Assessing and Mitigating Noise Impacts" that provides guidance for analyzing and minimizing the acoustical impact applicable to the State Environmental Quality Review Act (SEQRA) review. Guidelines require comparison of the average ambient sound level to proposed Site sound emissions to determine the extent of any potential acoustical impact, if any. The DEC states that an increase in ambient sound level by 0-to-3 dB should have no appreciable effect on receptors and an increase of 3-to-6 dB is tolerable but may have potential for an adverse noise impact only in cases where the most noise sensitive of receptors are present. Increases of more than 6 dB require closer scrutiny while increases of 10 dB deserve consideration of avoidance and mitigation measures in most cases.

To comply with DEC guidelines, the project must show that Site sound does not substantially deviate from existing ambient sound levels in the area. Specifically, average Site sound should not exceed existing average ambient sound conditions by 6 dB to avoid any negative acoustical impact to the area. To understand the ambient sound conditions in the area, a 24-hour sound survey was carried out, which is discussed in the next section.

Sound Level Survey

To determine appropriate criteria for comparison to local codes and DEC guidelines, an ambient sound survey was carried out to document sound in the area. Two measurement locations were selected to characterize the ambient of specific areas of nearby existing receptors. Location 1 was placed in the northern part of the Site, set back from Lockport Road a similar distance as residential receptors along this corridor. Location 2 was placed in the southwestern part of the Site to typify ambient sound levels for receptors fronting on Haseley Drive. OAA staff deployed the monitors on the morning of 15 December, and retrieved them the following day, 24- hours later.

For each Location, a Piccolo 2 sound level meter was placed within a weather enclosure and attached to a tripod. A windscreen was used on the microphone. Monitors were instructed to record detailed octave band time history data at ten-second intervals and hourly statistics for the duration of the survey. In the end, 24-hours of sound data were recorded from 1100 hours on 15 December through 1100 hours on 16 December. All sound levels meters were calibrated before and after deployment using a Bruel and Kjaer Model 4231 sound level calibrator, which is calibrated by an outside calibration service annually. It was observed upon deployment and retrieval of the long-term monitors that the acoustical environment was dominated by steady local and distant traffic flow, intermittent fauna noise, and occasional airport and train activity for all measurement locations.

Weather conditions were generally appropriate for each survey based on a review of historical data obtained from the nearest weather station at Niagara Falls International Airport. Temperatures ranged from 35-to-61 degrees Fahrenheit throughout the survey. There were occasions of high winds on the morning of 16 December. Worth mentioning is that while the weather station may record high wind speeds at times, these are generally not realized at the height of the microphones; no contamination of survey data was observed from wind gusts.

Acquisition of ambient sound data over the course of a 24-hour period results in a large amount of data. As a result, it is helpful to review data as hourly statistics to assist with observing ambient sound level trends. Important statistics include the average sound level (L_{eq}) and the background sound level (L_{90}), or level that occurs over 90 percent of the time, which is best used to evaluate continuous noise sources such as project HVAC sound. The L_{10}, or level that occurs over 10 percent of the time, indicates the extent of intermittent noise sources in the area, such as dog barks, surges in traffic noise, or aircraft passbys and is best used to evaluate intermittent motor vehicle noise from the proposed project. The purpose of this survey was to understand the existing acoustical conditions for comparison to project emissions. These data are important for use in establishing specific project noise goals to ensure no negative acoustical impact.

A summary of the average statistical sound levels recorded over the survey is provided in the following table:

Location	**L_{max}**	**L_{10}**	**L_{eq}**	**L_{90}**	**L_{min}**
1	79	69	63	51	51
2	70	57	52	46	45

Statistical hourly data are provided graphically in the Appendix; additional survey data is available upon request. Survey results reveal the following:

- ☐ Average sound levels (L_{eq}) were as expected for an area adjacent to a major roadway and active airport. Average sound levels for Location 1were generally near or above 60 dB(A) for most hours; two hours of the night the average sound level dipped below 50 dB(A). Location 2, which was more remote from local traffic, saw lower sound levels overall and was generally in the 50-to-55 dB(A) range for much of the survey.

- ☐ The lowest hourly background sound levels (L_{90}) generally occurred between midnight and 0400 hours. Lulls approaching 40 dB(A) were seen at both Locations. For all other hours, background sound levels were between 45-to-55 dB(A) for Location 1 and 45-to-50 dB(A) for Location 2.

- ☐ The L_{10} on the other hand, averaged between 52-to-74 dB(A) at Location 1. Location 2 was generally 5-to-10 dB lower in level. The average L_{10} across the measurement period was above 55 dB(A) for both Locations. This indicates that high level events in the area occur regularly. A review of maximum sound levels during the survey show that the lowest hourly maximum sound level documented at Location 1 was 63 dB(A) at 0300 hours and Location 2 was 49 dB(A) during the 0200 hour. This lull at Location 2 was only seen during this hour; all other hours showed maximum sound levels near or above 60 dB(A) for this Location.

Project Noise Goals

Overall, the Town noise code has proper intent, that is to not disturb or endanger the public. Of note is that it is written in a subjective manner which makes enforcement more challenging. As a result, OAA favors setting specific sound level limits as project goals, based on existing ambient conditions, to remove or reduce any subjectivity of the local code. Hence using the DEC guidelines for a project goal, which call for the Site to blend in with existing conditions, are appropriate. Note that even with blending Site sound may be audible, but by aligning Site sound levels with existing ambient sound levels, the project will result in no negative acoustical impact per the DEC guidelines.

Of most interest in the ambient sound survey data are the average sound levels as they directly correspond to DEC guidelines. Per DEC guidelines, the appropriate target is for average Site sound levels to not exceed 6 dB above the measured average ambient sound levels to ensure no negative acoustical impact. Essentially at residences along public street corridors typified by Location 1 data, Site sound should not exceed an average sound level of 69 dB(A). For receptors set back from the well-travelled roads, the target would be 58 dB(A).

While meeting these limits complies with DEC guidelines, OAA recommends that a more conservative approach should be taken to minimize any potential acoustical impact. Scrutinizing the background sound levels (L_{90}) of the sound survey, OAA recommends that steady-state noise sources, such as HVAC equipment sound, strive to not exceed 45 dB(A) at residential receptors to ensure that HVAC Site sound is closer aligned with some of the lulls documented during the survey. In a similar manner, maximum sound levels from on-site truck activity are appropriate to compare to existing transient noise sources documented by the L_{10} statistic. Intermittent sounds produced on-site should strive to not exceed 55 dB(A) to blend in with what was surveyed. Based on OAA's experience, following the DEC guidelines and meeting these project goal will result in meeting the intent of the Town of Niagara noise code.

From our professional experience, while code language is typically cited to apply "at or within" the property line of a receptor, noise is most commonly assessed and enforced at the location of repose. Inaccessible or uninhabited portions of the property are generally not scrutinized. For this study, sound was scrutinized at the facades of residences where inhabitants are sleeping during the night hours.

EXPECTED SOUND EMISSIONS

Acoustical modelling software, specifically CadnaA, was used to create and analyze Site sound emissions for the Site. The model takes into account relevant parameters between the noise source and receptor positions of interest to predict how sound will propagate. In addition to distance attenuation, the model accounts for the effects of terrain, various types of ground cover, shielding by structures, and reflections from buildings. In the model buildings are white and the Site property line is outlined in red. North is pointing up in all figures.

The acoustical model shows the results graphically as A-weighted sound level contours, in 1 dB increments, and tabulates the summed A-weighted sound levels at seven discrete locations at the façade of nearby residential receptors. Sound level contours are at ear height, 5 feet above grade. Single-story residential receptors are shown at Locations B and F at 8 feet above grade; Locations C, E, G, and H are at 15 feet above grade to typify an upper-story receptor, and Location D is at 25 feet above grade. Location A is not used and reserved for future use.

Rooftop HVAC Sound

Rooftop HVAC equipment produces noise that is steady in nature, and hence will not vary over time. Using a mechanical design template for the Site, noise sources were placed on the rooftop of the building. While a variety of HVAC equipment is proposed, the focus of this study is on the large HVAC units, those with a heating/cooling capacity of 25-tons or greater. Smaller HVAC equipment produces lower sound levels and are of less concern. In all, this project is expected to have 60 HVAC units that are 25-tons or larger. The majority of units are in the 25-to-36-ton range and were each modelled to be 93 dB(A) re 1 picowatt based on typical manufacturer's sound data; a handful of units were modeled as 55-ton units with a sound power level of 101 dB(A).

The noise from the rooftop units was included in the HVAC sound model. HVAC noise sources are shown as blue "+"s. Noise sources were placed 4 feet above the rooftop, and sound was projected off-site. Rooftop parapets were also modelled and are shown in light blue. Figure 2 shows the results graphically and tabulates the summed A-weighted sound levels at the seven discrete Locations. The results show that, with all rooftop units operating, HVAC sound levels at off-site receptors ranges from 38-to-45 dB(A) at nearby residential receptors.

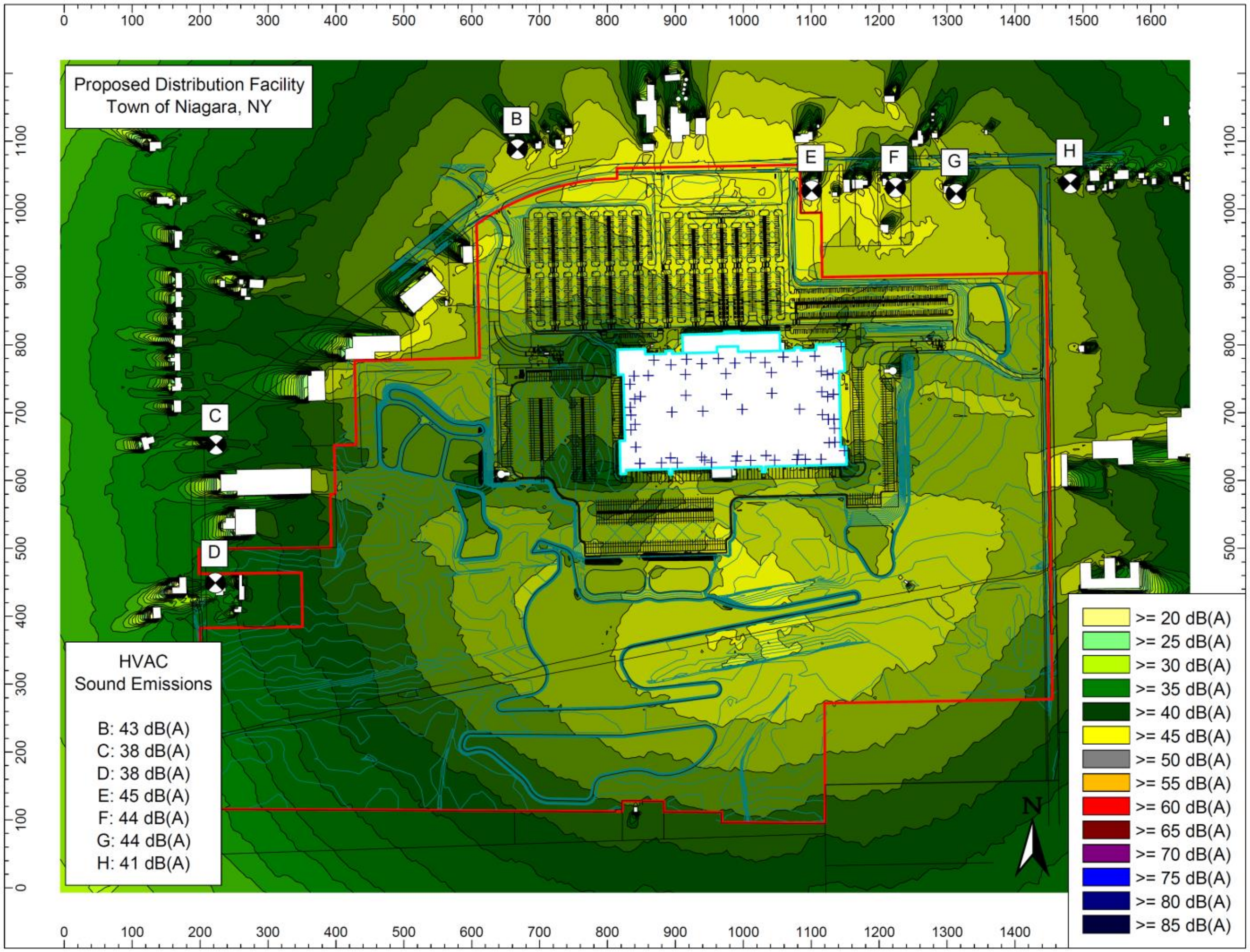


Figure 2 — A-weighted sound emission contours, 5 feet above grade, from rooftop HVAC equipment. Each of the 60 rooftop units shown with a blue + sign. Buildings shown in white, parapets in light blue. Site property line outlined in red. Locations B and F are 8 feet above grade; Locations C, E, G, and H are 15 feet above grade and Location D is 25 feet above grade.

This analysis shows that there is little concern about HVAC sound. HVAC sound is sufficiently controlled via distance and roof/parapet shielding effects so that noise meets the nighttime project noise goal of 45 dB(A). HVAC sound will be significantly below what is called for under DEC guidelines. In addition, this sound level aligns with some of the lowest levels documented during the ambient sound survey which will minimize the potential for audibility at off-site vantage points. Note that for these model results to be realized, acoustical performance of HVAC equipment must be aligned with what was modelled

Truck Activity

OAA has had the opportunity to visit various distribution and logistics facilities over the years to survey and document the sounds of truck activity. Truck noise in typical dock and trailer parking areas can routinely produce maximum sound levels of 79 dB(A) at 50 feet. This sound level was determined by looking at a wide variety of truck activity, such as truck movement, air brakes, back-up alarms, and coupling/decoupling, and distilling it to a single conservative maximum level and spectrum for use in acoustical studies such as this. A driving truck exhibits slightly lower maximum sound levels of 74 dB(A) at 50 feet. Personnel vehicles produce typical maximum sound levels of 59 dB(A) at 50 feet, and hence are traditionally not an acoustical concern. The height of a truck source for all truck activity is modelled at a conservative height of 8 feet above grade. OAA has found that using these maximum sound levels at this height ensures a conservative approach to evaluating truck sound. When specific individual activities are modelled at their actual height and sound level, results are typically lower in level than predicted below. For example, many of the high sound level activities, such as back-up alarms and air brakes, occur at a height of 4 feet above grade, not 8 feet. This is a critical detail when evaluating the effectiveness of a sound barrier or berm and when considering intervening topography. It is also important to recognize that all truck noise is dynamic in nature. Maximum sound levels only occur for a short duration and are not representative of the constant sound level produced by on-site trucks.

While there will certainly be multiple trucks on-site at any given time, it is most appropriate to model maximum sound from an individual truck. Several factors support this. Due to maximum levels being dynamic and short in duration, it is unlikely that multiple truck sound level maximums will occur at the exact same time and location. In addition, safe practices prevent more than one truck from operating at the same time and in the same vicinity. Hence off-site maximum sound levels will be driven by individual truck sources. In the unlikely event that two truck sources would contribute the same level in the same location at the exact same time, emissions would only be 3 dB higher due to the logarithmic nature of sound pressure level addition.

As the major noise source on-site, heavy truck activity was modelled at various on-site locations that are nearest to receptors. Figures 3 through 7 show the resulting worst-case Site sound emissions contributed by truck activity. Driving trucks are shown as pink "+"s and are modeled at 74 dB(A) at 50 feet. Truck yard activity is shown as white "+"s and modelled with a level of 79 dB(A) at 50 feet. HVAC noise sources were also included in the model to represent worst-case conditions, and are shown as blue "+"s. Several conclusions can be drawn from these models:

- ☐ Figure 3 shows a driving truck entering the Site from the Packard Road (Truck Position 1). Emissions received at all Locations meet the maximum project goal of 55 dB(A).

- ☐ Figure 4 shows that truck yard activity at the primary guard house (Truck Position 2) will produce a maximum level of 50 dB(A) at Location B.

- ☐ Figure 5 shows a truck in the western portion of the trailer parking area (Truck Position 3). Site sound emissions will be a maximum of 47 dB(A) at the nearest residences, Locations B and C.

- ☐ Figure 6 shows that a truck in the northeastern trailer parking area (Truck Position 4) will produce worst-case sound levels of 52 dB(A) at northern receptors. This maximum is far below the surveyed average maximum sound level of 69 dB(A) produced by existing local traffic on Lockport Road.

- ☐ Figure 7 shows a driving truck exiting the Site to the south via the secondary driveway (Truck Position 5). On-site Site sound emissions are 38-to-48 dB(A) at surrounding receptors.

The results show that Site sound emissions are well controlled by distance to meet the project goal at all receptors when heavy trucks are on-site. No supplemental noise mitigation is warranted. In addition to meeting all project goals, results support that there would be no negative acoustical impact per DEC guidelines.

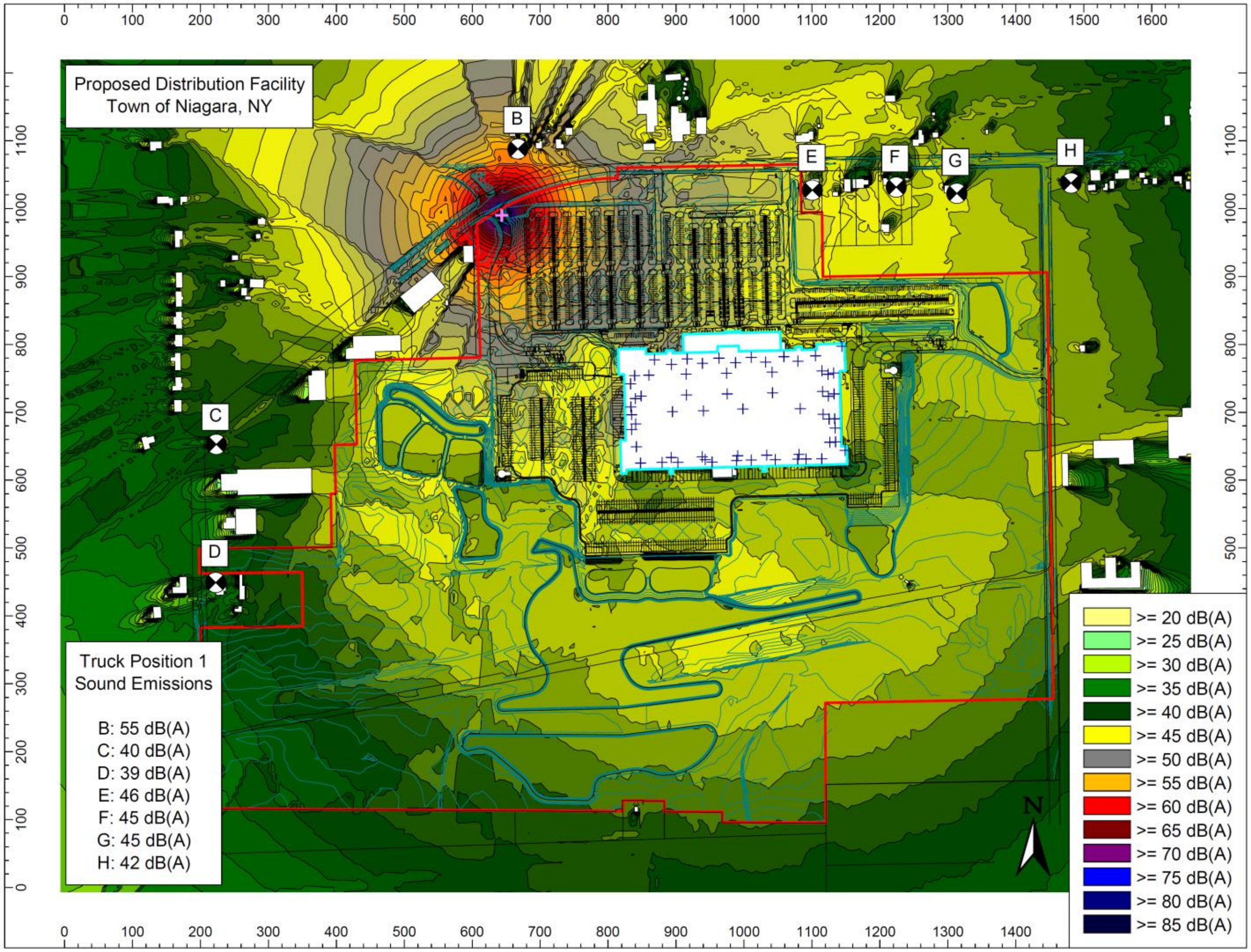


Figure 3 — A-weighted sound level contours 5 feet above grade expected for truck activity at Position 1 (pink "+"). Rooftop units shown with a blue + sign. Buildings shown in white, parapets in light blue. Site property line outlined in red. Locations B and F are 8 feet above grade; Locations C, E, G, and H are 15 feet above grade and Location D is 25 feet above grade.

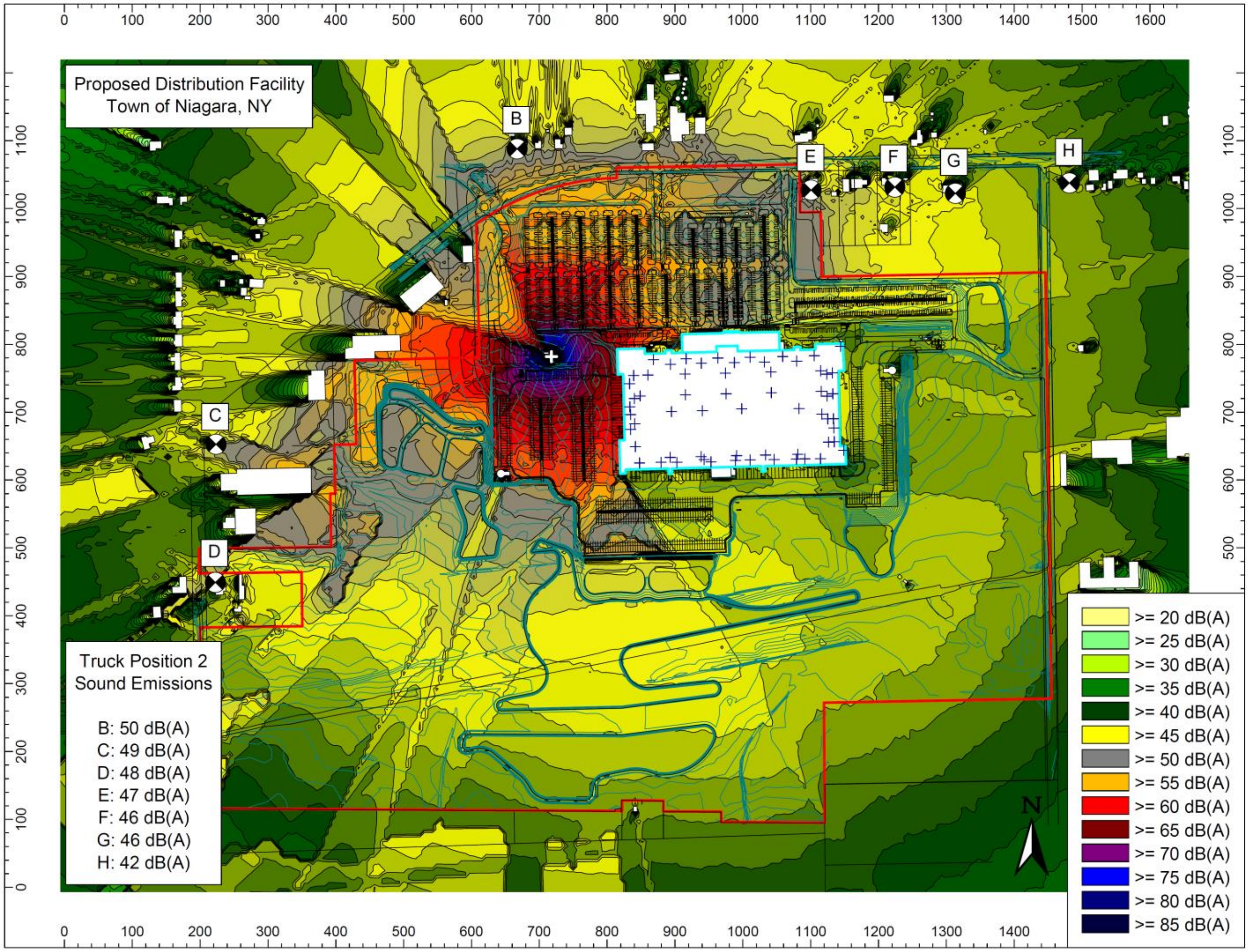


Figure 4 — A-weighted sound level contours 5 feet above grade expected for truck activity at Position 2 (white "+"). Rooftop units shown with a blue + sign. Buildings shown in white, parapets in light blue. Site property line outlined in red. Locations B and F are 8 feet above grade; Locations C, E, G, and H are 15 feet above grade and Location D is 25 feet above grade.

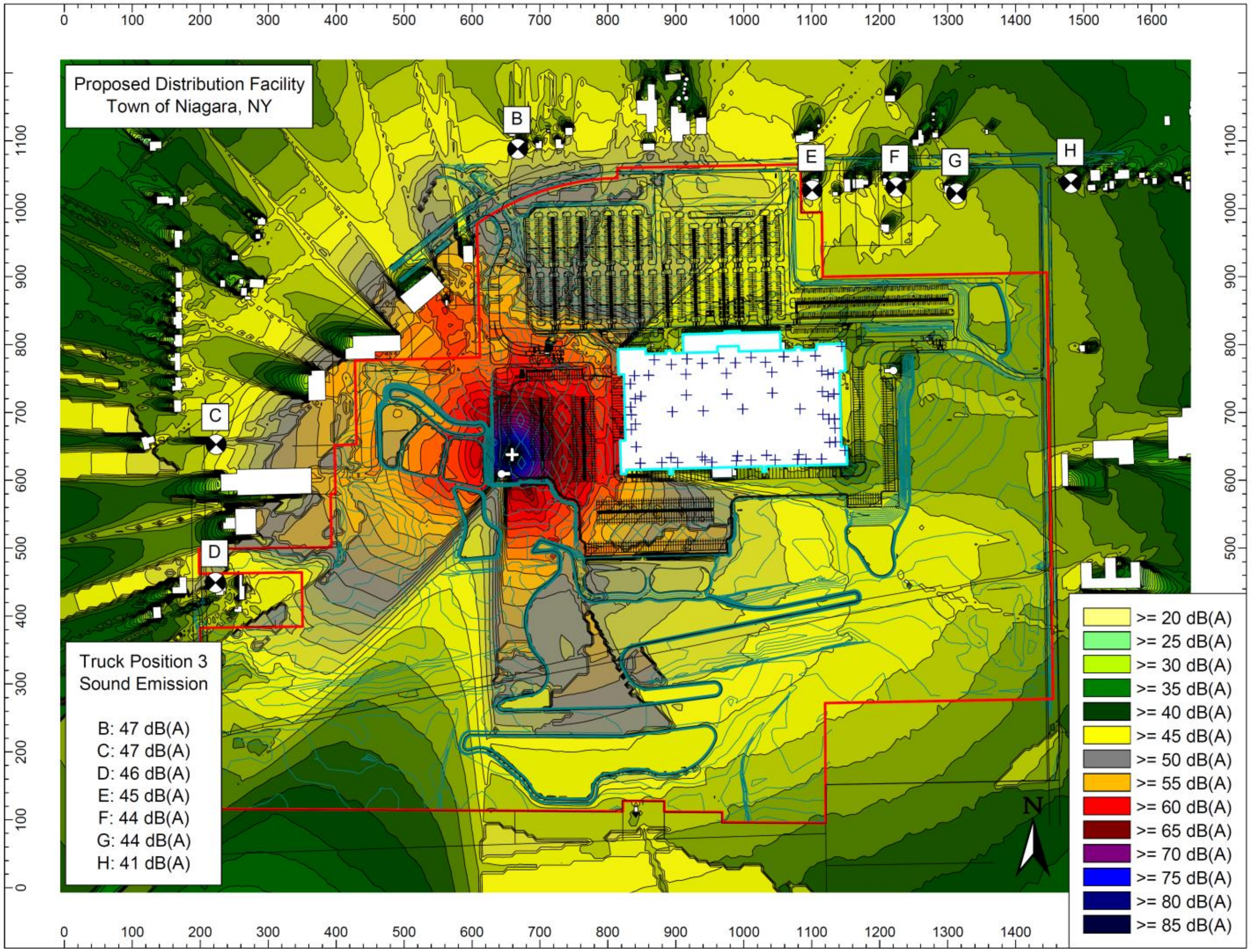


Figure 5 — A-weighted sound level contours 5 feet above grade expected for truck activity at Position 3 (white "+"). Rooftop units shown with a blue + sign. Buildings shown in white, parapets in light blue. Site property line outlined in red. Locations B and F are 8 feet above grade; Locations C, E, G, and H are 15 feet above grade and Location D is 25 feet above grade.

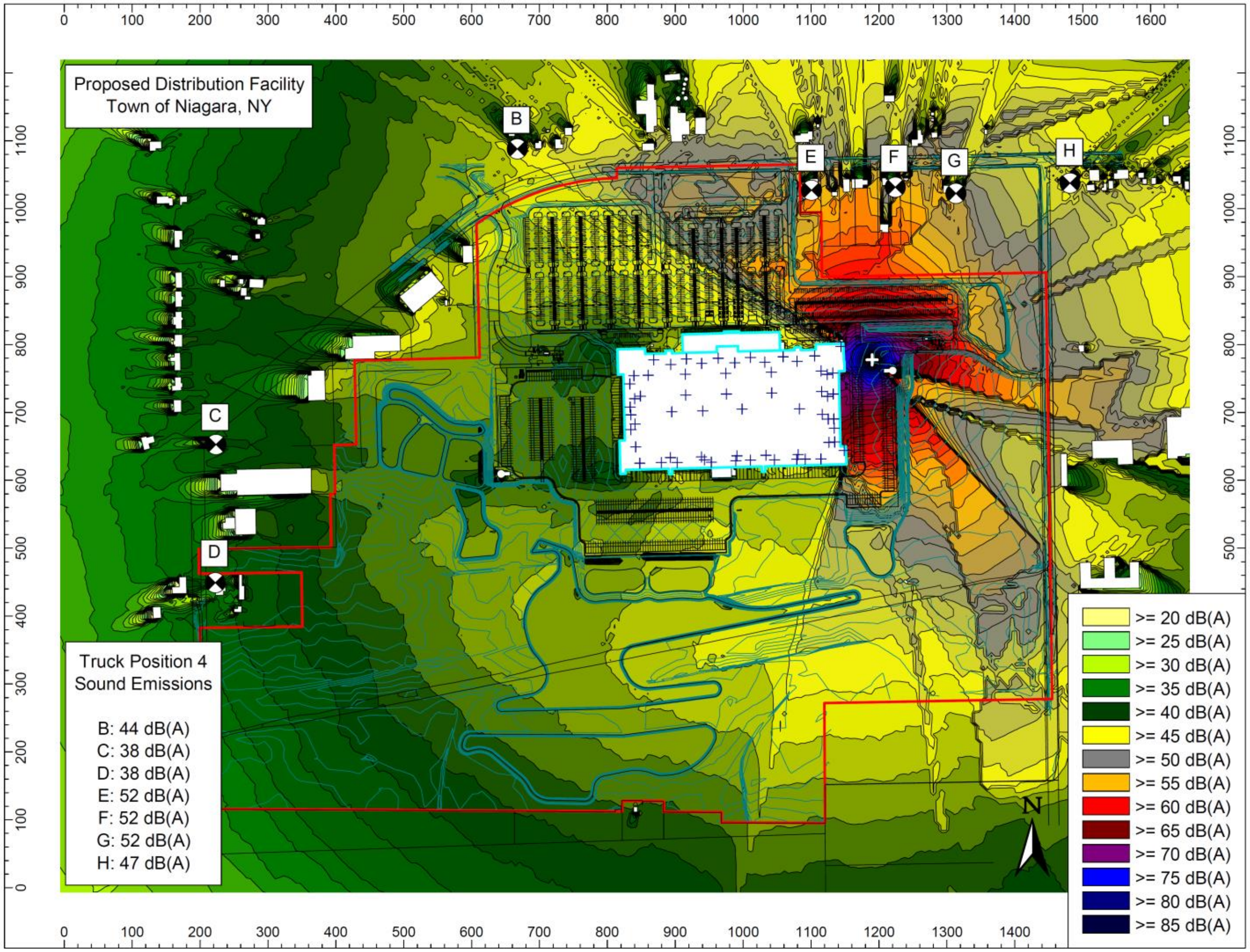


Figure 6 — A-weighted sound level contours 5 feet above grade expected for truck activity at Position 4 (white "+"). Rooftop units shown with a blue + sign. Buildings shown in white, parapets in light blue. Site property line outlined in red. Locations B and F are 8 feet above grade; Locations C, E, G, and H are 15 feet above grade and Location D is 25 feet above grade.

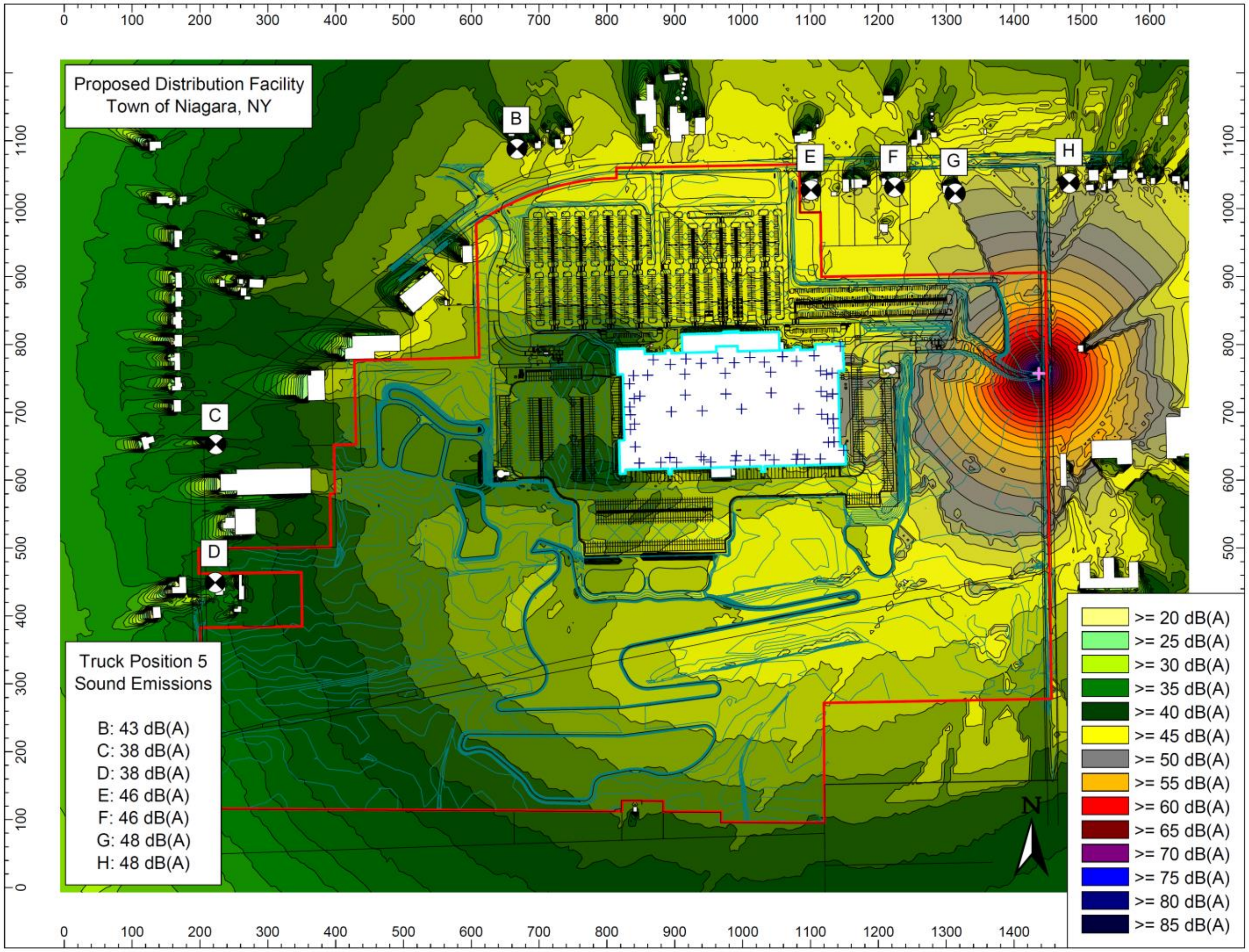


Figure 7 — A-weighted sound level contours 5 feet above grade expected for truck activity at Position 5 (pink "+"). Rooftop units shown with a blue + sign. Buildings shown in white, parapets in light blue. Site property line outlined in red. Locations B and F are 8 feet above grade; Locations C, E, G, and H are 15 feet above grade and Location D is 25 feet above grade.

RECOMMENDATIONS

1. Back-up alarms can be the cause of noise complaints. To minimize any potential complaints from back-up alarms, we generally recommend outfitting trucks owned and controlled by the Site with smart, ambient sensing, multi-frequency back-up alarms. This is especially effective on on-site terminal tractors/yard jockeys as these trucks are responsible for the majority of back-up movements at Sites like this. Acceptable back-up alarms are available from a variety of manufacturers, such as Ecco, specifically Model EA9724. These devices reduce annoyance generated from constant level, pure tone back-up alarms. The reduction in annoyance is accomplished in two ways:

    ☐ A broadband sound is less intrusive and annoying than a pure tone sound since, at a distance, it can blend in easier with other ambient sounds.

    ☐ The smart, ambient-sensing feature allows back-up alarms to operate safely and effectively at far lower sound levels than typical brute-force, constant level devices. The smart alarms sample ambient noise and adjust the warning signal to be 5-to-10 dB higher than the ambient, therefore reducing levels nearby and off-site.

2. Proceed with current HVAC equipment plans, assuming plans do not markedly deviate from those presented in the model. Acoustical performance of new equipment should be kept in mind.

ADDITIONAL CONSIDERATIONS

Although construction noise is not specifically discussed in the Town noise code, and construction conditions are temporary in nature, it is worth discussing considerations to minimize the acoustical impact of this activity. On-site buildings are centrally located and at least 650 feet from the nearest dwelling. Construction of the actual building is not an acoustical concern, however earth moving equipment used during the civil construction phase of the project could be much closer to receptors. Construction equipment such as bulldozers, front end loaders, and dump trucks can typically produce maximum sound levels of 80 dB(A) at 50 feet. Levels of this magnitude are similar to heavy truck activity and as a result, construction activity will generally result in similar sound emissions to those shown in Figures 3 through 7. To minimize receptor exposure to construction noise during this phase, consider the following construction mitigation measures:

- ☐ Limit all heavy equipment operation to non-noise-sensitive daytime hours and follow allowable town construction hours as applicable.
- ☐ If possible, limit the number of equipment operating near one receptor at a given time. Avoid exposing any one receptor to high sound levels for an extended period of time.
- ☐ Place stationary equipment such as generators, compressors, and office trailers away from receptors.
- ☐ Avoid having construction parking or laydown areas nearby receptors.
- ☐ Coordinate any high sound level construction activities with town representatives and provide advance notice to residences as feasible.

Specific noise issues can be individually evaluated for tailored noise mitigation recommendations should traditional methods above not be sufficient.

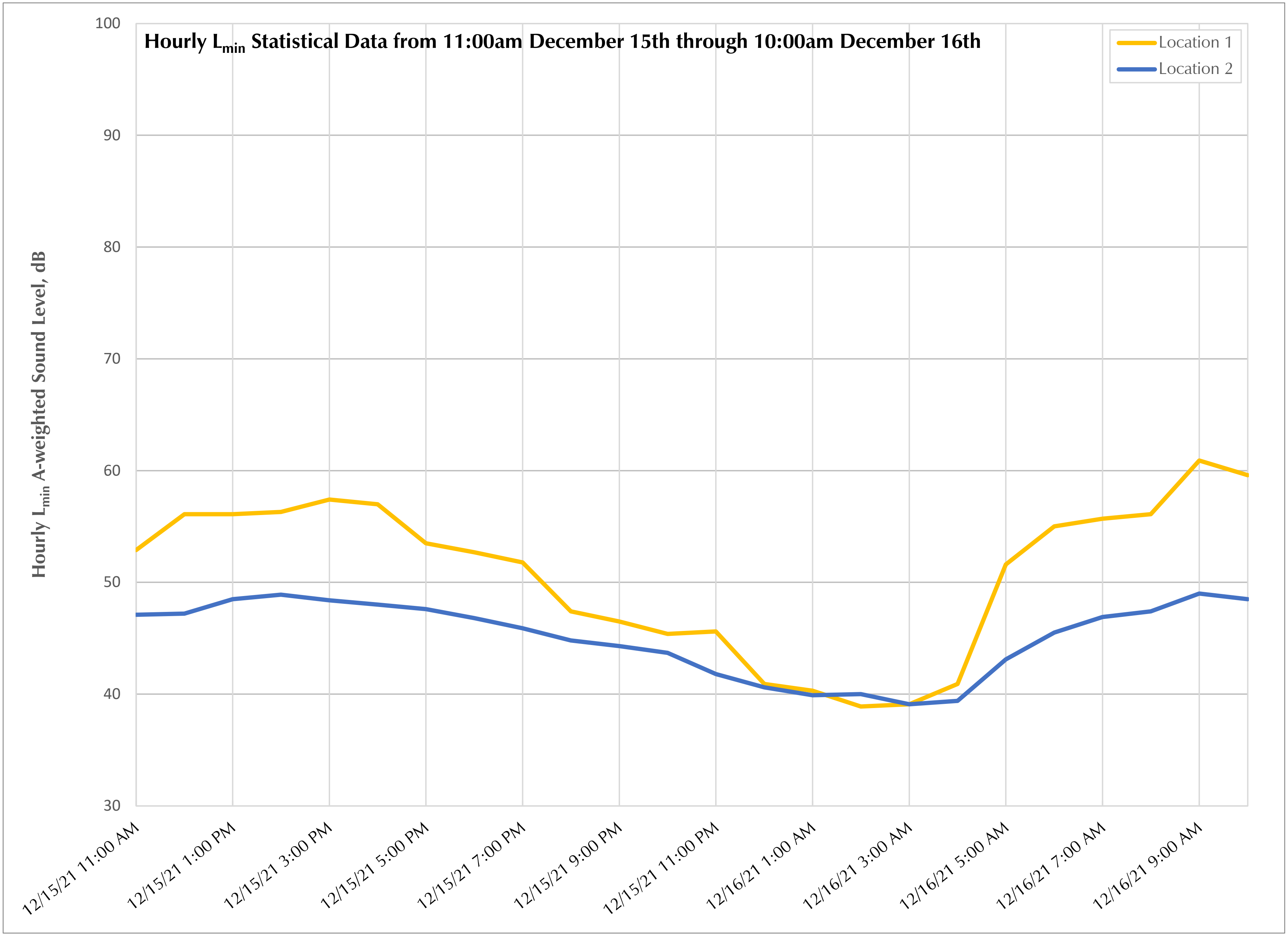
CONCLUSION

Plans call for the development of a distribution facility on industrially zoned propertied being used as farmland in the Town of Niagara, Niagara County, New York. The area is mixed in use and in proximity to Interstate 190 and an international airport. The focus of this analysis was on potentially noise sensitive residential receptors. The construction of a 24/7 warehouse would bring car and truck activity to the area. Site sound emissions must meet the intent of the local noise code and should also not deviate from existing sounds in the area to ensue no negative acoustical impact at potentially noise sensitive receptors.

The Site is well laid out and designed. Off-site truck routes via Packard Road and Lockport Road are a short distance to the Interstate and use existing well-travelled roads. Analyses show that distance and Site geometry will sufficiently attenuate on-site HVAC and vehicle noise to comply with the intent of local and State noise requirements and have no negative effect on the surroundings. Modelled steady and intermittent Site sound will be below existing average and maximum ambient levels, respectively. Given the results of this analysis and the prevailing ambient sound levels, on-site noise is expected to have no negative acoustical impact per DEC guidelines. Based on the foregoing, the findings in this report support and conclude that the warehouse will not create any significant adverse sound impacts and is appropriate for this Site.

APPENDIX

Hourly Statistical Time History Graphs from Sound Survey



Hourly L_min Statistical Data from 11:00am December 15th through 10:00am December 16th
Location 1
Location 2
Hourly L_min A-weighted Sound Level, dB
100
90
80
70
60
50
40
30
12/15/21 11:00 AM
12/15/21 1:00 PM
12/15/21 3:00 PM
12/15/21 5:00 PM
12/15/21 7:00 PM
12/15/21 9:00 PM
12/15/21 11:00 PM
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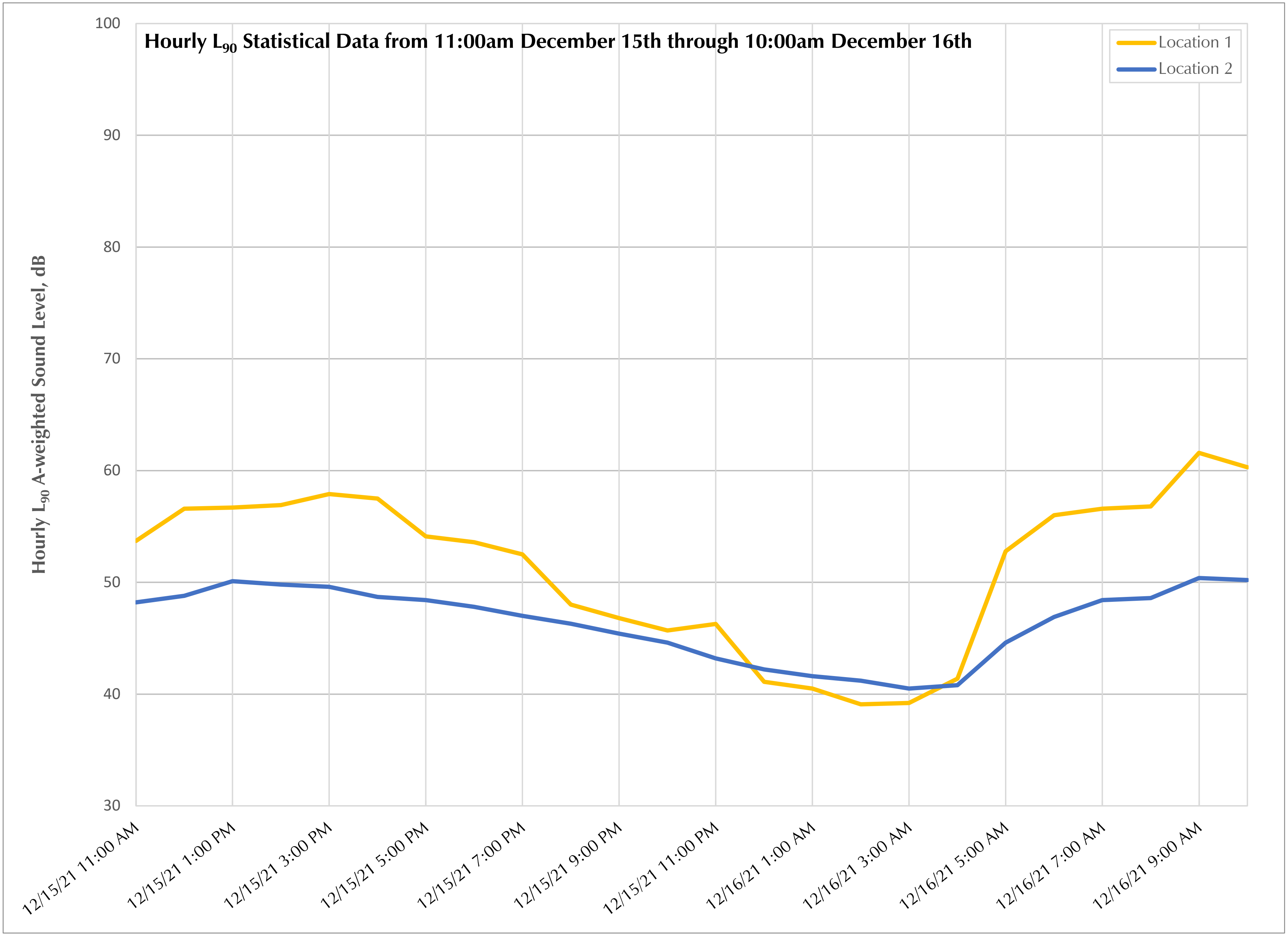
12/16/21 9:00 AM


Hourly L90 Statistical Data from 11:00am December 15th through 10:00am December 16th
Location 1
Location 2
Hourly L90 A-weighted Sound Level, dB
100
90
80
70
60
50
40
30
12/15/21 11:00 AM
12/15/21 1:00 PM
12/15/21 3:00 PM
12/15/21 5:00 PM
12/15/21 7:00 PM
12/15/21 9:00 PM
12/15/21 11:00 PM
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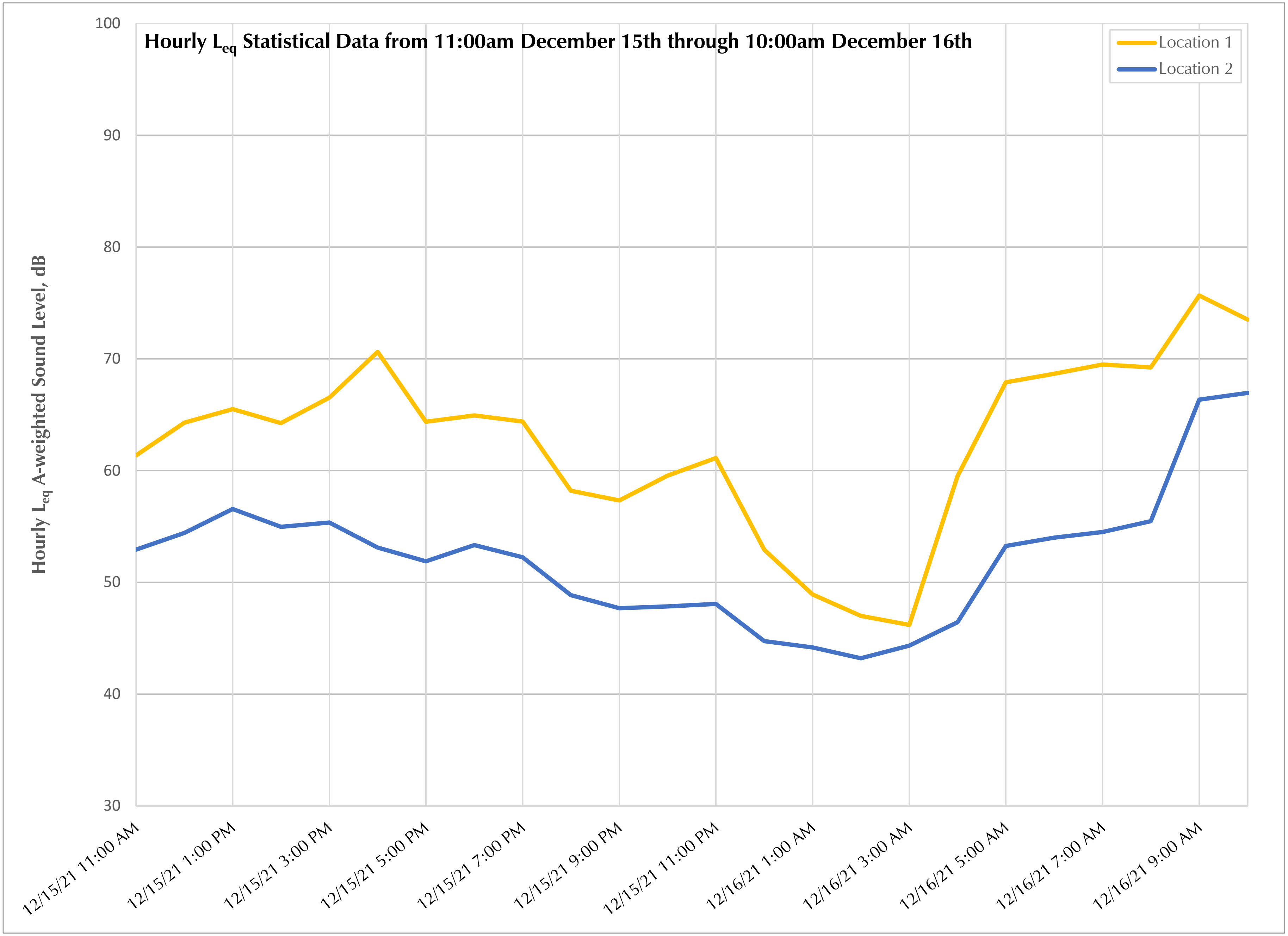
12/16/21 9:00 AM


Hourly L_{eq} Statistical Data from 11:00am December 15th through 10:00am December 16th
Location 1
Location 2
Hourly L_{eq} A-weighted Sound Level, dB
100
90
80
70
60
50
40
30
12/15/21 11:00 AM
12/15/21 1:00 PM
12/15/21 3:00 PM
12/15/21 5:00 PM
12/15/21 7:00 PM
12/15/21 9:00 PM
12/15/21 11:00 PM
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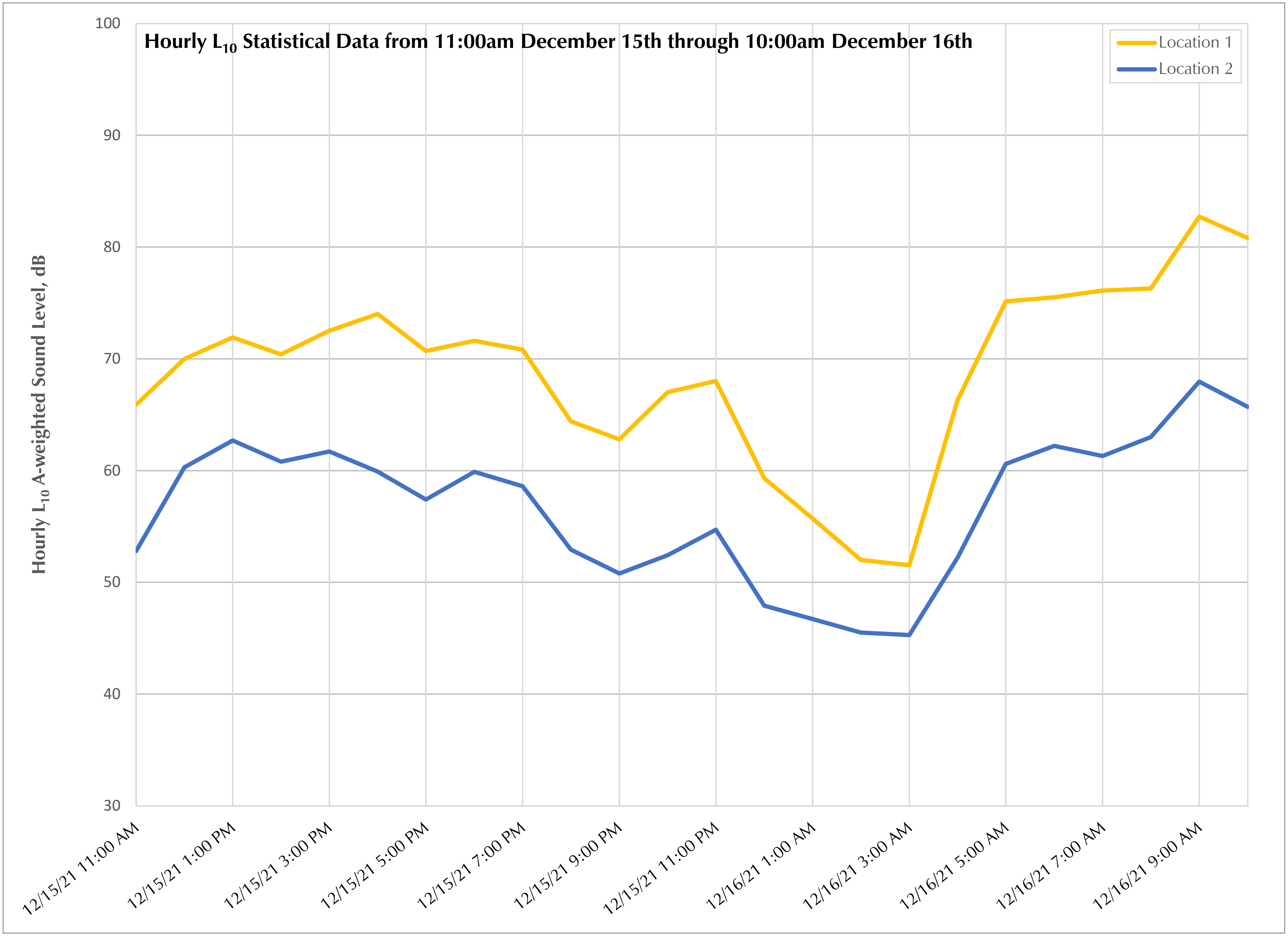
12/16/21 9:00 AM


Hourly L_{10} Statistical Data from 11:00am December 15th through 10:00am December 16th
Location 1
Location 2
Hourly L_{10} A-weighted Sound Level, dB
100
90
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70
60
50
40
30
12/15/21 11:00 AM
12/15/21 1:00 PM
12/15/21 3:00 PM
12/15/21 5:00 PM
12/15/21 7:00 PM
12/15/21 9:00 PM
12/15/21 11:00 PM
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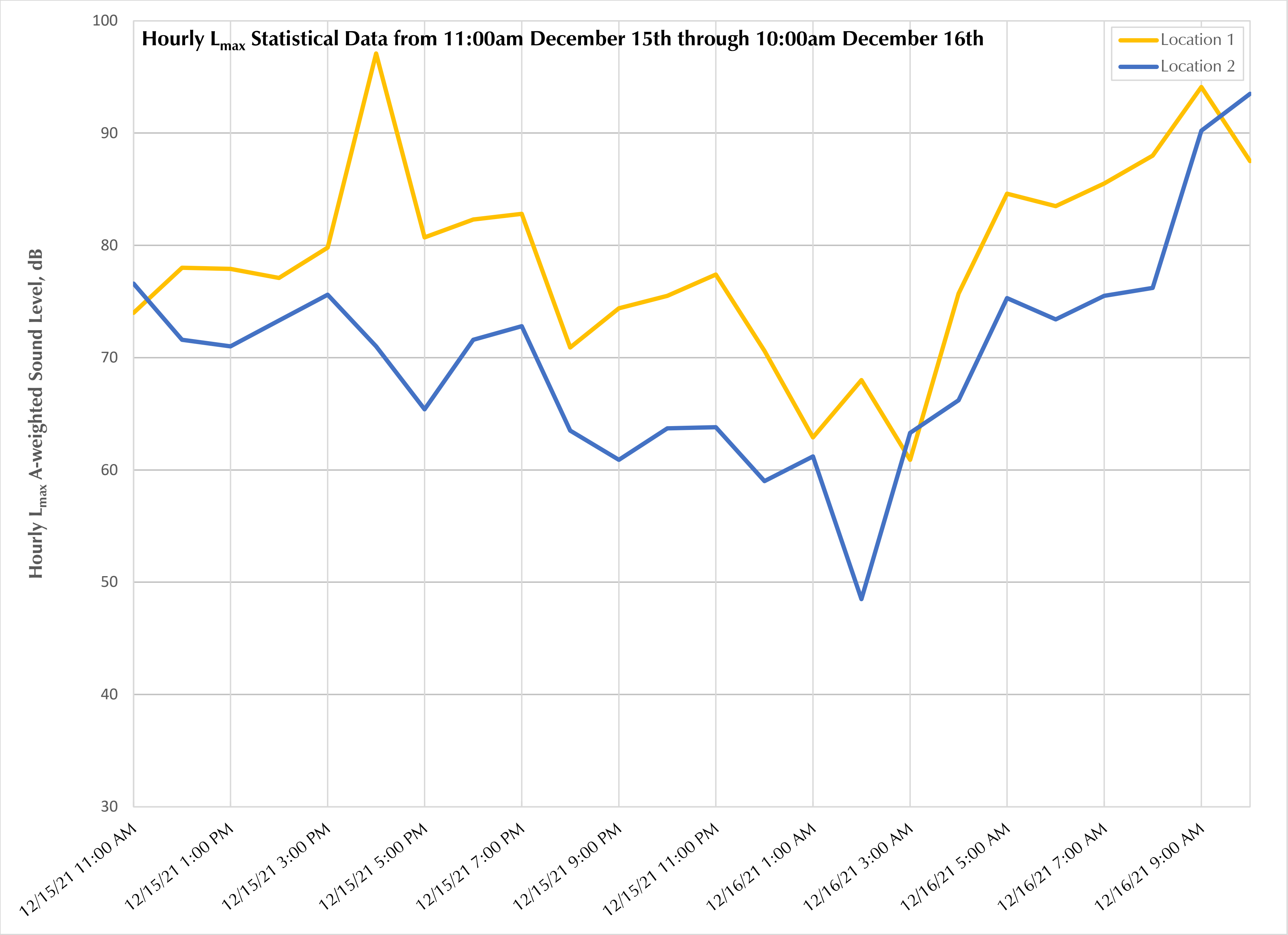
12/16/21 9:00 AM


Hourly L_{max} Statistical Data from 11:00am December 15th through 10:00am December 16th
Location 1
Location 2
Hourly L_{max} A-weighted Sound Level, dB
100
90
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70
60
50
40
30
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12/15/21 1:00 PM
12/15/21 3:00 PM
12/15/21 5:00 PM
12/15/21 7:00 PM
12/15/21 9:00 PM
12/15/21 11:00 PM
12/16/21 1:00 AM
12/16/21 3:00 AM
12/16/21 5:00 AM
12/16/21 7:00 AM
12/16/21 9:00 AM

Exhibit C

STORMWATER POLLUTION PREVENTION PLAN

for

Project Fifi

Packard Road and Lockport Road
Town of Niagara, New York

Prepared For:

JB2 Partners, LLC
3322 Grant Valley Road NW
Atlanta, GA 30305

Prepared By:

Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology, D.P.C.
One North Broadway, Suite 910
White Plains, New York 10601

February 15, 2022

LANGAN

Project No.: 190071801

Preparer of the SWPPP

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 SPDES General Permit for Stormwater Discharges from Construction Activity. 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 or administrative proceedings.

Name: Michael Finan, PE, LEED-AP

Date: February 15, 2022

Table of Contents

Table of Contents

Tables

Figures

Appendices

1 Executive Summary

This Stormwater Pollution Prevention Plan (SWPPP) and accompanying project plans have been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (General Permit) latest revision, the *New York State Stormwater Management Design Manual* (*Design Manual*) latest revision, and the *New York State Standards and Specifications for Erosion and Sediment Control* latest revision. The Applicant, JB2 Partners, LLC, is proposing to develop ±218.4 acre property along Packard Road (County Road No. 82) and Lockport Road (County Road No. 6) ("Site") in the Town of Niagara ("Town"), New York for use as an e-commerce storage and distribution facility for consumer products ("Facility") by a single, prospective entity (collectively, the "Project"). The Project, also known as Project Fifi, is a 5-story warehouse distribution facility that has an approximate 650,000 square foot building footprint (approximately 3,400,000 square foot area total) with associated car and trailer parking. The upper floors will have limited employees due to the use of robotics.

The Project is a new development that will maintain existing drainage patterns as much as practical, control the rate of stormwater runoff resulting from the development, and mitigate potential impacts on water quality and erosion generated during and after construction. A combination of runoff reduction techniques and standard stormwater management practices with runoff reduction volume capacity will be used to treat stormwater runoff.

The pre- and post-development conditions were analyzed using the USDA Soil Conservation Service Publication Technical Release (TR-55) "Urban Hydrology for Small Watersheds", which provides procedures for estimating runoff and peak discharges in small watersheds. The analysis is based upon the watershed areas, land coverage, soil group types, curve numbers (CN), times of concentration (Tc), rainfall distribution type, and rainfall amount for the design storm events. The pre- and post-development peak discharge rates of runoff have been evaluated utilizing stormwater modeling software. An overall comparison of the pre- and post-development peak discharge rates for each of the design storms analyzed is provided in the table below.

Table 1-1: Overall Summary of Peak Discharge Rates

Storm Event	Pre (cfs)	Post (cfs)	Diff (cfs)
1-year	34.51	27.38	-7.13
10-year	105.14	80.98	-24.16
100-year	239.21	172.02	-67.19

The overall comparison of the pre- and post-development stormwater runoff peak discharge rates demonstrates no significant adverse impacts to the design points analyzed. In addition, the erosion control, sediment control, pollution-prevention, and stormwater management measures to be implemented during construction as outlined in this SWPPP and project drawings will minimize soil erosion and control sediment transport off site, and after construction will control the water quality and quantity of stormwater runoff.

Coverage under the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) General Permit for Stormwater Discharges from Construction Activity (General Permit) latest revision will be required (see Appendix A), since the project involves soil disturbance of 1 or more acres. The proposed project is also in a municipal separate storm sewer system (MS4); therefore, the (city, town, village) of (name) will review and accept the SWPPP. The Notice of Intent (NOI) form and signed "MS4 SWPPP Acceptance" form will be submitted to the NYSDEC before construction begins to obtain coverage under the SPDES General Permit. The forms have been provided in Appendix B.

2 Project Information

2.1 Project Summary

Below is a summary of the project information:

Table 2-1: Project Summary

Project Name:	Project Fifi
Project Location:	Packard Road and Lockport Road Town of Niagara, New York
Property Tax ID No.:	Tax ID No. 132.18-1-2, 146.05-1-9, 146.06-1-1 and 146.06-1-2
Property Acreage:	218.4 acres
Municipality:	Town of Niagara, which is an municipal separate storm sewer system (MS4)
Project Description:	The project is a 5-story warehouse distribution facility that has an approximate 650,000 square foot building footprint (approximately 3,400,000 square foot area total) with associated car and trailer parking. The upper floors will have limited employees due to the use of robotics
Estimated Disturbed Area:	121.0 acres (includes offsite traffic improvements), which does require coverage under the SPDES General Permit
Existing Site Conditions:	agricultural fields, wooded areas (fair condition), wetlands, a stream, and impervious areas (i.e., pavement and gravel) 5.1 acres of existing impervious area
Proposed Site Conditions:	agricultural fields, wooded areas (fair condition), wetlands, a stream, grass (good condition), and impervious areas (i.e., gravel, pavement, and buildings) 56.3 acres of proposed impervious area
Stormwater Management Practices:	Bioretention basins and dry detention basins
Construction Duration:	From May 2022 to May 2024, including planned winter shutdowns.

2.2 Site Conditions

The Site is bounded by Packard Road (County Road No. 82) and Lockport Road (County Road No. 6) to the North; residential properties and Tuscarora Road to the north east; Niagara International Airport to the south; and commercial properties, a residential property, and Haseley Drive to the west (see Figure 1). The site consists of agricultural fields, wooded areas, wetlands, a stream, and impervious areas (i.e., the former Niagara Drag strip and gravel).

The United States Department of Agriculture (USDA) Soil Conservation Service Soil Survey for Niagara County has been reviewed. The surficial soil conditions are shown in Figure 2 and are summarized in the table below.

Table 2-2: USDA Soil Data

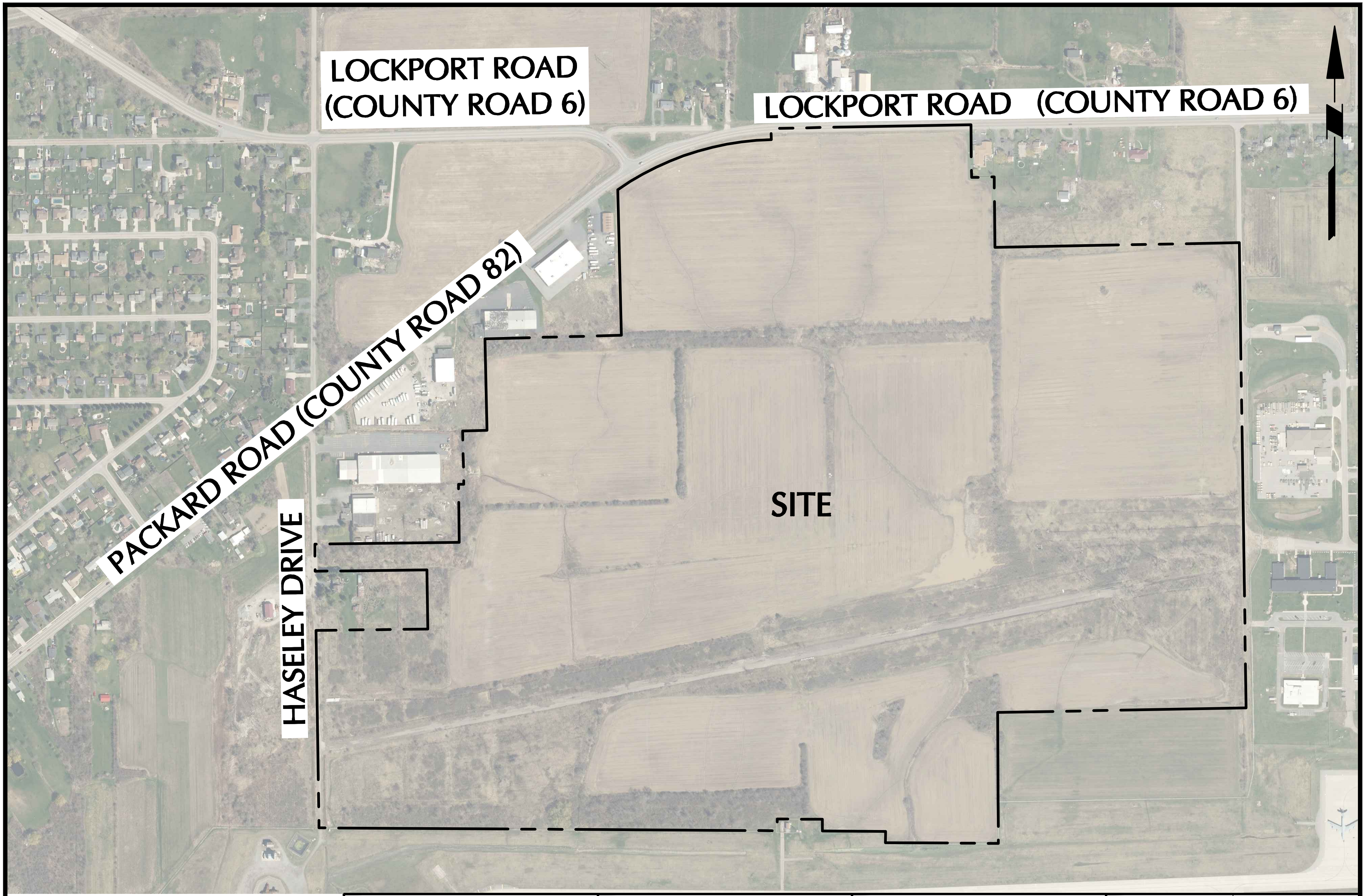
Map Symbol	Description	Depth to Groundwater (ft.)	Depth to Bedrock (ft.)	Hydrologic Soil Group
CcA	Cayuga and Cazenovia silt loams, 0-2% slopes	2.0	>6.0	D
CcB	Cayuga and Cazenovia silt loams, 2-6% slopes	2.0	>6.0	D
Lc	Lakemont silty clay loam, 0-3% slopes	0	>6.0	D
OdA	Odessa silty clay loam, 0-3% slopes	0.5	>6.0	D

Langan performed a soil investigation between November 30 to December 17, 2021 to determine the subsurface soil conditions in various locations throughout the Site. A total of 48 borings were drilled from 4.5 to 22.5 feet below existing grade and a total of 49 test pits were excavated from 2 to 22 feet below existing grade. Rock was encountered approximately 4.4 feet to 14.7 feet below existing grade in portions of the Site. Groundwater was encountered approximately 4 feet to 10 feet below grade in portions of the Site. Refer to Appendix C for the testing data.

The Site is used for agricultural purposes; however, the Site is zoned for heavy industry. A Langan wetland scientist conducted a delineation of the onsite wetlands in November 2021. There are 16 wetlands present onsite and a portion of the Cayuga Creek West Tributary is located in the western portion of the Site. The United States Army Corps of Engineers (USACOE) has been contacted about the project and a Jurisdictional Determination application for proposed disturbance of the wetlands will be submitted.

Based on a review of the Federal Emergency Management Agency (FEMA) Effective Flood Insurance Rate Map (FIRM), a Cayuga Creek West Tributary is mapped in the western portion of the site (see Figure 3). The stream contains a mapped floodway, generally limited to the stream centerline and 100-year floodplain elevations that range from approximate elevation 600 (NAVD88) at the upstream end of the site to approximate elevation 590 (NAVD88) at the downstream end of the site. The floodplain associated with an offsite reach of the tributary generally parallels the southern site boundary.

According to the New York State Office of Parks, Recreation and Historic Preservation (NYSOPRHP) Cultural Resource Information System (CRIS), the property is not within an archaeological sensitive area; not listed or eligible for listing on the state or national registers of historic places; and not adjacent to a place listed or eligible for listing on the state or national registers of historic places (see Figure 4).



LANGAN

Project No. 190071801

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SCALE: 1 INCH = 600 FEET

LANGAN

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One North Broadway, Suite 910
White Plains, NY 10601

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Project

PROJECT FIFI

TAX ID. 132.18-1-2, 146.05-1-9, 146.06-1-1, & 146.06-1-2

TOWN OF NIAGARA

NIAGARA COUNTY NEW YORK

Drawing Title

SITE LOCATION MAP

Project No.	190071801
Date	SEPTEMBER 29, 2021
Drawn By	LM
Checked By	CZ

Figure

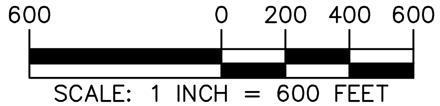
FG01

Sheet 1 of 1

Date: 2/3/2022 Time: 11:05 User: czolezi Style Table: Langan.stb Layout: FG01 Document Code: FG01-190071801-0201-CS101-0101

LANGAN

Project No. 190071801



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Project

PROJECT FIFI

TAX ID. 132.18-1-2, 146.05-1-9, 146.06-1-1, & 146.06-1-2
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

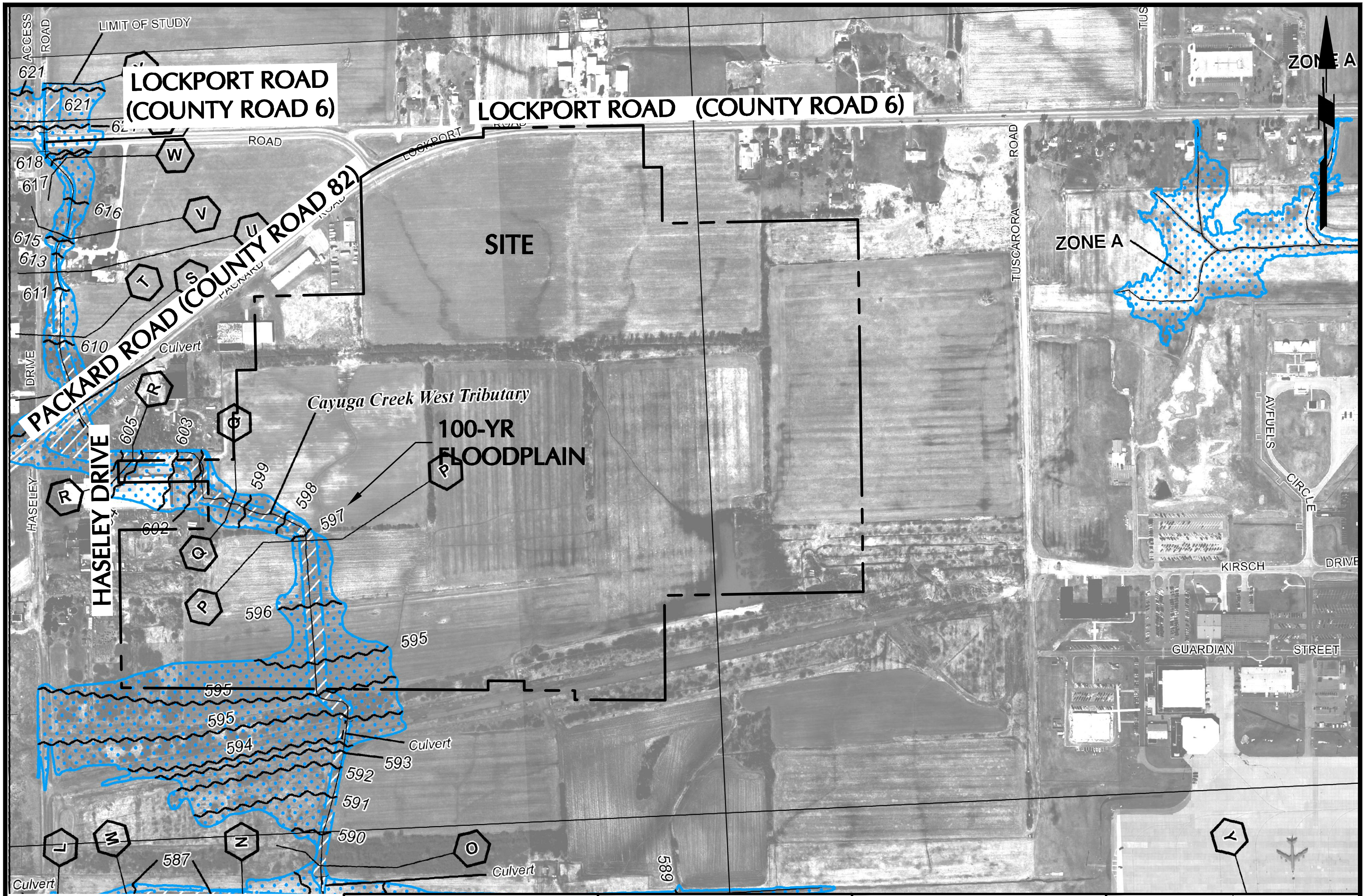
SOILS MAP

Project No.
190071801
Date
FEBRUARY 15, 2022
Drawn By
LM
Checked By
CZ

Figure

FG02

Sheet 1 of 1



LANGAN

Project No. 190071801

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Project

PROJECT FIFI

TAX ID. 132.18-1-2, 146.05-1-9, 146.06-1-1, & 146.06-1-2
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

FLOOD INSURANCE RATE MAP

Project No.
190071801

Date
FEBRUARY 15, 2022

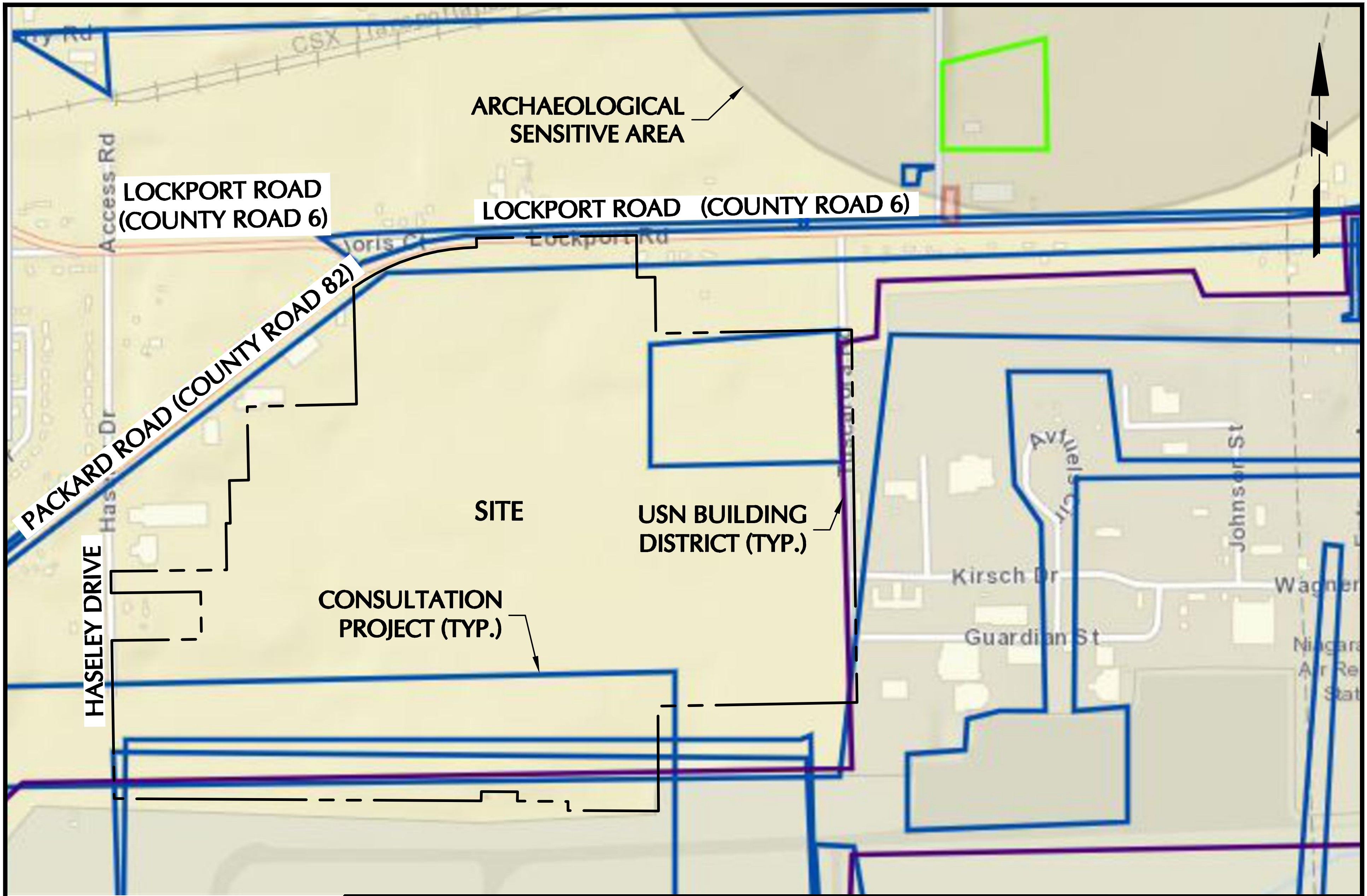
Drawn By
LM

Checked By
CZ

Figure

FG03

Sheet 1 of 1



LANGAN

Project No. 190071801

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LANGAN

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Project	PROJECT FIFI TAX ID. 132.18-1-2, 146.05-1-9, 146.06-1-1, & 146.06-1-2 TOWN OF NIAGARA NIAGARA COUNTY NEW YORK
Drawing Title	CULTURAL RESOURCE MAP
Project No.	190071801
Date	FEBRUARY 15, 2022
Drawn By	LM
Checked By	CZ
Figure	FG04
Sheet	1 of 1

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3 Stormwater Management Plan

3.1 Stormwater Site Planning

3.1.1 Preservation of Natural Features and Conservation

Preservation of natural features includes techniques to identify and preserve natural areas that can be used to protect water, habitat and vegetative resources. Conservation includes designing elements of the development in a way that the site design takes advantage of a site's natural features, preserves sensitive areas and identifies constraints and opportunities to prevent or reduce negative effects of a development. An evaluation of the preservation of natural features and conservation planning practices is provided in the table below.

Table 3-1: Preservation of Natural Features and Conservation

Practice	Description	Incorporated	Reason
Preservation of Undisturbed Areas	Delineate and place into permanent conservation undisturbed forests, native vegetated areas, riparian corridors, wetlands, and natural terrain.	Considered and not applied	There are no build areas, but no credit has been taken since the areas will not be put into permanent conservation.
Preservation of Buffers	Define, delineate and preserve naturally vegetated buffers along perennial streams, rivers, shorelines and wetlands.	N/A	The wetlands and stream do not have buffers.
Reduction of Clearing and Grading	Limit clearing and grading to the minimum amount needed for roads, driveways, foundations, utilities and stormwater management facilities.	Considered and Applied	The clearing and grading has been kept to the minimum amount required for the project.
Locating Development in Less Sensitive Areas	Avoid sensitive resource areas such as floodplains, steep slopes, erodible soils, wetlands, mature forests and critical habitats by locating development to fit the terrain in areas that will create the least impact.	Considered and Applied	The development factored in the sensitive areas and avoided them to the greatest extent practicable.
Open Space Design	Use clustering, conservation design or open space design to reduce impervious cover, preserve more open space and protect water resources.	N/A	This is typically for residential subdivisions to promote open space through clustering the homes.
Soil Restoration	Restore the original properties and porosity of the soil by deep till and amendment with compost to reduce the generation of runoff and enhance the runoff reduction performance of post construction practices.	Considered and Applied	N/A

3.1.2 Reduction of Impervious Cover

Reduction of impervious cover includes methods to reduce the amount of rooftops, parking lots, roadways, sidewalks, and other surfaces that do not allow rain to infiltrate into the soil. An evaluation of the reduction of impervious cover techniques is provided in the table below.

Table 3-2: Reduction of Impervious Cover

Practice	Description	Incorporated	Reason
Roadway Reduction	Minimize roadway widths and lengths to reduce site impervious area	N/A	The roadway improvements are required to comply with the regulating authority; therefore, there are not any opportunities to minimize the roadway widths and lengths.
Sidewalk Reduction	Minimize sidewalk lengths and widths to reduce site impervious area	Considered and applied	The proposed sidewalks were minimized to the amount necessary for the proposed development.
Driveway Reduction	Minimize driveway lengths and widths to reduce site impervious area	Considered and applied	The building was placed to reduce the length of the driveways as much as possible to reduce impervious cover as well as minimize the amount of wetland disturbance.
Cul-de-sac Reduction	Minimize the number of cul-de-sacs and incorporate landscaped areas to reduce their impervious cover.	N/A	The project does not propose any cul-de-sacs.
Building Footprint Reduction	Reduce the impervious footprint of residences and commercial buildings by using alternate or taller buildings while maintaining the same floor to area ratio.	Considered and applied.	The building is a multi-story facility, which has reduced the proposed building footprint.
Parking Reduction	Reduce imperviousness on parking lots by eliminating unneeded spaces, providing compact car spaces and efficient parking lanes, minimizing stall dimensions, using porous pavement surfaces in overflow parking areas, and using multi-storied parking decks where appropriate.	N/A	The proposed parking shown on the project plans is the minimum parking required for this facility.

3.1.3 Runoff Reduction Techniques

Green infrastructure techniques use the natural features of the site and promote runoff reduction through micromanaging runoff, promoting groundwater recharge, increasing losses through evapotranspiration, and emulating the existing hydrology. An evaluation of the runoff reduction practices is provided in the table below.

Table 3-3: Runoff-Reduction Practices

Practice	Description	Incorporated	Reason
Conservation of Natural Areas	Retain the pre-development hydrologic and water quality characteristics of undisturbed natural areas, stream and wetland buffers by restoring and/or permanently conserving these areas on a site.	Considered and not applied.	There are no build areas, but no credit has been taken since the areas will not be put into permanent conservation.
Sheet flow to Riparian Buffers or Filter Strips	Undisturbed natural areas such as forested conservation areas and stream buffers or vegetated filter strips and riparian buffers can be used to treat and control stormwater runoff from some areas of a development project.	N/A	There are no conservation areas proposed as part of this project and there are no buffers associated with the wetlands.

Practice	Description	Incorporated	Reason
Vegetated Open Swale	The natural drainage paths, or properly designed vegetated channels, can be used instead of constructing underground storm sewers or concrete open channels to increase time of concentration, reduce the peak discharge, and provide infiltration.	Considered and applied	Swales have been incorporated into the project design.
Tree Planting/Tree Box	Plant or conserve trees to reduce stormwater runoff, increase nutrient uptake, and provide bank stabilization. Trees can be used for applications such as landscaping, stormwater management practice areas, conservation areas and erosion and sediment control.	Considered and not applied	Tree planting is proposed around the perimeter; however, new trees are not credited towards area reduction for the water quality volume.
Disconnection of Rooftop Runoff	Direct runoff from residential rooftop areas and upland overland runoff flow to designated pervious areas.	Considered and not applied	This practice is not practical for this project, since this practice is typically used in residential applications for small rooftop areas.
Stream Daylighting for Redevelopment Projects	Stream daylight previously culverted/ piped streams to restore natural habitats, better attenuate runoff by increasing the storage size and promoting infiltration.	N/A	There are no previously culverted/ piped streams to take credit for this practice as part of this project.
Rain Garden	Manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.	Considered and not applied	This practice is not practical for this project, since the contributing drainage area is limited to 1,000 square feet. In addition, other standard stormwater management practices with runoff reduction volume are being used.
Green Roof	Capture runoff through a layer of vegetation and soil installed on top of a conventional flat or sloped roof.	Considered and not applied	This practice is not practical for this project.
Stormwater Planter	Small landscaped stormwater treatment devices that can be designed as infiltration or filtering practices.	Considered and not applied	This practice is not practical for this project, since infiltration planters are typically used in applications to collect small drainage areas of less than 15,000 square feet and infiltrating the stormwater through the planter prior to entering collection piping.
Rain Tank/Cistern	Capture and store stormwater runoff to be used for irrigation systems or filtered and reused for non-contact activities.	N/A	
Porous Pavement	Pervious types of pavements that provide an alternative to conventional paved surfaces, designed to infiltrate rainfall through the surface.	Considered and not applied	Porous pavement has not been incorporated based upon the amount of snowfall annually received in the area.

3.1.4 Standard Stormwater Management Practices

Standard stormwater management practices (SMPs) are structural practices that are designed to capture and treat the water quality volume. Some of the standard SMPs can also provide runoff reduction or water quantity controls. An evaluation of the standard SMPs is provided in the table below.

Table 3-4: Standard Stormwater Management Practices

Practice	Description	Incorporated	Reason
Stormwater Ponds	Constructed stormwater retention basins that have a permanent pool (or micropool). Runoff from each rain event is detained and treated in the pool. Can be used to treat hostspot runoff if 2 feet minimum separation to seasonally groundwater is provided or if a permeable liner is provided.	Considered and not applied.	This practice requires a permanent pool of water for treatment and it is not practical given the close proximity to the airport.
Stormwater Wetlands	Constructed stormwater wetlands that are structural practices that incorporate wetland plants to store and treat runoff. Can be used to treat hostspot runoff if 2 feet minimum separation to seasonally groundwater is provided.	Considered and not applied.	This practice is not practical for this project given the close proximity to the Niagara International Airport.
Stormwater Infiltration	Excavated trench or basin used to capture and allow for infiltration into the surrounding soils from the bottom and sides of the basin or trench. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and not applied.	This practice is not practical given the poor infiltration soils, depth to groundwater, and locations of onsite wetlands.
Underground Infiltration System	An underground perforated piping or chambers used to capture and allow for infiltration into the surrounding soils from the bottom and sides. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and not applied.	This practice is not practical given the poor infiltration soils, depth to groundwater, and locations of onsite wetlands.
Stormwater Filtering Systems – Sand or Organic	Aboveground or underground multi-chamber practice designed to treat stormwater runoff through filtration using a sediment forebay, primary filter media and underdrain. Can be used to treat hostspot runoff if a permeable liner is provided.	N/A	Using another filtering practice that provides runoff reduction in addition to water quality treatment.
Stormwater Filtering Systems – Bioretention	Shallow basin or landscaped area that uses engineered soils and vegetation to capture and treat runoff. Can be used to treat hostspot runoff if a permeable liner is provided. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and applied.	Bioretention basins have been incorporated to provide water quality treatment and runoff reduction.
Stormwater Open Channel Systems - Dry Swale	Vegetated channel that captures and treats runoff within dry cells formed by check dams or other means. Can be used to treat hostspot runoff if a permeable liner is provided. Also, a standard stormwater practice that also provides runoff reduction volume capacity.	Considered and not applied.	The vegetated channels that were incorporated into the design will be used for pretreatment and conveyances purposes.
Stormwater Open Channel Systems - Wet Swale	Vegetated channel that captures and treats runoff within wet cells formed by check dams or other means.	Considered and not applied	Using another practice that provides runoff reduction in addition to water quality treatment.

3.2 Hydrologic Analysis

3.2.1 Stormwater Modeling

The USDA Soil Conservation Service Publication Technical Release (TR-55) "Urban Hydrology for Small Watersheds" has been used to analyze the pre- and post-development rainfall runoff rates and volumes. Watershed areas, curve numbers (CN), and times of concentration (T_C) were calculated for each contributing watershed. The curve number is a land-sensitive coefficient that dictates the relationship between total rainfall depth and direct storm runoff. Based on the land coverage and soil group types, the average CN has been determined for each of the subcatchments for both the existing and proposed conditions.

The T_C is defined as the time for runoff to travel from the hydraulically most distant point in the watershed to a Design Point (DP). Values of the time of concentration were determined for both the pervious and impervious area of each watershed for both the existing and proposed conditions based on land cover and slope of the flow path using methods outlined in TR-55. As per TR-55, the minimum T_C used in 0.1 hours (for 6 minutes).

An overall watershed boundary was developed for the pre- and post-development conditions (see Figure 5 and Figure 6, respectively). The overall watershed was broken down into smaller watersheds, or subcatchments to allow for analysis of runoff conditions at several locations. Each of these locations is defined as a Design Point (DP) to compare the proposed development to the existing conditions. Descriptions of each of the selected design points are provided below:

- DP-1: Channel south of the southern property line.
- DP-2: Ditch along Haseley Road near southwestern property corner.
- DP-3: Wetland along Tuscarora Road near northeastern property corner.
- DP-4: Wetland along southern property line.

Rainfall data used in the modeling and analysis was obtained from the isohyet maps provided in the *Design Manual* and the Northeast Regional Climate Center (NRCC). A Type II rainfall distribution was used to evaluate the pre- and post-development stormwater runoff conditions for the 1-, 10-, and 100-year 24-hour storm events. The rainfall data used in the stormwater management design and analysis is provided in the table below.

Table 3-5: Rainfall Data

Storm Event	24-Hour Rainfall
90th Percentile(1,2)	1.00 inches
1-year	1.77 inches
2-year(3)	2.12 inches
10-year	2.96 inches
100-year	4.78 inches

1. The 90th percentile 24-hour rainfall value was taken from the *New York State Stormwater Management Design Manual*. The other 24-hour rainfall values are taken from NRCC.
2. The 90th percentile 24-hour rainfall amount was used to calculate the required total water quality volume.
3. The 2-year 24-hour rainfall amount was used to calculate the sheet flow component in the time of concentration.

The rainfall data used in the stormwater management design and analysis is provided in Appendix D. The results of the computer modeling used to analyze the pre- and post-development watershed conditions are provided in Appendix E and Appendix F, respectively.

3.2.2 Water Quality Control

The water quality volumes have been determined based on the methodology described in the Design Manual. The total water quality volume is provided in the table below.

Table 3-6: Total Water Quality Volume

Subcatchment	Area (ac)	Impervious Area (ac)	WQ_v (cf)
118	11.69	7.53	26,716
119	11.32	7.53	26,648
120	11.60	7.56	26,793
115	12.22	9.99	34,846
116	12.24	9.99	34,849
113	4.29	3.68	12,813
114	8.73	5.10	18,255
301	3.85	2.46	8,746
302	6.99	2.62	9,829
Total	**82.93**	**56.46**	**199,496**

Detailed design calculations have been provided in Appendix D.

3.2.3 Runoff Reduction Volume

Runoff reduction is achieved by infiltration, groundwater recharge, reuse, recycle, evaporation and evapotranspiration of 100 percent of the post-development water quality volumes to replicate pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow, discharge volume, and minimizing concentrated flow by using runoff-control techniques to provide treatment in a distributed manner before runoff reaches the collection system. The runoff-reduction-volume techniques that were used to reduce the total required water quality volume are in the table below.

Table 3-7: Implemented Runoff Reduction Volume Techniques

Techniques/ Practices	RRv Reduction Method	Reduction Amount
Bioretention Practice	Standard SMP with RRv capacity	40% of the WQv provided by practice (with underdrains)

After applying the runoff-reduction-volume techniques, the total required water quality volume was not reduced 100 percent. The minimum required runoff reduction volume was determined to confirm that at least the minimum percent of the total water quality volume has been reduced. The total provided runoff reduction volume was greater than the minimum required runoff reduction volume. Therefore, the minimum required runoff-reduction volume has been met. Detailed design calculations have been provided in Appendix D.

3.2.4 Water Quantity Control

A comparison of the required and provided channel protection volume is provided in the table below.

Table 3-8: Summary of Channel Protection Volume

Water Quantity Parameter	Required (cf)	Provided (cf)
Channel Protection Volume	230,536	554,026

Detailed channel protection volume calculations have been provided in Appendix D. A comparison of the pre- and post-development peak discharge rates is provided in the table below.

Table 3-9: Summary of Peak Discharge Rates

Storm Event	Design Point	Pre (cfs)	Post (cfs)	Diff (cfs)
1-year	1	5.98	5.42	-0.56
	2	13.47	7.74	-5.73
	3	11.01	10.70	-0.31
	4	4.05	3.52	-0.53
10-year	1	16.77	15.50	-1.27
	2	42.35	23.57	-18.78
	3	32.69	30.37	-2.32
	4	13.33	11.54	-1.79
100-year	1	36.41	33.73	-2.68
	2	101.12	51.50	-49.62
	3	71.11	60.31	-10.80
	4	30.57	26.48	-4.09

Comparison of the peak discharge rates for pre- and post-development watershed conditions demonstrates that the peak rate of runoff from the proposed development will not be increased. The pre- and post-development stormwater models have been provided in Appendix F and Appendix E, respectively.

3.3 Hydraulic Analysis

Stormwater runoff from the proposed development will be collected and conveyed to the proposed stormwater management facilities by the closed pipe-network system. A hydraulic analysis of the proposed stormwater collection system was performed to verify that the system has the capacity to convey the stormwater runoff associated with the 25-year storm.

The Rational Method was used to calculate the peak surface runoff rate for the each of the drainage structures. The contributing drainage areas to each of the drainage structures were defined and broken into impervious and pervious areas. A runoff coefficient of 0.9 was used for impervious areas and 0.4 for pervious areas. A rainfall intensity of 5.15 inches per hour was used for the 25-year storm. The minimum time of concentration of six minutes was used for each of the drainage areas to be conservative.

Based upon the hydraulic analysis, the proposed stormwater collection system has adequate capacity to collect and convey the stormwater runoff associated with the 25-year storm. None of the proposed drainage structures surcharge above the proposed rim elevations. The proposed stormwater collection system hydraulic analysis has been provided in Appendix G.

4 Erosion and Sediment Control Plan

4.1 Construction Sequencing Schedule and Phasing

The proposed project is to be completed in two phases. Phase 1 will consist of the site work and Phase 2 will consist of the offsite roadway improvements. The general construction sequencing is shown on the project plans. In addition, the Applicant is requesting written approval from the Town of Niagara, which is an MS4, to disturb more than 5 acres of soil at any one time to obtain the necessary fill to construct sections of the project while balancing earthwork operations.

4.2 Erosion and Sediment Control Measures

Temporary erosion and sediment control measures to be used during construction generally include the following:

- **Stabilized Construction Access** - Before construction, the stabilized construction access shall be installed to reduce the tracking of sediment onto adjacent roadways. Construction traffic must enter and exit the site at the stabilized construction access. The stabilized construction access shall be maintained in good condition to control tracking of sediment onto rights-of-way or streets. When necessary, the placement of additional aggregate atop the filter fabric shall be done to maintain the minimum thickness. Sediments and soils spilled, dropped, or washed onto the public rights-of-way shall be removed immediately.

- **Dust Control** - Water trucks or other approved water source shall be used, as needed, during construction to reduce dust generated on the site. Dust control shall be provided by the general contractor to a degree acceptable to the owner/operator, and in compliance with the applicable local and state dust control requirements.

- **Temporary Soil Stockpile** - Materials, such as topsoil, shall be temporarily stockpiled (if necessary) on site during construction. Stockpiles shall be located away from storm drainage, water bodies or courses, and shall be properly protected from erosion in accordance with the NYSDEC standard detail.

- **Silt Fencing** - Before initiation of and during construction, silt fencing shall be established along the perimeter of areas to be disturbed as a result of the construction up gradient of water courses or adjacent properties. These barriers may extend into non-impact areas to adequately protect adjacent lands. Clearing and grubbing shall be performed only as necessary for the installation of the sediment control barrier. To maximize effectiveness of the silt fencing, daily inspections shall be performed by site personnel. Maintenance of the fence shall be performed as needed and when directed by the Qualified Inspector.

- **Temporary Seeding** - Within seven days after construction ceases on any particular area of the site, all disturbed areas where there shall be no construction for longer than 14 days shall be temporarily seeded and mulched to minimize erosion and sediment loss. Other stabilization methods maybe approved by the Qualified Inspector.

- **Inlet Protection** – Inlet protection shall be installed around existing and proposed catch basins (once installed) to keep sediment from entering the storm-sewer system. During construction, the inlet protection measures shall be replaced as needed to ensure proper function of the structure.

- **Check Dams** - Check dams shall be installed within drainage ditches to reduce the velocity of stormwater runoff, promote settling of sediment, and reduce sediment transport off site. The stone check dams shall be inspected at least every seven days. Damage shall be repaired upon discovery. If significant erosion has occurred between structures, a liner of stone or other suitable material shall be installed in that part of the channel. Sediment accumulated behind the stone check dams shall be removed to allow the channel to drain through the stone check dam and prevent large flows from carrying sediment over or around the dam. Stones shall be replaced to maintain the design cross section of the structures.

- **Temporary Sediment Basins and Traps** - Temporary sediment basins and traps shall be constructed to intercept sediment laden runoff, reduce the amount of sediment leaving the disturbed areas, and protect drainage ways, properties, and rights-of-way. Projects that have proposed stormwater ponds can be used as temporary sediment basins during construction. Temporary sediment basins and traps shall be inspected at least every seven days. All damage caused by soil erosion and construction equipment shall be repaired upon discovery. Accumulated sediment shall be removed from the sediment basin or trap when it reaches 50 percent of the design capacity and must not exceed 50 percent. Sediment must not be placed downstream from the embankment, adjacent to a stream, or floodplain.

- **Fiber Rolls** – Fiber rolls shall be installed on the finished slopes 3:1 or steeper to reduce sheet flow on slopes help minimize erosion while final seeding and planting is underway.

- **Erosion Control Matting** – Erosion control matting shall be installed on all slopes exceeding 3:1. Erosion control matting shall provide protection from temporary erosion, establishment of rapid vegetation, and long-term resistance of erosion to shear stresses associated with high runoff flow velocities associated with steep slopes.

- **Dewatering** - Dewatering, if required, must not be discharged directly into wetlands, water courses, water bodies, and storm sewer systems without appropriate protection or authorizations. Proper methods and devices shall be used to the extent permitted by law, such as pumping water into temporary sediment basins, providing surge protection at the inlet and outlet of pumps, floating the intake of the pump, or other methods to minimize and retain the suspended solids.

- **Water Bars** - Water bars shall be installed to limit erosive velocities of surface runoff and prevent erosion on sloping access rights-of-ways or either long, narrow sloping areas generally less than 100 feet wide. Periodically inspect water bars for erosion damage and sediment. Check outlet areas and make repairs to restore operation.

Permanent erosion and sediment control measures to be used after construction generally include the following:

- **Establish Permanent Vegetation** - Disturbed areas not covered by impervious surfaces shall be seeded in accordance with the accompanying plans. The type of seed, mulch, and maintenance measures shall be followed. All areas at final grade shall be seeded and mulched within 14 days after completion of the major construction. All seeded areas shall be protected with mulch or hay. Final site stabilization is achieved when soil-disturbing activities have been completed and a uniform, perennial vegetative cover with a density of 80 percent has been established or equivalent stabilization measures (such as the use of mulches or geotextiles) have been employed on the disturbed unpaved areas and areas not covered by permanent structures.

- **Rock Outlet Protection** - Rock outlet protection shall be installed at the locations as shown on the accompanying plans. The installation of rock outlet protection will reduce the depth, velocity, and energy of water, such that the flow will not erode the receiving water course or water body.

Specific erosion and sediment control measures, inspection frequency, and remediation procedures are provided in the subsequent sections and on the accompanying project plans.

4.3 Pollution Prevention Controls

Good housekeeping practices are designed to maintain a clean and orderly work environment. Good housekeeping measures shall be maintained throughout the construction process by those parties involved with the direct care and development of the site. The following measures shall be implemented to control the possible exposure of harmful substances and materials to stormwater runoff:

1. Material resulting from the clearing and grubbing operation shall be stockpiled away from storm drainage, water bodies or watercourses and surrounded with adequate erosion and sediment control measures. Soil stockpile locations shall be exposed no longer than 14 days before seeding.

2. Equipment maintenance areas shall be protected from stormwater flows and shall be supplied with appropriate waste receptacles for spent chemicals, solvents, oils, greases, gasoline, and any pollutants that might contaminate the surrounding habitat or water supply. Equipment wash-down zones shall be within areas draining to sediment control devices.

3. The use of detergents for large-scale (e.g., vehicles, buildings, pavement surfaces) washing is prohibited.

4. Material storage locations and facilities (e.g., covered storage areas, storage sheds) shall be on-site and shall be stored according to the manufacturer’s standards in a dedicated staging area. Chemicals, paints, solvents, fertilizers, and other toxic material shall be

stored in waterproof containers. Runoff containing such materials shall be collected, removed from the site, treated and disposed of at an approved solid waste or chemical disposal facility.

5. Hazardous spills shall be immediately contained to prevent pollutants from entering the surrounding habitat or water supply. Spill Kits shall be provided on site and shall be displayed in a prominent location for ease of access and use. Spills greater than 5 gallons shall be reported to the NYSDEC Response Unit at 1-800-457-7362. In addition, a record of the incidents or notifications shall be documented and attached to the SWPPP.

6. Portable sanitary waste facilities shall be provided on site for workers and shall be properly maintained.

7. Dumpsters or debris containers shall be on site and shall be of adequate size to manage respective materials. Regular collection and disposal of wastes must occur as required.

8. Temporary concrete washout facilities shall be a minimum of 50 feet from storm drain inlets, open drainage facilities, and watercourses. Each facility should be away from construction traffic or access areas to prevent disturbance or tracking. A sign shall be installed adjacent to each washout facility to inform concrete equipment operators to use the proper facilities. When temporary concrete washout facilities are no longer required for the work, the hardened concrete shall be removed and disposed of. Materials used to construct the temporary concrete washout facilities shall be removed and disposed of. Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities shall be backfilled or repaired, seeded, and mulched for final stabilization. Wastewater discharges from washout of concrete is prohibited.

9. Non-stormwater components of site discharge shall be clean water. Water used for construction, which discharges from the site, must originate from a public water supply or approved private well. Water used for construction that does not originate from an approved public supply must not discharge from the site.

10. Discharges from dewatering activities, including discharges from dewatering trenches and excavations, shall be managed by appropriate control measures.

11. Wastewater discharges from washout and cleanout of stucco, paint, form-release oils, curing compounds, and other construction materials is prohibited.

4.4 Soil Stabilization and Restoration

Stabilization

In areas where soil disturbance has temporarily or permanently ceased, the application of soil stabilization measures shall be initiated by the end of the next business day and completed within 14 days from the date the current soil disturbance ceased. The soil-stabilization measures shall be in conformance with the *New York State Standards and Specifications for Erosion and Sediment Control*, latest edition.

For construction sites authorized to disturb more than 5 acres of soil at any one time, the application of soil stabilization measures shall be initiated by the end of the next business day and completed within seven days from the date that current soil disturbance ceased. The soil-stabilization measures shall be in conformance with the *New York State Standards and Specifications for Erosion and Sediment Control*, latest edition. Additional site-specific practices shall be installed as needed to protect water quality.

Restoration

Soil restoration shall be performed in the disturbed areas. The soils shall be restored in accordance with the table below.

Table 4-1: Soil Restoration

Type of Soil Disturbance	Soil Restoration Requirement
No Soil Disturbance (e.g., preservation of natural features)	Restoration not required.
Minimal Soil Disturbance (e.g., clearing and grubbing)	Restoration not required.
Areas where top soil is stripped only (e.g., no change in grade)	Aerate and apply 6 inches of topsoil.
Areas of cut or fill	Apply full soil restoration (see below).
Heavy traffic areas on site (especially in 5 to 25 feet around buildings, but not within a 5-foot perimeter around foundation walls)	Apply full soil restoration (see below).
Areas where runoff reduction or infiltration practices are applied	Restoration not required, but can be applied to enhance soil infiltration.
Redevelopment projects	Soil restoration is required on redevelopment projects in areas where existing impervious area will be converted to pervious area.

Full Soil Restoration

Before applying full soil restoration, all construction, including construction equipment and material storage, site cleanup and trafficking, should be finished and the site closed to further disturbance. Full soil restoration should be performed with a heavy-duty agricultural-grade deep ripper, deep angled-leg subsoiler, or equivalent machinery to achieve de-compaction.

Full soil restoration is implemented in a two-phase process:

1. Deep rip the affected thickness of exposed subsoil, aggressively fracturing it before the protected topsoil is reapplied on the site.
2. De-compact simultaneously through the restored topsoil layer and upper half of the affected subsoil.

Low to Moderate Subsoil Moisture

The disturbed soils are returned to rough grade and the following is applied:

1. Apply 3 inches of compost over the subsoil.
2. Till compost a minimum of 12 inches into the subsoil using a cat-mounted ripper, tractor-mounted disc, or tiller mixing and circulating air and compost into subsoils.
3. Rock-pick until uplifted stone and rock of 4 inches or larger size are cleaned off the site. All construction material and foreign debris and existing root masses shall be removed from proposed planting areas.
4. Apply 6 inches of topsoil. Newly installed planting soils shall be mixed with existing soils where they meet in order to create a transitional gradient to allow for proper drainage.
5. Install plants and vegetation in accordance with the Landscaping Plan.

5 Stormwater Pollution Prevention Plan Implementation

5.1 Certification Statements

Before starting construction, the owner/operator, contractors, and subcontractors are required to sign the certification statements provided in Appendix H.

The owner/operator must sign a copy of the Owner's/Operator's certification before submitting the Notice of Intent. The owner/operator acknowledges that the SWPPP has been developed and will be implemented as the first element of construction and agrees to comply with the terms and conditions of the general permit for which the Notice of Intent is being submitted.

The owner/operator must identify the contractors and subcontractors that will be responsible for installing, constructing, repairing, replacing, inspecting, and maintaining the erosion and sediment control practices; and constructing the post-construction stormwater management practices included in the SWPPP. The contractors and subcontractors must identify at least one trained individual from their company who will be responsible for implementation of the SWPPP. This person will be known as the trained contractor. At least one trained contractor will be on site daily when soil disturbing activities are being performed. If new or additional contractors are hired to implement measures identified in the SWPPP after construction has begun, they must also sign the certification statement and identify their responsibilities.

5.2 Pre-Construction Meeting

Before beginning construction, the owner/operator must set up a pre-construction meeting with the Town representative, qualified professional, qualified inspector, contractors, and subcontractors. The primary purpose of the pre-construction meeting is to discuss the responsibilities of each party as they relate to the implementation of the SWPPP and to clarify any questions.

5.3 Construction Site Log

The owner/operator must maintain a copy of the following, including but not limited to: General Permit, signed NOI, signed MS4 Acceptance form, NOI Acknowledgement Letter, SWPPP, signed certification statements, and inspections reports. The documents must be maintained in a secure location on site. The secure location must be accessible during normal business hours to an individual performing a compliance inspection.

5.4 Construction Inspections and Maintenance

5.4.1 Contractor Maintenance Inspection Requirements

The trained contractor must inspect the erosion and sediment control practices and pollution-prevention measures to verify that they are being maintained in effective operating condition. The inspections will be conducted as follows:

- For construction sites where soil disturbance is on-going, the trained contractor must inspect the measures within the active work area daily. If deficiencies are identified, the contractor will begin implementing corrective actions within one business day and must complete the corrective actions by the end of the day.

- 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 must conduct the daily maintenance inspections as soil disturbance resumes.

- For construction sites where soil disturbance has 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 part of the project have been constructed in conformance with the SWPPP and are operational.

5.4.2 Qualified Inspector Inspection Requirements

The owner/operator must have a Qualified Inspector conduct site inspections to verify the stability and effectiveness of protective measures and practices employed during construction. The site inspections will be conducted as follows:

- For construction sites where soil disturbance is ongoing, the Qualified Inspector must conduct a site inspection at least once every seven days.

- For construction sites where soil disturbance is ongoing and the owner/operator has received authorization to disturb greater than 5 acres, the Qualified Inspector must conduct at least two site inspections every seven days. The two site inspections shall be separated by a minimum of two days.

- 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 must conduct a site inspection at least once every 30 days. The owner/operator must notify the NYSDEC or MS4 in writing before reducing the frequency of the inspections.

- 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 are operational. The owner/operator must notify the NYSDEC or the MS4 in writing before the shutdown.

All erosion and sediment control inspections shall be performed in accordance with this SWPPP, accompanying project plans, latest revision of *New York State Standards and Specifications for Erosion and Sediment Control,* and procedures outlined in Appendix H of the latest revision of the *New York State Stormwater Management Design Manual*. Inspection reports must identify and document the maintenance of the erosion and sediment control measures. An Example inspection report has been provided in Appendix I.

Specific maintenance components, schedule frequency, inspection parameters and remediation procedures are provided on the accompanying project plans. Any adjustments or modifications to the maintenance plan shall be noted in the inspection reports and submitted to the Town for approval.

6 Permit Closure and Post-Construction Requirements

6.1 Permit Closure

The owner/operator may terminate coverage when:

a. Total project completion has occurred.
b. A planned shutdown with partial project completion has occurred.
c. Property ownership changes or when there is a change in operational control over the construction plans and specifications; and the new owner/operator has obtained coverage under the SPDES General Permit.
d. Coverage under an alternative SPDES general permit or an individual SPDES permit has been obtained.

The completed NOT must be submitted to the NYSDEC to cancel coverage.

6.2 Record Retention

Following construction, the owner/operator must retain a copy of the signed NOI, signed MS4 SWPPP Acceptance, NOI Acknowledgement Letter, SWPPP, project plans, and any inspection reports that were prepared in conjunction with the General Permit for at least five years from the date that the NYSDEC receives a complete NOT.

6.3 Inspection and Maintenance

Post-construction inspections and maintenance will be performed by the tenant. Inspections and maintenance for the various site components and stormwater management facilities shall be performed in accordance with the accompanying project plans and this SWPPP. Detailed post-construction inspections and maintenance procedures are provided in Appendix J.

7 Conclusion

This Stormwater Pollution Prevention Plan has been developed in accordance with the requirements of the Town of Niagara and the New York State Department of Environmental Conservation (NYSDEC) State Pollutant Discharge Elimination System (SPDES) Phase II technical guidelines. This SWPPP identifies the erosion control, sediment control, pollution-prevention, and stormwater management measures to be implemented during construction to minimize soil erosion and control sediment transport off site, and after construction to control and treat stormwater runoff from the developed site.

In the opinion of the SWPPP preparer, the proposed project will not have adverse impacts if the measures for erosion control, sediment control, pollution prevention, and stormwater management measures are properly constructed and maintained in accordance with the requirements outlined herein and on the accompanying project plans.

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Appendix A: NYSDEC SPDES General Permit

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

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 discharges*;

   (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 **<u>not</u>** 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 not 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 not 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* <u>and</u> 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, <u>with the exception of</u>:

    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 <u>not</u> 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* <u>and</u> 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,* <u>and</u> 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; <u>and</u> all areas disturbed as of the project shutdown date have achieved *final stabilization*; <u>and</u> all temporary, structural erosion and sediment control measures have been removed; <u>and</u> 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

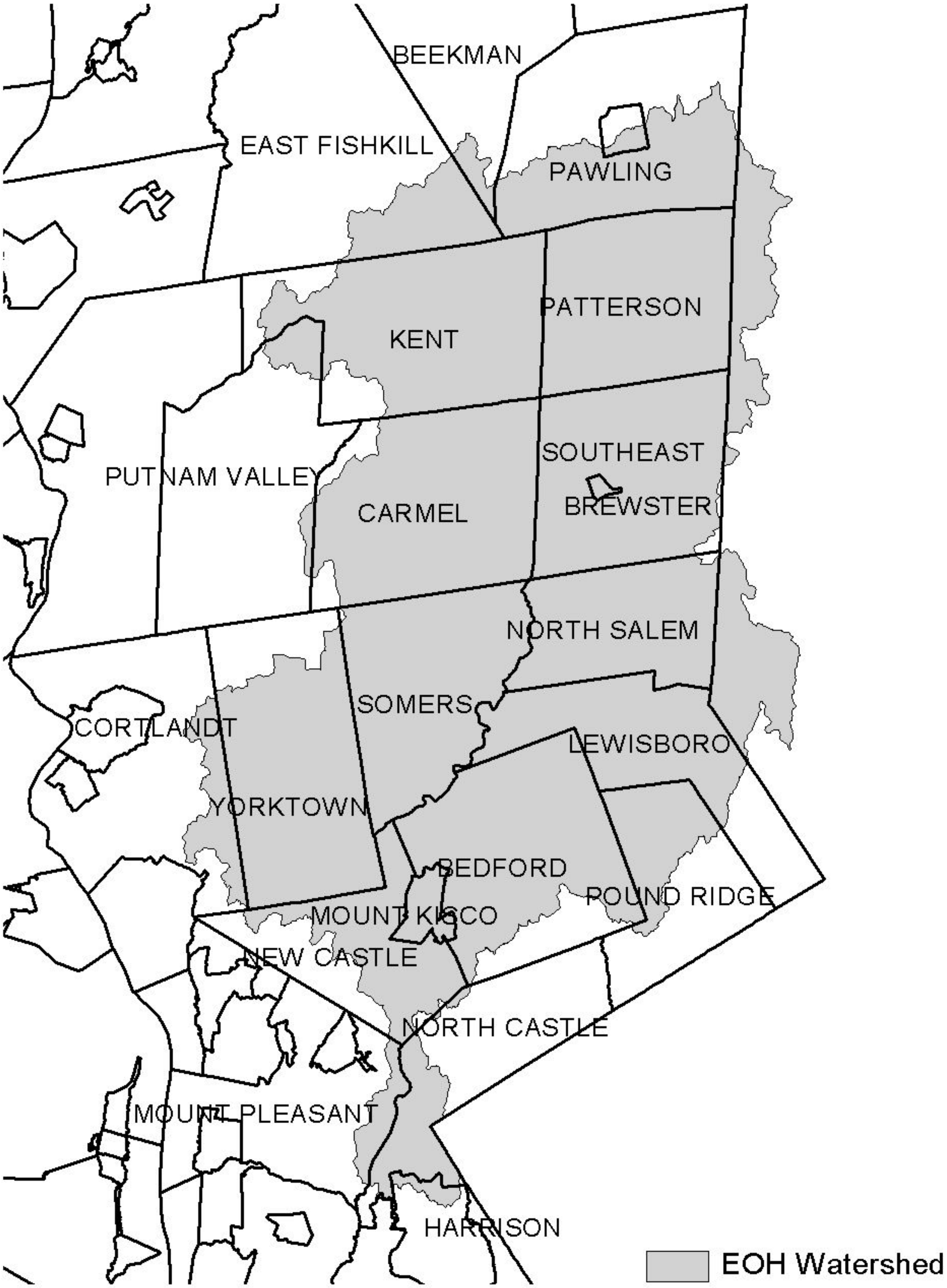


Figure 2 - Onondaga Lake Watershed

Figure 3 - Greenwood Lake Watershed

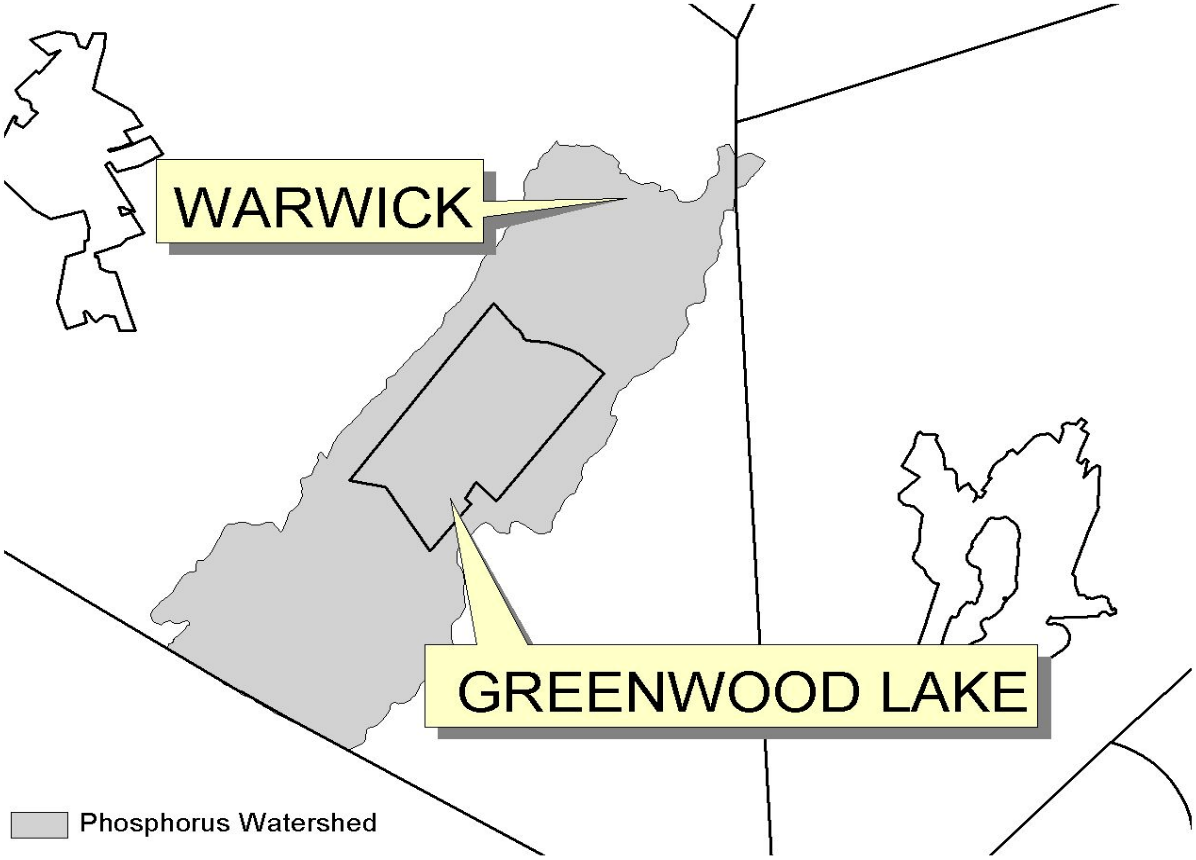


Figure 4 - Oscawana Lake Watershed

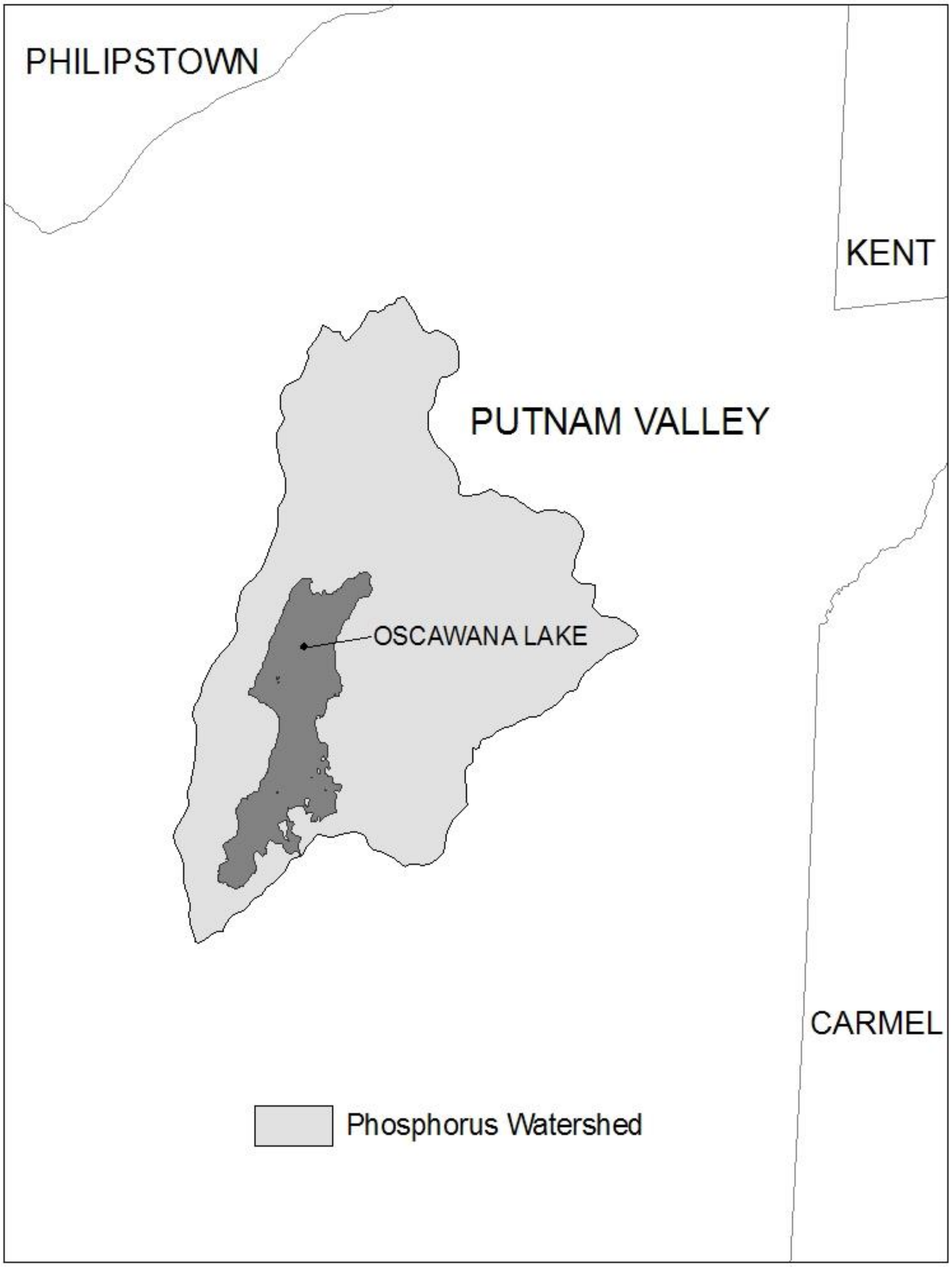
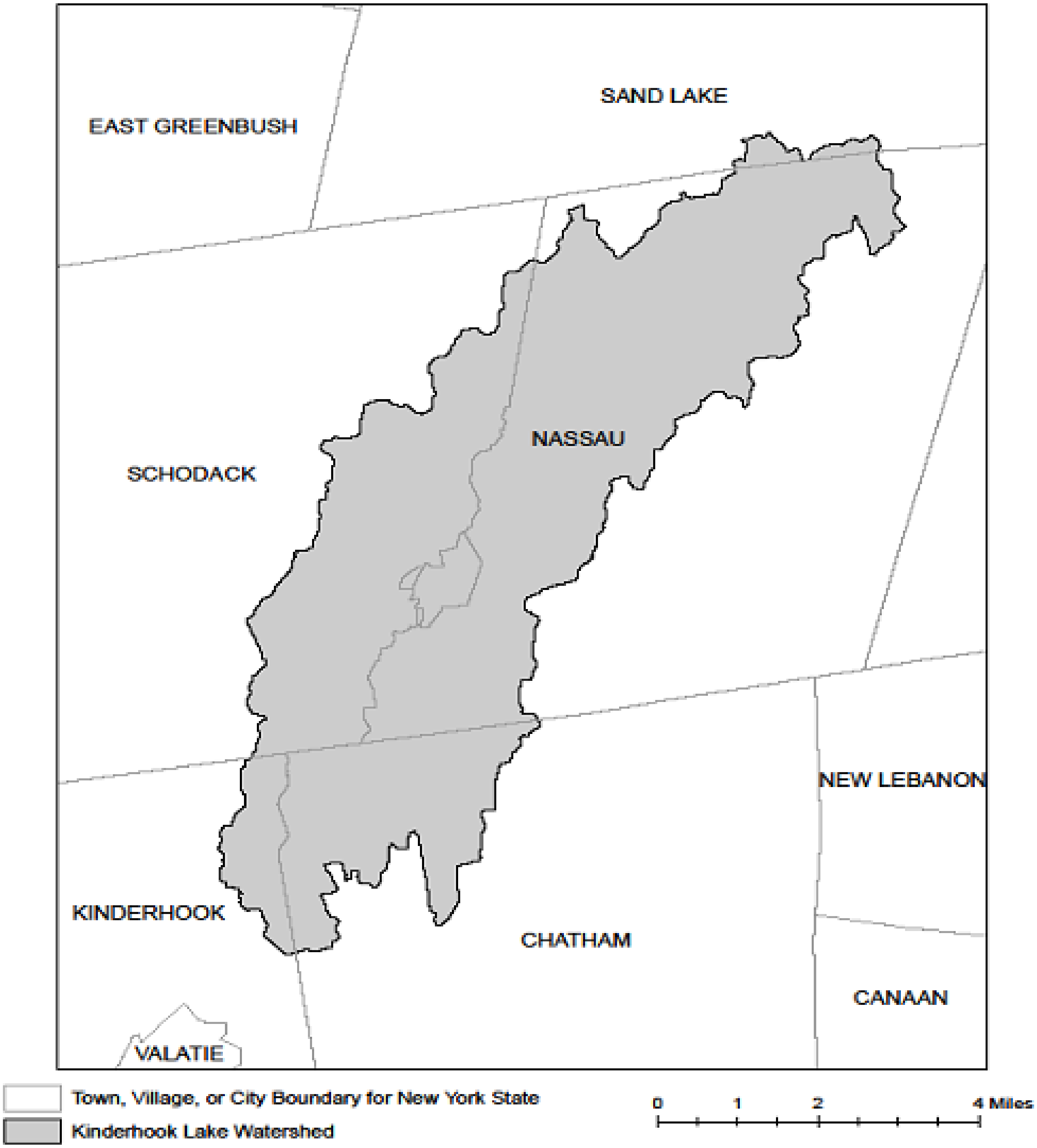


Figure 5 - Kinderhook Lake Watershed



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

Project Fifi
Packard Road and Lockport Road
Town of Niagara, New York

Appendix B: NYSDEC SPDES General Permit Forms

LANGAN

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)
JB2 Partners, LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Bancroft

Owner/Operator Contact Person First Name
John

Owner/Operator Mailing Address
3322 Grant Valley Road NW

City
Atlanta

State
GA

Zip
30305 -

Phone (Owner/Operator)
516 - 732 - 2307

Fax (Owner/Operator)
- -

Email (Owner/Operator)
jbancroft@jb2partners.com

FED TAX ID
- (not required for individuals)

Project Site Information

Project/Site Name
Project Fifi

Street Address (NOT P.O. BOX)
Lockport Road

Side of Street
○ **North** ● **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)
Town of Niagara

State	Zip	County	DEC Region
NY	14303 -	Niagara	9

Name of Nearest Cross Street
Packard Road

Distance to Nearest Cross Street (Feet)
0

Project In Relation to Cross Street
○ **North** ○ **South** ○ **East** ● **West**

Tax Map Numbers
Section-Block-Parcel
132.18-1-2

Tax Map Numbers
146.05-1-9

146.06-1-1 and 146.06-1-2

1. Provide the Geographic Coordinates for the project site in NYTM Units. To do this you **must** go to the NYSDEC Stormwater Interactive Map on the DEC website at:

www.dec.ny.gov/imsmaps/stormwater/viewer.htm

Zoom into your Project Location such that you can accurately click on the centroid of your site. Once you have located your project site, go to the tool boxes on the top and choose "i"(identify). Then click on the center of your site and a new window containing the X, Y coordinates in UTM will pop up. Transcribe these coordinates into the boxes below. For problems with the interactive map use the help function.

X Coordinates (Easting)	Y Coordinates (Northing)
177684	4781774

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

○ FOREST
● PASTURE/OPEN LAND
○ CULTIVATED LAND
○ SINGLE FAMILY HOME
○ SINGLE FAMILY SUBDIVISION
○ TOWN HOME RESIDENTIAL
○ MULTIFAMILY RESIDENTIAL
○ INSTITUTIONAL/SCHOOL
○ INDUSTRIAL
○ COMMERCIAL
○ ROAD/HIGHWAY
○ RECREATIONAL/SPORTS FIELD
○ BIKE PATH/TRAIL
○ LINEAR UTILITY
○ PARKING LOT
○ OTHER

Post-Development Future Land Use

○ SINGLE FAMILY HOME
○ SINGLE FAMILY SUBDIVISION — Number of Lots
○ TOWN HOME RESIDENTIAL
○ MULTIFAMILY RESIDENTIAL
○ INSTITUTIONAL/SCHOOL
○ INDUSTRIAL
○ COMMERCIAL
○ MUNICIPAL
○ ROAD/HIGHWAY
○ RECREATIONAL/SPORTS FIELD
○ BIKE PATH/TRAIL
○ LINEAR UTILITY (water, sewer, gas, etc.)
○ PARKING LOT
○ CLEARING/GRADING ONLY
○ DEMOLITION, NO REDEVELOPMENT
○ WELL DRILLING ACTIVITY *(Oil, Gas, etc.)
● OTHER
Warehouse

***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**
218.4	121.0	5.1	56.3

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**
0 %	0 %	0 %	100 %

7. Is this a phased project? ● **Yes** ○ **No**

8. Enter the planned start and end dates of the disturbance activities.
Start Date 05/01/2022 - **End Date** 05/01/2024

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

onsite federal wetlands

Cayuga Creek West Tributary

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)

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 Niagara

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: Langan

Contact Name (Last, Space, First): Zolezi Christina

Mailing Address: One North Broadway, Suite 91

City: White Plains

State: NY

Zip: 10601 -

Phone: 914 - 323 - 7418

Fax: 914 - 323 - 7401

Email: czolezi@langan.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: Michael

MI:

Last Name: Finan

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

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

4.580 **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)			.
● Bioretention (F-5)			56.46
○ 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

1.832 **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

0.894 **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

2.748 **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). 4.580

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	**CPv Provided**
5.292 **acre-feet**	12.719 **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	**Post-development**
105.14 **CFS**	80.98 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development	**Post-development**
239.21 **CFS**	172.02 **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

Facility Tenant

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.

The total WQv could not be reduced 100% using green infrastructure practices or other standard practices that provide RRV due to the presence of onsite wetlands, steep slopes, shallow bedrock, and poor infiltrating soils.

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 NYR
- ○ Other
- ○ None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ● **Yes** ○ **No**
If Yes, Indicate Size of Impact. 2.8

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. NYR

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 John

MI

Print Last Name Bancroft

Owner/Operator Signature

Date / /

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: JB2 Partners, LLC
2. Contact Person: John Bancroft
3. Street Address: 3322 Grant Valley Road NW
4. City/State/Zip: Atlanta, GA 30305

II. Project Site Information

5. Project/Site Name: Project Fifi
6. Street Address: Packard Road and Lockport Road
7. City/State/Zip: Niagara, New York 14303

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: Town of Niagara
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)

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

SWPPP Preparer Certification Form

SPDES General Permit for Stormwater Discharges From Construction Activity (GP-0-20-001)

Project Site Information

Project/Site Name

Project Fifi

Owner/Operator Information

Owner/Operator (Company Name/Private Owner/Municipality Name)

JB2 Partners LLC

Certification Statement – SWPPP Preparer

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.

Michael		Finan
First name	MI	Last Name

Signature

Date

Revised: January 2020

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Owner/Operator Certification Form

SPDES General Permit For Stormwater Discharges From Construction Activity (GP-0-20-001)

Project/Site Name: Project Fifi

eNOI Submission Number: ______

eNOI Submitted by: ☐ **Owner/Operator** ☑ **SWPPP Preparer** ☐ **Other**

Certification Statement - Owner/Operator

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.

John		Bancroft
Owner/Operator First Name	M.I.	Last Name

______
Signature

______
Date

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 C: Soil Testing Results

Refer to geotechnical report prepared by Langan

Appendix D: Design Calculations

Total Required Water Quality Volume Calculation Worksheet

Is this project subject to Chapter 10 of the NYS Design Manual (i.e. WQv is equal to post-development 1 year runoff volume)?...

Design Point(s): 1, 2, 3, and 4

P= 1.00 *inch*

Manually enter the information below.

Breakdown of Subcatchments

Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Description**
1	118	11.69	7.53	64%	0.63	26,716	Bioretention
2	119	11.32	7.53	67%	0.65	26,648	Bioretention
3	120	11.60	7.56	65%	0.64	26,793	Bioretention
4	115	12.22	10.01	82%	0.79	34,912	Bioretention
5	116	12.24	10.01	82%	0.79	34,915	Bioretention
6	113	4.29	3.68	86%	0.82	12,813	Bioretention
7	114	8.73	5.10	58%	0.58	18,255	Bioretention
8	301	3.85	2.46	64%	0.63	8,746	Bioretention
9	302	6.99	2.62	37%	0.39	9,829	Bioretention
10							
Subtotal		82.93	56.50	68%	0.66	199,628	Subtotal 1
Total		**82.93**	**56.50**	**68%**	**0.66**	**199,628**	**Initial WQv**

Identify Runoff Reduction Techniques By Area

Technique	**Total Contributing Area** *(Acre)*	**Contributing Impervious Area** *(Acre)*	**Notes**
Conservation of Natural Areas	0.00	0.00	*minimum 10,000 sf*
Riparian Buffers	0.00	0.00	*maximum contributing length 75 feet to*
Filter Strips	0.00	0.00	
Tree Planting	0.00	0.00	*Up to 100 sf directly connected*
Total	**0.00**	**0.00**	

Recalculate WQv after application of Area Reduction Techniques

	Total Area *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Runoff Coefficient Rv**	**WQv** *(ft^3)*
Initial WQv	82.93	56.50	68%	0.66	199,628
Subtract Area	0.00	0.00	--	--	--
WQv adjusted after Area Reductions	**82.93**	**56.50**	68%	0.66	199,628
Disconnection of Rooftops		0.00			
Adjusted WQv after Area Reduction and Rooftop Disconnect	82.93	56.50	68%	0.66	**199,628**
WQv reduced by Area Reduction techniques					0

Runoff Reduction Summary Table Worksheet

Runoff Reduction Volume and Treated Volumes

Runoff Reduction Techniques/Standard SMPs			Total Contributing Area (acres)	Total Contributing Impervious Area (acres)	WQv Reduced (RRv) cf	WQv Treated cf
Area Reduction	Conservation of Natural Areas	RR-1	0.00	0.00		
	Sheet flow to Riparian Buffers	RR-2	0.00	0.00		
	Sheet flow to Filter Strips		0.00	0.00		
	Tree Planting/Tree Pit	RR-3	0.00	0.00		
	Disconnection of Rooftop Runoff	RR-4		0.00		
Volume Reduction	Vegetated Swale	RR-5	0.00	0.00	0	
	Rain Garden	RR-6	0.00	0.00	0	
	Stormwater Planter	RR-7	0.00	0.00	0	
	Rain Barrel/Cistern	RR-8	0.00	0.00	0	
	Porous Pavement	RR-9	0.00	0.00	0	
	Green Roof (Intensive)	RR-10	0.00	0.00	0	
	Green Roof (Extensive)		0.00	0.00	0	
Standard SMPs w/RRv Capacity	Infiltration Trench	I-1	0.00	0.00	0	0
	Infiltration Basin	I-2	0.00	0.00	0	0
	Dry Well	I-3	0.00	0.00	0	0
	Underground Infiltration System	I-4	0.00	0.00	0	0
	Bioretention	F-5	82.93	56.50	79,851	119,777
	Infiltration Bioretention		0.00	0.00	0	0
	Dry swale	O-1	0.00	0.00		0
Standard SMPs	Micropool Extended Detention Pond	P-1	0.00	0.00		0
	Wet Pond	P-2	0.00	0.00		0
	Wet Extended Detention Pond	P-3	0.00	0.00		0
	Multiple Pond system	P-4	0.00	0.00		0
	Pocket Pond	P-5	0.00	0.00		0
	Surface Sand Filter	F-1	0.00	0.00		0
	Underground Sand Filter	F-2	0.00	0.00		0
	Perimeter Sand Filter	F-3	0.00	0.00		0
	Organic Filter	F-4	0.00	0.00		0
	Shallow Wetland	W-1	0.00	0.00		0
	Extended Detention Shallow Wetland	W-2	0.00	0.00		0
	Pond/Wetland System	W-3	0.00	0.00		0
	Pocket Wetland	W-4	0.00	0.00		0
	Wet Swale	O-2	0.00	0.00		0
Totals by Area Reduction →			0.00	0.00	0	
Totals by Volume Reduction →			0.00	0.00	0	
Totals by Standard SMP w/RRV →			82.93	56.50	79,851	119,777
Totals by Standard SMP →			0.00	0.00		0
Totals (Area + Volume + all SMPs) →			**82.93**	**56.50**	**79,851**	**119,777**

Bioretention Worksheet

(For use on HSG C or D Soils with underdrains)

Af=WQv*(df)/[k*(hf+df)(tf)]

where:		
	Af	Required Surface Area (ft^2)
	WQv	Water Quality Volume (ft^3)
	df	Depth of the Soil Medium (ft)
	hf	Average height of water above the planter bed (ft)
	tf	The Design Time to Filter the Treatment Volume Through the Filter Media (days)
	k	Hydraulic conductivity (ft/day)

Design Point(s): **1, 2, 3, and 4**

Enter Site Data For Drainage Area to be Treated by Practice

Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
1	118	11.69	7.53	0.64	0.63	26,716	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	64%	0.63	26,716	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	

Soil Information

Soil Group	D	
Using Underdrains?	*yes*	*Okay*

Pretreatment

WQv	26,716	*ft^3*	
Pretreatment Sizing	25%	*of WQv*	
Required Pretreatment Volume	6,679	*ft^3*	
Pretreatment Provided	27,898	*ft^3*	*Note: The pretreatment provided for subcatchment 118 is the provided forebay volume for subcatchment 118, 119, amd 120 divided by 3*
Pretreatment techniques utilized	*Sediment Basin/Forebay*		

Calculate the Minimum Filter Area

WQv		26,716	*ft^3*	
Media Type	--	Bioretention Soil		
Depth of Soil Media	*df*	2.5	*ft*	*2.5 ft to 4 ft*
Hydraulic Conductivity	*k*	0.5	*ft/day*	
Average Height of Ponding	*hf*	0.25	*ft*	*typically 0.25 ft*
Filter Time	*tf*	2.00	*days*	
Required Filter Area	***Af***	**24,288**	***ft^2***	

Determine Actual Bioretention Area

Filter Width		*ft*	
Filter Length		*ft*	
Filter Area	35,640	*ft^2*	*OK*
Actual Volume Provided	39,204	*ft^3*	

Determine Underdrain

Underdrain Gravel Bed Width	3	*ft*	
Required length of underdrain	1,188	*ft*	
Provided length of underdain	1,250	*ft*	*OK*

Determine Runoff Reduction

Percent Reduction	40%			
Runoff Reduction	**10,687**	***ft^3***	***This is 40% of the storage provided or WQv, whichever is smaller.***	
Volume Treated	**16,030**	***ft^3***	***This is the portion of the WQv that is not reduced in the practice.***	
Is the Bioretention contributing flow to another practice?	*no*		Select Practice	N/A
Volume Directed to Another Practice	0	*ft^3*	This volume is directed another practice	

Bioretention Worksheet

Design Point(s): **1, 2, 3, and 4**

Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
2	119	11.32	7.53	0.67	0.65	26,648	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection			0.00	67%	0.65	26,648	<<WQv after adjusting for	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Soil Information								
Soil Group			D					
Using Underdrains?			*yes*	*Okay*				
Pretreatment								
WQv				26,648	*ft^3*			
Pretreatment Sizing				25%	*of WQv*			
Required Pretreatment Volume				6,662	*ft^3*			
Pretreatment Provided				27,898	*ft^3*	*Note: The pretreatment provided for subcatchment 119 is the provided forebay volume for subcatchment 118, 119, amd 120 divided by 3*		
Pretreatment techniques utilized				*Sediment Basin/Forebay*				
Calculate the Minimum Filter Area								
WQv				26,648		*ft^3*		
Media Type			--	Bioretention Soil				
Depth of Soil Media			*df*	2.5		*ft*	*2.5 ft to 4 ft*	
Hydraulic Conductivity			*k*	0.5		*ft/day*		
Average Height of Ponding			*hf*	0.25		*ft*	*typically 0.25 ft*	
Filter Time			*tf*	2.00		*days*		
Required Filter Area			***Af***	**24,225**		***ft^2***		
Determine Actual Bioretention Area								
Filter Width				*ft*				
Filter Length				*ft*				
Filter Area			37,960	*ft^2*	*OK*			
Actual Volume Provided			41,756	*ft^3*				
Determine Underdrain								
Underdrain Gravel Bed Width			3	*ft*				
Required length of underdrain			1,265	*ft*				
Provided length of underdain			1,300	*ft*	*OK*			
Determine Runoff Reduction								
Percent Reduction			40%					
Runoff Reduction			**10,659**	***ft^3***	***This is 40% of the storage provided or WQv, whichever is smaller.***			
Volume Treated			**15,989**	***ft^3***	***This is the portion of the WQv that is not reduced in the practice.***			
Is the Bioretention contributing flow to another practice?				*no*	Select Practice		N/A	
Volume Directed to Another Practice			0	*ft^3*	This volume is directed another practice			

Bioretention Worksheet

Design Point(s):	**1, 2, 3, and 4**							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
3	120	11.60	7.56	0.65	0.64	26,793	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection			0.00	65%	0.64	26,793	<<WQv after adjusting for	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Soil Information								
Soil Group			D					
Using Underdrains?			*yes*	*Okay*				
Pretreatment								
WQv				26,793	*ft^3*			
Pretreatment Sizing				25%	*of WQv*			
Required Pretreatment Volume				6,698	*ft^3*			
Pretreatment Provided				27,898	*ft^3*	*Note: The pretreatment provided for subcatchment 120 is the provided forebay volume for subcatchment 118, 119, amd 120 divided by 3*		
Pretreatment techniques utilized				*Sediment Basin/Forebay*				
Calculate the Minimum Filter Area								
WQv				26,793		*ft^3*		
Media Type			--	Bioretention Soil				
Depth of Soil Media			*df*	2.5		*ft*	*2.5 ft to 4 ft*	
Hydraulic Conductivity			*k*	0.5		*ft/day*		
Average Height of Ponding			*hf*	0.25		*ft*	*typically 0.25 ft*	
Filter Time			*tf*	2.00		*days*		
Required Filter Area			***Af***	**24,357**		***ft^2***		
Determine Actual Bioretention Area								
Filter Width				*ft*				
Filter Length				*ft*				
Filter Area			36,590	*ft^2*	OK			
Actual Volume Provided			40,249	*ft^3*				
Determine Underdrain								
Underdrain Gravel Bed Width			3	*ft*				
Required length of underdrain			1,220	*ft*				
Provided length of underdain			1,290	*ft*	OK			
Determine Runoff Reduction								
Percent Reduction			40%					
Runoff Reduction			**10,717**	***ft^3***	***This is 40% of the storage provided or WQv, whichever is smaller.***			
Volume Treated			**16,076**	***ft^3***	***This is the portion of the WQv that is not reduced in the practice.***			
Is the Bioretention contributing flow to another practice?				*no*	Select Practice		N/A	
Volume Directed to Another Practice			0	*ft^3*	This volume is directed another practice			

Bioretention Worksheet

Design Point(s):	**1, 2, 3, and 4**							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
4	115	12.22	9.99	0.82	0.79	34,846	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection			0.00	82%	0.79	34,846	<<WQv after adjusting for	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Soil Information								
Soil Group			D					
Using Underdrains?			*yes*	*Okay*				
Pretreatment								
WQv				34,846	*ft^3*			
Pretreatment Sizing				25%	*of WQv*			
Required Pretreatment Volume				8,712	*ft^3*			
Pretreatment Provided				54,424	*ft^3*	*Note: The pretreatment provided for subcatchment 115 is the provided forebay volume for subcatchment 115 and 116 divided by 2*		
Pretreatment techniques utilized				*Sediment Basin/Forebay*				
Calculate the Minimum Filter Area								
WQv				34,846		*ft^3*		
Media Type			--	Bioretention Soil				
Depth of Soil Media			*df*	2.5		*ft*	*2.5 ft to 4 ft*	
Hydraulic Conductivity			*k*	0.5		*ft/day*		
Average Height of Ponding			*hf*	0.25		*ft*	*typically 0.25 ft*	
Filter Time			*tf*	2.00		*days*		
Required Filter Area			***Af***	**31,678**		***ft^2***		
Determine Actual Bioretention Area								
Filter Width				*ft*				
Filter Length				*ft*				
Filter Area			37,780	*ft^2*	*OK*			
Actual Volume Provided			41,558	*ft^3*				
Determine Underdrain								
Underdrain Gravel Bed Width			3	*ft*				
Required length of underdrain			1,259	*ft*				
Provided length of underdain			1,350	*ft*	*OK*			
Determine Runoff Reduction								
Percent Reduction			40%					
Runoff Reduction			**13,938**	***ft^3***	***This is 40% of the storage provided or WQv, whichever is smaller.***			
Volume Treated			**20,908**	***ft^3***	***This is the portion of the WQv that is not reduced in the practice.***			
Is the Bioretention contributing flow to another practice?				*no*	Select Practice		N/A	
Volume Directed to Another Practice			0	*ft^3*	This volume is directed another practice			

Bioretention Worksheet

Design Point(s):	**1, 2, 3, and 4**							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
5	116	12.24	9.99	0.82	0.78	34,849	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection			0.00	82%	0.78	34,849	<<WQv after adjusting for	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Soil Information								
Soil Group			D					
Using Underdrains?			*yes*	*Okay*				
Pretreatment								
WQv				34,849	*ft^3*			
Pretreatment Sizing				25%	*of WQv*			
Required Pretreatment Volume				8,712	*ft^3*			
Pretreatment Provided				54,424	*ft^3*	*Note: The pretreatment provided for subcatchment 116 is the provided forebay volume for subcatchment 115 and 116 divided by 2*		
Pretreatment techniques utilized				*Sediment Basin/Forebay*				
Calculate the Minimum Filter Area								
WQv				34,849		*ft^3*		
Media Type			--	Bioretention Soil				
Depth of Soil Media			*df*	2.5		*ft*	*2.5 ft to 4 ft*	
Hydraulic Conductivity			*k*	0.5		*ft/day*		
Average Height of Ponding			*hf*	0.25		*ft*	*typically 0.25 ft*	
Filter Time			*tf*	2.00		*days*		
Required Filter Area			***Af***	**31,681**		***ft^2***		
Determine Actual Bioretention Area								
Filter Width				*ft*				
Filter Length				*ft*				
Filter Area			37,780	*ft^2*	*OK*			
Actual Volume Provided			41,558	*ft^3*				
Determine Underdrain								
Underdrain Gravel Bed Width			3	*ft*				
Required length of underdrain			1,259	*ft*				
Provided length of underdain			1,350	*ft*	*OK*			
Determine Runoff Reduction								
Percent Reduction			40%					
Runoff Reduction			**13,940**	***ft^3***	***This is 40% of the storage provided or WQv, whichever is smaller.***			
Volume Treated			**20,909**	***ft^3***	***This is the portion of the WQv that is not reduced in the practice.***			
Is the Bioretention contributing flow to another practice?				*no*	Select Practice		N/A	
Volume Directed to Another Practice			0	*ft^3*	This volume is directed another practice			

Bioretention Worksheet

Design Point(s):	**1, 2, 3, and 4**							
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
6	113	4.29	3.68	0.86	0.82	12,813	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	86%	0.82	12,813	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Soil Information								
Soil Group			D					
Using Underdrains?			*yes*	*Okay*				
Pretreatment								
WQv				12,813	*ft^3*			
Pretreatment Sizing				25%	*of WQv*			
Required Pretreatment Volume				3,203	*ft^3*			
Pretreatment Provided				16,727	*ft^3*			
Pretreatment techniques utilized				*Sediment Basin/Forebay*				
Enter Site Data For Drainage Area to be Treated by Practice								
Subcatchment Number	**Subcatchment Model Number**	**Total Area** *(Acres)*	**Impervious Area** *(Acres)*	**Percent Impervious** *%*	**Rv**	**WQv** *(ft^3)*	**Precipitation** *(in)*	**Description**
7	114	8.73	5.10	0.58	0.58	18,255	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	58%	0.58	18,255	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	
Soil Information								
Soil Group			D					
Using Underdrains?			*yes*	*Okay*				
Pretreatment								
WQv				18,255	*ft^3*			
Pretreatment Sizing				25%	*of WQv*			
Required Pretreatment Volume				4,564	*ft^3*			
Pretreatment Provided				7,755	*ft^3*			
Pretreatment techniques utilized				*Grass Channel*				
Calculate the Minimum Filter Area								
WQv				31,068		*ft^3*		
Media Type			--	Bioretention Soil				
Depth of Soil Media			*df*	2.5		*ft*	*2.5 ft to 4 ft*	
Hydraulic Conductivity			*k*	0.5		*ft/day*		
Average Height of Ponding			*hf*	0.25		*ft*	*typically 0.25 ft*	
Filter Time			*tf*	2.00		*days*		
Required Filter Area			***Af***	**28,243**		***ft^2***		
Determine Actual Bioretention Area								
Filter Width				*ft*				
Filter Length				*ft*				
Filter Area			33,470	*ft^2*	*OK*			
Actual Volume Provided			36,817	*ft^3*				
Determine Underdrain								
Underdrain Gravel Bed Width			3	*ft*				
Required length of underdrain			1,116	*ft*				
Provided length of underdain			1,130	*ft*	*OK*			
Determine Runoff Reduction								
Percent Reduction			40%					
Runoff Reduction			**12,427**	***ft^3***	***This is 40% of the storage provided or WQv, whichever is smaller.***			
Volume Treated			**18,641**	***ft^3***	***This is the portion of the WQv that is not reduced in the practice.***			
Is the Bioretention contributing flow to another practice?				*no*	Select Practice		N/A	
Volume Directed to Another Practice			0	*ft^3*	This volume is directed another practice			

Bioretention Worksheet

Design Point(s): 1, 2, 3, and 4

Enter Site Data For Drainage Area to be Treated by Practice

Subcatchment Number	Subcatchment Model Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Precipitation *(in)*	Description
8	301	3.85	2.46	0.64	0.63	8,746	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection			0.00	64%	0.63	8,746	<<WQv after adjusting for	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	

Soil Information

Soil Group	D	
Using Underdrains?	*yes*	*Okay*

Pretreatment

WQv	8,746	*ft^3*	
Pretreatment Sizing	25%	*of WQv*	
Required Pretreatment Volume	2,187	*ft^3*	
Pretreatment Provided	21,930	*ft^3*	
Pretreatment techniques utilized	*Sediment Basin/Forebay*		

Enter Site Data For Drainage Area to be Treated by Practice

Subcatchment Number	Subcatchment Model Number	Total Area *(Acres)*	Impervious Area *(Acres)*	Percent Impervious *%*	Rv	WQv *(ft^3)*	Precipitation *(in)*	Description
9	302	6.99	2.62	0.37	0.39	9,829	1.00	Bioretention
Enter Impervious Area Reduced by Disconnection of Rooftops			0.00	37%	0.39	9,829	<<WQv after adjusting for Disconnected Rooftops	
Enter the portion of the WQv that is not reduced for all practices routed to this practice.						0	*ft^3*	

Soil Information

Soil Group	D	
Using Underdrains?	*yes*	*Okay*

Pretreatment

WQv	9,829	*ft^3*	
Pretreatment Sizing	25%	*of WQv*	
Required Pretreatment Volume	2,457	*ft^3*	
Pretreatment Provided	8,940	*ft^3*	
Pretreatment techniques utilized	*Grass Channel*		

Calculate the Minimum Filter Area

WQv		18,576	*ft^3*	
Media Type	--	Bioretention Soil		
Depth of Soil Media	*df*	2.5	*ft*	*2.5 ft to 4 ft*
Hydraulic Conductivity	*k*	0.5	*ft/day*	
Average Height of Ponding	*hf*	0.25	*ft*	*typically 0.25 ft*
Filter Time	*tf*	2.00	*days*	
Required Filter Area	***Af***	**16,887**	***ft^2***	

Determine Actual Bioretention Area

Filter Width		*ft*	
Filter Length		*ft*	
Filter Area	19,750	*ft^2*	*OK*
Actual Volume Provided	21,725	*ft^3*	

Determine Underdrain

Underdrain Gravel Bed Width	3	*ft*	
Required length of underdrain	658	*ft*	
Provided length of underdain	790	*ft*	*OK*

Determine Runoff Reduction

Percent Reduction	40%			
Runoff Reduction	**7,430**	***ft^3***	***This is 40% of the storage provided or WQv, whichever is smaller.***	
Volume Treated	**11,145**	***ft^3***	***This is the portion of the WQv that is not reduced in the practice.***	
Is the Bioretention contributing flow to another practice?	*no*	Select Practice	N/A	
Volume Directed to Another Practice	0	*ft^3*	This volume is directed another practice	

Minimum Runoff Reduction Volume Worksheet

Minimum Runoff Reduction Volume

1. Construction activities that cannot achieve 100% reduction of the total water quality volume due to site limitation shall direct runoff from all newly constructed impervious areas to a runoff reduction technique or standard stormwater management practice with runoff reduction volume capacity unless infeasible.

2. In no case shall the runoff reduction achieved from the newly constructed impervious areas be less than the minimum runoff reduction (RRv_{min}).

3. The minimum runoff reduction volume is calculated as follows:

$$RRv_{min} = \frac{P * \bar{R}v * Aic * S}{12}$$

Where:

RRv_{min} = *Minimum runoff reduction required from impervious area*

$\bar{R}v$ = *0.05 + 0.009 (I), where I is 100% impervious*

Aic = Total area of new impervious cover

S = Hydrologic Soil Group Specific Reduction Factor

Enter the Soils Data for the site

Soil Group	Acres	S	
A	0.00	55%	*(new impervious area in Type A Soils)*
B	0.00	40%	*(new impervious area in Type B Soils)*
C	0.00	30%	*(new impervious area in Type C Soils)*
D	**56.46**	20%	*(new impervious area in Type D Soils)*
Total Area	56.46		

Calculate the Minimum RRv

Soil Group Speific Reduction Factor (S)	**0.20**		*(weighted average)*
Total Area of New Impervious Cover (Aic)	56.46	*acre*	
Precipitation (P)	1.00	*in*	
Rv	0.95		
Minimum RRv	**38,938**	***ft3***	*(P * Rv x Aic * S)/12*
	0.89	af	

Channel Protection Volume Worksheet

Design Point(s): 1,2,3,& 4

Channel Protection Volume			
Area	82.93	*ac*	*0.130 sq. miles*
Curve Number (CN)	94		
Precipitation for 1 yr storm ($P_{1\ \mathrm{yr\ storm}}$)	1.77	*in*	
Ia (200 / CN - 2)	0.13		
Ia / $P_{1\ \mathrm{yr\ storm}}$	0.07		
S (Ia / 0.2)	0.66		
Time of Concentration	6.00	*min*	*0.100 hours*
Unit peak discharge (q_u)	1,000	*csm/in*	*from Exhibit 4-III of TR-55*
Ratio of Outflow to Inflow (q_o/q_i)	0.020		*from Figure B.1 of Design Manual*
Unit Volume (V_S/V_r)	0.66		$0.683 - 1.43*(q_o/q_i) + 1.64*(q_o/q_i)^2 - 0.804*(q_o/q_i)^3$
Runoff for 1 yr storm ($Q_{1\ \mathrm{yr\ runoff}}$)	1.17	*in*	$(P_{1\ \mathrm{yr\ storm}} - 0.2*S)^2/(P_{1\ \mathrm{yr\ storm}} + 0.8*S)$
Channel Protection Volume	**230,536**	***cf***	$[((V_s/V_r) * (Q_{1\ \mathrm{yr\ runoff}}) * A)/12]*43560$
Average Release Rate over 24 hours	**2.67**	***cfs***	

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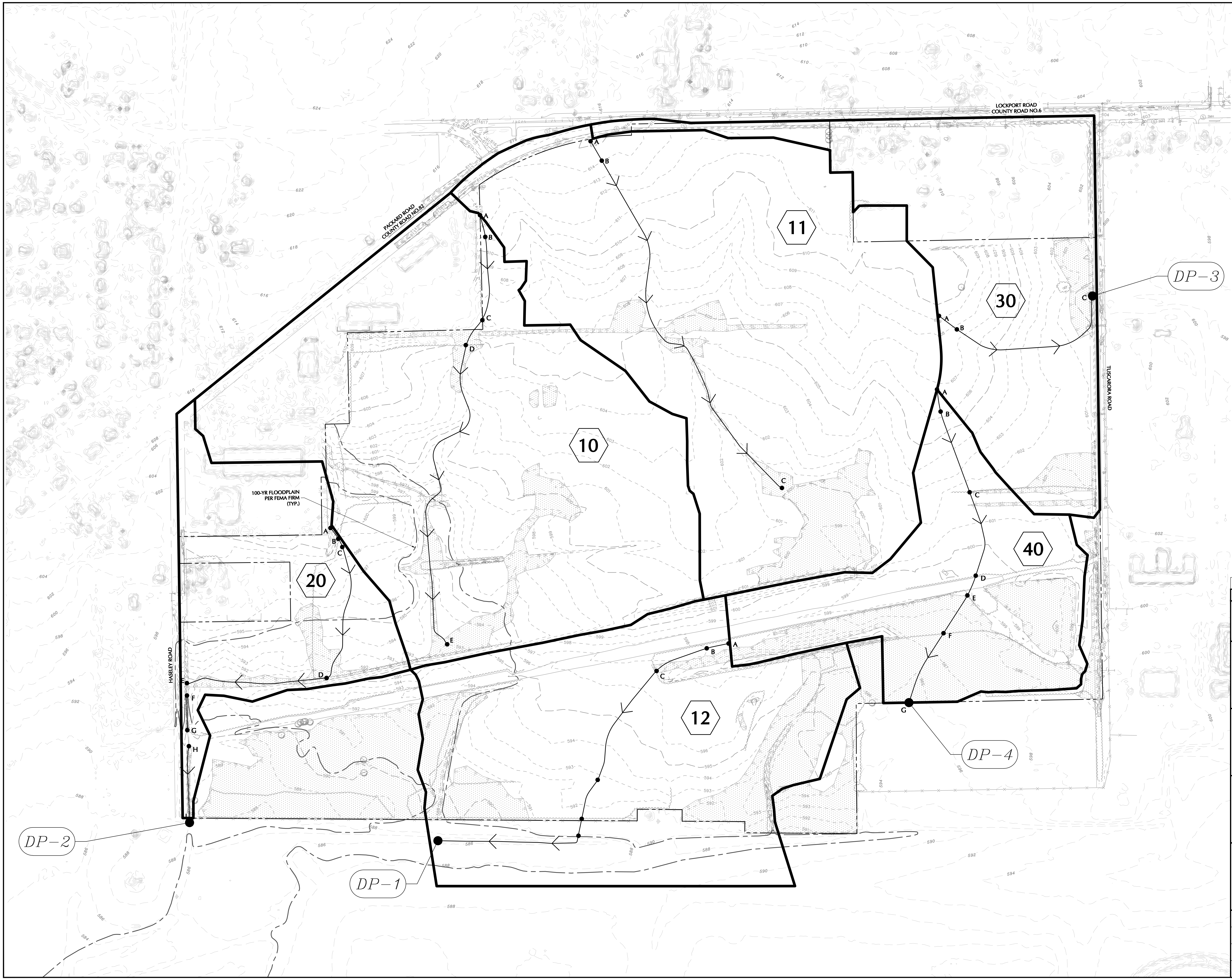
Appendix E: Pre-Development Stormwater Analysis



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Project No. 190071801

Date	Description	No.
Revisions		

150 0 75 150
SCALE IN FEET

WARNING
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Project

PROJECT FIFI

TAX ID. 132.18-1-2, 146.05-1-9, 146.06-1-1, & 146.06-1-2
TOWN OF NIAGARA
NIAGARA COUNTY **NEW YORK**

Drawing Title

PRE-DEVELOPMENT WATERSHED MAP

Project No.
190071801

Date
FEBRUARY 15, 2022

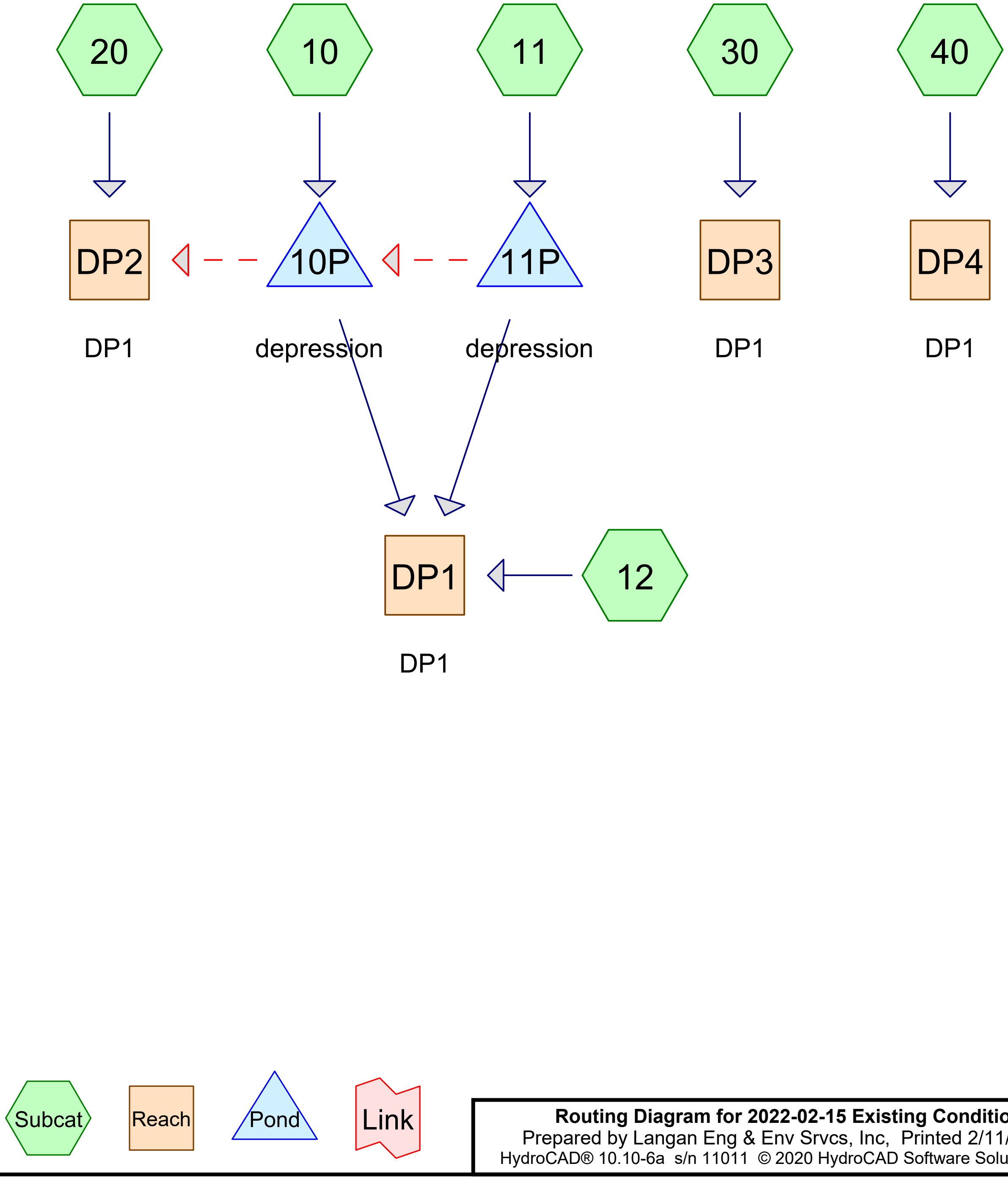
Drawn By
LM

Checked By
CZ/MF

Drawing No.
FG05

Sheet **1** of **1**

Filename: C:\bms\langan-pw-01\dms95167\190071801-0201-CG101-0101.dwg Date: 2/11/2022 Time: 18:03 User: lmcmahon Style Table: Langan.stb Layout: FG05



Routing Diagram for 2022-02-15 Existing Conditions
Prepared by Langan Eng & Env Srvcs, Inc, Printed 2/11/2022
HydroCAD® 10.10-6a s/n 11011 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.77	2
2	10-yr	Type II 24-hr		Default	24.00	1	2.96	2
3	100-yr	Type II 24-hr		Default	24.00	1	4.78	2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10: Runoff Area=62.050 ac 13.75% Impervious Runoff Depth=0.46"
Flow Length=2,090' Tc=65.8 min CN=81 Runoff=12.39 cfs 2.400 af

Subcatchment11: Runoff Area=64.030 ac 1.11% Impervious Runoff Depth=0.36"
Flow Length=1,850' Tc=62.5 min CN=78 Runoff=9.30 cfs 1.927 af

Subcatchment12: Runoff Area=44.230 ac 6.35% Impervious Runoff Depth=0.46"
Flow Length=1,830' Tc=136.9 min CN=81 Runoff=5.09 cfs 1.710 af

Subcatchment20: Runoff Area=21.200 ac 20.19% Impervious Runoff Depth=0.54"
Flow Length=1,930' Tc=118.0 min CN=83 Runoff=3.35 cfs 0.959 af

Subcatchment30: Runoff Area=32.580 ac 9.05% Impervious Runoff Depth=0.50"
Flow Length=880' Tc=36.9 min CN=82 Runoff=11.01 cfs 1.364 af

Subcatchment40: Runoff Area=24.470 ac 5.80% Impervious Runoff Depth=0.43"
Flow Length=1,515' Tc=72.8 min CN=80 Runoff=4.05 cfs 0.872 af

Reach DP1: DP1 Inflow=5.98 cfs 3.562 af
Outflow=5.98 cfs 3.562 af

Reach DP2: DP1 Inflow=13.47 cfs 2.958 af
Outflow=13.47 cfs 2.958 af

Reach DP3: DP1 Inflow=11.01 cfs 1.364 af
Outflow=11.01 cfs 1.364 af

Reach DP4: DP1 Inflow=4.05 cfs 0.872 af
Outflow=4.05 cfs 0.872 af

Pond 10P: depression Peak Elev=593.44' Storage=9,963 cf Inflow=12.39 cfs 2.400 af
Primary=0.49 cfs 0.400 af Secondary=10.85 cfs 1.999 af Outflow=11.34 cfs 2.399 af

Pond 11P: depression Peak Elev=599.88' Storage=60,129 cf Inflow=9.30 cfs 1.927 af
Primary=0.55 cfs 1.452 af Secondary=0.00 cfs 0.000 af Outflow=0.55 cfs 1.452 af

Total Runoff Area = 248.560 ac Runoff Volume = 9.233 af Average Runoff Depth = 0.45"
91.67% Pervious = 227.860 ac 8.33% Impervious = 20.700 ac

Summary for Subcatchment 10:

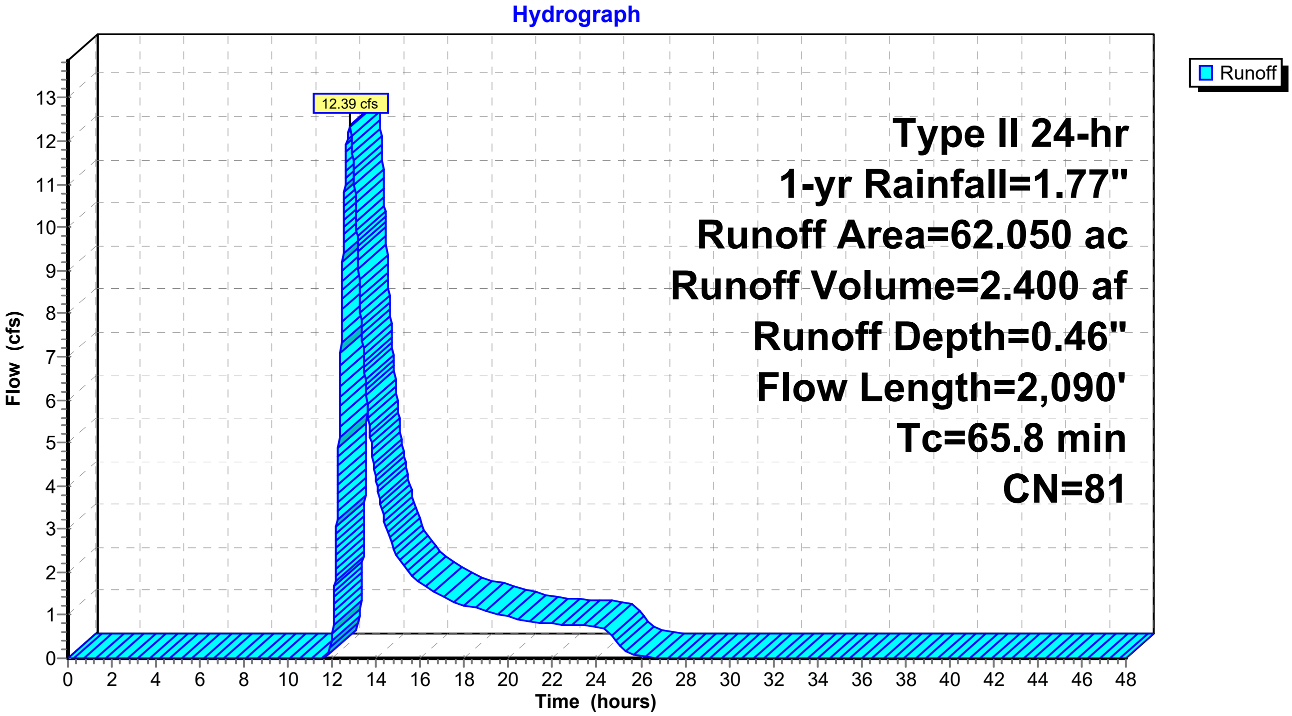
Runoff = 12.39 cfs @ 12.79 hrs, Volume= 2.400 af, Depth= 0.46"
Routed to Pond 10P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	4.410	79	Woods, Fair, HSG D
	43.130	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	3.280	79	Woods, Fair, HSG D Offsite
*	2.700	84	50-75% Grass cover, Fair, HSG D Offsite
*	8.530	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	62.050	81	Weighted Average
	53.520		86.25% Pervious Area
	8.530		13.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0200	0.14		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
9.0	380	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.7	130	0.0250	0.79		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
42.1	1,480	0.0070	0.59		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
65.8	2,090	Total			

Subcatchment 10:



Summary for Subcatchment 11:

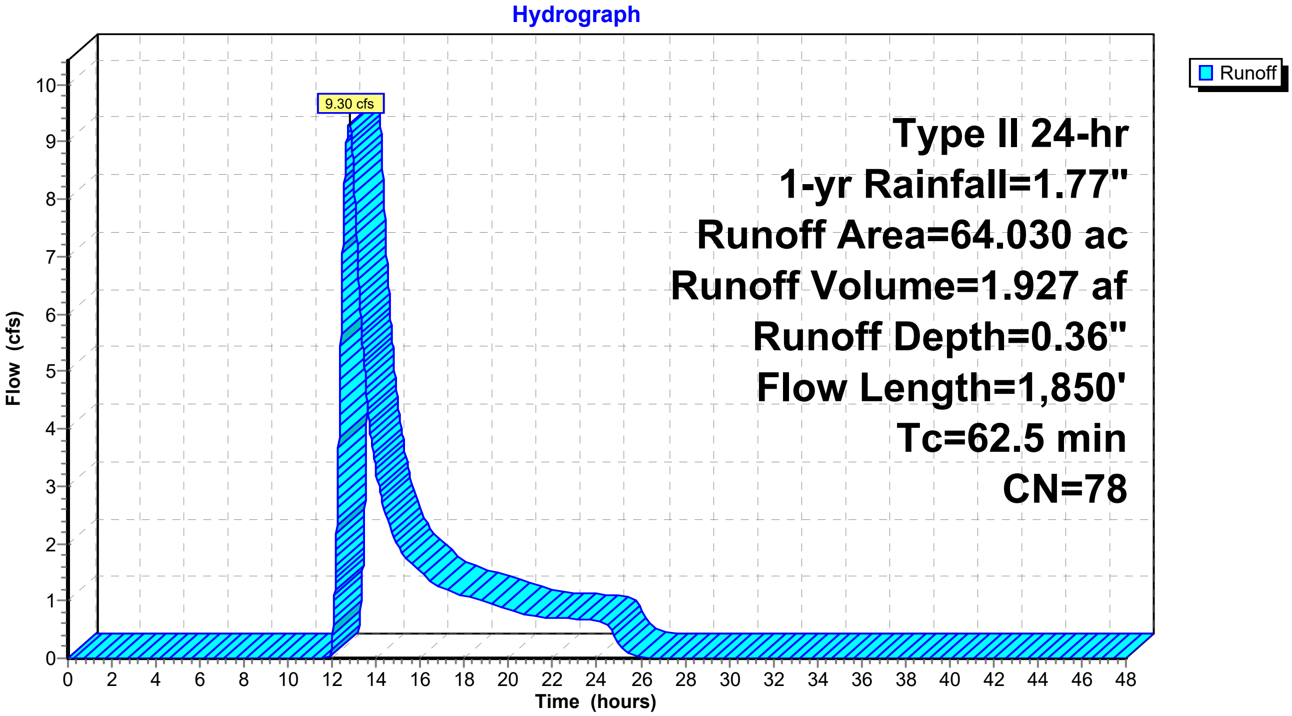
Runoff = 9.30 cfs @ 12.77 hrs, Volume= 1.927 af, Depth= 0.36"
Routed to Pond 11P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	6.980	79	Woods, Fair, HSG D
	54.940	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	1.350	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.710	98	Impervious Offsite
*	0.050	91	Gravel roads, HSG D Offsite
	64.030	78	Weighted Average
	63.320		98.89% Pervious Area
	0.710		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	100	0.0100	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
46.6	1,750	0.0080	0.63		**Shallow Concentrated Flow, A-B** Short Grass Pasture Kv= 7.0 fps
62.5	1,850	Total			

Subcatchment 11:



Summary for Subcatchment 12:

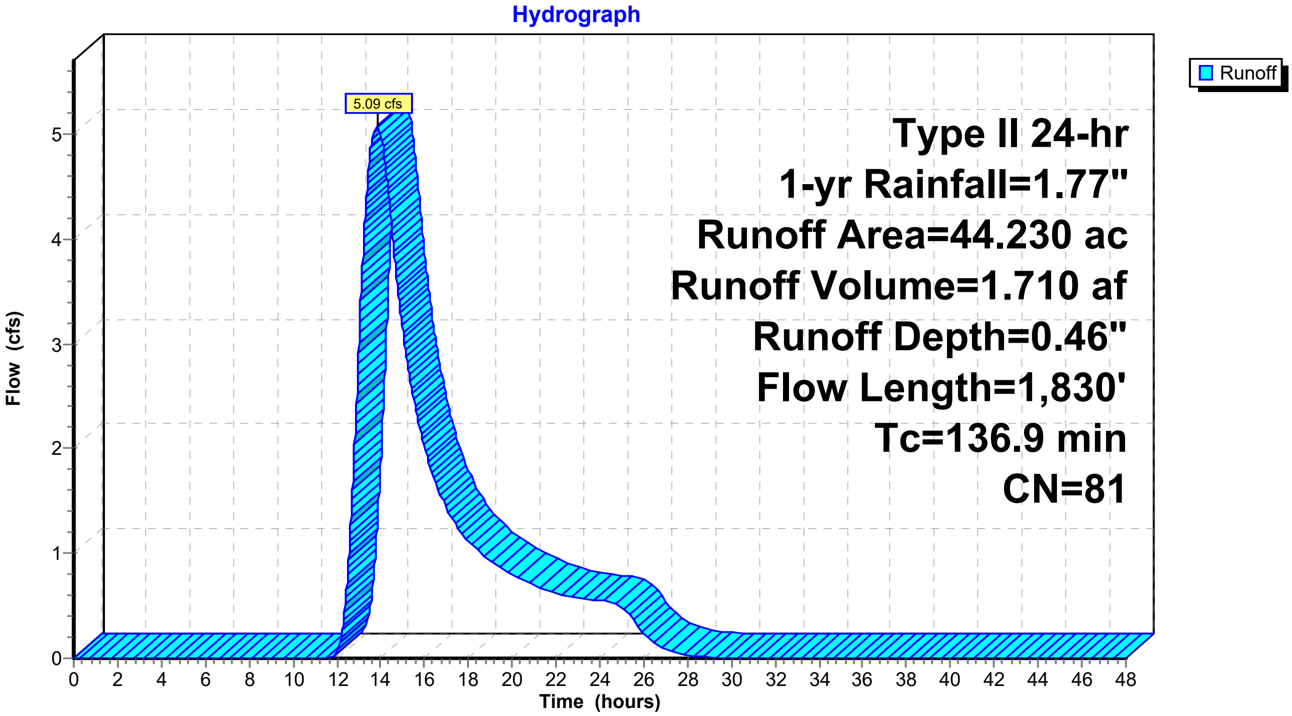
Runoff = 5.09 cfs @ 13.84 hrs, Volume= 1.710 af, Depth= 0.46"
Routed to Reach DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	11.420	79	Woods, Fair, HSG D
	20.610	78	Meadow, non-grazed, HSG D
*	1.550	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	9.390	84	50-75% Grass cover, Fair, HSG D Offsite
*	1.260	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	44.230	81	Weighted Average
	41.420		93.65% Pervious Area
	2.810		6.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
98.1	100	0.0030	0.02		**Sheet Flow, A-B** Woods: Dense underbrush n= 0.800 P2= 2.12"
10.0	250	0.0070	0.42		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
17.2	560	0.0060	0.54		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
8.2	190	0.0060	0.39		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
1.3	80	0.0200	0.99		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
2.1	650	0.0030	5.20	101.36	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
136.9	1,830	Total			

Subcatchment 12:



Summary for Subcatchment 20:

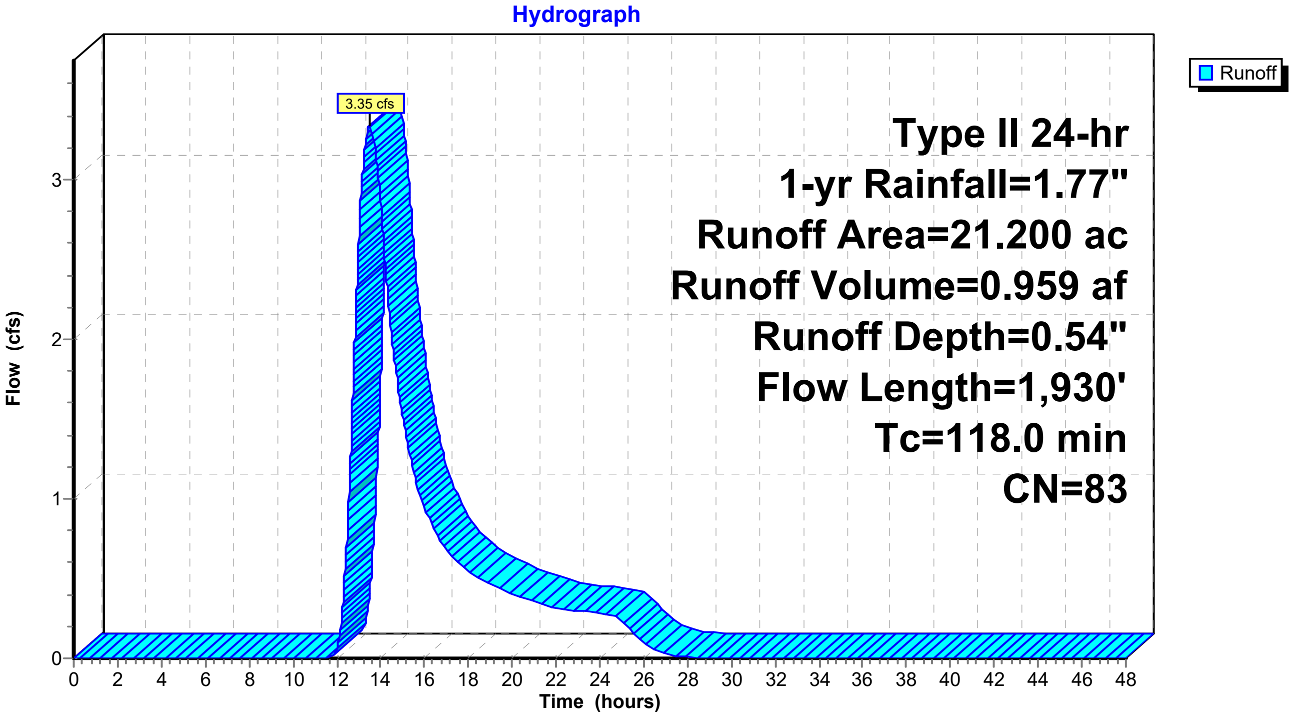
Runoff = 3.35 cfs @ 13.50 hrs, Volume= 0.959 af, Depth= 0.54"
Routed to Reach DP2 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	7.720	79	Woods, Fair, HSG D
	4.040	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.270	91	Gravel roads, HSG D
*	2.760	79	Woods, Fair, HSG D Offsite
*	2.100	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.280	98	Impervious Offsite
*	0.030	91	Gravel roads, HSG D Offsite
	21.200	83	Weighted Average
	16.920		79.81% Pervious Area
	4.280		20.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	60	0.0400	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
16.7	40	0.0100	0.04		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.12"
13.4	615	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
52.5	630	0.0016	0.20		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
0.2	40	0.0055	2.78	8.72	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
4.2	155	0.0077	0.61		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0030	2.05	6.44	**Pipe Channel, G-H** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
17.3	340	0.0022	0.33		**Shallow Concentrated Flow, H-I** Short Grass Pasture Kv= 7.0 fps
118.0	1,930	Total			

Subcatchment 20:



Summary for Subcatchment 30:

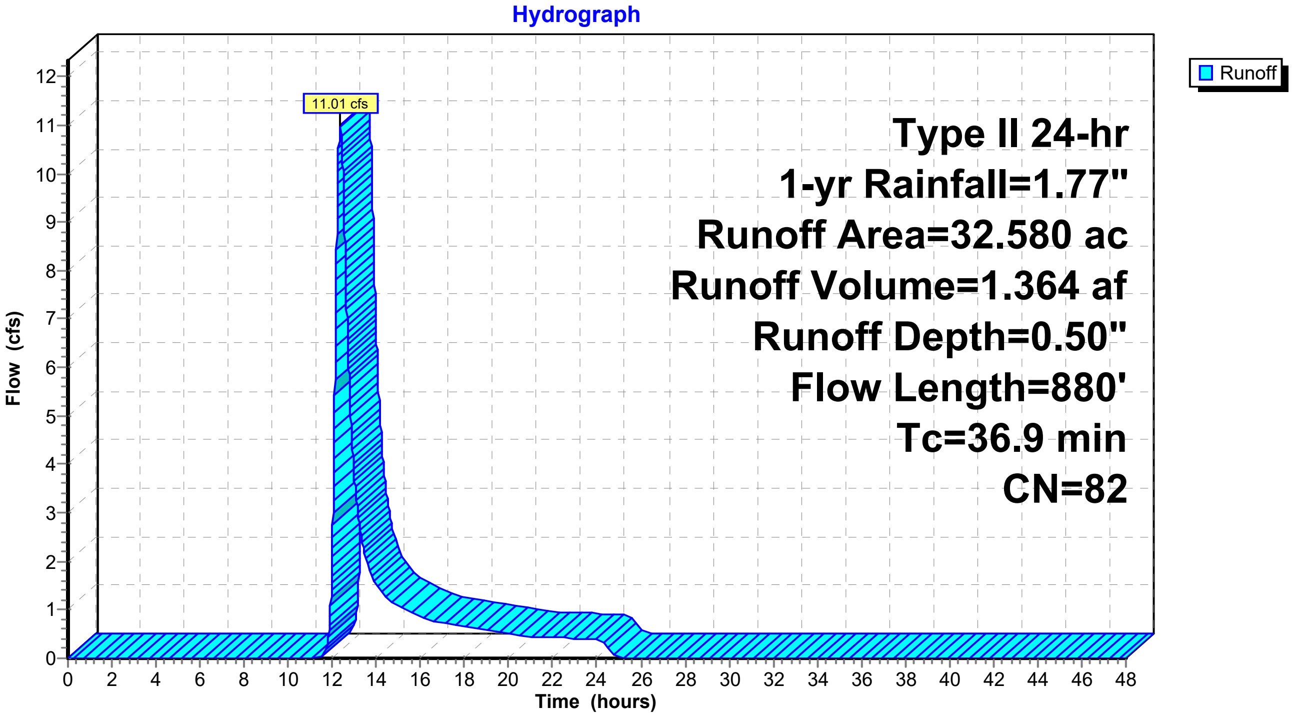
Runoff = 11.01 cfs @ 12.35 hrs, Volume= 1.364 af, Depth= 0.50"
Routed to Reach DP3 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	1.140	79	Woods, Fair, HSG D
	17.300	78	Meadow, non-grazed, HSG D
*	0.650	98	Impervious
	0.050	91	Gravel roads, HSG D
*	0.050	79	Woods, Fair, HSG D Offsite
*	11.070	84	50-75% Grass cover, Fair, HSG D Offsite
*	2.300	98	Impervious Offsite
*	0.020	91	Gravel roads, HSG D Offsite
	32.580	82	Weighted Average
	29.630		90.95% Pervious Area
	2.950		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0160	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
17.7	780	0.0110	0.73		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
36.9	880	Total			

Subcatchment 30:



Summary for Subcatchment 40:

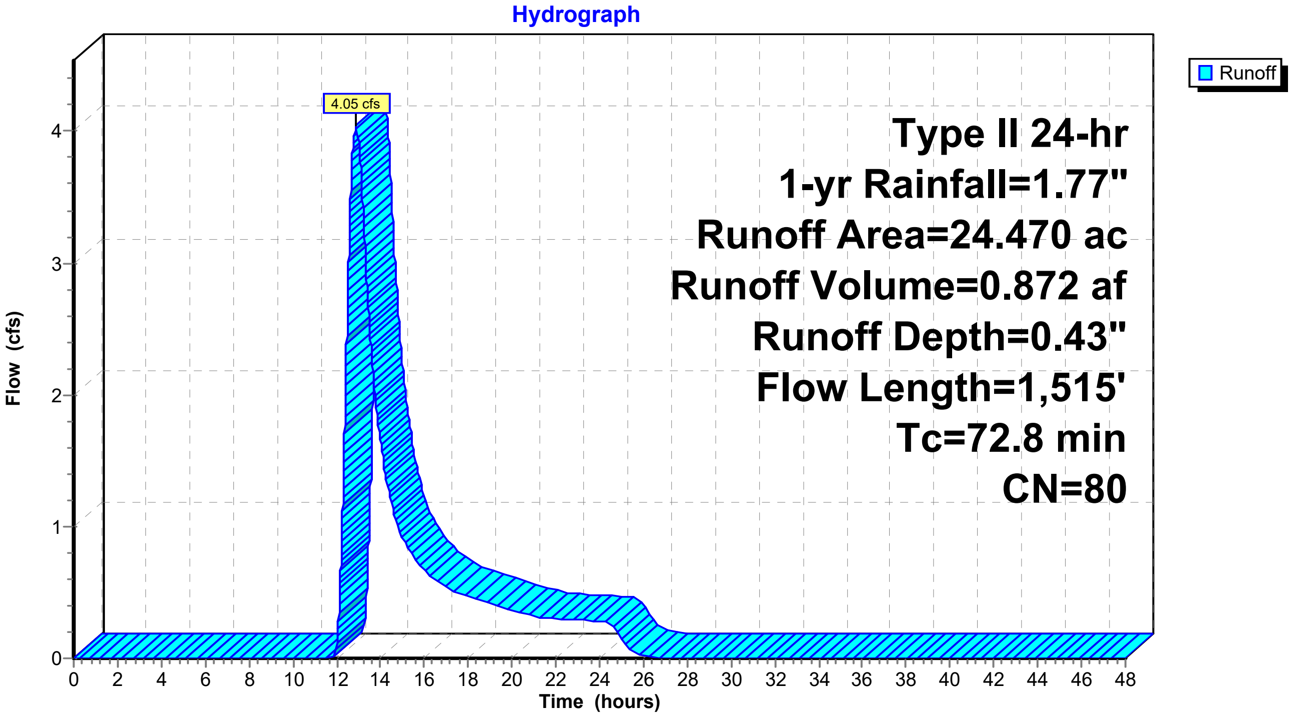
Runoff = 4.05 cfs @ 12.86 hrs, Volume= 0.872 af, Depth= 0.43"
Routed to Reach DP4 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	14.860	79	Woods, Fair, HSG D
	7.880	78	Meadow, non-grazed, HSG D
*	1.420	98	Impervious
	0.310	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	24.470	80	Weighted Average
	23.050		94.20% Pervious Area
	1.420		5.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0061	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
7.9	383	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.8	389	0.0043	0.33		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.0	96	0.0063	1.61		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
7.8	199	0.0073	0.43		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
16.9	348	0.0024	0.34		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
72.8	1,515	Total			

Subcatchment 40:



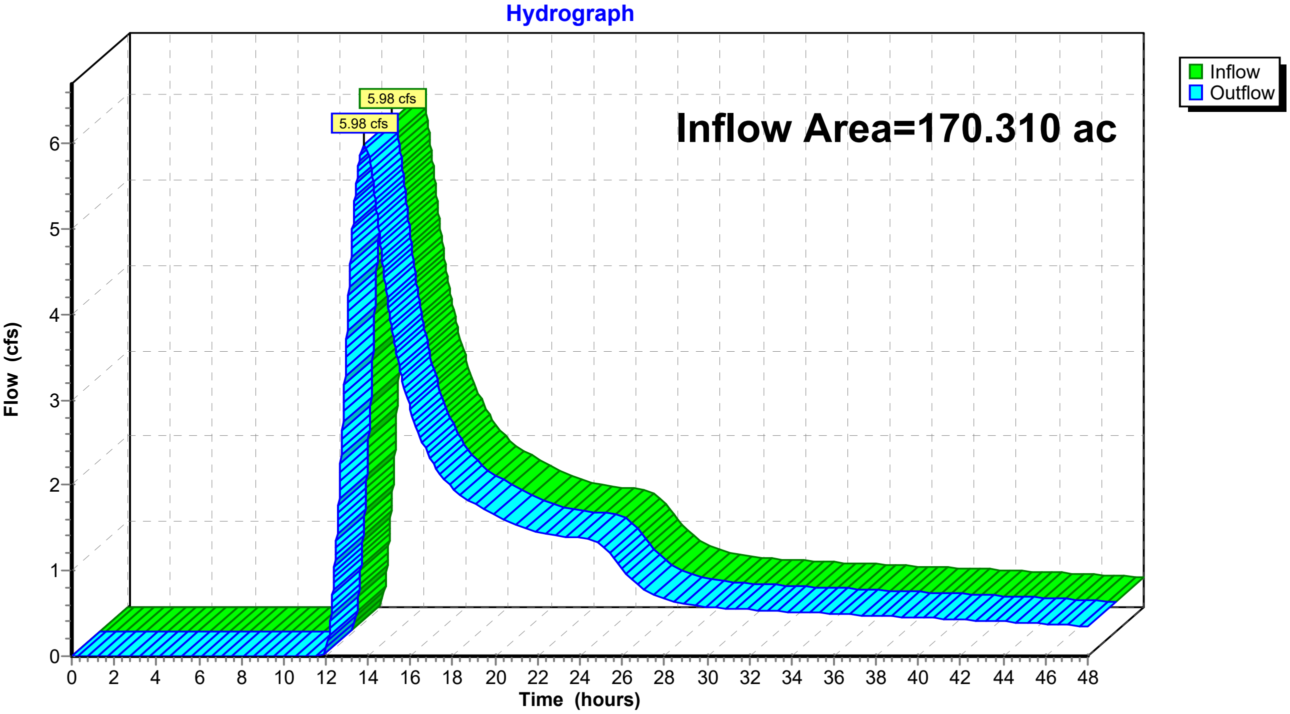
Summary for Reach DP1: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 170.310 ac, 7.08% Impervious, Inflow Depth > 0.25" for 1-yr event
Inflow = 5.98 cfs @ 13.84 hrs, Volume= 3.562 af
Outflow = 5.98 cfs @ 13.84 hrs, Volume= 3.562 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP1: DP1



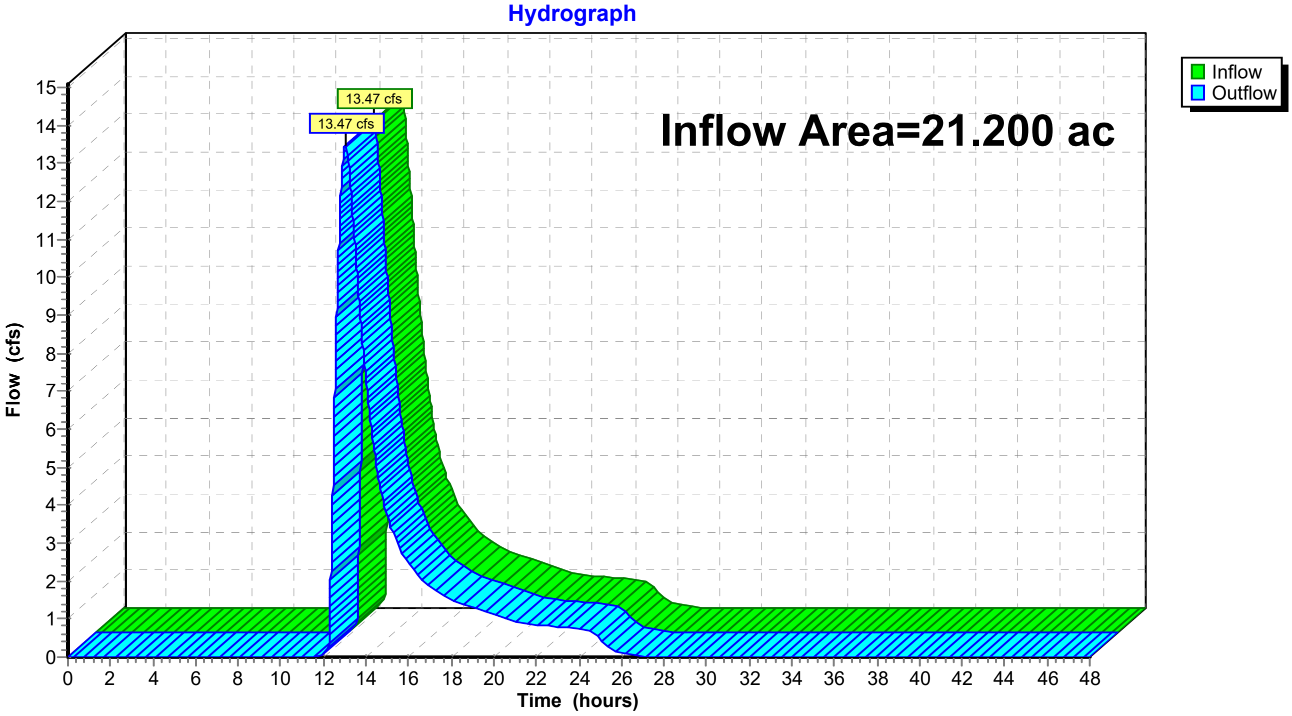
Summary for Reach DP2: DP1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =       21.200 ac,  20.19% Impervious,  Inflow Depth =   1.67"    for  1-yr event
Inflow      =       13.47 cfs @   13.04 hrs,  Volume=           2.958 af
Outflow     =       13.47 cfs @   13.04 hrs,  Volume=           2.958 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP2: DP1

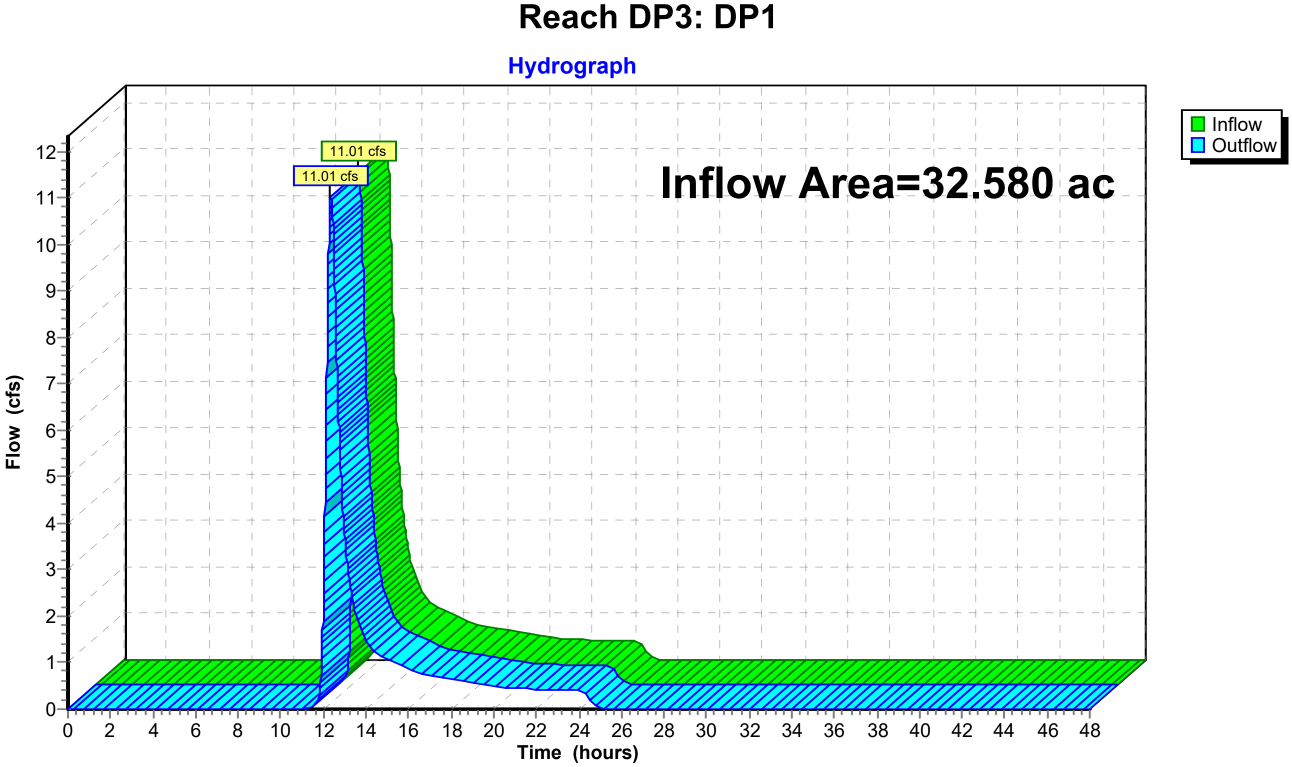


Summary for Reach DP3: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.580 ac, 9.05% Impervious, Inflow Depth = 0.50" for 1-yr event
Inflow = 11.01 cfs @ 12.35 hrs, Volume= 1.364 af
Outflow = 11.01 cfs @ 12.35 hrs, Volume= 1.364 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs



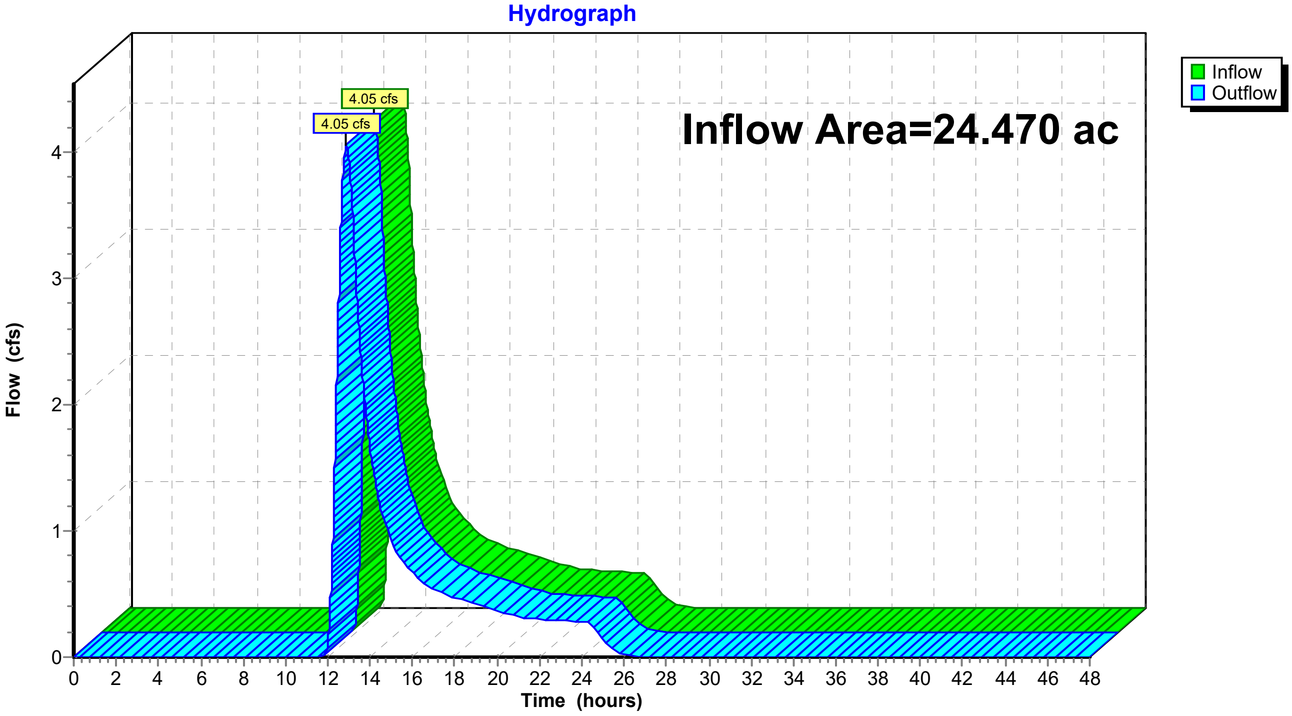
Summary for Reach DP4: DP1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =       24.470 ac,    5.80% Impervious,  Inflow Depth =   0.43"    for  1-yr event
Inflow       =       4.05 cfs @   12.86 hrs,  Volume=           0.872 af
Outflow      =       4.05 cfs @   12.86 hrs,  Volume=           0.872 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP4: DP1



Summary for Pond 10P: depression

Inflow Area = 62.050 ac, 13.75% Impervious, Inflow Depth = 0.46" for 1-yr event
Inflow = 12.39 cfs @ 12.79 hrs, Volume= 2.400 af
Outflow = 11.34 cfs @ 12.98 hrs, Volume= 2.399 af, Atten= 8%, Lag= 11.1 min
Primary = 0.49 cfs @ 12.98 hrs, Volume= 0.400 af
Routed to Reach DP1 : DP1
Secondary = 10.85 cfs @ 12.98 hrs, Volume= 1.999 af
Routed to Reach DP2 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 593.44' @ 12.98 hrs Surf.Area= 34,939 sf Storage= 9,963 cf

Plug-Flow detention time= 29.7 min calculated for 2.399 af (100% of inflow)
Center-of-Mass det. time= 29.7 min (957.0 - 927.3)

Volume	Invert	Avail.Storage	Storage Description
#1	592.75'	157,748 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

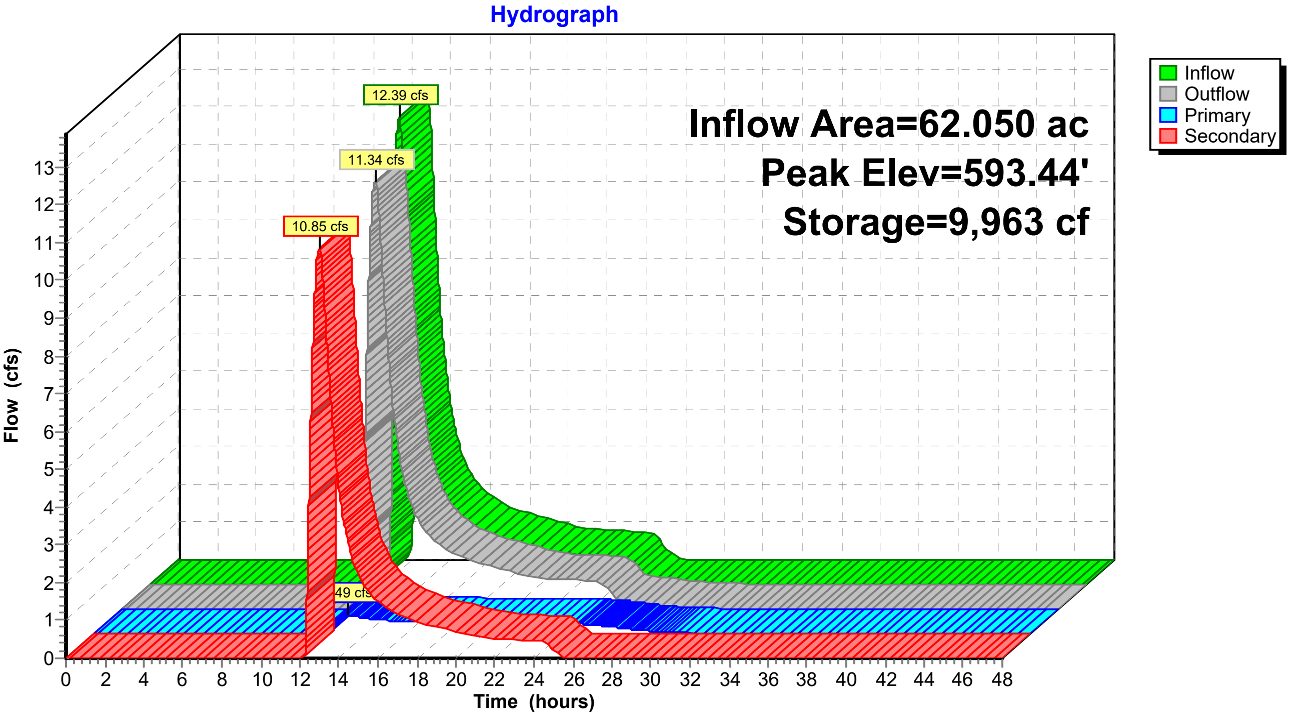
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.75	1,300	0	0
593.00	6,400	963	963
594.00	71,940	39,170	40,133
595.00	163,290	117,615	157,748

Device	Routing	Invert	Outlet Devices
#1	Primary	592.75'	**6.0" Round Pipe to DA 12** L= 250.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.75' / 591.00' S= 0.0070 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	593.10'	**22.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.49 cfs @ 12.98 hrs HW=593.44' TW=0.00' (Dynamic Tailwater)
↑—**1=Pipe to DA 12** (Inlet Controls 0.49 cfs @ 2.51 fps)

Secondary OutFlow Max=10.84 cfs @ 12.98 hrs HW=593.44' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 10.84 cfs @ 1.47 fps)

Pond 10P: depression



Summary for Pond 11P: depression

Inflow Area = 64.030 ac, 1.11% Impervious, Inflow Depth = 0.36" for 1-yr event
Inflow = 9.30 cfs @ 12.77 hrs, Volume= 1.927 af
Outflow = 0.55 cfs @ 24.54 hrs, Volume= 1.452 af, Atten= 94%, Lag= 706.3 min
Primary = 0.55 cfs @ 24.54 hrs, Volume= 1.452 af
Routed to Reach DP1 : DP1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 10P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 599.88' @ 24.54 hrs Surf.Area= 115,805 sf Storage= 60,129 cf

Plug-Flow detention time= 929.4 min calculated for 1.452 af (75% of inflow)
Center-of-Mass det. time= 824.5 min (1,764.3 - 939.9)

Volume	Invert	Avail.Storage	Storage Description
#1	599.00'	642,539 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

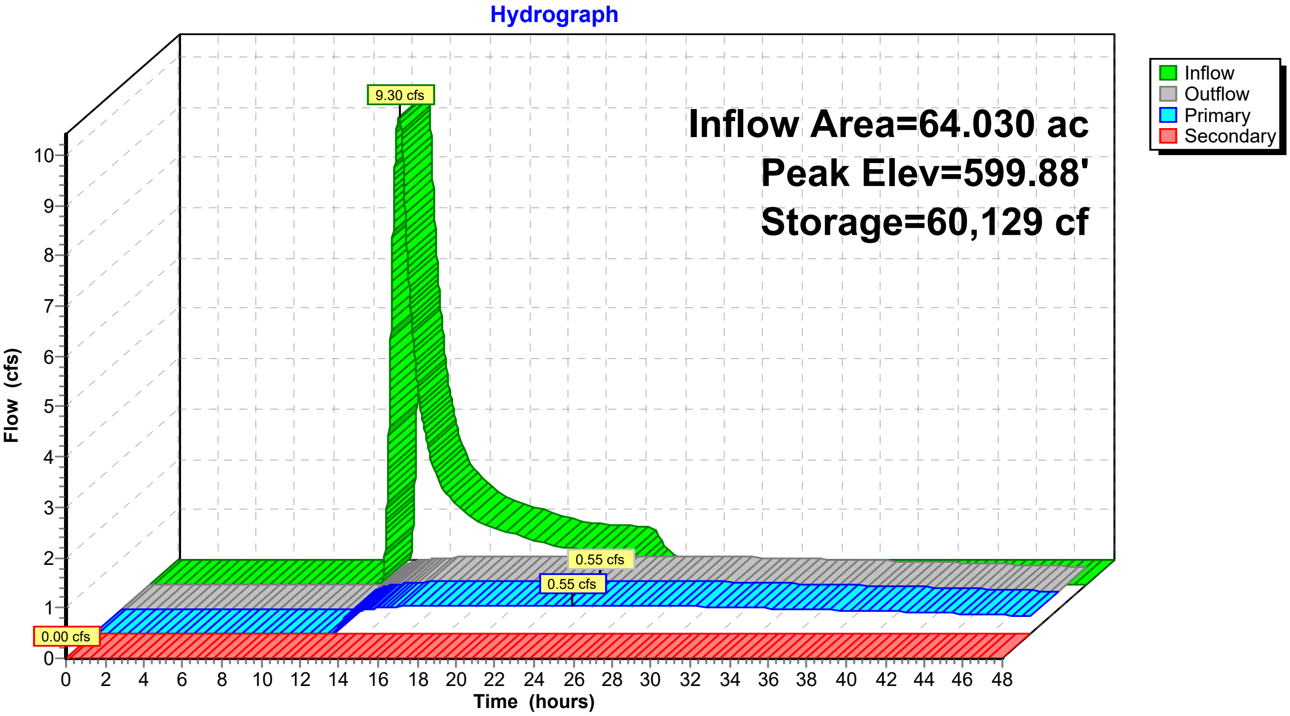
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	16,745	0	0
599.50	75,340	23,021	23,021
599.75	104,880	22,528	45,549
600.00	125,550	28,804	74,353
600.25	152,370	34,740	109,093
601.00	273,140	159,566	268,659
602.00	474,620	373,880	642,539

Device	Routing	Invert	Outlet Devices
#1	Primary	599.00'	**6.0" Round Pipe to DA 12** L= 500.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 599.00' / 595.00' S= 0.0080 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	600.50'	**25.0' long x 300.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.55 cfs @ 24.54 hrs HW=599.88' TW=0.00' (Dynamic Tailwater)
↑—**1=Pipe to DA 12** (Barrel Controls 0.55 cfs @ 2.82 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=599.00' TW=592.75' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: depression



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10: Runoff Area=62.050 ac 13.75% Impervious Runoff Depth=1.28"
Flow Length=2,090' Tc=65.8 min CN=81 Runoff=38.59 cfs 6.633 af

Subcatchment11: Runoff Area=64.030 ac 1.11% Impervious Runoff Depth=1.10"
Flow Length=1,850' Tc=62.5 min CN=78 Runoff=34.62 cfs 5.872 af

Subcatchment12: Runoff Area=44.230 ac 6.35% Impervious Runoff Depth=1.28"
Flow Length=1,830' Tc=136.9 min CN=81 Runoff=15.66 cfs 4.728 af

Subcatchment20: Runoff Area=21.200 ac 20.19% Impervious Runoff Depth=1.41"
Flow Length=1,930' Tc=118.0 min CN=83 Runoff=9.46 cfs 2.499 af

Subcatchment30: Runoff Area=32.580 ac 9.05% Impervious Runoff Depth=1.35"
Flow Length=880' Tc=36.9 min CN=82 Runoff=32.69 cfs 3.659 af

Subcatchment40: Runoff Area=24.470 ac 5.80% Impervious Runoff Depth=1.22"
Flow Length=1,515' Tc=72.8 min CN=80 Runoff=13.33 cfs 2.488 af

Reach DP1: DP1 Inflow=16.77 cfs 7.032 af
Outflow=16.77 cfs 7.032 af

Reach DP2: DP1 Inflow=42.35 cfs 10.133 af
Outflow=42.35 cfs 10.133 af

Reach DP3: DP1 Inflow=32.69 cfs 3.659 af
Outflow=32.69 cfs 3.659 af

Reach DP4: DP1 Inflow=13.33 cfs 2.488 af
Outflow=13.33 cfs 2.488 af

Pond 10P: depression Peak Elev=593.80' Storage=27,038 cf Inflow=38.59 cfs 8.205 af
Primary=0.55 cfs 0.570 af Secondary=34.70 cfs 7.634 af Outflow=35.25 cfs 8.204 af

Pond 11P: depression Peak Elev=600.61' Storage=173,803 cf Inflow=34.62 cfs 5.872 af
Primary=0.60 cfs 1.734 af Secondary=2.35 cfs 1.571 af Outflow=2.95 cfs 3.305 af

Total Runoff Area = 248.560 ac Runoff Volume = 25.879 af Average Runoff Depth = 1.25"
91.67% Pervious = 227.860 ac 8.33% Impervious = 20.700 ac

Summary for Subcatchment 10:

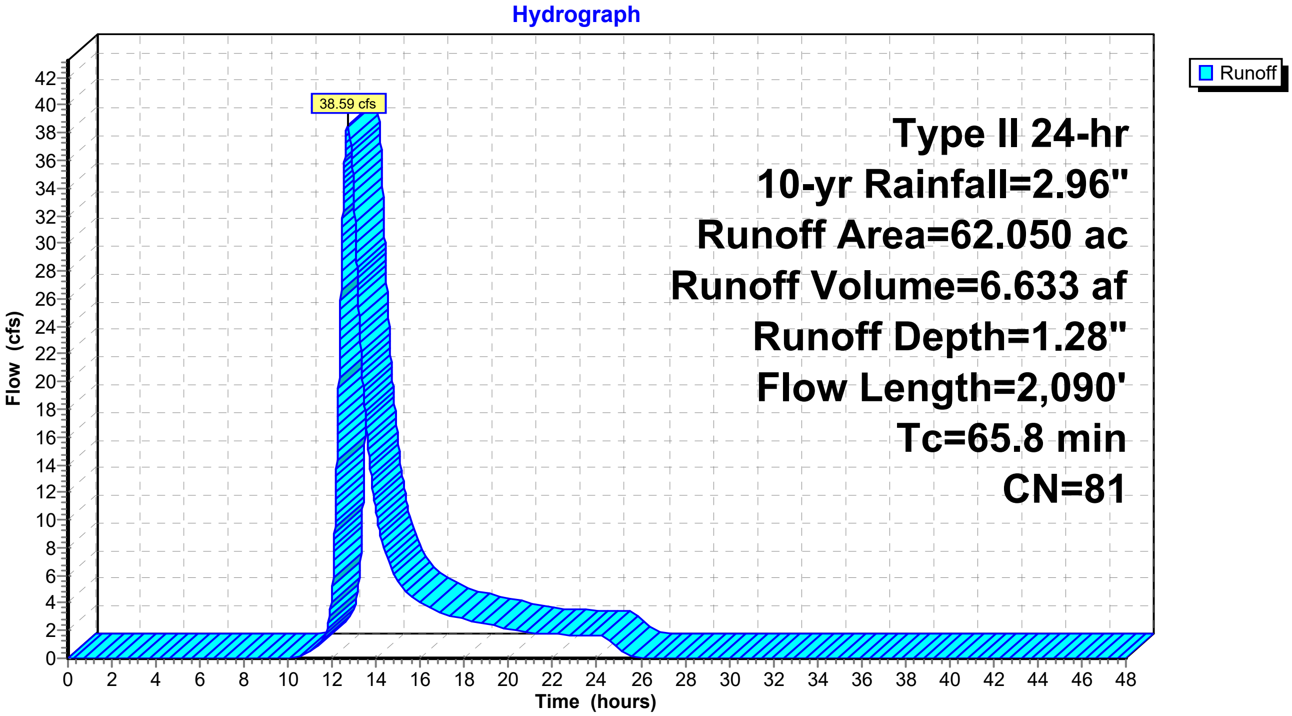
Runoff = 38.59 cfs @ 12.72 hrs, Volume= 6.633 af, Depth= 1.28"
Routed to Pond 10P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	4.410	79	Woods, Fair, HSG D
	43.130	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	3.280	79	Woods, Fair, HSG D Offsite
*	2.700	84	50-75% Grass cover, Fair, HSG D Offsite
*	8.530	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	62.050	81	Weighted Average
	53.520		86.25% Pervious Area
	8.530		13.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0200	0.14		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
9.0	380	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.7	130	0.0250	0.79		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
42.1	1,480	0.0070	0.59		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
65.8	2,090	Total			

Subcatchment 10:



Summary for Subcatchment 11:

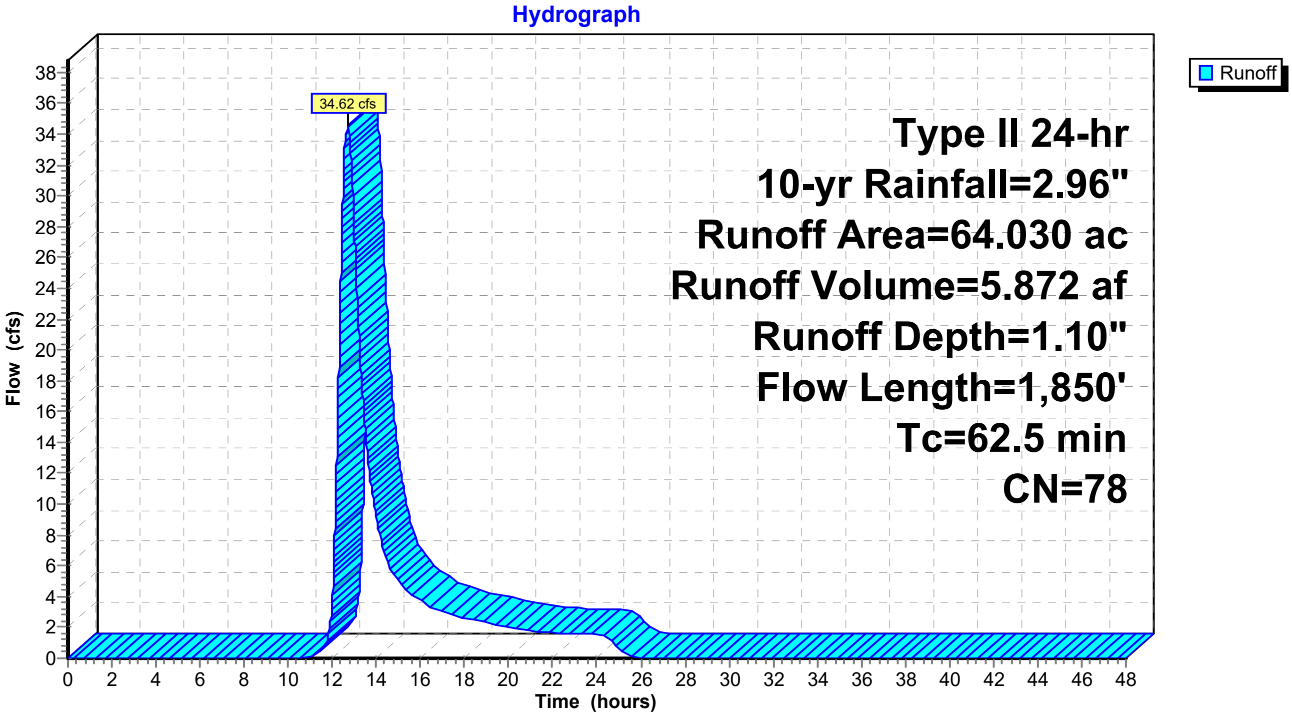
Runoff = 34.62 cfs @ 12.71 hrs, Volume= 5.872 af, Depth= 1.10"
Routed to Pond 11P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	6.980	79	Woods, Fair, HSG D
	54.940	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	1.350	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.710	98	Impervious Offsite
*	0.050	91	Gravel roads, HSG D Offsite
	64.030	78	Weighted Average
	63.320		98.89% Pervious Area
	0.710		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	100	0.0100	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
46.6	1,750	0.0080	0.63		**Shallow Concentrated Flow, A-B** Short Grass Pasture Kv= 7.0 fps
62.5	1,850	Total			

Subcatchment 11:



Summary for Subcatchment 12:

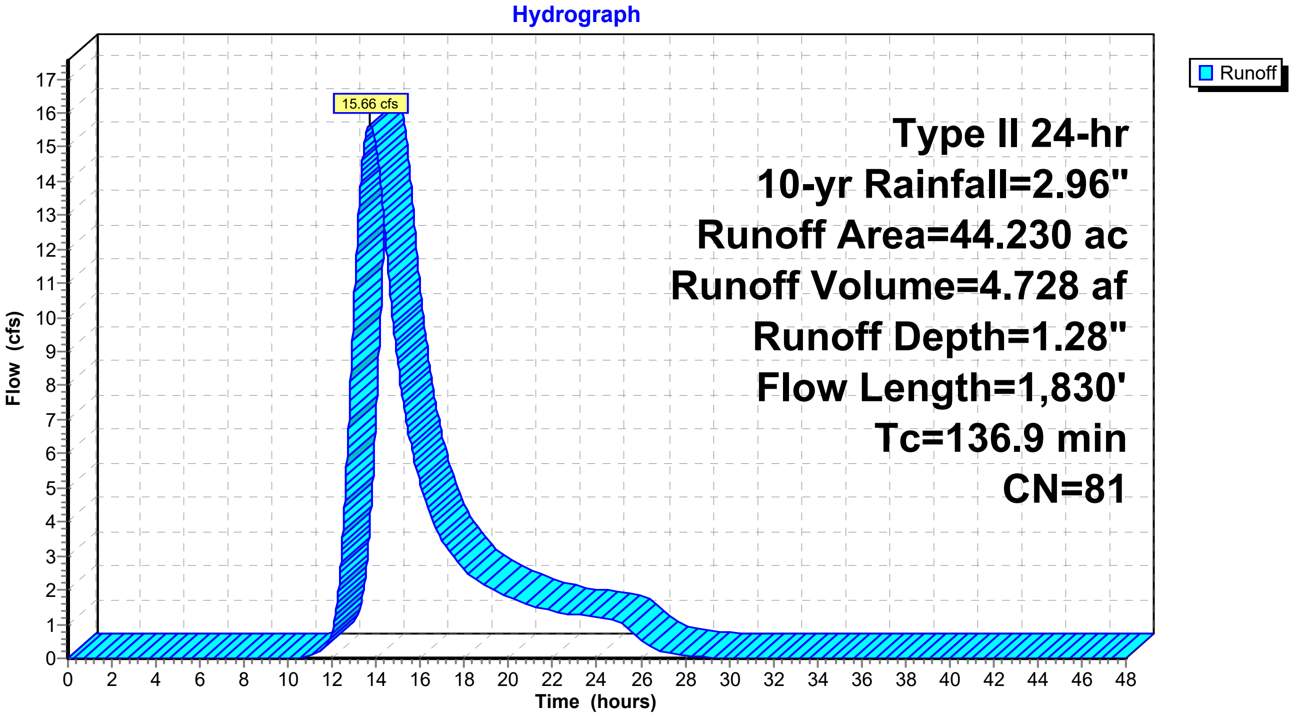
Runoff = 15.66 cfs @ 13.69 hrs, Volume= 4.728 af, Depth= 1.28"
Routed to Reach DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	11.420	79	Woods, Fair, HSG D
	20.610	78	Meadow, non-grazed, HSG D
*	1.550	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	9.390	84	50-75% Grass cover, Fair, HSG D Offsite
*	1.260	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	44.230	81	Weighted Average
	41.420		93.65% Pervious Area
	2.810		6.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
98.1	100	0.0030	0.02		**Sheet Flow, A-B** Woods: Dense underbrush n= 0.800 P2= 2.12"
10.0	250	0.0070	0.42		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
17.2	560	0.0060	0.54		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
8.2	190	0.0060	0.39		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
1.3	80	0.0200	0.99		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
2.1	650	0.0030	5.20	101.36	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
136.9	1,830	Total			

Subcatchment 12:



Summary for Subcatchment 20:

[47] Hint: Peak is 108% of capacity of segment #5
[47] Hint: Peak is 147% of capacity of segment #7

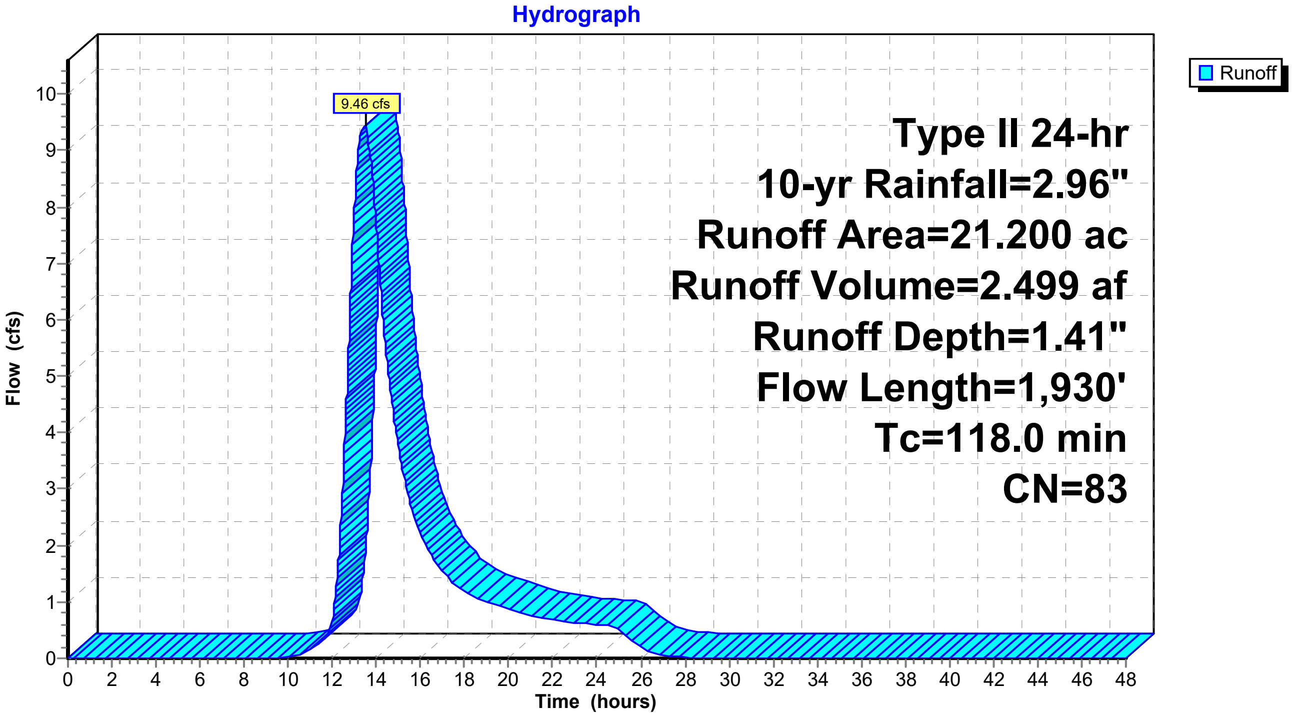
Runoff = 9.46 cfs @ 13.50 hrs, Volume= 2.499 af, Depth= 1.41"
Routed to Reach DP2 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	7.720	79	Woods, Fair, HSG D
	4.040	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.270	91	Gravel roads, HSG D
*	2.760	79	Woods, Fair, HSG D Offsite
*	2.100	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.280	98	Impervious Offsite
*	0.030	91	Gravel roads, HSG D Offsite
	21.200	83	Weighted Average
	16.920		79.81% Pervious Area
	4.280		20.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	60	0.0400	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
16.7	40	0.0100	0.04		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.12"
13.4	615	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
52.5	630	0.0016	0.20		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
0.2	40	0.0055	2.78	8.72	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
4.2	155	0.0077	0.61		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0030	2.05	6.44	**Pipe Channel, G-H** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
17.3	340	0.0022	0.33		**Shallow Concentrated Flow, H-I** Short Grass Pasture Kv= 7.0 fps
118.0	1,930	Total			

Subcatchment 20:



Summary for Subcatchment 30:

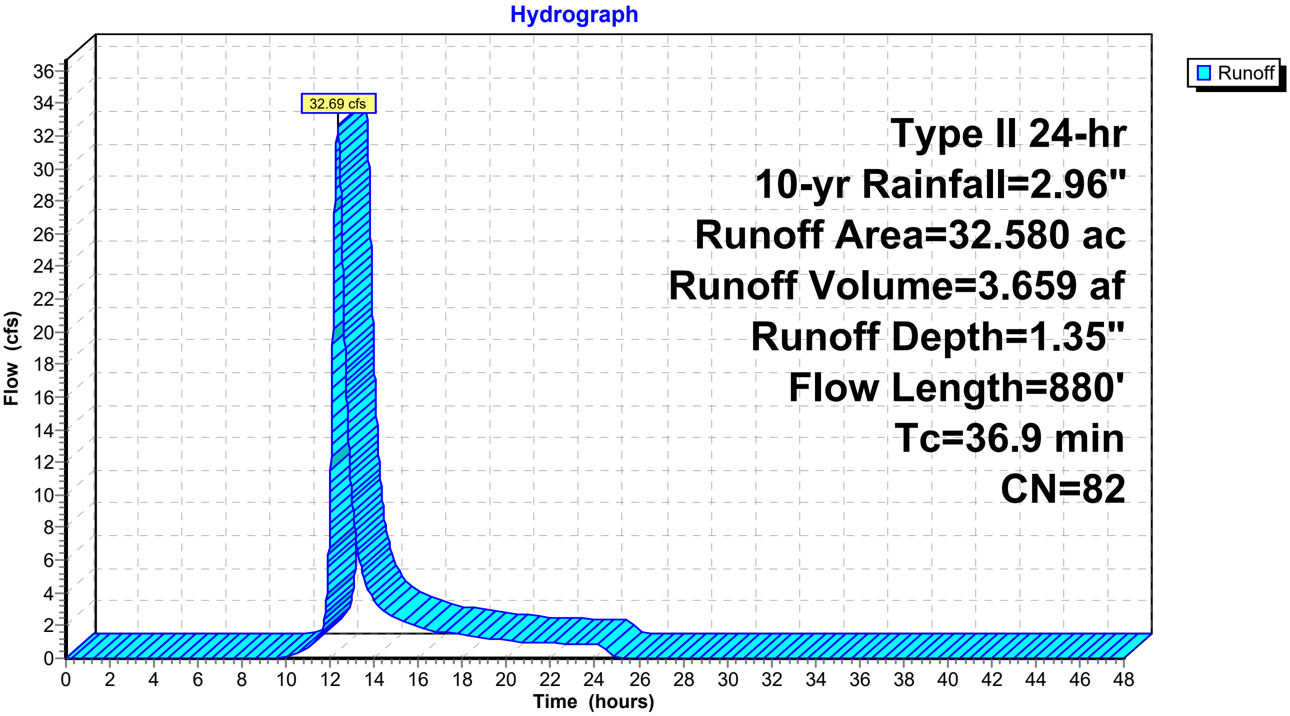
Runoff = 32.69 cfs @ 12.34 hrs, Volume= 3.659 af, Depth= 1.35"
Routed to Reach DP3 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	1.140	79	Woods, Fair, HSG D
	17.300	78	Meadow, non-grazed, HSG D
*	0.650	98	Impervious
	0.050	91	Gravel roads, HSG D
*	0.050	79	Woods, Fair, HSG D Offsite
*	11.070	84	50-75% Grass cover, Fair, HSG D Offsite
*	2.300	98	Impervious Offsite
*	0.020	91	Gravel roads, HSG D Offsite
	32.580	82	Weighted Average
	29.630		90.95% Pervious Area
	2.950		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0160	0.09		**Sheet Flow, A-B**
					Grass: Dense n= 0.240 P2= 2.12"
17.7	780	0.0110	0.73		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
36.9	880	Total			

Subcatchment 30:



Summary for Subcatchment 40:

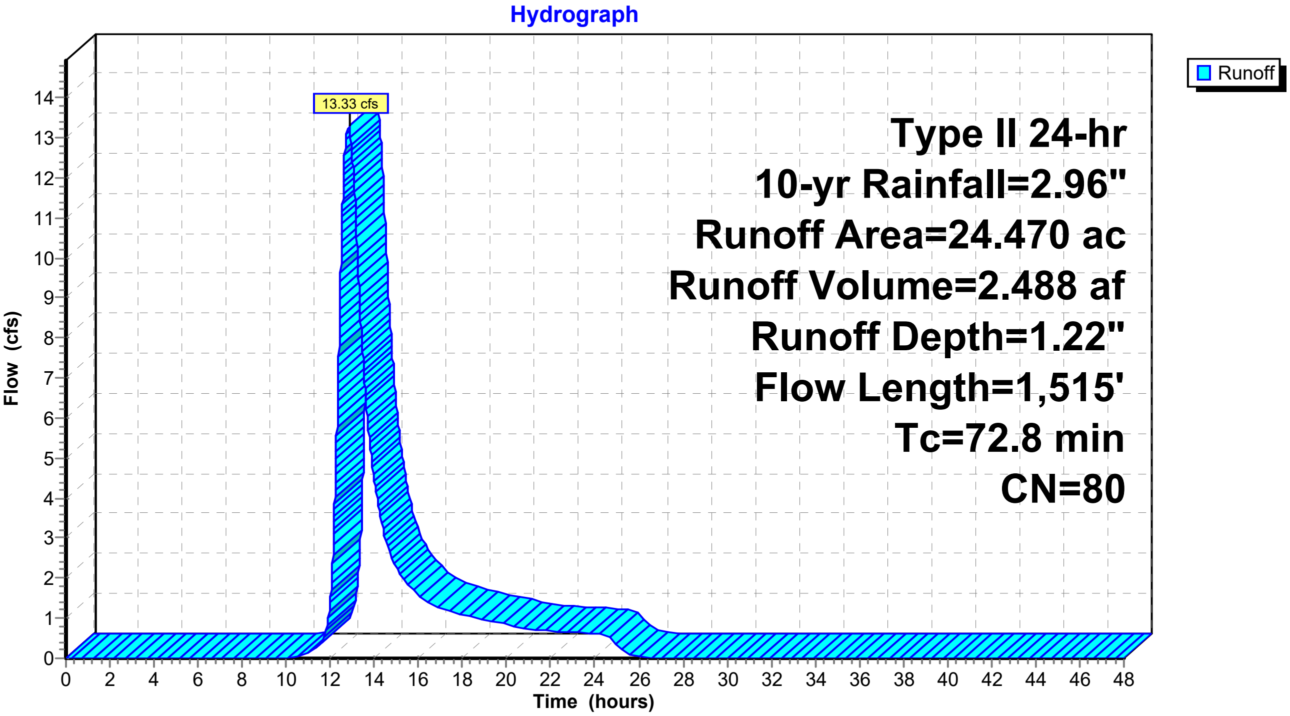
Runoff = 13.33 cfs @ 12.86 hrs, Volume= 2.488 af, Depth= 1.22"
Routed to Reach DP4 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	14.860	79	Woods, Fair, HSG D
	7.880	78	Meadow, non-grazed, HSG D
*	1.420	98	Impervious
	0.310	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	24.470	80	Weighted Average
	23.050		94.20% Pervious Area
	1.420		5.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0061	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
7.9	383	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.8	389	0.0043	0.33		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.0	96	0.0063	1.61		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
7.8	199	0.0073	0.43		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
16.9	348	0.0024	0.34		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
72.8	1,515	Total			

Subcatchment 40:



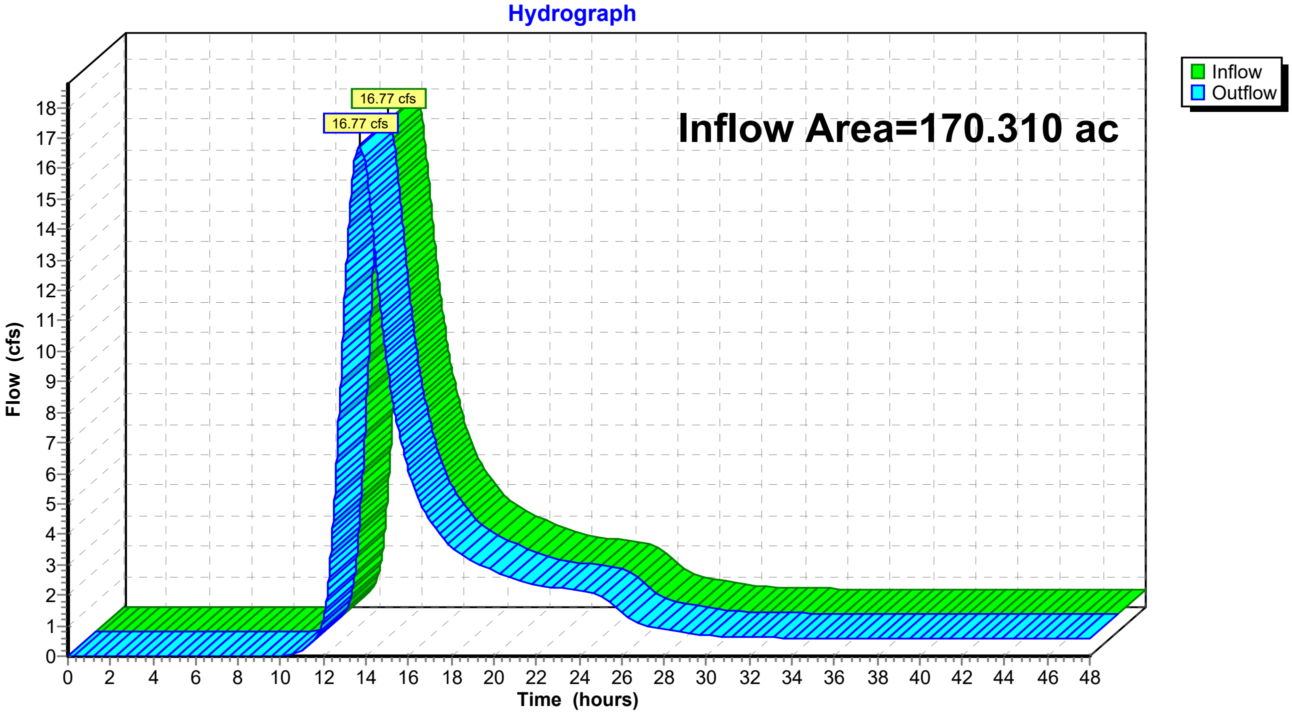
Summary for Reach DP1: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 170.310 ac, 7.08% Impervious, Inflow Depth > 0.50" for 10-yr event
Inflow = 16.77 cfs @ 13.69 hrs, Volume= 7.032 af
Outflow = 16.77 cfs @ 13.69 hrs, Volume= 7.032 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP1: DP1



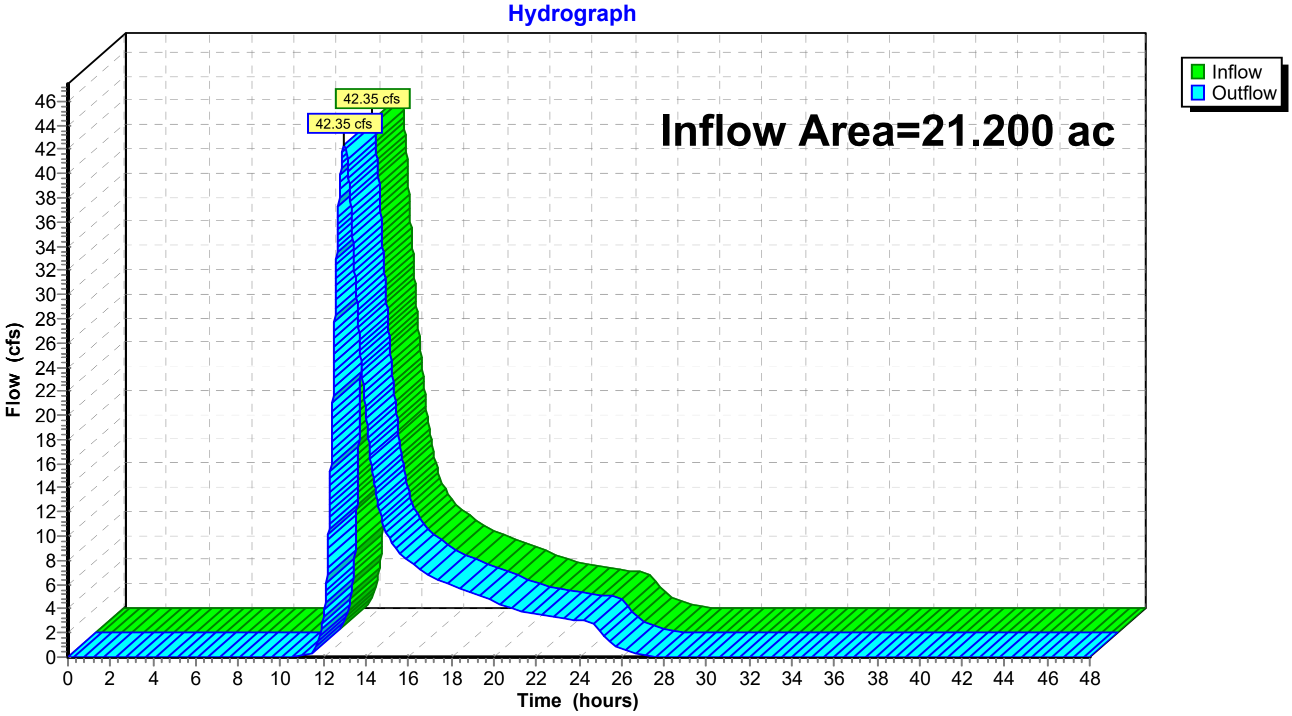
Summary for Reach DP2: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	21.200 ac,	20.19% Impervious,	Inflow Depth = 5.74"	for 10-yr event
Inflow =	42.35 cfs @	12.98 hrs,	Volume=	10.133 af
Outflow =	42.35 cfs @	12.98 hrs,	Volume=	10.133 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP2: DP1



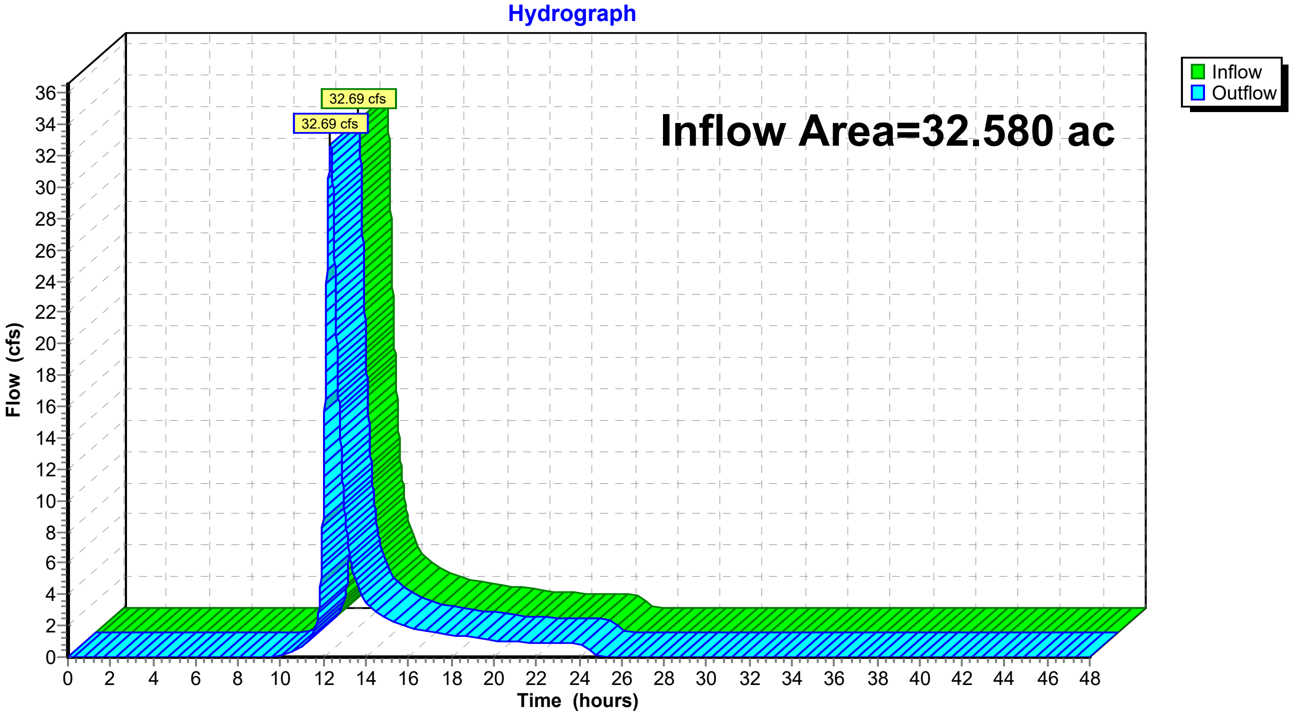
Summary for Reach DP3: DP1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =       32.580 ac,    9.05% Impervious,  Inflow Depth =   1.35"    for  10-yr event
Inflow       =      32.69 cfs @   12.34 hrs,  Volume=            3.659 af
Outflow      =      32.69 cfs @   12.34 hrs,  Volume=            3.659 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP3: DP1



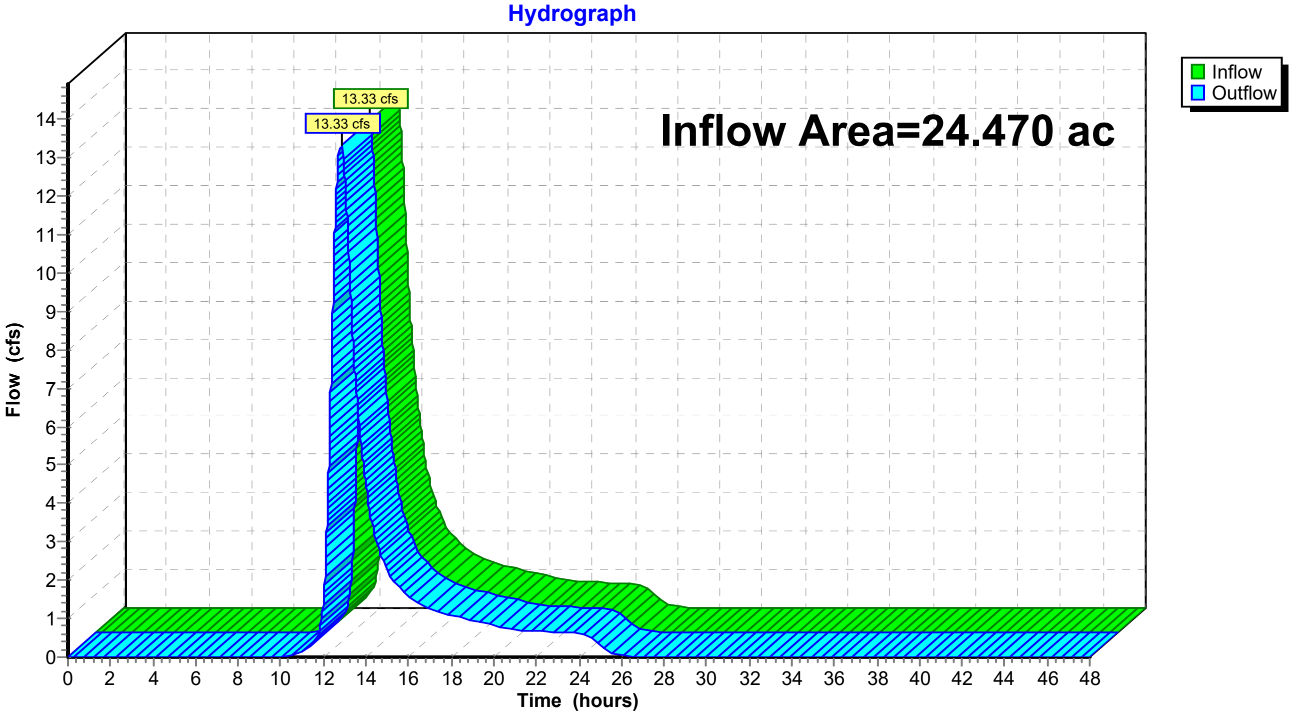
Summary for Reach DP4: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 24.470 ac, 5.80% Impervious, Inflow Depth = 1.22" for 10-yr event
Inflow = 13.33 cfs @ 12.86 hrs, Volume= 2.488 af
Outflow = 13.33 cfs @ 12.86 hrs, Volume= 2.488 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP4: DP1



Summary for Pond 10P: depression

Inflow Area = 62.050 ac, 13.75% Impervious, Inflow Depth = 1.59" for 10-yr event
Inflow = 38.59 cfs @ 12.72 hrs, Volume= 8.205 af
Outflow = 35.25 cfs @ 12.93 hrs, Volume= 8.204 af, Atten= 9%, Lag= 12.3 min
Primary = 0.55 cfs @ 12.93 hrs, Volume= 0.570 af
Routed to Reach DP1 : DP1
Secondary = 34.70 cfs @ 12.93 hrs, Volume= 7.634 af
Routed to Reach DP2 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 593.80' @ 12.93 hrs Surf.Area= 58,812 sf Storage= 27,038 cf

Plug-Flow detention time= 17.9 min calculated for 8.202 af (100% of inflow)
Center-of-Mass det. time= 18.0 min (969.3 - 951.3)

Volume	Invert	Avail.Storage	Storage Description
#1	592.75'	157,748 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

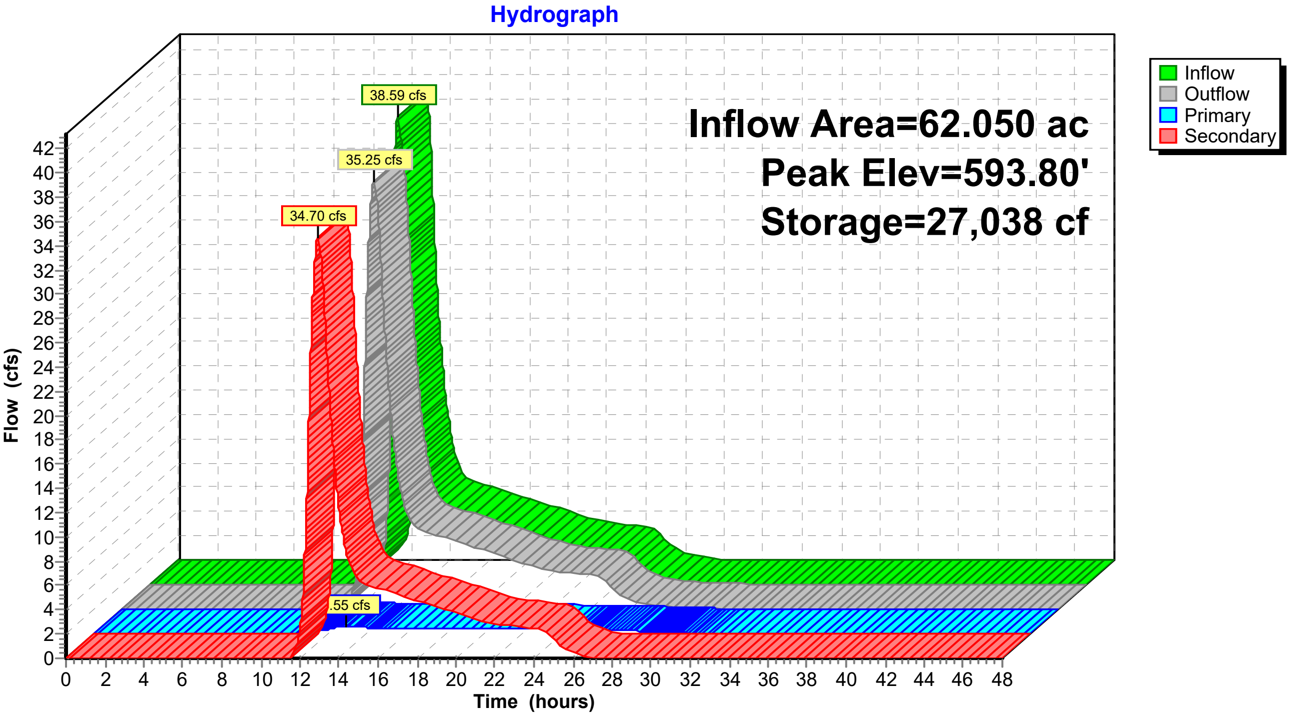
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.75	1,300	0	0
593.00	6,400	963	963
594.00	71,940	39,170	40,133
595.00	163,290	117,615	157,748

Device	Routing	Invert	Outlet Devices
#1	Primary	592.75'	**6.0" Round Pipe to DA 12** L= 250.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.75' / 591.00' S= 0.0070 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	593.10'	**22.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.55 cfs @ 12.93 hrs HW=593.80' TW=0.00' (Dynamic Tailwater)
↑—**1=Pipe to DA 12** (Barrel Controls 0.55 cfs @ 2.81 fps)

Secondary OutFlow Max=34.70 cfs @ 12.93 hrs HW=593.80' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 34.70 cfs @ 2.25 fps)

Pond 10P: depression



Summary for Pond 11P: depression

```
Inflow Area =        64.030 ac,    1.11% Impervious,  Inflow Depth =   1.10"    for  10-yr event
Inflow      =        34.62 cfs @   12.71 hrs,  Volume=          5.872 af
Outflow     =         2.95 cfs @   17.09 hrs,  Volume=          3.305 af,  Atten= 91%,  Lag= 263.1 min
Primary     =         0.60 cfs @   17.09 hrs,  Volume=          1.734 af
    Routed to Reach DP1 : DP1
Secondary =           2.35 cfs @   17.09 hrs,  Volume=          1.571 af
    Routed to Pond 10P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 600.61' @ 17.09 hrs   Surf.Area= 209,897 sf   Storage= 173,803 cf

Plug-Flow detention time= 739.0 min calculated for 3.305 af (56% of inflow)
Center-of-Mass det. time= 608.2 min ( 1,510.7 - 902.5 )
```

Volume	Invert	Avail.Storage	Storage Description
#1	599.00'	642,539 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

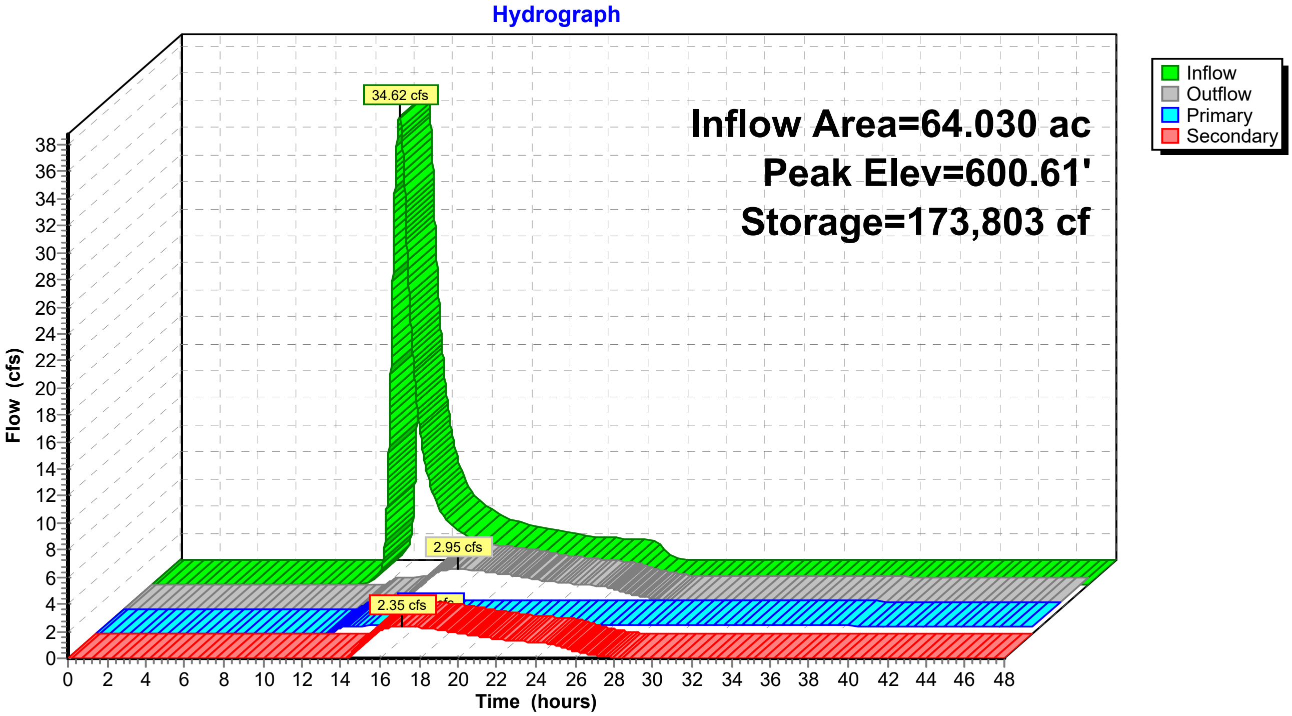
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	16,745	0	0
599.50	75,340	23,021	23,021
599.75	104,880	22,528	45,549
600.00	125,550	28,804	74,353
600.25	152,370	34,740	109,093
601.00	273,140	159,566	268,659
602.00	474,620	373,880	642,539

Device	Routing	Invert	Outlet Devices
#1	Primary	599.00'	**6.0" Round Pipe to DA 12** L= 500.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 599.00' / 595.00' S= 0.0080 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	600.50'	**25.0' long x 300.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.60 cfs @ 17.09 hrs HW=600.61' TW=0.00' (Dynamic Tailwater)
↑—**1=Pipe to DA 12** (Barrel Controls 0.60 cfs @ 3.04 fps)

Secondary OutFlow Max=2.35 cfs @ 17.09 hrs HW=600.61' TW=593.31' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 2.35 cfs @ 0.88 fps)

Pond 11P: depression



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10: Runoff Area=62.050 ac 13.75% Impervious Runoff Depth=2.79"
Flow Length=2,090' Tc=65.8 min CN=81 Runoff=86.45 cfs 14.436 af

Subcatchment11: Runoff Area=64.030 ac 1.11% Impervious Runoff Depth=2.53"
Flow Length=1,850' Tc=62.5 min CN=78 Runoff=83.23 cfs 13.478 af

Subcatchment12: Runoff Area=44.230 ac 6.35% Impervious Runoff Depth=2.79"
Flow Length=1,830' Tc=136.9 min CN=81 Runoff=35.19 cfs 10.290 af

Subcatchment20: Runoff Area=21.200 ac 20.19% Impervious Runoff Depth=2.98"
Flow Length=1,930' Tc=118.0 min CN=83 Runoff=20.30 cfs 5.257 af

Subcatchment30: Runoff Area=32.580 ac 9.05% Impervious Runoff Depth=2.88"
Flow Length=880' Tc=36.9 min CN=82 Runoff=71.11 cfs 7.828 af

Subcatchment40: Runoff Area=24.470 ac 5.80% Impervious Runoff Depth=2.70"
Flow Length=1,515' Tc=72.8 min CN=80 Runoff=30.57 cfs 5.509 af

Reach DP1: DP1 Inflow=36.41 cfs 12.830 af
Outflow=36.41 cfs 12.830 af

Reach DP2: DP1 Inflow=101.12 cfs 28.005 af
Outflow=101.12 cfs 28.005 af

Reach DP3: DP1 Inflow=71.11 cfs 7.828 af
Outflow=71.11 cfs 7.828 af

Reach DP4: DP1 Inflow=30.57 cfs 5.509 af
Outflow=30.57 cfs 5.509 af

Pond 10P: depression Peak Elev=594.35' Storage=70,425 cf Inflow=90.18 cfs 23.502 af
Primary=0.61 cfs 0.754 af Secondary=82.11 cfs 22.748 af Outflow=82.72 cfs 23.501 af

Pond 11P: depression Peak Elev=601.03' Storage=278,185 cf Inflow=83.23 cfs 13.478 af
Primary=0.62 cfs 1.786 af Secondary=26.37 cfs 9.066 af Outflow=26.99 cfs 10.852 af

Total Runoff Area = 248.560 ac Runoff Volume = 56.798 af Average Runoff Depth = 2.74"
91.67% Pervious = 227.860 ac 8.33% Impervious = 20.700 ac

Summary for Subcatchment 10:

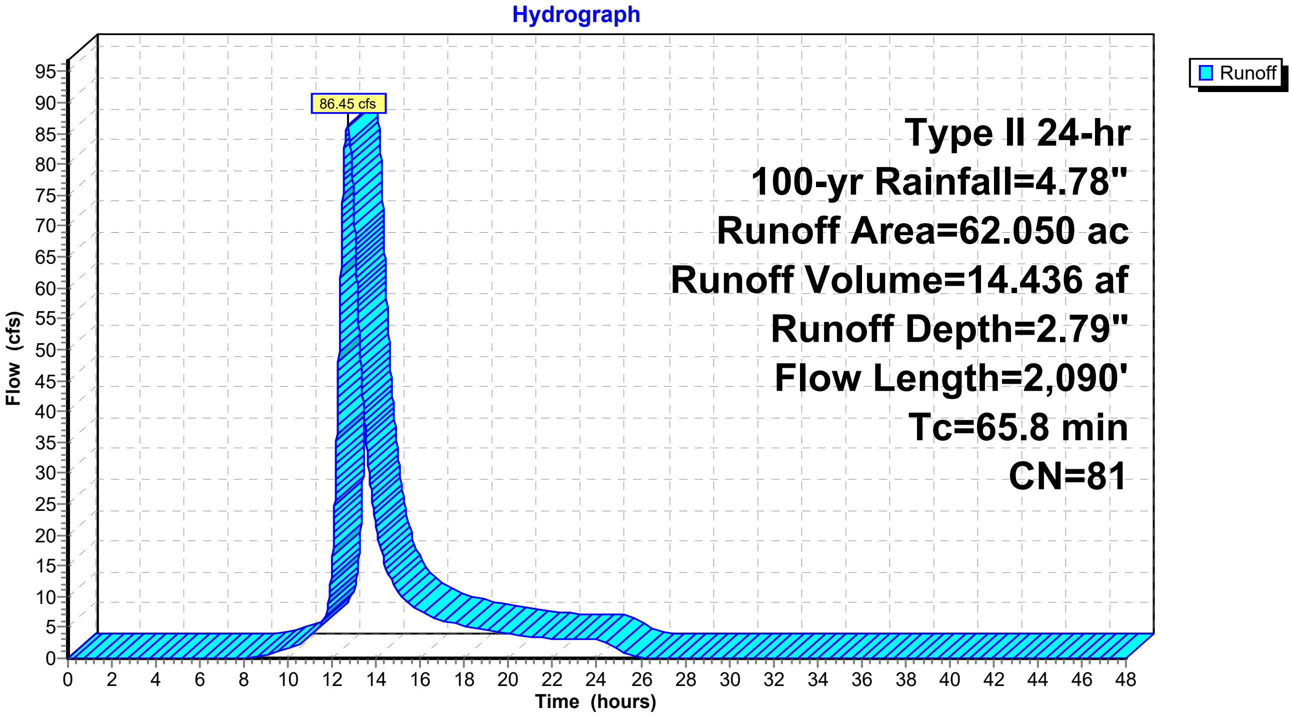
Runoff = 86.45 cfs @ 12.66 hrs, Volume= 14.436 af, Depth= 2.79"
Routed to Pond 10P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	4.410	79	Woods, Fair, HSG D
	43.130	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	3.280	79	Woods, Fair, HSG D Offsite
*	2.700	84	50-75% Grass cover, Fair, HSG D Offsite
*	8.530	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	62.050	81	Weighted Average
	53.520		86.25% Pervious Area
	8.530		13.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.0	100	0.0200	0.14		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
9.0	380	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.7	130	0.0250	0.79		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
42.1	1,480	0.0070	0.59		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
65.8	2,090	Total			

Subcatchment 10:



Summary for Subcatchment 11:

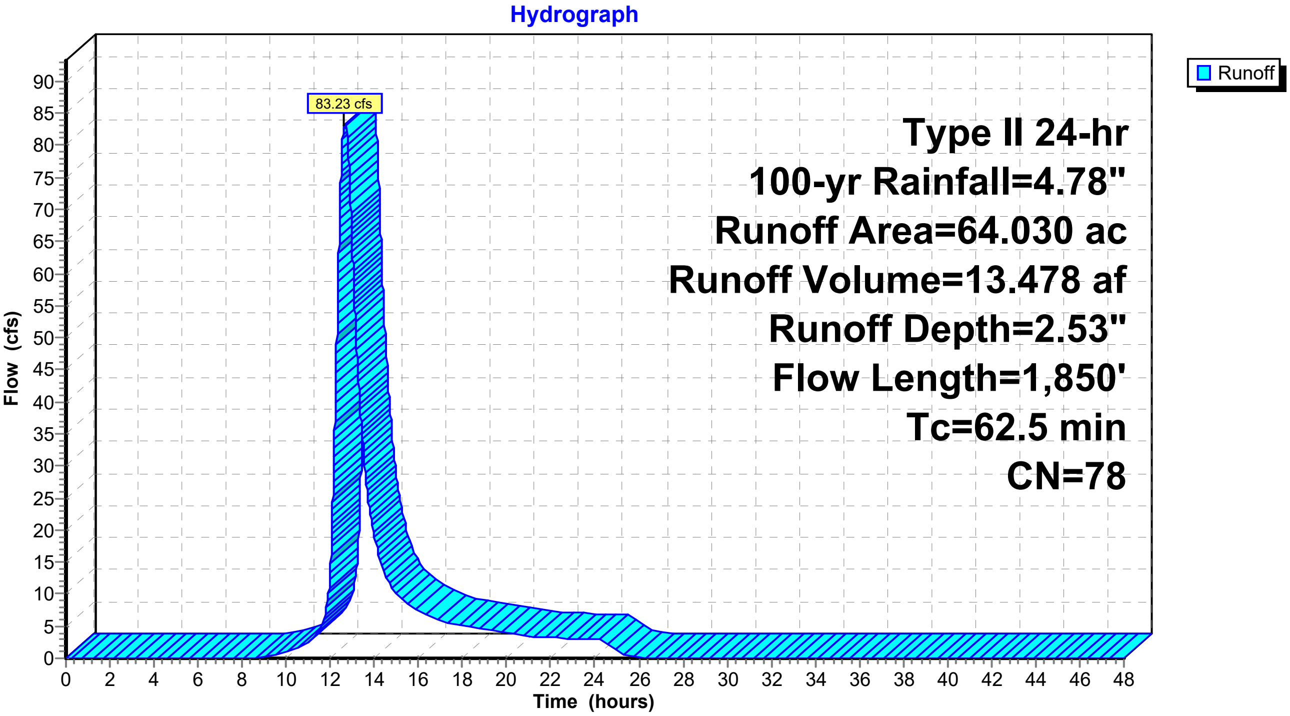
Runoff = 83.23 cfs @ 12.65 hrs, Volume= 13.478 af, Depth= 2.53"
Routed to Pond 11P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	6.980	79	Woods, Fair, HSG D
	54.940	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	1.350	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.710	98	Impervious Offsite
*	0.050	91	Gravel roads, HSG D Offsite
	64.030	78	Weighted Average
	63.320		98.89% Pervious Area
	0.710		1.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	100	0.0100	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
46.6	1,750	0.0080	0.63		**Shallow Concentrated Flow, A-B** Short Grass Pasture Kv= 7.0 fps
62.5	1,850	Total			

Subcatchment 11:



Summary for Subcatchment 12:

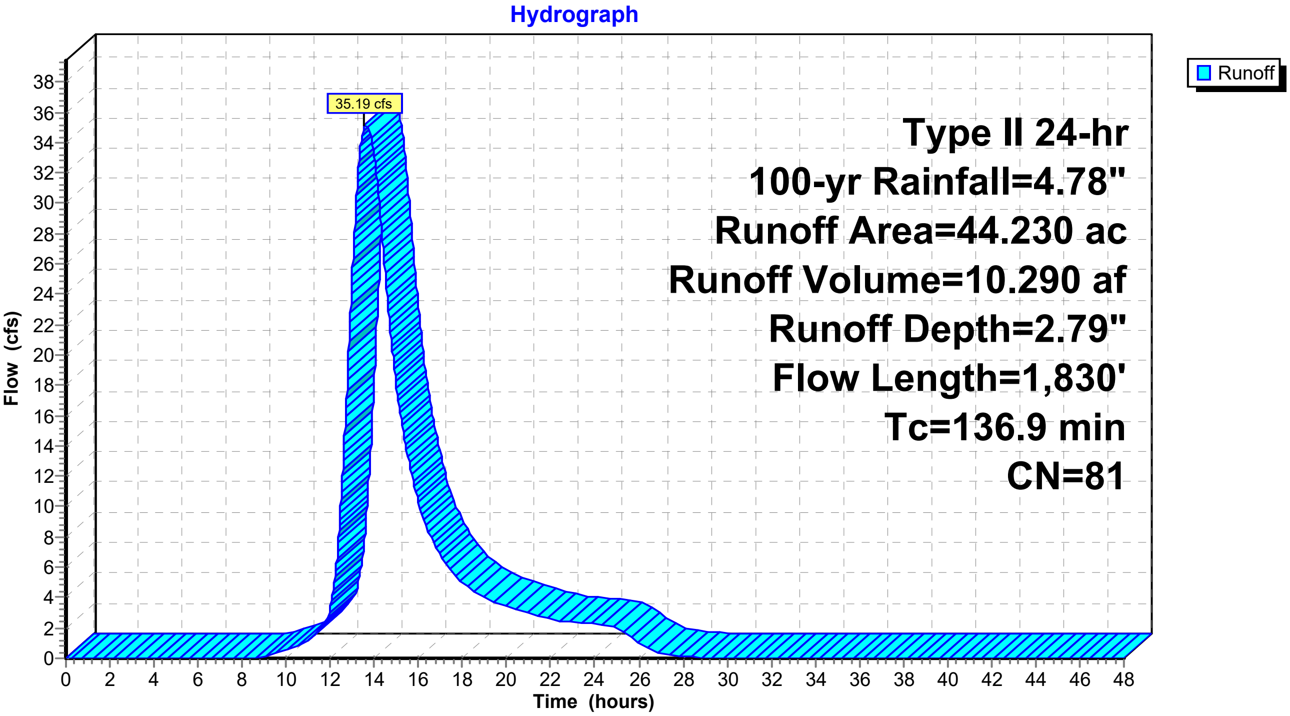
Runoff = 35.19 cfs @ 13.55 hrs, Volume= 10.290 af, Depth= 2.79"
Routed to Reach DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	11.420	79	Woods, Fair, HSG D
	20.610	78	Meadow, non-grazed, HSG D
*	1.550	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	9.390	84	50-75% Grass cover, Fair, HSG D Offsite
*	1.260	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	44.230	81	Weighted Average
	41.420		93.65% Pervious Area
	2.810		6.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
98.1	100	0.0030	0.02		**Sheet Flow, A-B** Woods: Dense underbrush n= 0.800 P2= 2.12"
10.0	250	0.0070	0.42		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
17.2	560	0.0060	0.54		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
8.2	190	0.0060	0.39		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
1.3	80	0.0200	0.99		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
2.1	650	0.0030	5.20	101.36	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
136.9	1,830	Total			

Subcatchment 12:



Summary for Subcatchment 20:

[47] Hint: Peak is 233% of capacity of segment #5
[47] Hint: Peak is 315% of capacity of segment #7

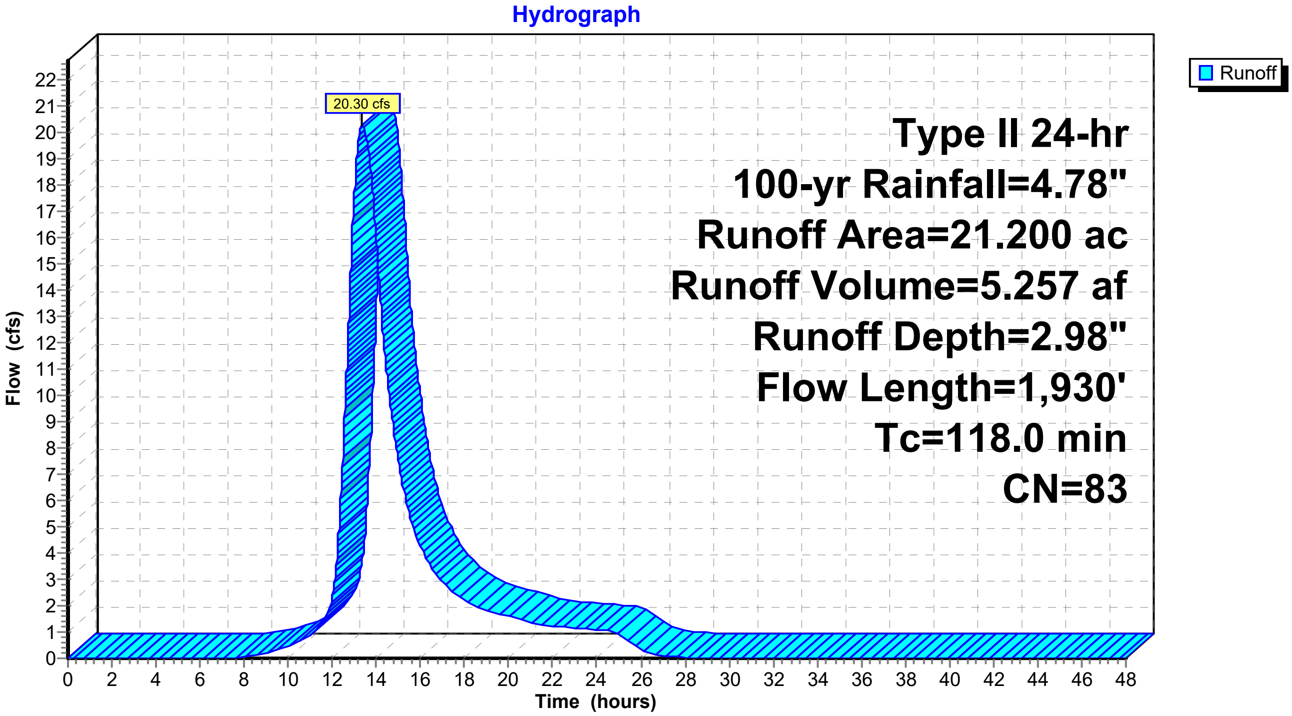
Runoff = 20.30 cfs @ 13.38 hrs, Volume= 5.257 af, Depth= 2.98"
Routed to Reach DP2 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	7.720	79	Woods, Fair, HSG D
	4.040	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.270	91	Gravel roads, HSG D
*	2.760	79	Woods, Fair, HSG D Offsite
*	2.100	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.280	98	Impervious Offsite
*	0.030	91	Gravel roads, HSG D Offsite
	21.200	83	Weighted Average
	16.920		79.81% Pervious Area
	4.280		20.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	60	0.0400	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
16.7	40	0.0100	0.04		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.12"
13.4	615	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
52.5	630	0.0016	0.20		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
0.2	40	0.0055	2.78	8.72	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
4.2	155	0.0077	0.61		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0030	2.05	6.44	**Pipe Channel, G-H** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
17.3	340	0.0022	0.33		**Shallow Concentrated Flow, H-I** Short Grass Pasture Kv= 7.0 fps
118.0	1,930	Total			

Subcatchment 20:



Summary for Subcatchment 30:

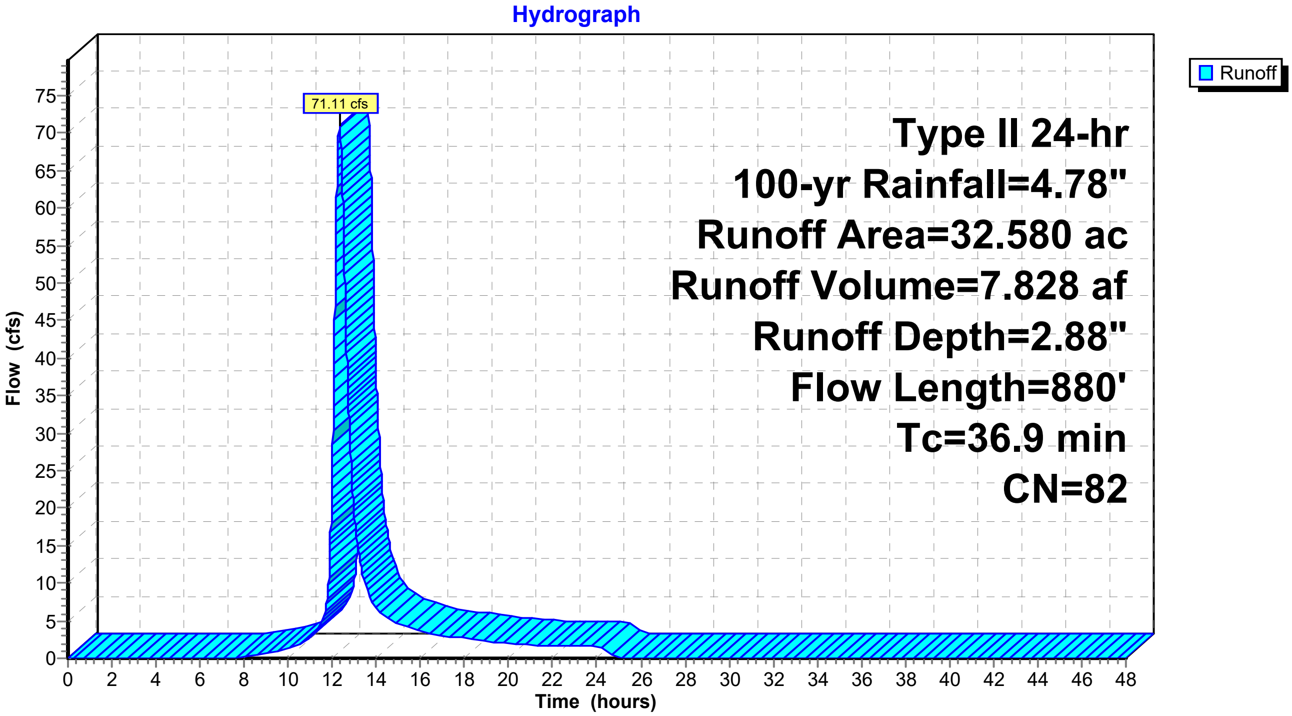
Runoff = 71.11 cfs @ 12.34 hrs, Volume= 7.828 af, Depth= 2.88"
Routed to Reach DP3 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	1.140	79	Woods, Fair, HSG D
	17.300	78	Meadow, non-grazed, HSG D
*	0.650	98	Impervious
	0.050	91	Gravel roads, HSG D
*	0.050	79	Woods, Fair, HSG D Offsite
*	11.070	84	50-75% Grass cover, Fair, HSG D Offsite
*	2.300	98	Impervious Offsite
*	0.020	91	Gravel roads, HSG D Offsite
	32.580	82	Weighted Average
	29.630		90.95% Pervious Area
	2.950		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.2	100	0.0160	0.09		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
17.7	780	0.0110	0.73		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
36.9	880	Total			

Subcatchment 30:



Summary for Subcatchment 40:

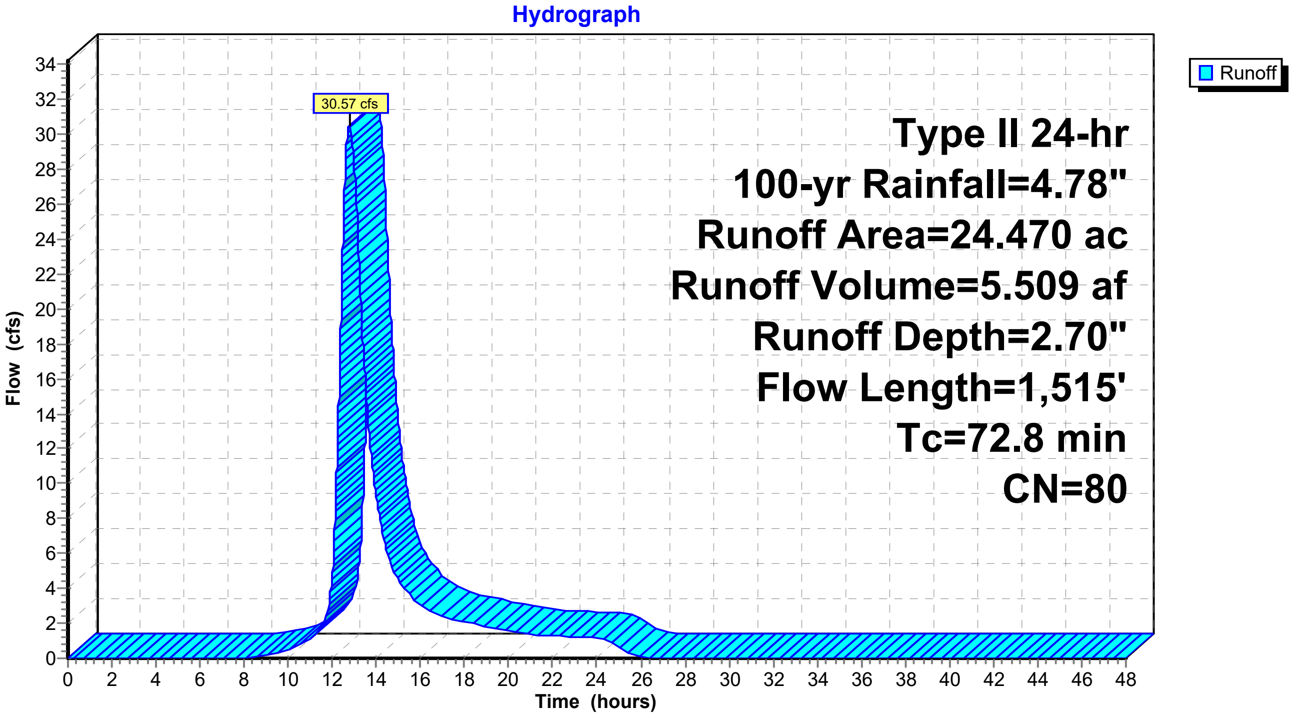
Runoff = 30.57 cfs @ 12.78 hrs, Volume= 5.509 af, Depth= 2.70"
Routed to Reach DP4 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	14.860	79	Woods, Fair, HSG D
	7.880	78	Meadow, non-grazed, HSG D
*	1.420	98	Impervious
	0.310	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	24.470	80	Weighted Average
	23.050		94.20% Pervious Area
	1.420		5.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.4	100	0.0061	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
7.9	383	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.8	389	0.0043	0.33		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.0	96	0.0063	1.61		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
7.8	199	0.0073	0.43		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
16.9	348	0.0024	0.34		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
72.8	1,515	Total			

Subcatchment 40:



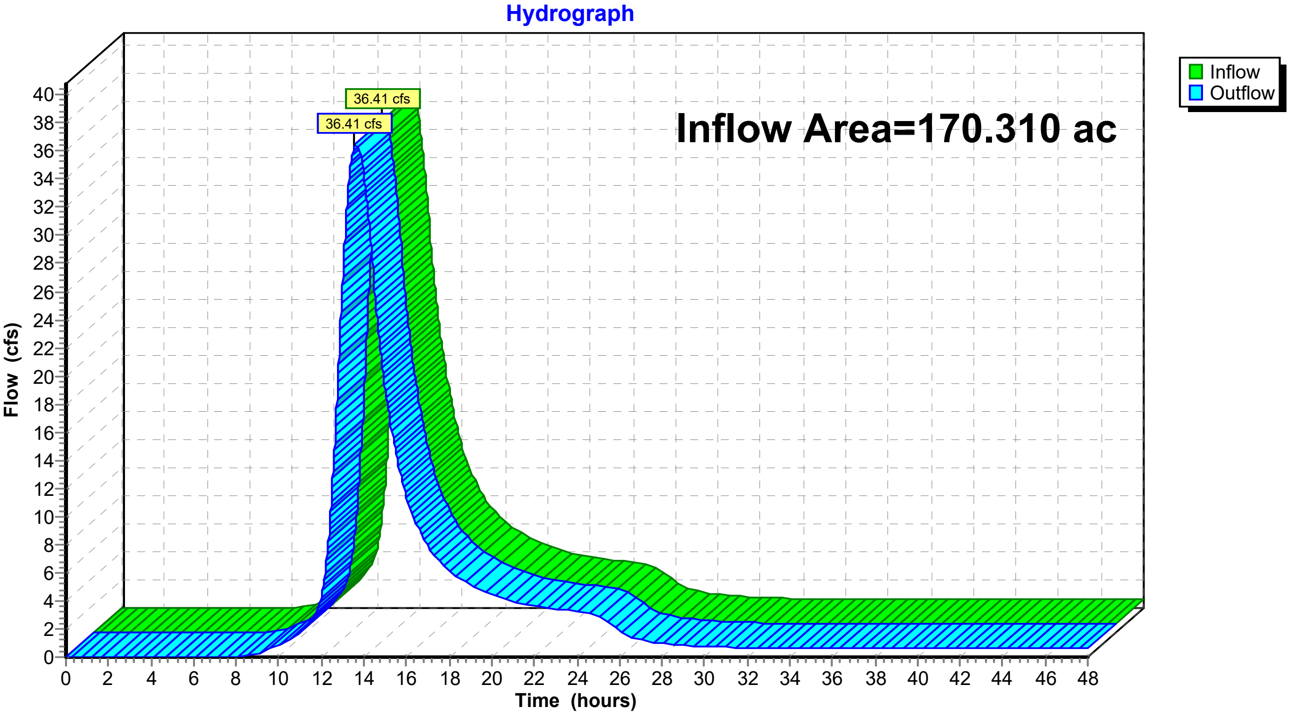
Summary for Reach DP1: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 170.310 ac, 7.08% Impervious, Inflow Depth > 0.90" for 100-yr event
Inflow = 36.41 cfs @ 13.55 hrs, Volume= 12.830 af
Outflow = 36.41 cfs @ 13.55 hrs, Volume= 12.830 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP1: DP1



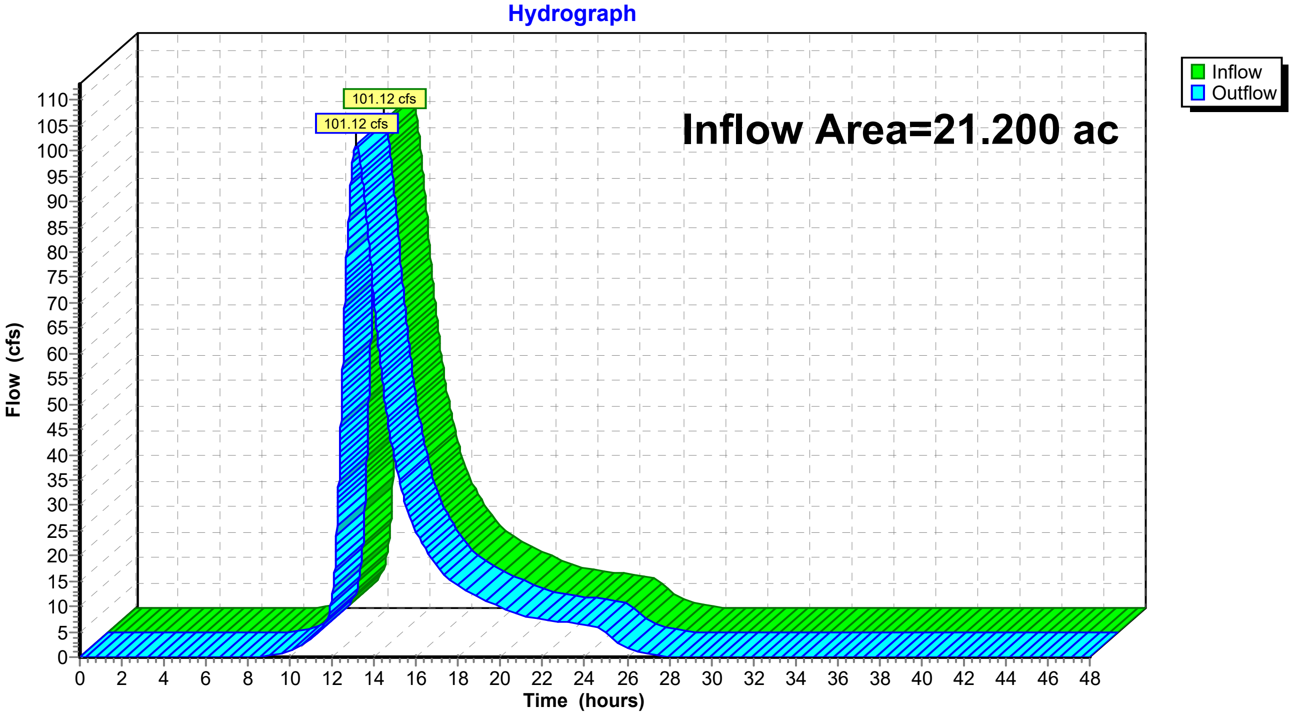
Summary for Reach DP2: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 21.200 ac, 20.19% Impervious, Inflow Depth = 15.85" for 100-yr event
Inflow = 101.12 cfs @ 13.13 hrs, Volume= 28.005 af
Outflow = 101.12 cfs @ 13.13 hrs, Volume= 28.005 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP2: DP1



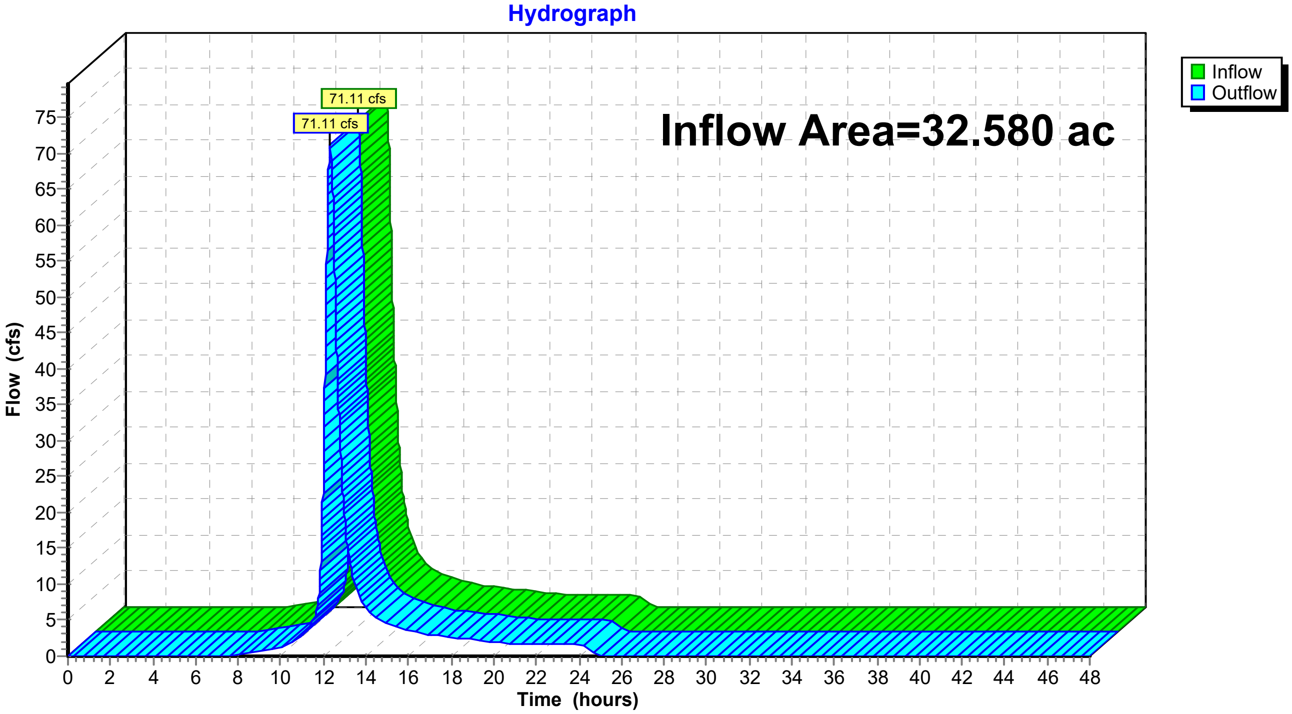
Summary for Reach DP3: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 32.580 ac, 9.05% Impervious, Inflow Depth = 2.88" for 100-yr event
Inflow = 71.11 cfs @ 12.34 hrs, Volume= 7.828 af
Outflow = 71.11 cfs @ 12.34 hrs, Volume= 7.828 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP3: DP1



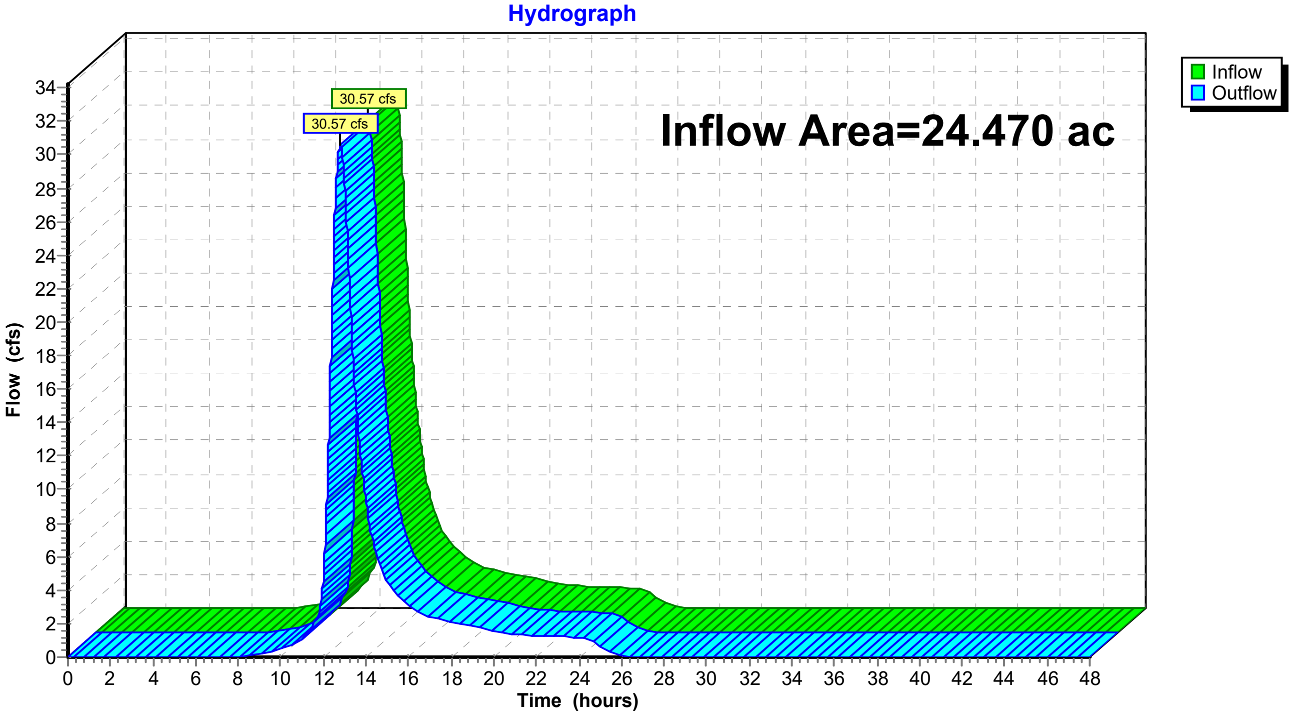
Summary for Reach DP4: DP1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      24.470 ac,   5.80% Impervious,  Inflow Depth =   2.70"    for  100-yr event
Inflow      =      30.57 cfs @   12.78 hrs,  Volume=           5.509 af
Outflow     =      30.57 cfs @   12.78 hrs,  Volume=           5.509 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP4: DP1



Summary for Pond 10P: depression

Inflow Area = 62.050 ac, 13.75% Impervious, Inflow Depth = 4.55" for 100-yr event
Inflow = 90.18 cfs @ 12.80 hrs, Volume= 23.502 af
Outflow = 82.72 cfs @ 13.08 hrs, Volume= 23.501 af, Atten= 8%, Lag= 16.8 min
Primary = 0.61 cfs @ 13.08 hrs, Volume= 0.754 af
Routed to Reach DP1 : DP1
Secondary = 82.11 cfs @ 13.08 hrs, Volume= 22.748 af
Routed to Reach DP2 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 594.35' @ 13.08 hrs Surf.Area= 103,488 sf Storage= 70,425 cf

Plug-Flow detention time= 15.0 min calculated for 23.501 af (100% of inflow)
Center-of-Mass det. time= 15.0 min (937.4 - 922.4)

Volume	Invert	Avail.Storage	Storage Description
#1	592.75'	157,748 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

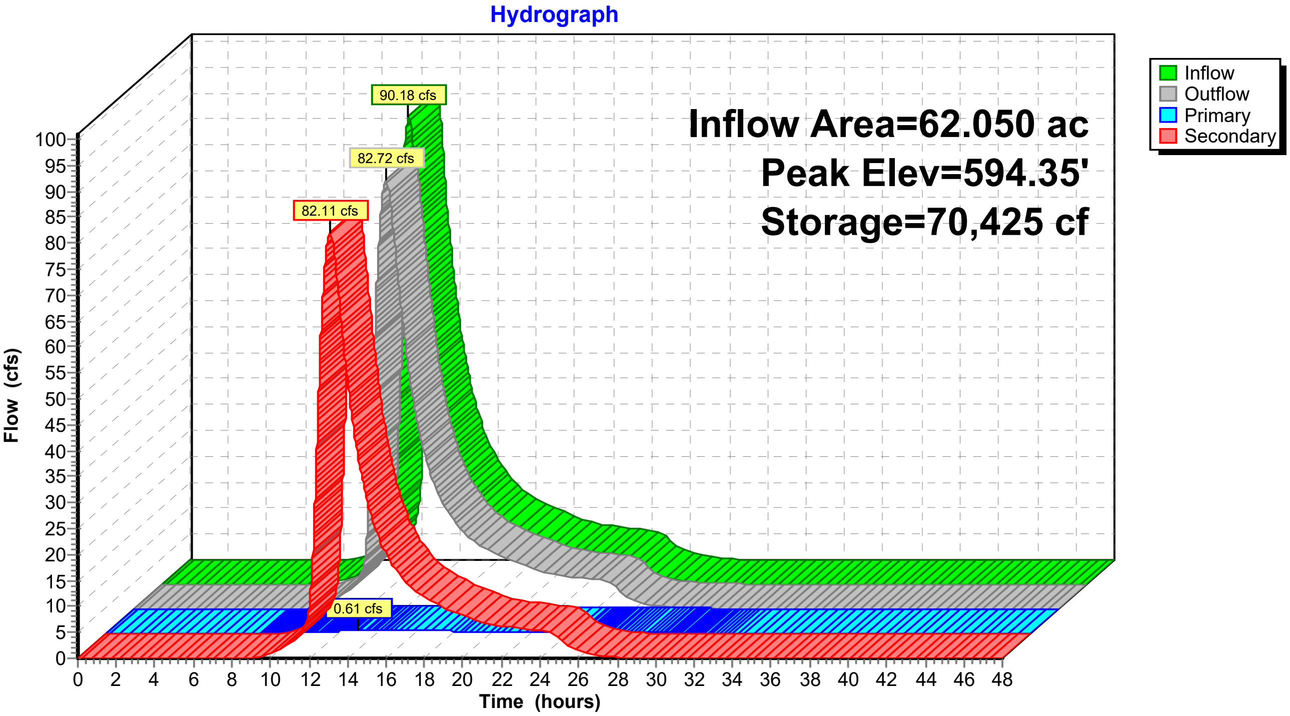
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.75	1,300	0	0
593.00	6,400	963	963
594.00	71,940	39,170	40,133
595.00	163,290	117,615	157,748

Device	Routing	Invert	Outlet Devices
#1	Primary	592.75'	**6.0" Round Pipe to DA 12** L= 250.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.75' / 591.00' S= 0.0070 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	593.10'	**22.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.61 cfs @ 13.08 hrs HW=594.35' TW=0.00' (Dynamic Tailwater)
↑—**1=Pipe to DA 12** (Barrel Controls 0.61 cfs @ 3.13 fps)

Secondary OutFlow Max=82.11 cfs @ 13.08 hrs HW=594.35' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 82.11 cfs @ 3.00 fps)

Pond 10P: depression



Summary for Pond 11P: depression

Inflow Area = 64.030 ac, 1.11% Impervious, Inflow Depth = 2.53" for 100-yr event
Inflow = 83.23 cfs @ 12.65 hrs, Volume= 13.478 af
Outflow = 26.99 cfs @ 13.65 hrs, Volume= 10.852 af, Atten= 68%, Lag= 60.2 min
Primary = 0.62 cfs @ 13.65 hrs, Volume= 1.786 af
Routed to Reach DP1 : DP1
Secondary = 26.37 cfs @ 13.65 hrs, Volume= 9.066 af
Routed to Pond 10P : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 601.03' @ 13.65 hrs Surf.Area= 280,079 sf Storage= 278,185 cf

Plug-Flow detention time= 332.6 min calculated for 10.852 af (81% of inflow)
Center-of-Mass det. time= 249.8 min (1,128.2 - 878.4)

Volume	Invert	Avail.Storage	Storage Description
#1	599.00'	642,539 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	16,745	0	0
599.50	75,340	23,021	23,021
599.75	104,880	22,528	45,549
600.00	125,550	28,804	74,353
600.25	152,370	34,740	109,093
601.00	273,140	159,566	268,659
602.00	474,620	373,880	642,539

Device	Routing	Invert	Outlet Devices
#1	Primary	599.00'	**6.0" Round Pipe to DA 12** L= 500.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 599.00' / 595.00' S= 0.0080 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	600.50'	**25.0' long x 300.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.62 cfs @ 13.65 hrs HW=601.03' TW=0.00' (Dynamic Tailwater)
└─**1=Pipe to DA 12** (Barrel Controls 0.62 cfs @ 3.16 fps)

Secondary OutFlow Max=26.37 cfs @ 13.65 hrs HW=601.03' TW=594.18' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 26.37 cfs @ 1.97 fps)

Pond 11P: depression

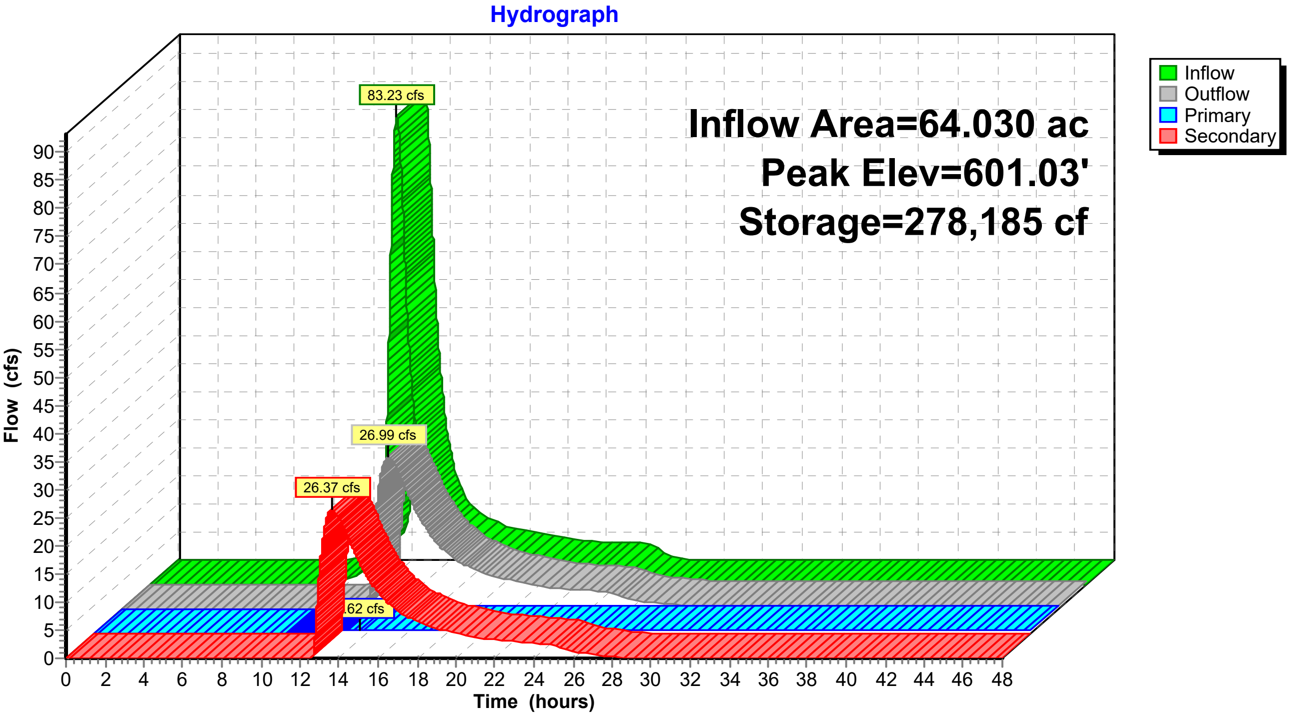


TABLE OF CONTENTS

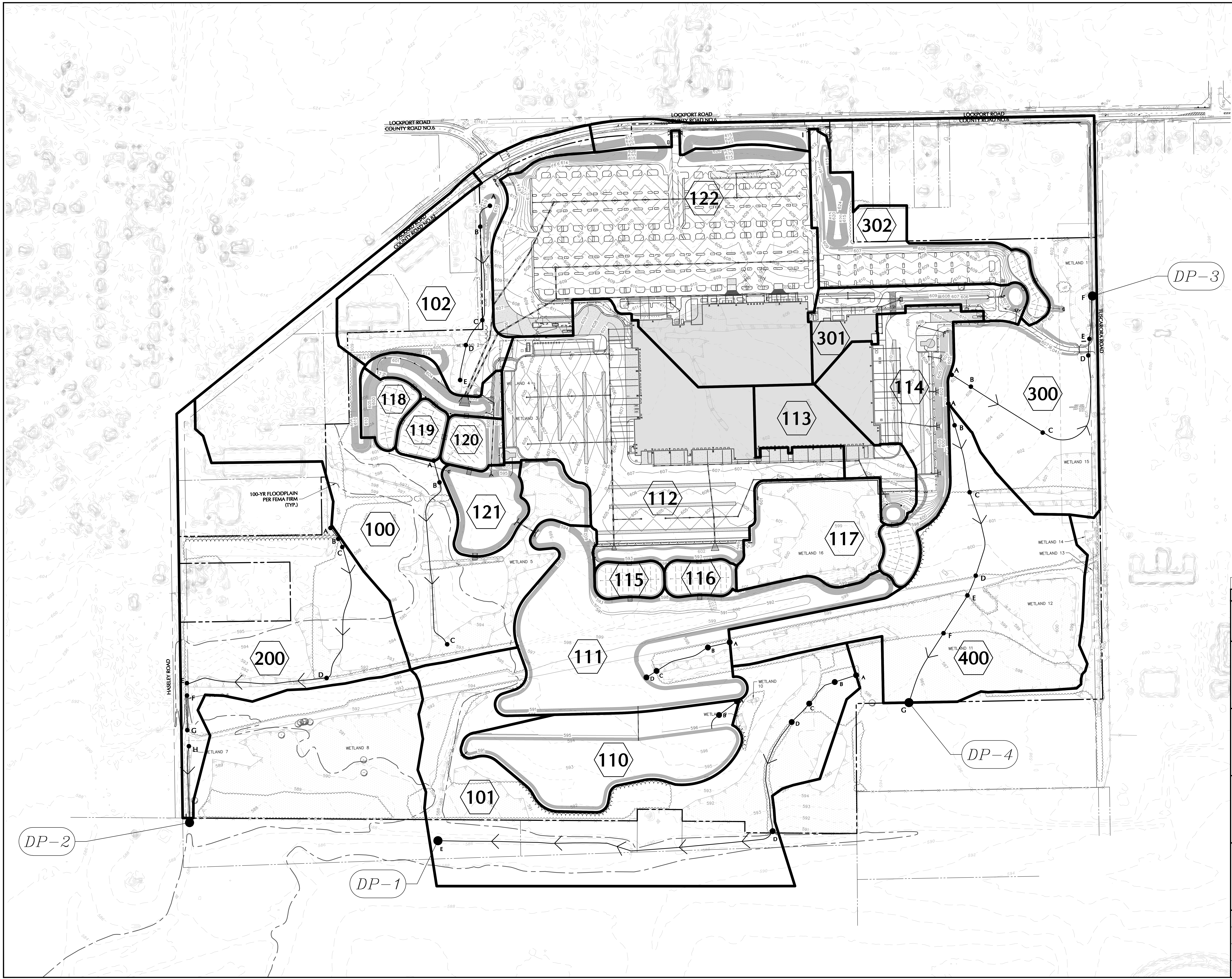
Project Reports

1-yr Event

10-yr Event

100-yr Event

Appendix F: Post-Development Stormwater Analysis



Date	Description	No.

Revisions

150 0 75 150
SCALE IN FEET

WARNING
IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

Signature Date
MICHAEL FINAN, PE, LEED–AP
PROFESSIONAL ENGINEER NY Lic. No. 081473

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Project

PROJECT FIFI

TAX ID. 132.18-1-2, 146.05-1-9, 146.06-1-1, & 146.06-1-2
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

POST DEVELOPMENT WATERSHED MAP

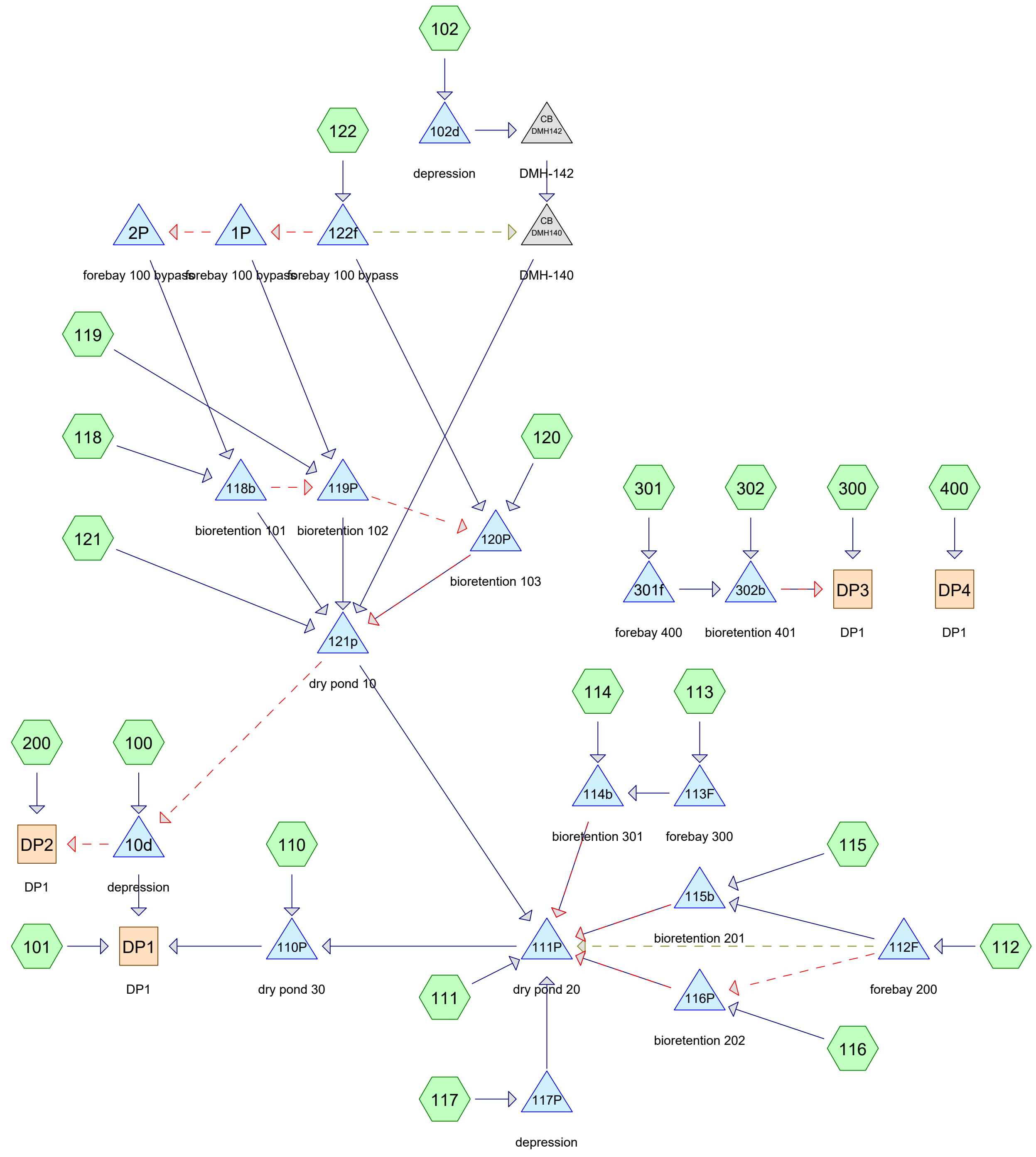
Project No.
190071801
Date
FEBRUARY 15, 2022
Drawn By
LM
Checked By
CZ/MF

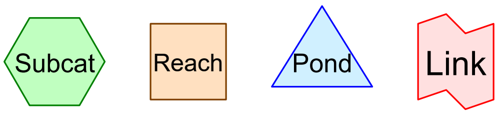
Drawing No.
FG06
Sheet 1 of 1

Project No. 190071801

LANGAN

Filename: C:\bms\langan-pw-01\dms95167\190071801-0201-CG101-0102.dwg Date: 2/11/2022 Time: 19:14 User: lmcmahon Style Table: Langan.stb Layout: FG05





Routing Diagram for 2022-02-15 Proposed Conditions
Prepared by Langan Eng & Env Srvcs, Inc, Printed 2/11/2022
HydroCAD® 10.10-6a s/n 11011 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	1.77	2
2	10-yr	Type II 24-hr		Default	24.00	1	2.96	2
3	100-yr	Type II 24-hr		Default	24.00	1	4.78	2

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment100: Runoff Area=24.040 ac 21.88% Impervious Runoff Depth=0.54"
Flow Length=870' Tc=41.8 min CN=83 Runoff=8.22 cfs 1.088 af

Subcatchment101: Runoff Area=26.590 ac 6.54% Impervious Runoff Depth=0.50"
Flow Length=2,403' Tc=81.0 min CN=82 Runoff=5.01 cfs 1.113 af

Subcatchment102: Runoff Area=11.170 ac 37.42% Impervious Runoff Depth=0.78"
Flow Length=810' Tc=25.1 min CN=88 Runoff=8.41 cfs 0.729 af

Subcatchment110: Runoff Area=8.800 ac 0.00% Impervious Runoff Depth=0.54"
Flow Length=175' Tc=31.0 min CN=83 Runoff=3.72 cfs 0.398 af

Subcatchment111: Runoff Area=15.540 ac 2.25% Impervious Runoff Depth=0.39"
Flow Length=405' Tc=69.9 min CN=79 Runoff=2.36 cfs 0.510 af

Subcatchment112: Runoff Area=22.280 ac 93.27% Impervious Runoff Depth=1.45"
Tc=6.0 min CN=97 Runoff=52.60 cfs 2.685 af

Subcatchment113: Runoff Area=4.290 ac 88.58% Impervious Runoff Depth=1.35"
Tc=6.0 min CN=96 Runoff=9.70 cfs 0.484 af

Subcatchment114: Runoff Area=8.730 ac 58.42% Impervious Runoff Depth=1.03"
Tc=6.0 min CN=92 Runoff=15.92 cfs 0.752 af

Subcatchment115: Runoff Area=1.080 ac 0.00% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=84 Runoff=1.12 cfs 0.053 af

Subcatchment116: Runoff Area=1.100 ac 0.00% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=84 Runoff=1.14 cfs 0.054 af

Subcatchment117: Runoff Area=6.250 ac 0.00% Impervious Runoff Depth=0.36"
Tc=6.0 min CN=78 Runoff=3.72 cfs 0.188 af

Subcatchment118: Runoff Area=1.450 ac 0.00% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=84 Runoff=1.51 cfs 0.071 af

Subcatchment119: Runoff Area=1.070 ac 0.00% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=84 Runoff=1.11 cfs 0.052 af

Subcatchment120: Runoff Area=1.360 ac 2.21% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=84 Runoff=1.42 cfs 0.066 af

Subcatchment121: Runoff Area=2.700 ac 0.00% Impervious Runoff Depth=0.59"
Tc=6.0 min CN=84 Runoff=2.81 cfs 0.132 af

Subcatchment122: Runoff Area=30.720 ac 75.42% Impervious Runoff Depth=1.26"
Tc=6.0 min CN=95 Runoff=66.22 cfs 3.238 af

```
Subcatchment200:                          Runoff Area=21.200 ac   20.19% Impervious   Runoff Depth=0.54"
                                      Flow Length=1,930'   Tc=118.0 min   CN=83   Runoff=3.35 cfs  0.959 af

Subcatchment300:                          Runoff Area=29.510 ac   12.27% Impervious   Runoff Depth=0.54"
                                       Flow Length=1,170'   Tc=56.0 min   CN=83   Runoff=8.15 cfs  1.335 af

Subcatchment301:                           Runoff Area=3.840 ac   67.97% Impervious   Runoff Depth=1.18"
                                                          Tc=6.0 min   CN=94   Runoff=7.85 cfs  0.378 af

Subcatchment302:                           Runoff Area=6.990 ac   37.48% Impervious   Runoff Depth=0.84"
                                                         Tc=6.0 min   CN=89   Runoff=10.52 cfs  0.490 af

Subcatchment400:                           Runoff Area=19.850 ac   5.84% Impervious   Runoff Depth=0.43"
                                       Flow Length=1,438'   Tc=66.6 min   CN=80   Runoff=3.52 cfs  0.708 af

Reach DP1: DP1                                                                   Inflow=5.42 cfs  1.873 af
                                                                                Outflow=5.42 cfs  1.873 af

Reach DP2: DP1                                                                   Inflow=7.74 cfs  1.709 af
                                                                                Outflow=7.74 cfs  1.709 af

Reach DP3: DP1                                                                  Inflow=10.70 cfs  2.183 af
                                                                               Outflow=10.70 cfs  2.183 af

Reach DP4: DP1                                                                   Inflow=3.52 cfs  0.708 af
                                                                                Outflow=3.52 cfs  0.708 af

Pond 1P: forebay 100 bypass               Peak Elev=597.10'  Storage=7,186 cf   Inflow=40.64 cfs  1.843 af
                        Primary=18.87 cfs  0.989 af   Secondary=19.99 cfs  0.854 af   Outflow=37.80 cfs  1.843 af

Pond 2P: forebay 100 bypass               Peak Elev=597.09'  Storage=7,078 cf   Inflow=19.99 cfs  0.854 af
                                                                               Outflow=18.15 cfs  0.854 af

Pond 10d: depression                       Peak Elev=593.34'  Storage=6,871 cf   Inflow=8.22 cfs  1.088 af
                           Primary=0.43 cfs  0.338 af   Secondary=6.40 cfs  0.750 af   Outflow=6.83 cfs  1.087 af

Pond 102d: depression                        Peak Elev=598.35'  Storage=284 cf   Inflow=8.41 cfs  0.729 af
                              30.0"  Round Culvert  n=0.012  L=72.0'  S=0.0290 '/'   Outflow=8.39 cfs  0.729 af

Pond 110P: dry pond 30                    Peak Elev=591.28'  Storage=61,656 cf   Inflow=3.73 cfs  1.837 af
                                                                                Outflow=0.37 cfs  0.422 af

Pond 111P: dry pond 20                  Peak Elev=591.70'  Storage=255,567 cf   Inflow=11.72 cfs  7.306 af
                             15.0"  Round Culvert  n=0.012  L=154.0'  S=0.0000 '/'   Outflow=0.74 cfs  1.439 af

Pond 112F: forebay 200                  Peak Elev=597.07'  Storage=129,604 cf   Inflow=52.60 cfs  2.685 af
Primary=17.07 cfs  1.256 af   Secondary=17.07 cfs  1.255 af   Tertiary=8.22 cfs  0.174 af   Outflow=42.37 cfs  2.685 af

Pond 113F: forebay 300                    Peak Elev=597.88'  Storage=18,938 cf   Inflow=9.70 cfs  0.484 af
                                                                                Outflow=8.74 cfs  0.484 af
```

Pond 114b: bioretention 301 Peak Elev=597.74' Storage=25,283 cf Inflow=24.33 cfs 1.235 af
Primary=0.20 cfs 0.604 af Secondary=4.00 cfs 0.597 af Outflow=4.20 cfs 1.201 af

Pond 115b: bioretention 201 Peak Elev=596.69' Storage=26,550 cf Inflow=18.06 cfs 1.309 af
Primary=0.23 cfs 0.704 af Secondary=2.75 cfs 0.562 af Outflow=2.98 cfs 1.266 af

Pond 116P: bioretention 202 Peak Elev=596.69' Storage=26,558 cf Inflow=18.08 cfs 1.309 af
Primary=0.23 cfs 0.704 af Secondary=2.76 cfs 0.562 af Outflow=2.99 cfs 1.266 af

Pond 117P: depression Peak Elev=599.26' Storage=8,194 cf Inflow=3.72 cfs 0.188 af
Outflow=0.00 cfs 0.000 af

Pond 118b: bioretention 101 Peak Elev=596.72' Storage=26,282 cf Inflow=19.62 cfs 0.925 af
Primary=0.22 cfs 0.654 af Secondary=0.76 cfs 0.225 af Outflow=0.98 cfs 0.879 af

Pond 119P: bioretention 102 Peak Elev=596.72' Storage=27,787 cf Inflow=19.92 cfs 1.266 af
Primary=0.23 cfs 0.692 af Secondary=1.42 cfs 0.525 af Outflow=1.65 cfs 1.218 af

Pond 120P: bioretention 103 Peak Elev=596.71' Storage=26,414 cf Inflow=23.06 cfs 1.965 af
Primary=0.22 cfs 0.671 af Secondary=3.21 cfs 1.249 af Outflow=3.43 cfs 1.920 af

Pond 121p: dry pond 10 Peak Elev=591.82' Storage=62,888 cf Inflow=12.64 cfs 4.148 af
Primary=2.15 cfs 2.889 af Secondary=0.00 cfs 0.000 af Outflow=2.15 cfs 2.889 af

Pond 122f: forebay 100 bypass Peak Elev=597.15' Storage=7,601 cf Inflow=66.22 cfs 3.238 af
Primary=21.69 cfs 1.373 af Secondary=40.64 cfs 1.843 af Tertiary=2.55 cfs 0.022 af Outflow=63.71 cfs 3.238 af

Pond 301f: forebay 400 Peak Elev=605.33' Storage=24,285 cf Inflow=7.85 cfs 0.378 af
Outflow=6.49 cfs 0.378 af

Pond 302b: bioretention 401 Peak Elev=605.23' Storage=15,041 cf Inflow=16.69 cfs 0.868 af
Primary=4.84 cfs 0.848 af Secondary=0.00 cfs 0.000 af Outflow=4.84 cfs 0.848 af

Pond DMH140: DMH-140 Peak Elev=593.99' Inflow=8.39 cfs 0.751 af
36.0" Round Culvert n=0.012 L=265.0' S=0.0050 '/' Outflow=8.39 cfs 0.751 af

Pond DMH142: DMH-142 Peak Elev=596.09' Inflow=8.39 cfs 0.729 af
30.0" Round Culvert n=0.012 L=54.0' S=0.0291 '/' Outflow=8.39 cfs 0.729 af

Total Runoff Area = 248.560 ac Runoff Volume = 15.482 af Average Runoff Depth = 0.75"
68.34% Pervious = 169.860 ac 31.66% Impervious = 78.700 ac

Summary for Subcatchment 100:

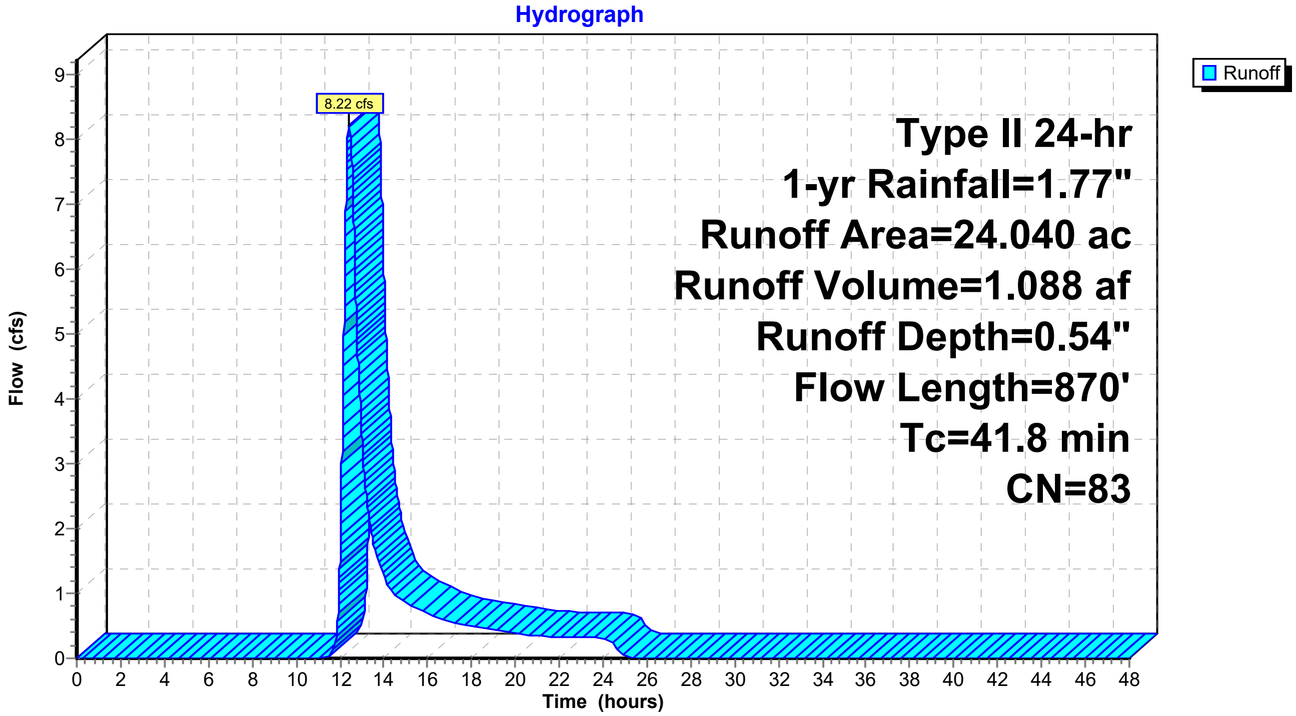
Runoff = 8.22 cfs @ 12.41 hrs, Volume= 1.088 af, Depth= 0.54"
Routed to Pond 10d : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	1.200	79	Woods, Fair, HSG D
	14.030	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	2.670	79	Woods, Fair, HSG D Offsite
*	0.870	84	50-75% Grass cover, Fair, HSG D Offsite
*	5.260	98	Impervious Offsite
*	0.010	91	Gravel roads, HSG D Offsite
	24.040	83	Weighted Average
	18.780		78.12% Pervious Area
	5.260		21.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	100	0.0100	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
25.9	770	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
41.8	870	Total			

Subcatchment 100:



Summary for Subcatchment 101:

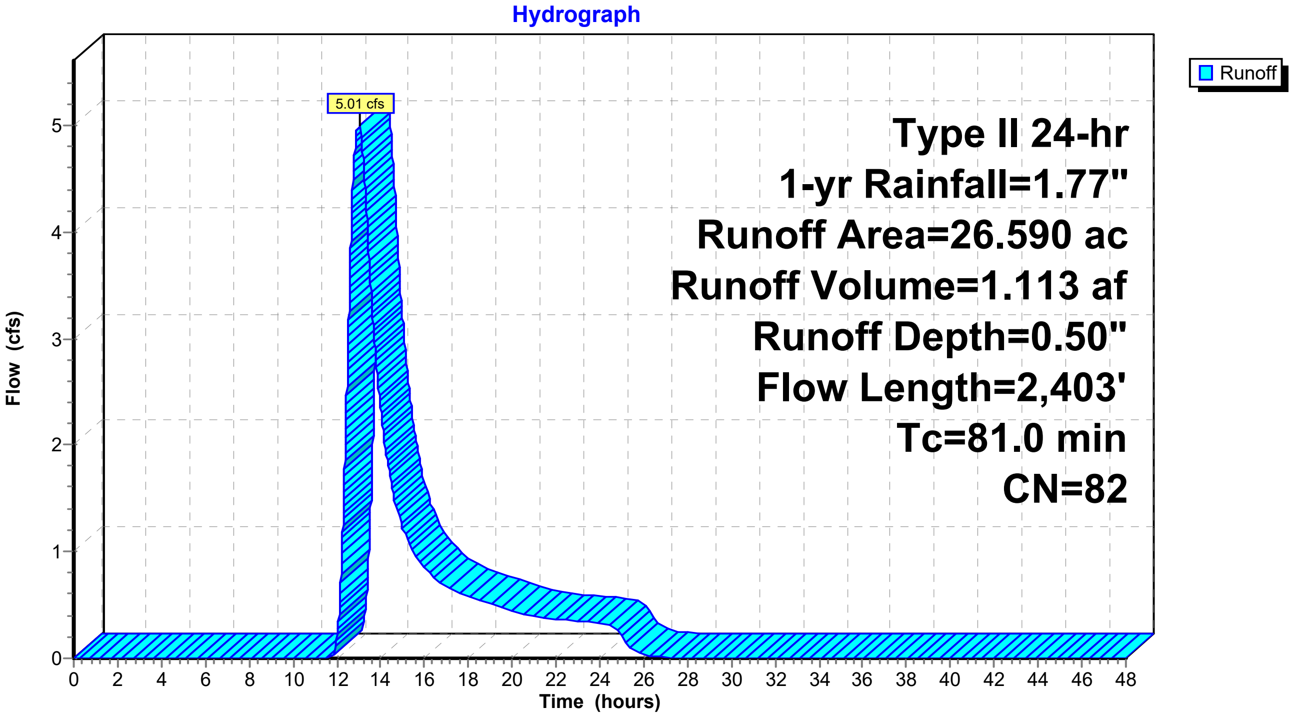
Runoff = 5.01 cfs @ 13.04 hrs, Volume= 1.113 af, Depth= 0.50"
Routed to Reach DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	5.590	79	Woods, Fair, HSG D
	9.870	78	Meadow, non-grazed, HSG D
*	0.480	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	9.390	84	50-75% Grass cover, Fair, HSG D Offsite
*	1.260	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	26.590	82	Weighted Average
	24.850		93.46% Pervious Area
	1.740		6.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
66.6	100	0.0079	0.03		**Sheet Flow, A-B** Woods: Dense underbrush n= 0.800 P2= 2.12"
4.4	160	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.0	113	0.0010	0.47		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
1.2	520	0.0070	6.99	136.26	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.025 Earth, clean & winding
4.8	1,510	0.0030	5.20	101.36	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
81.0	2,403	Total			

Subcatchment 101:



Summary for Subcatchment 102:

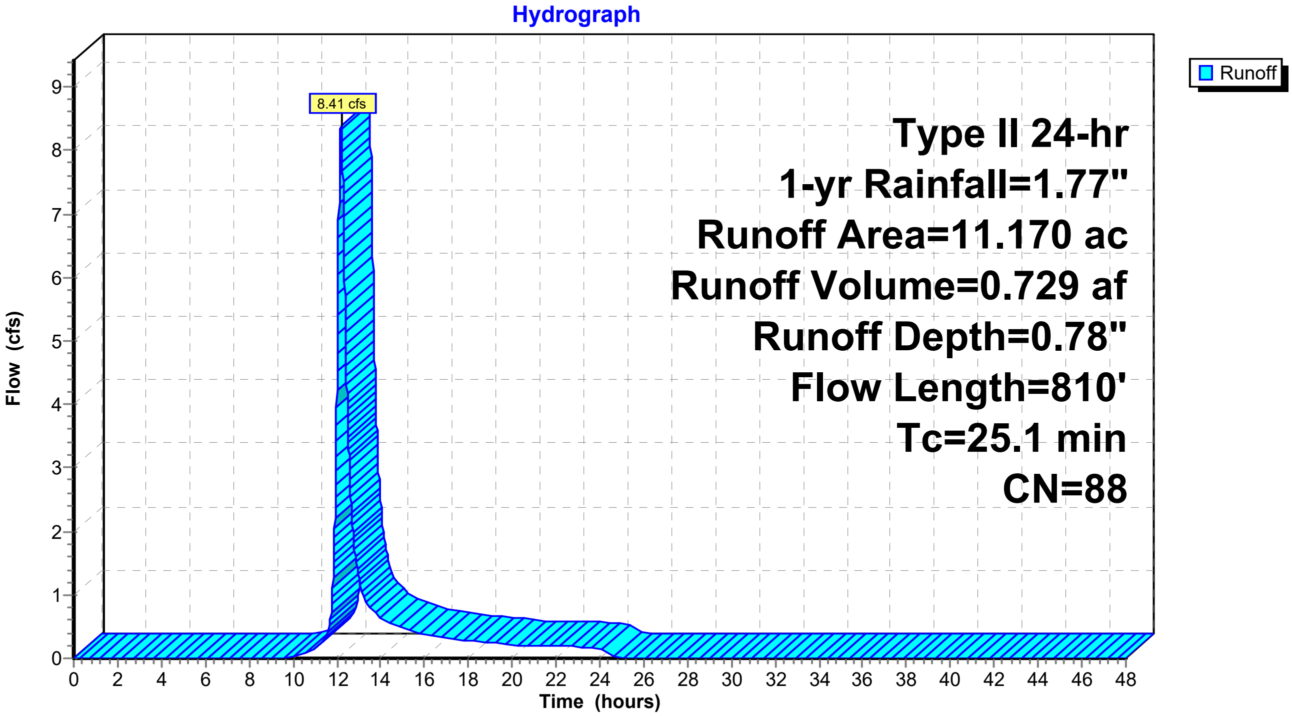
Runoff = 8.41 cfs @ 12.19 hrs, Volume= 0.729 af, Depth= 0.78"
Routed to Pond 102d : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	1.010	79	Woods, Fair, HSG D
	0.880	78	Meadow, non-grazed, HSG D
	2.320	84	50-75% Grass cover, Fair, HSG D
*	0.040	98	Impervious
	0.030	91	Gravel roads, HSG D
*	0.620	79	Woods, Fair, HSG D Offsite
*	2.130	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.140	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	11.170	88	Weighted Average
	6.990		62.58% Pervious Area
	4.180		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0700	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
9.1	420	0.0120	0.77		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	130	0.0250	1.11		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.4	160	0.0125	0.78		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
25.1	810	Total			

Subcatchment 102:



Summary for Subcatchment 110:

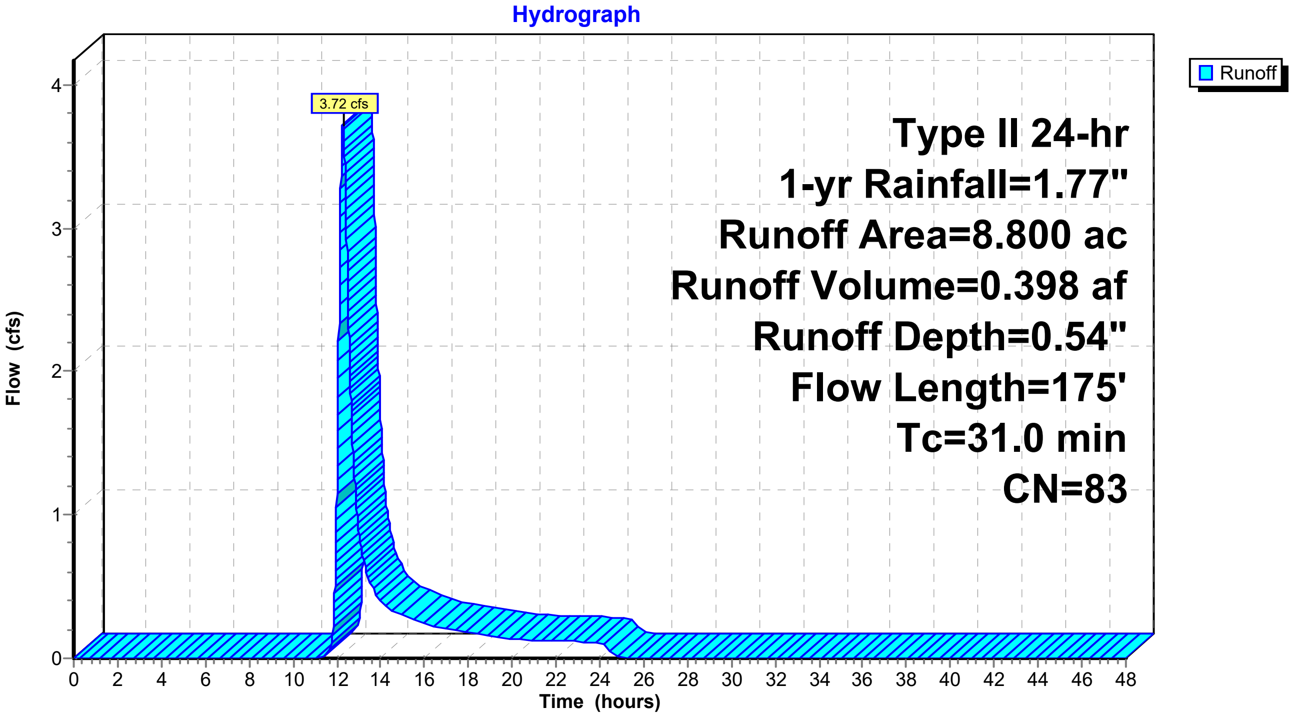
Runoff = 3.72 cfs @ 12.29 hrs, Volume= 0.398 af, Depth= 0.54"
Routed to Pond 110P : dry pond 30

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.950	78	Meadow, non-grazed, HSG D
	6.850	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	8.800	83	Weighted Average
	8.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.7	100	0.0021	0.06		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
1.3	75	0.0180	0.94		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
31.0	175	Total			

Subcatchment 110:



Summary for Subcatchment 111:

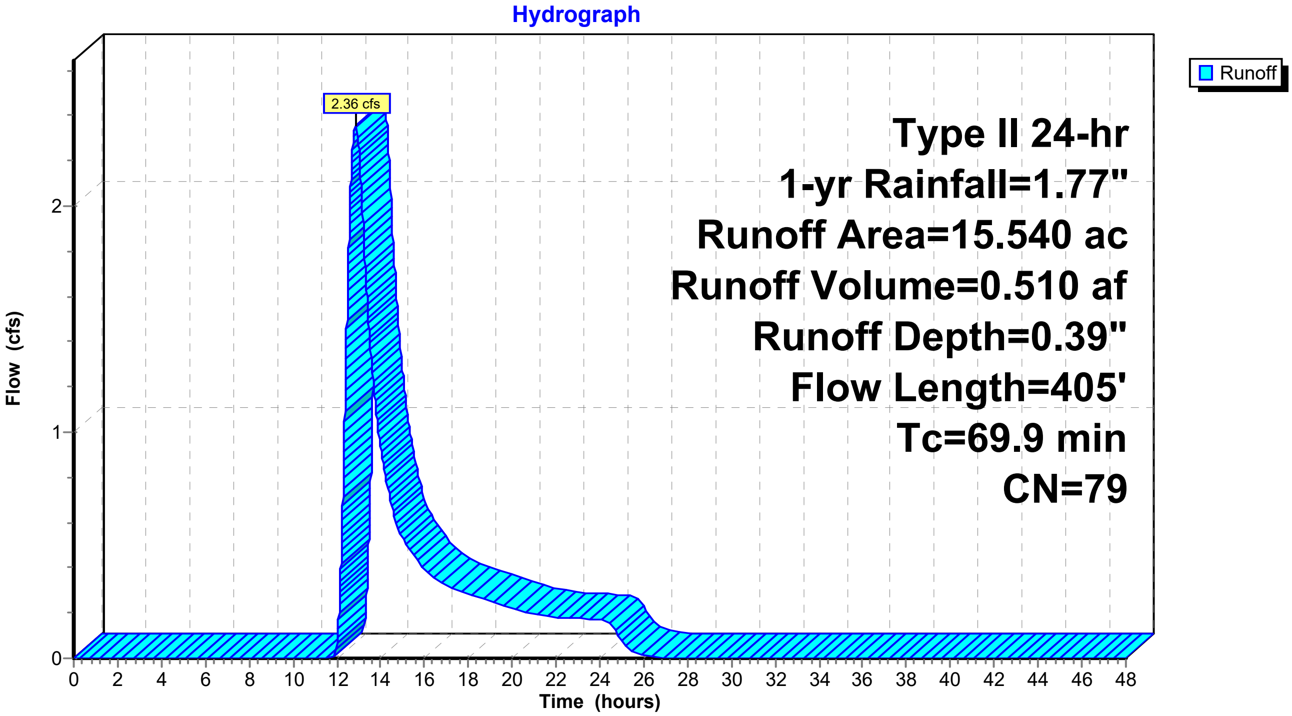
Runoff = 2.36 cfs @ 12.82 hrs, Volume= 0.510 af, Depth= 0.39"
Routed to Pond 111P : dry pond 20

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	1.040	79	Woods, Fair, HSG D
	14.150	78	Meadow, non-grazed, HSG D
*	0.350	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	15.540	79	Weighted Average
	15.190		97.75% Pervious Area
	0.350		2.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.8	100	0.0027	0.03		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
9.5	255	0.0080	0.45		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.6	50	0.0054	0.51		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
69.9	405	Total			

Subcatchment 111:



Summary for Subcatchment 112:

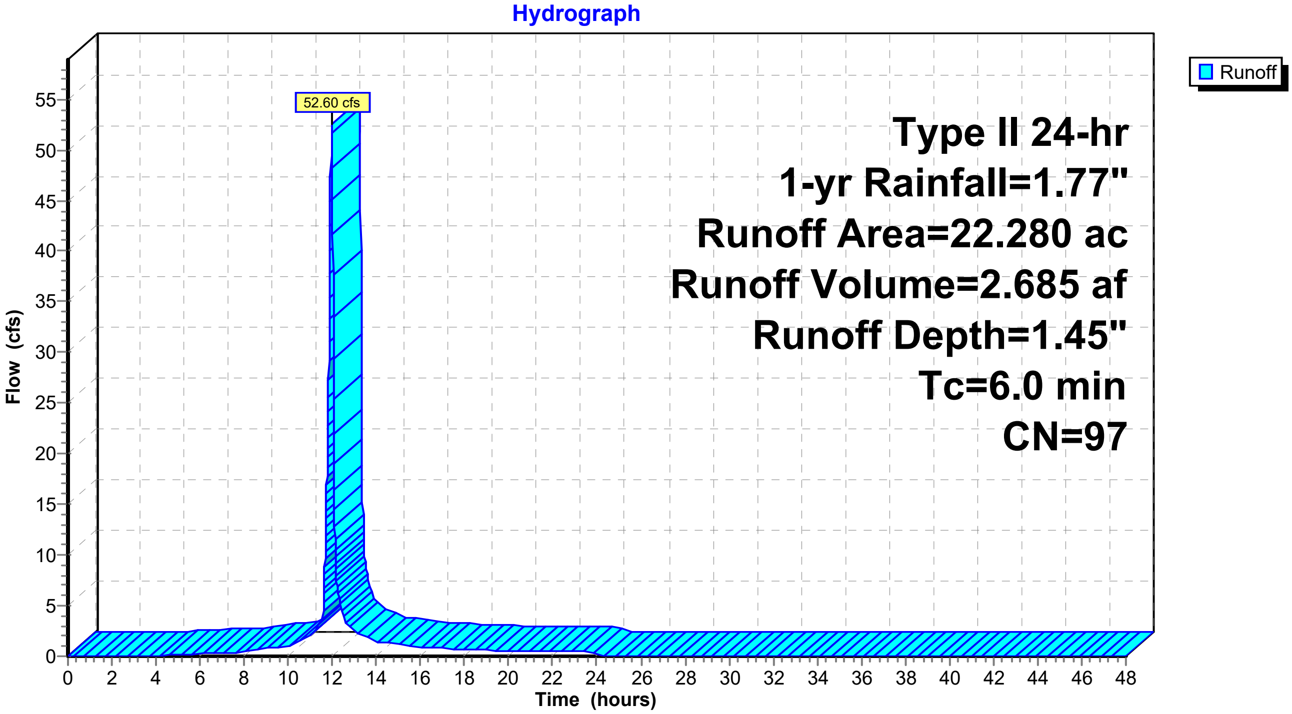
Runoff = 52.60 cfs @ 11.97 hrs, Volume= 2.685 af, Depth= 1.45"
Routed to Pond 112F : forebay 200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.480	84	50-75% Grass cover, Fair, HSG D
*	19.970	98	Impervious
*	0.810	98	Forebay WSE
	0.020	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	22.280	97	Weighted Average
	1.500		6.73% Pervious Area
	20.780		93.27% Impervious Area

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

Subcatchment 112:



Summary for Subcatchment 113:

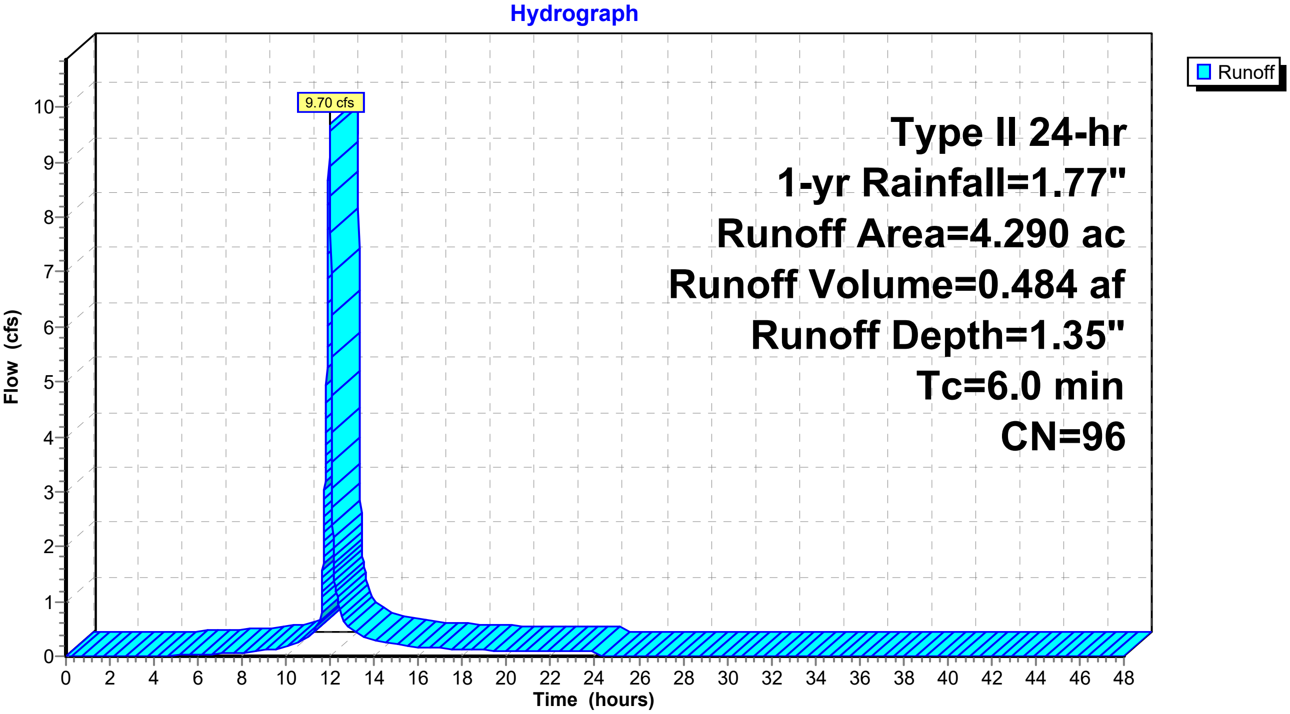
Runoff = 9.70 cfs @ 11.97 hrs, Volume= 0.484 af, Depth= 1.35"
Routed to Pond 113F : forebay 300

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	0.490	84	50-75% Grass cover, Fair, HSG D
*	3.680	98	Impervious
*	0.120	98	Forebay WSE
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	4.290	96	Weighted Average
	0.490		11.42% Pervious Area
	3.800		88.58% Impervious Area

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

Subcatchment 113:



Summary for Subcatchment 114:

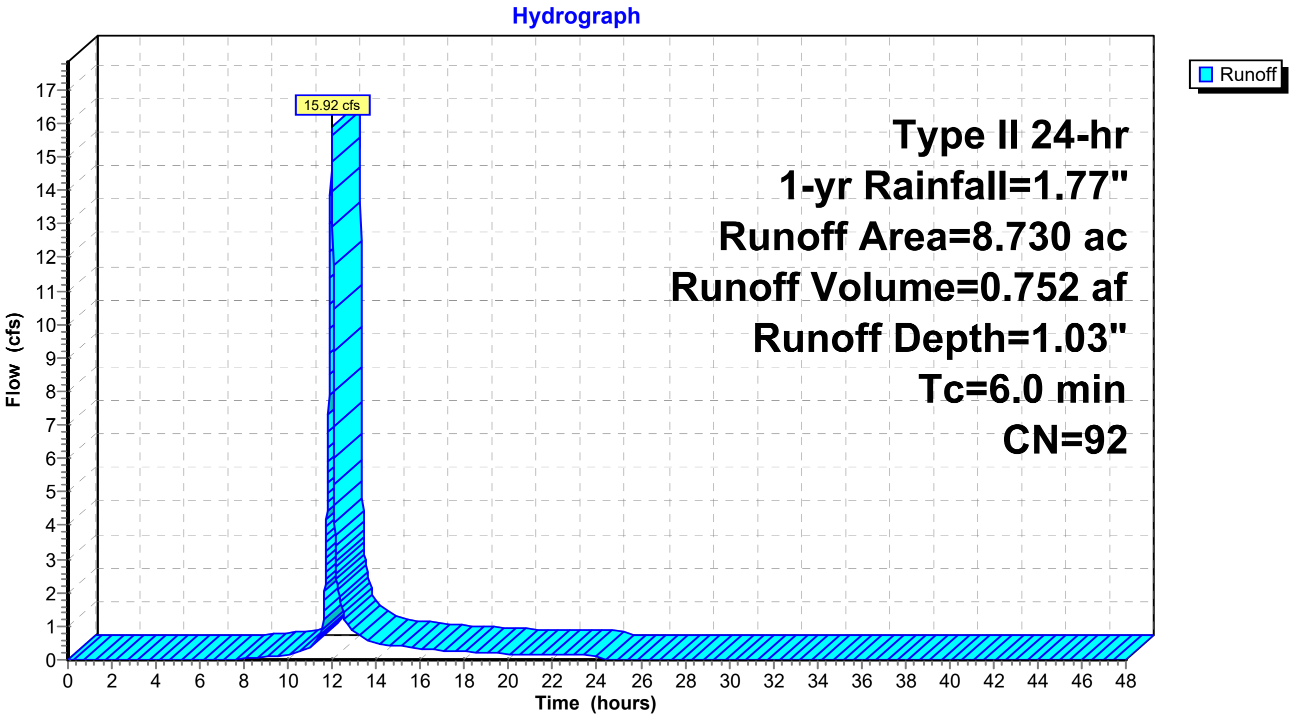
Runoff = 15.92 cfs @ 11.97 hrs, Volume= 0.752 af, Depth= 1.03"
Routed to Pond 114b : bioretention 301

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	3.560	84	50-75% Grass cover, Fair, HSG D
*	5.100	98	Impervious
	0.070	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	8.730	92	Weighted Average
	3.630		41.58% Pervious Area
	5.100		58.42% Impervious Area

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

Subcatchment 114:



Summary for Subcatchment 115:

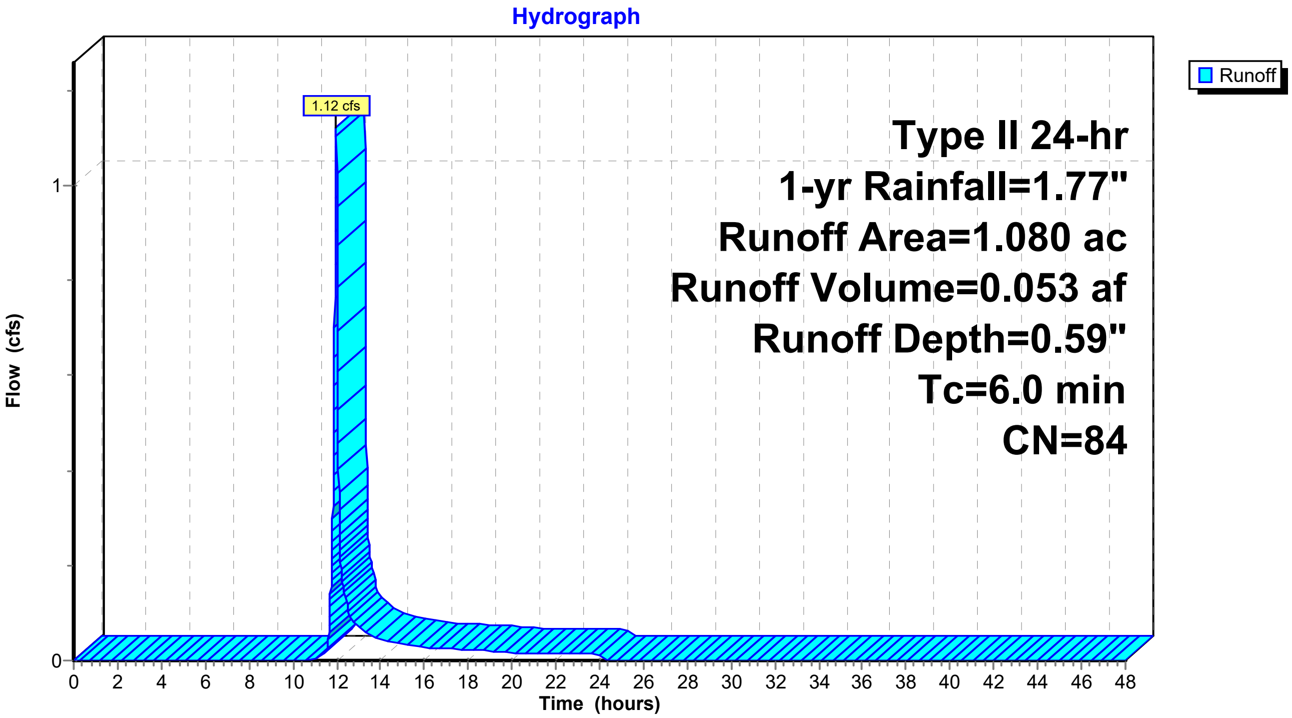
Runoff = 1.12 cfs @ 11.98 hrs, Volume= 0.053 af, Depth= 0.59"
Routed to Pond 115b : bioretention 201

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.080	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.080	84	Weighted Average
	1.080		100.00% Pervious Area

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

Subcatchment 115:



Summary for Subcatchment 116:

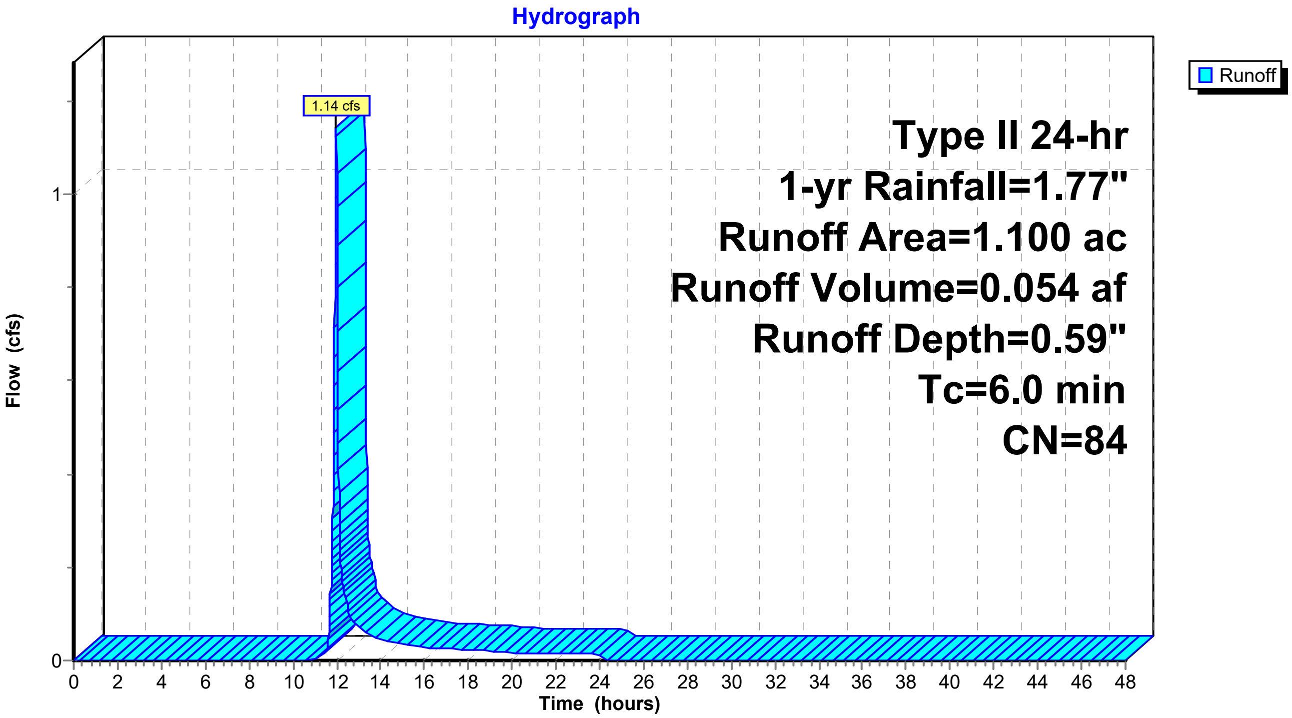
Runoff = 1.14 cfs @ 11.98 hrs, Volume= 0.054 af, Depth= 0.59"
Routed to Pond 116P : bioretention 202

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.100	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.100	84	Weighted Average
	1.100		100.00% Pervious Area

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

Subcatchment 116:



Summary for Subcatchment 117:

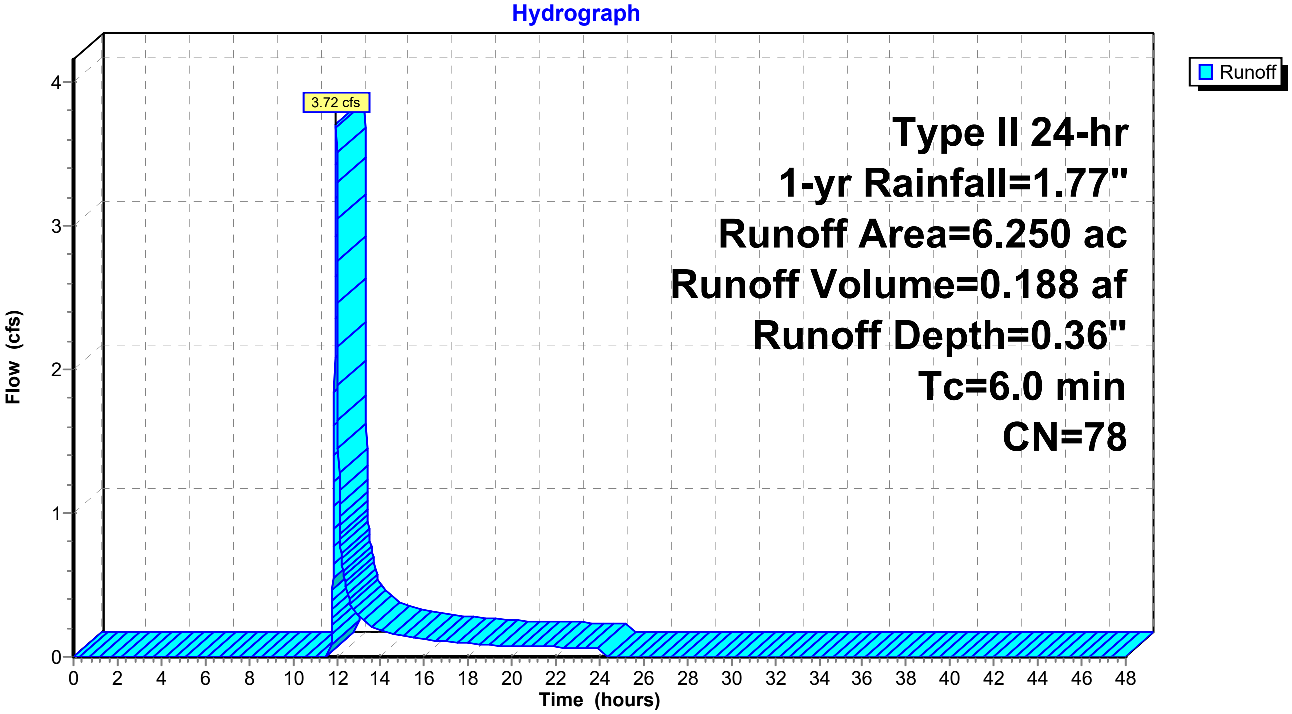
Runoff = 3.72 cfs @ 11.99 hrs, Volume= 0.188 af, Depth= 0.36"
Routed to Pond 117P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	6.250	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	6.250	78	Weighted Average
	6.250		100.00% Pervious Area

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

Subcatchment 117:



Summary for Subcatchment 118:

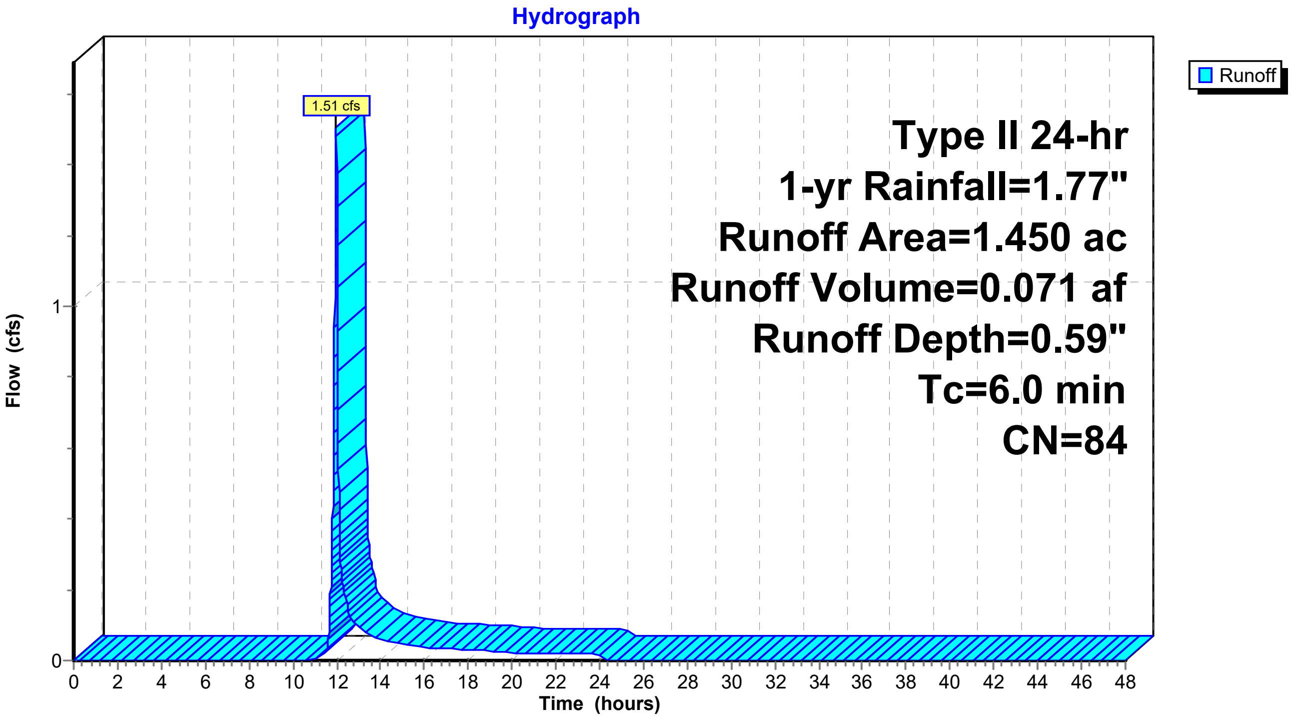
Runoff = 1.51 cfs @ 11.98 hrs, Volume= 0.071 af, Depth= 0.59"
Routed to Pond 118b : bioretention 101

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.450	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.450	84	Weighted Average
	1.450		100.00% Pervious Area

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

Subcatchment 118:



Summary for Subcatchment 119:

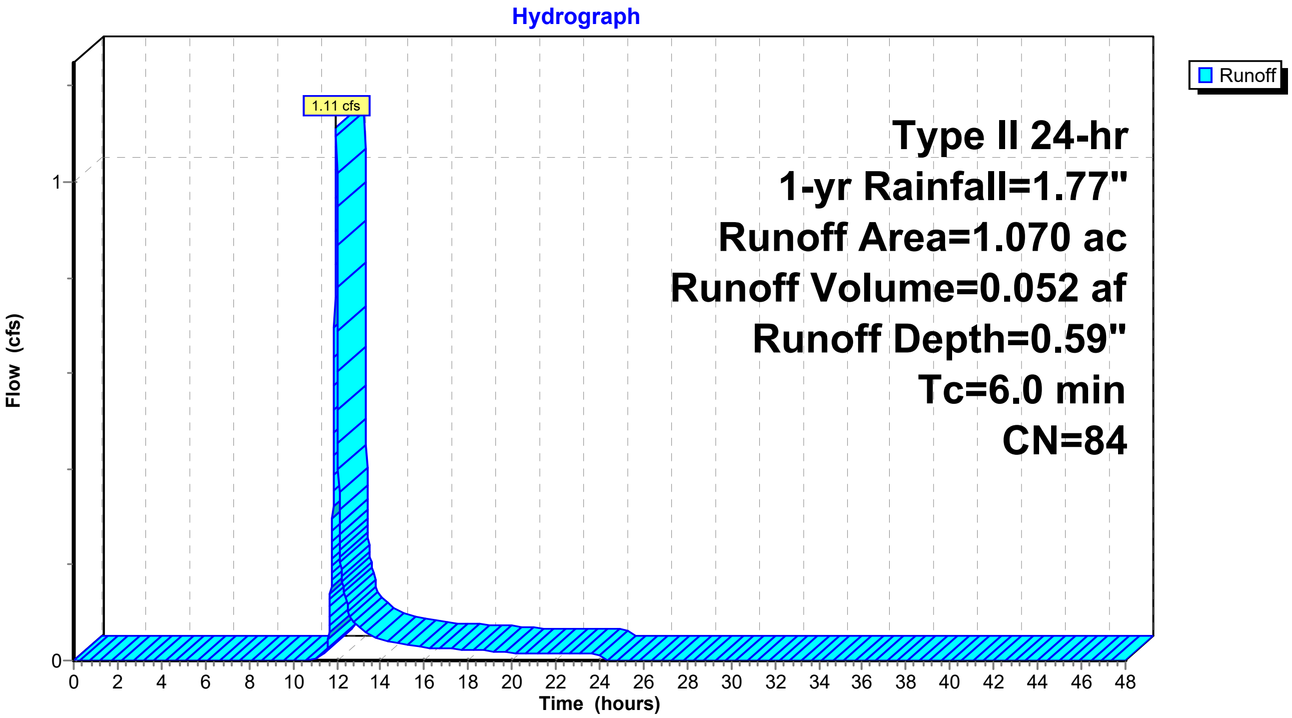
Runoff = 1.11 cfs @ 11.98 hrs, Volume= 0.052 af, Depth= 0.59"
Routed to Pond 119P : bioretention 102

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.070	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.070	84	Weighted Average
	1.070		100.00% Pervious Area

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

Subcatchment 119:



Summary for Subcatchment 120:

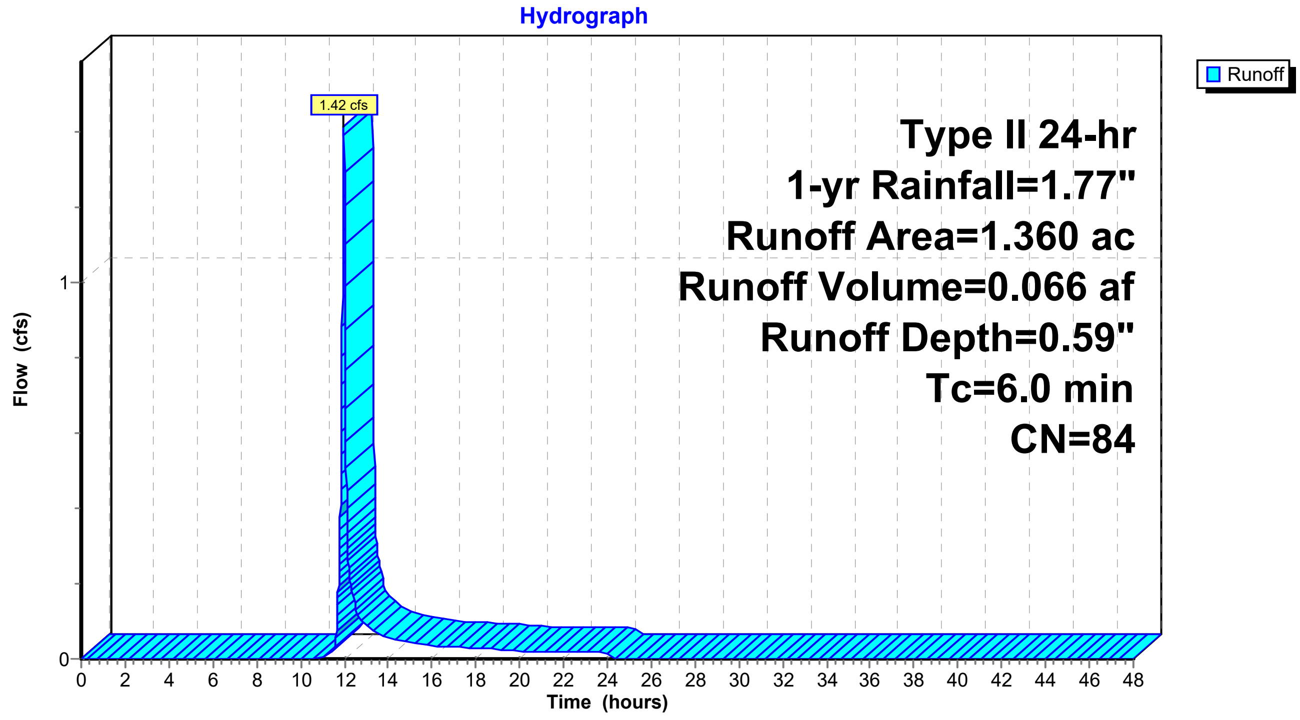
Runoff = 1.42 cfs @ 11.98 hrs, Volume= 0.066 af, Depth= 0.59"
Routed to Pond 120P : bioretention 103

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.330	84	50-75% Grass cover, Fair, HSG D
*	0.030	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.360	84	Weighted Average
	1.330		97.79% Pervious Area
	0.030		2.21% Impervious Area

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

Subcatchment 120:



Summary for Subcatchment 121:

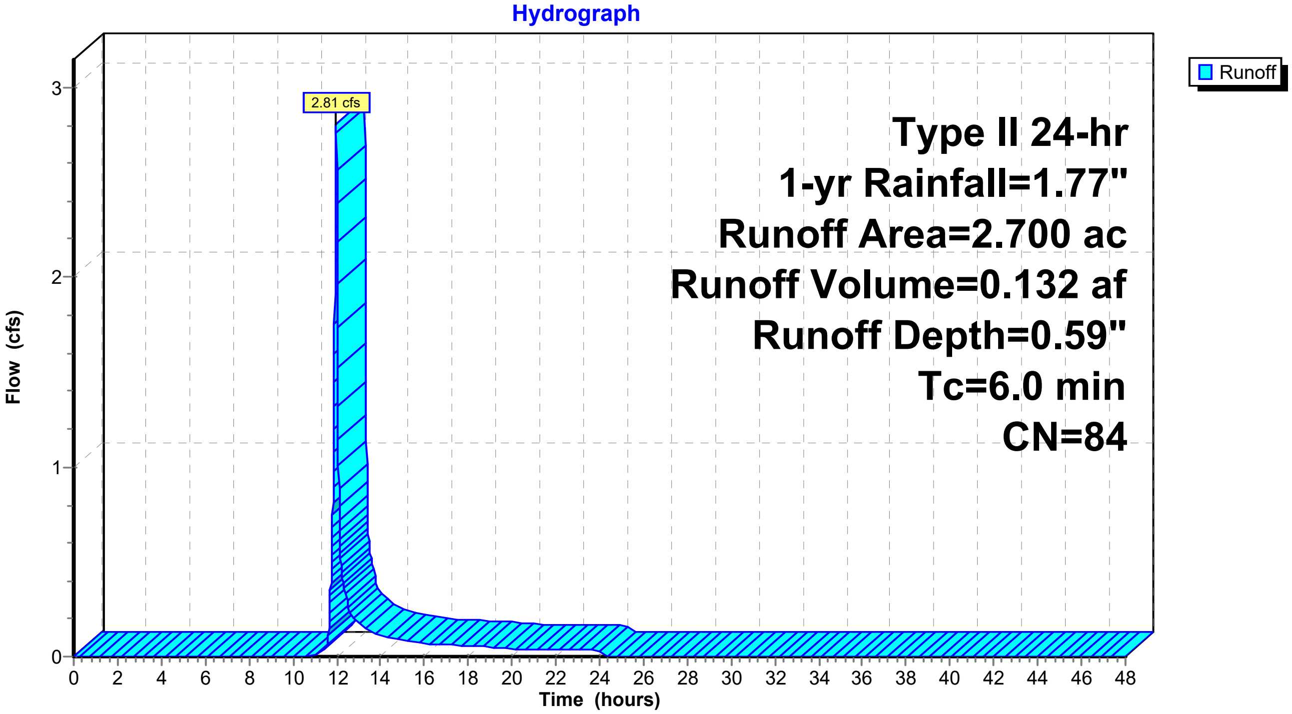
Runoff = 2.81 cfs @ 11.98 hrs, Volume= 0.132 af, Depth= 0.59"
Routed to Pond 121p : dry pond 10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	2.700	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	2.700	84	Weighted Average
	2.700		100.00% Pervious Area

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

Subcatchment 121:



Summary for Subcatchment 122:

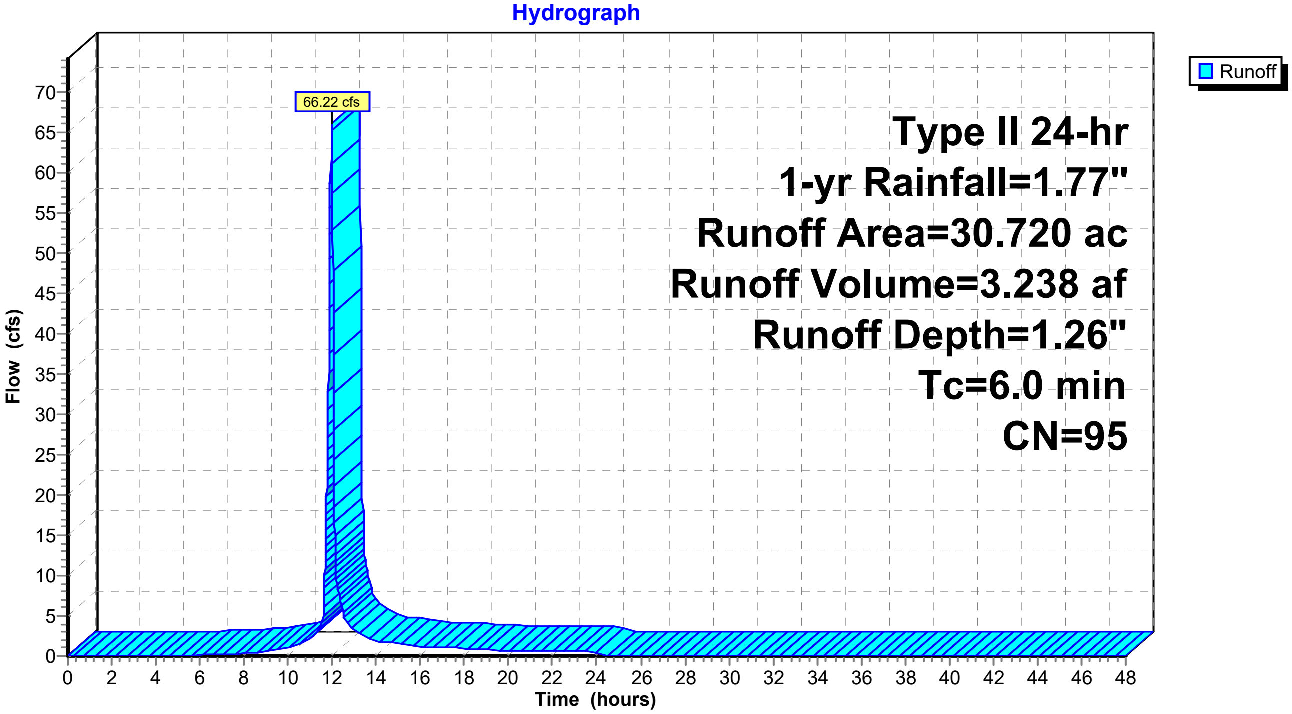
Runoff = 66.22 cfs @ 11.97 hrs, Volume= 3.238 af, Depth= 1.26"
Routed to Pond 122f : forebay 100 bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	7.510	84	50-75% Grass cover, Fair, HSG D
*	22.580	98	Impervious
*	0.590	98	Forebay WSE
	0.040	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	30.720	95	Weighted Average
	7.550		24.58% Pervious Area
	23.170		75.42% Impervious Area

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

Subcatchment 122:



Summary for Subcatchment 200:

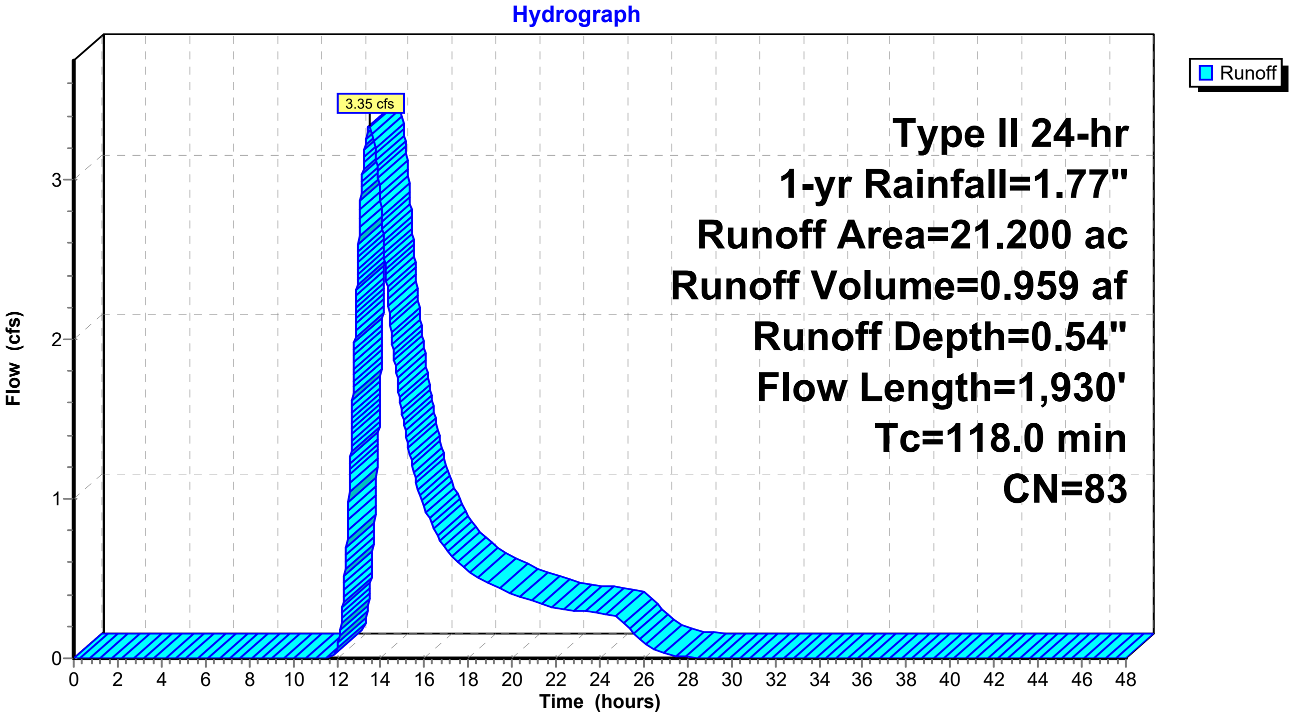
Runoff = 3.35 cfs @ 13.50 hrs, Volume= 0.959 af, Depth= 0.54"
Routed to Reach DP2 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	7.720	79	Woods, Fair, HSG D
	4.040	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.270	91	Gravel roads, HSG D
*	2.760	79	Woods, Fair, HSG D Offsite
*	2.100	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.280	98	Impervious Offsite
*	0.030	91	Gravel roads, HSG D Offsite
	21.200	83	Weighted Average
	16.920		79.81% Pervious Area
	4.280		20.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	60	0.0400	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
16.7	40	0.0100	0.04		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.12"
13.4	615	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
52.5	630	0.0016	0.20		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
0.2	40	0.0055	2.78	8.72	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
4.2	155	0.0077	0.61		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0030	2.05	6.44	**Pipe Channel, G-H** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
17.3	340	0.0022	0.33		**Shallow Concentrated Flow, H-I** Short Grass Pasture Kv= 7.0 fps
118.0	1,930	Total			

Subcatchment 200:



Summary for Subcatchment 300:

[47] Hint: Peak is 110% of capacity of segment #4

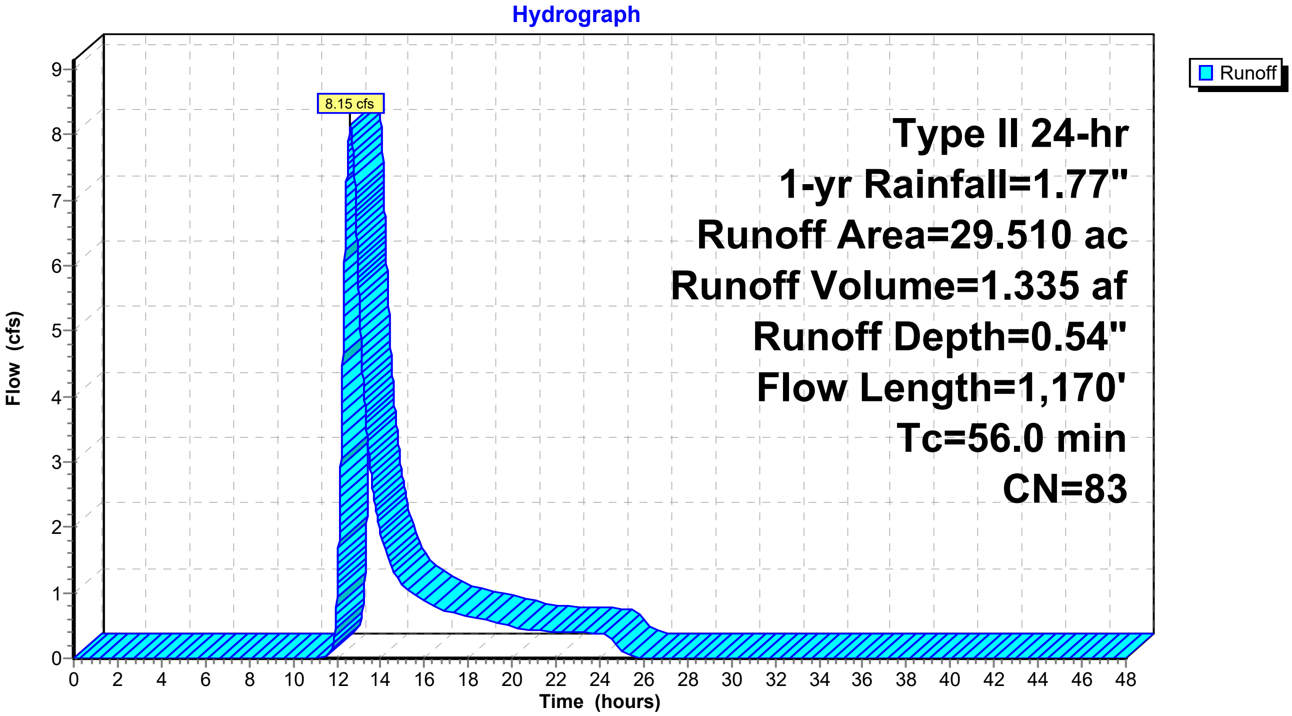
Runoff = 8.15 cfs @ 12.63 hrs, Volume= 1.335 af, Depth= 0.54"
Routed to Reach DP3 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.940	79	Woods, Fair, HSG D
	10.780	78	Meadow, non-grazed, HSG D
	2.970	84	50-75% Grass cover, Fair, HSG D
*	1.090	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.050	79	Woods, Fair, HSG D Offsite
*	11.150	84	50-75% Grass cover, Fair, HSG D Offsite
*	2.530	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	29.510	83	Weighted Average
	25.890		87.73% Pervious Area
	3.620		12.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	100	0.0120	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
8.8	370	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.1	440	0.0030	0.38		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0050	4.20	7.43	**Pipe Channel, D-E** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
6.5	230	0.0070	0.59		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
56.0	1,170	Total			

Subcatchment 300:



Summary for Subcatchment 301:

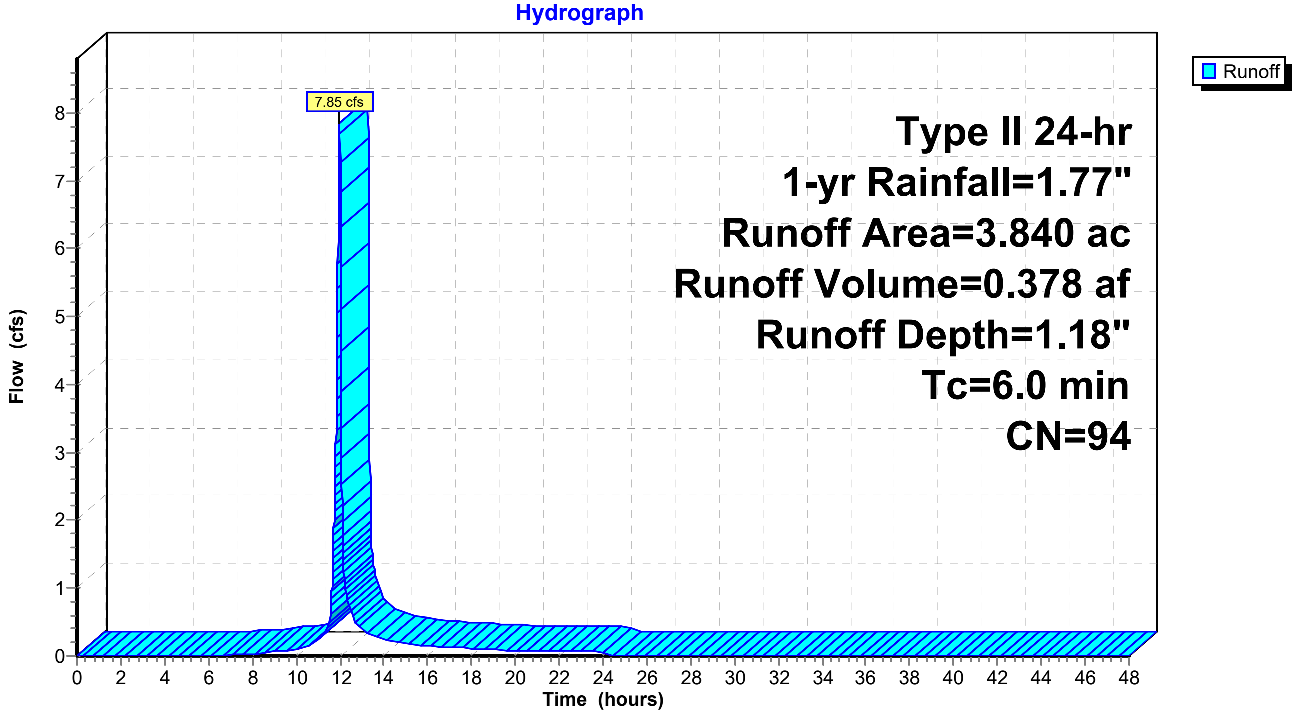
Runoff = 7.85 cfs @ 11.97 hrs, Volume= 0.378 af, Depth= 1.18"
Routed to Pond 301f : forebay 400

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.170	84	50-75% Grass cover, Fair, HSG D
*	2.460	98	Impervious
*	0.150	98	Forebay WSE
	0.060	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	3.840	94	Weighted Average
	1.230		32.03% Pervious Area
	2.610		67.97% Impervious Area

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

Subcatchment 301:



Summary for Subcatchment 302:

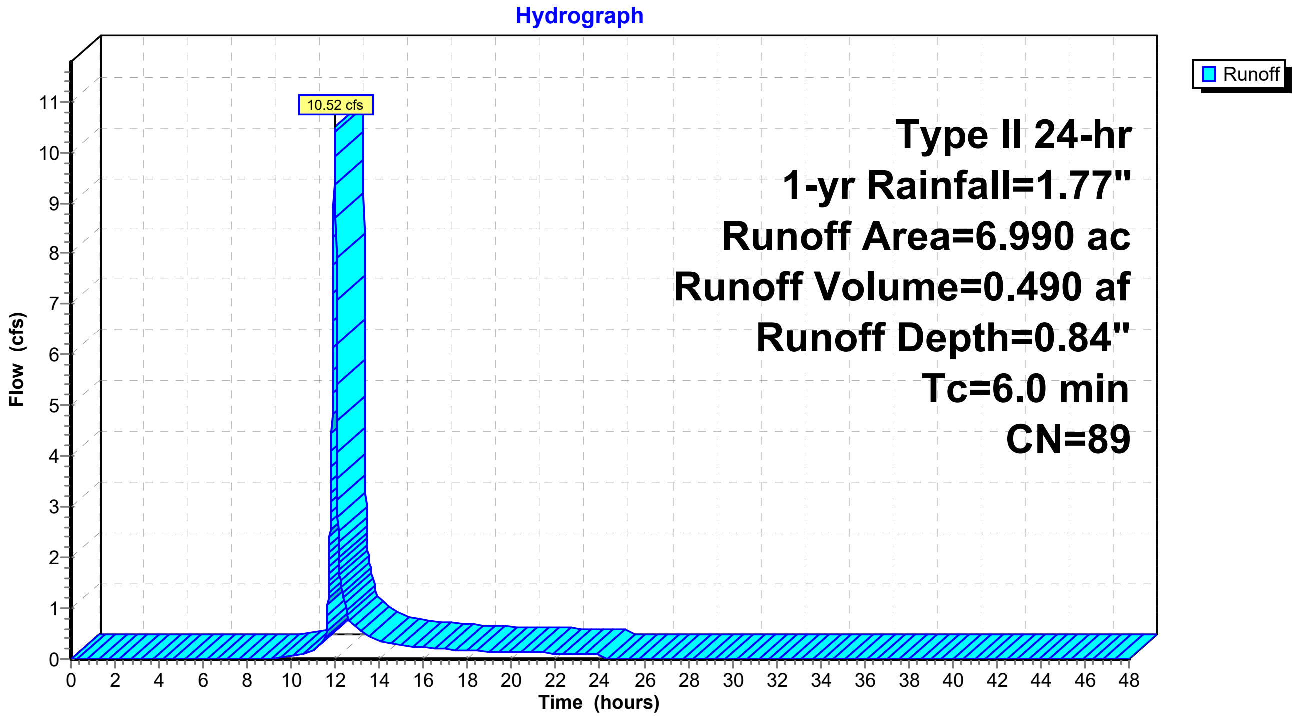
Runoff = 10.52 cfs @ 11.97 hrs, Volume= 0.490 af, Depth= 0.84"
Routed to Pond 302b : bioretention 401

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	4.370	84	50-75% Grass cover, Fair, HSG D
*	2.620	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	6.990	89	Weighted Average
	4.370		62.52% Pervious Area
	2.620		37.48% Impervious Area

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

Subcatchment 302:



Summary for Subcatchment 400:

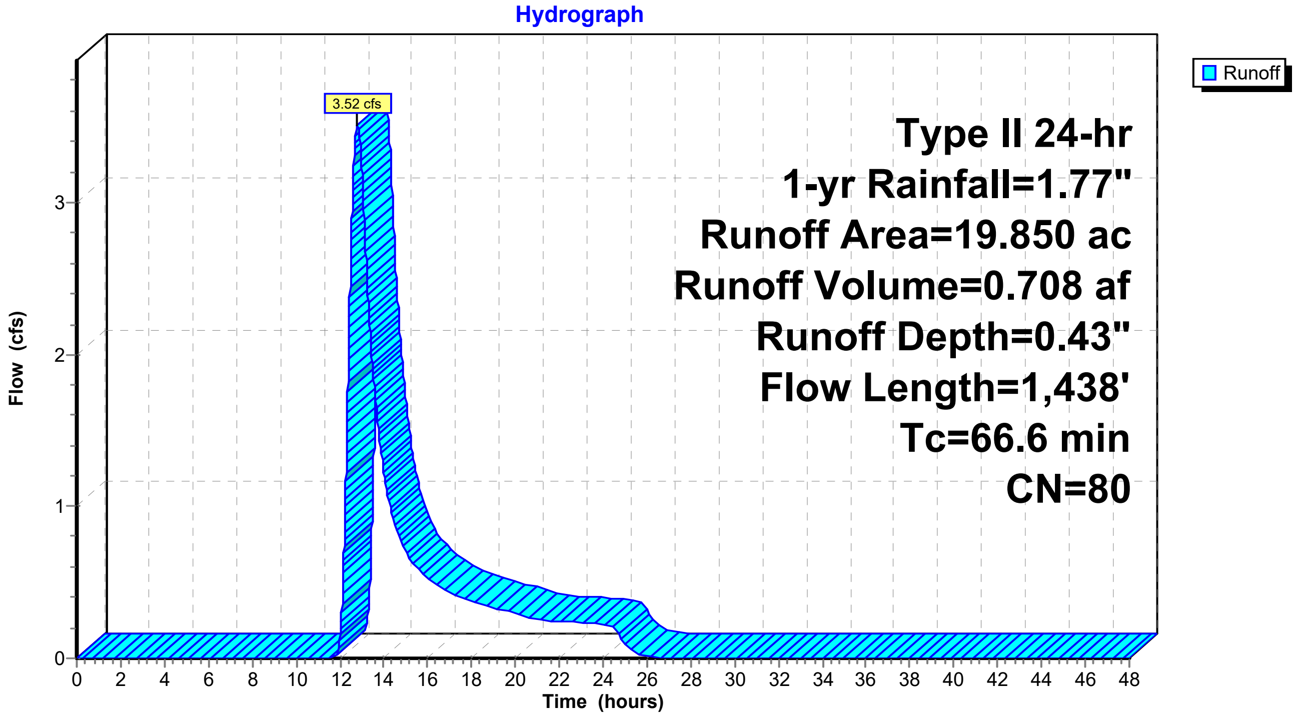
Runoff = 3.52 cfs @ 12.80 hrs, Volume= 0.708 af, Depth= 0.43"
Routed to Reach DP4 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 1-yr Rainfall=1.77"

	Area (ac)	CN	Description
	11.650	79	Woods, Fair, HSG D
	6.730	78	Meadow, non-grazed, HSG D
*	1.160	98	Impervious
	0.310	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	19.850	80	Weighted Average
	18.690		94.16% Pervious Area
	1.160		5.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0120	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
6.3	306	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.8	389	0.0043	0.33		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.0	96	0.0063	1.61		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
7.8	199	0.0073	0.43		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
16.9	348	0.0024	0.34		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
66.6	1,438	Total			

Subcatchment 400:



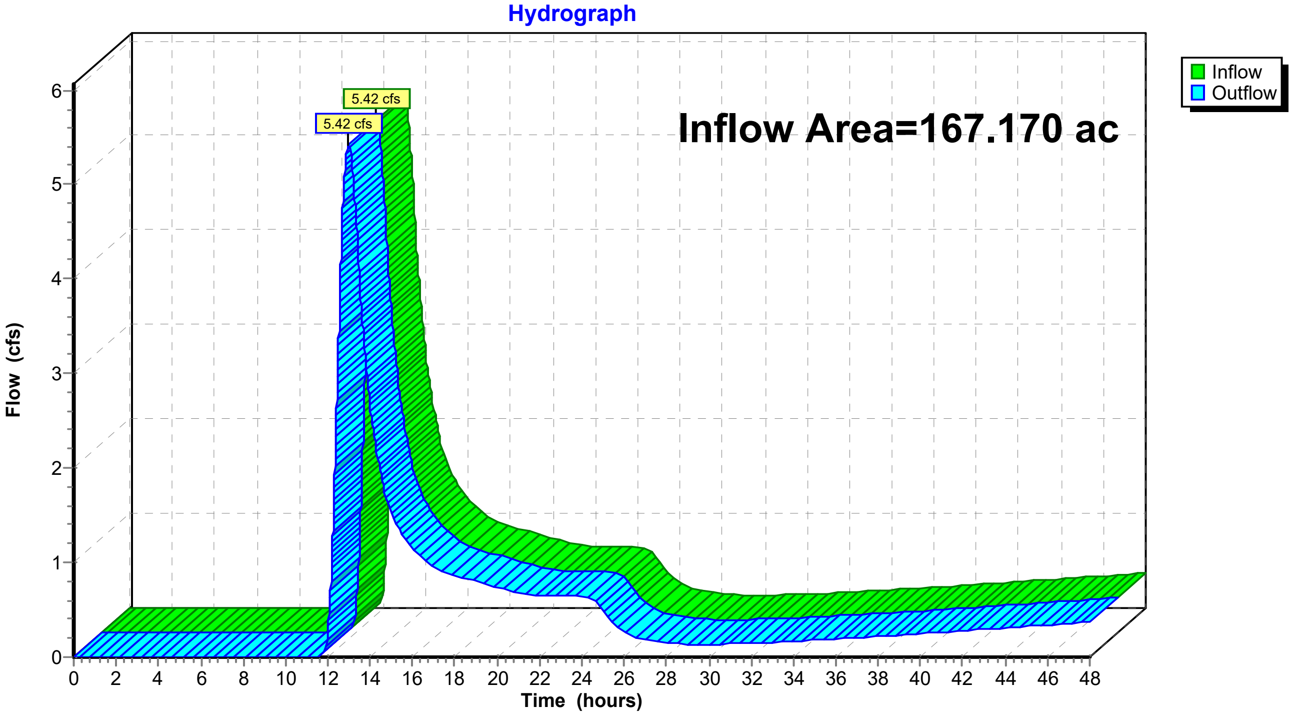
Summary for Reach DP1: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 167.170 ac, 38.53% Impervious, Inflow Depth > 0.13" for 1-yr event
Inflow = 5.42 cfs @ 12.96 hrs, Volume= 1.873 af
Outflow = 5.42 cfs @ 12.96 hrs, Volume= 1.873 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP1: DP1



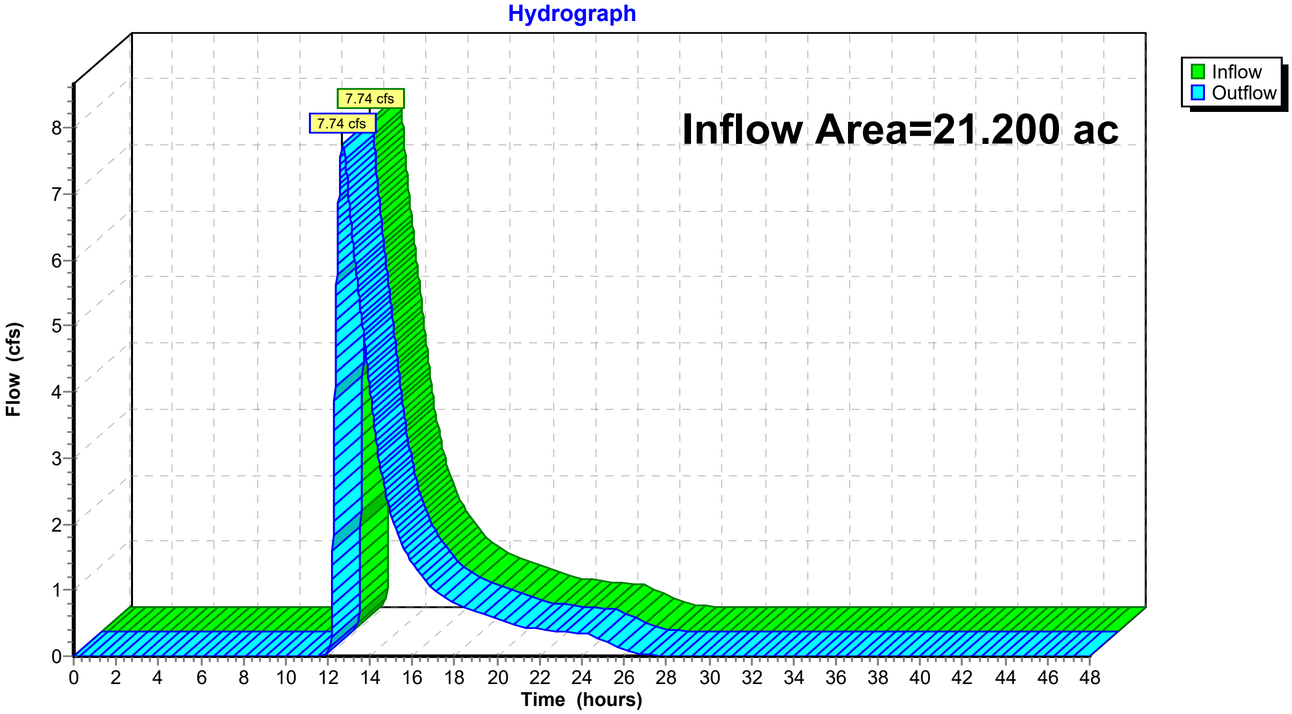
Summary for Reach DP2: DP1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =        21.200 ac,  20.19% Impervious,  Inflow Depth =   0.97"    for  1-yr event
Inflow       =        7.74 cfs @   12.69 hrs,  Volume=            1.709 af
Outflow      =        7.74 cfs @   12.69 hrs,  Volume=            1.709 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP2: DP1



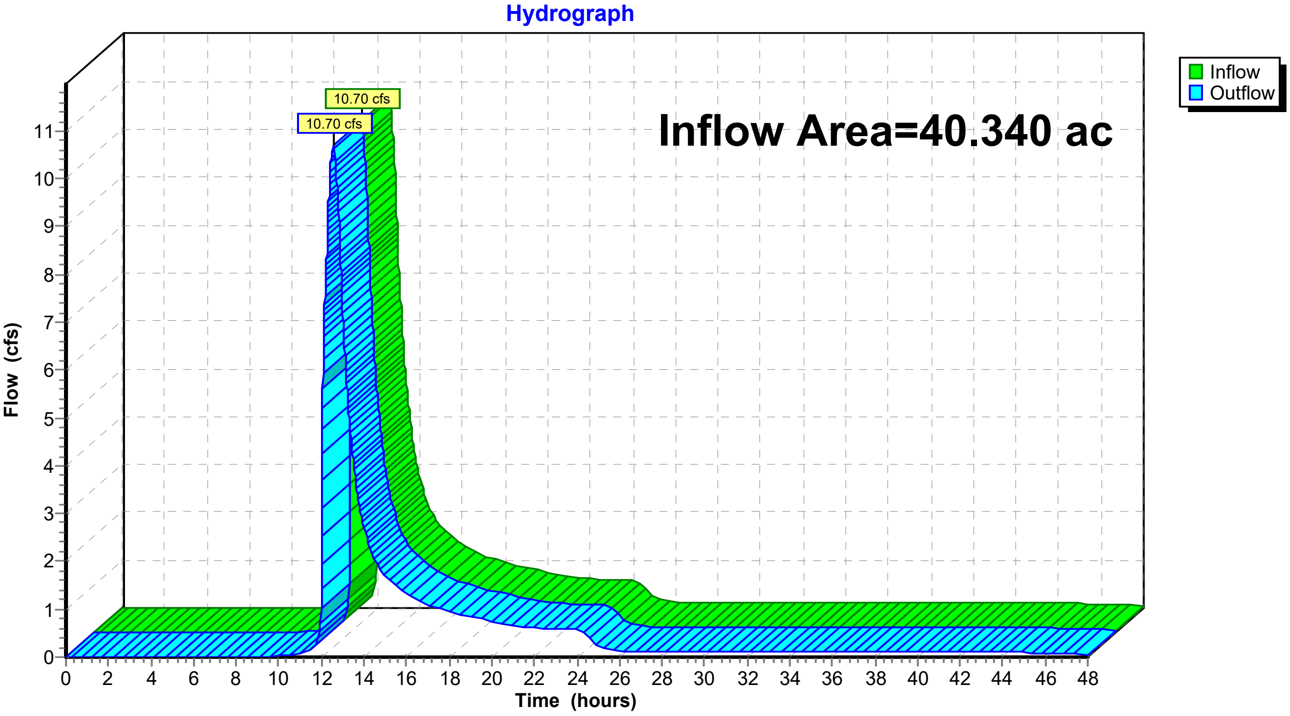
Summary for Reach DP3: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.340 ac, 21.94% Impervious, Inflow Depth > 0.65" for 1-yr event
Inflow = 10.70 cfs @ 12.56 hrs, Volume= 2.183 af
Outflow = 10.70 cfs @ 12.56 hrs, Volume= 2.183 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP3: DP1



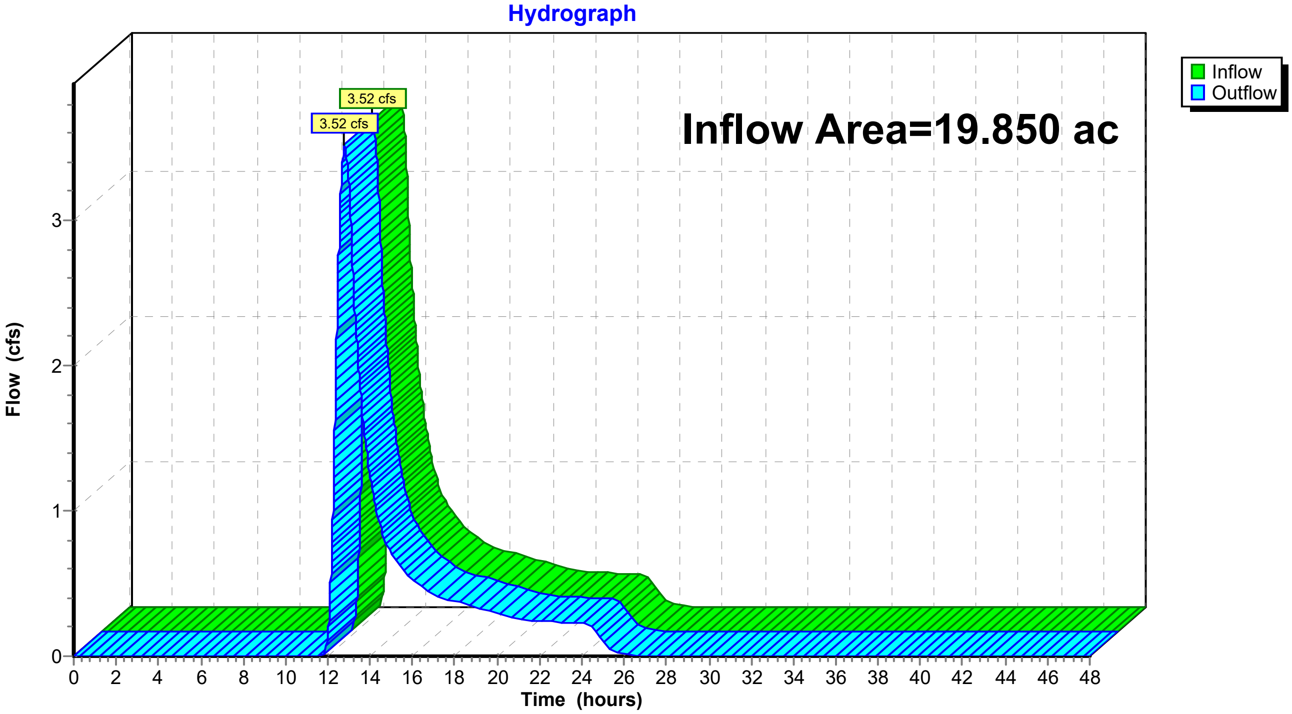
Summary for Reach DP4: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.850 ac, 5.84% Impervious, Inflow Depth = 0.43" for 1-yr event
Inflow = 3.52 cfs @ 12.80 hrs, Volume= 0.708 af
Outflow = 3.52 cfs @ 12.80 hrs, Volume= 0.708 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP4: DP1



Summary for Pond 1P: forebay 100 bypass

```
Inflow      =      40.64 cfs @  11.97 hrs,  Volume=          1.843 af
Outflow     =      37.80 cfs @  11.98 hrs,  Volume=          1.843 af,  Atten= 7%,  Lag= 0.7 min
Primary     =      18.87 cfs @  12.00 hrs,  Volume=          0.989 af
    Routed to Pond 119P : bioretention 102
Secondary =        19.99 cfs @  11.96 hrs,  Volume=          0.854 af
    Routed to Pond 2P : forebay 100 bypass
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.10' @ 12.00 hrs Surf.Area= 8,169 sf Storage= 7,186 cf (4,381 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 42.0 min calculated for 1.779 af (97% of inflow)
Center-of-Mass det. time= 9.3 min (792.0 - 782.7)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

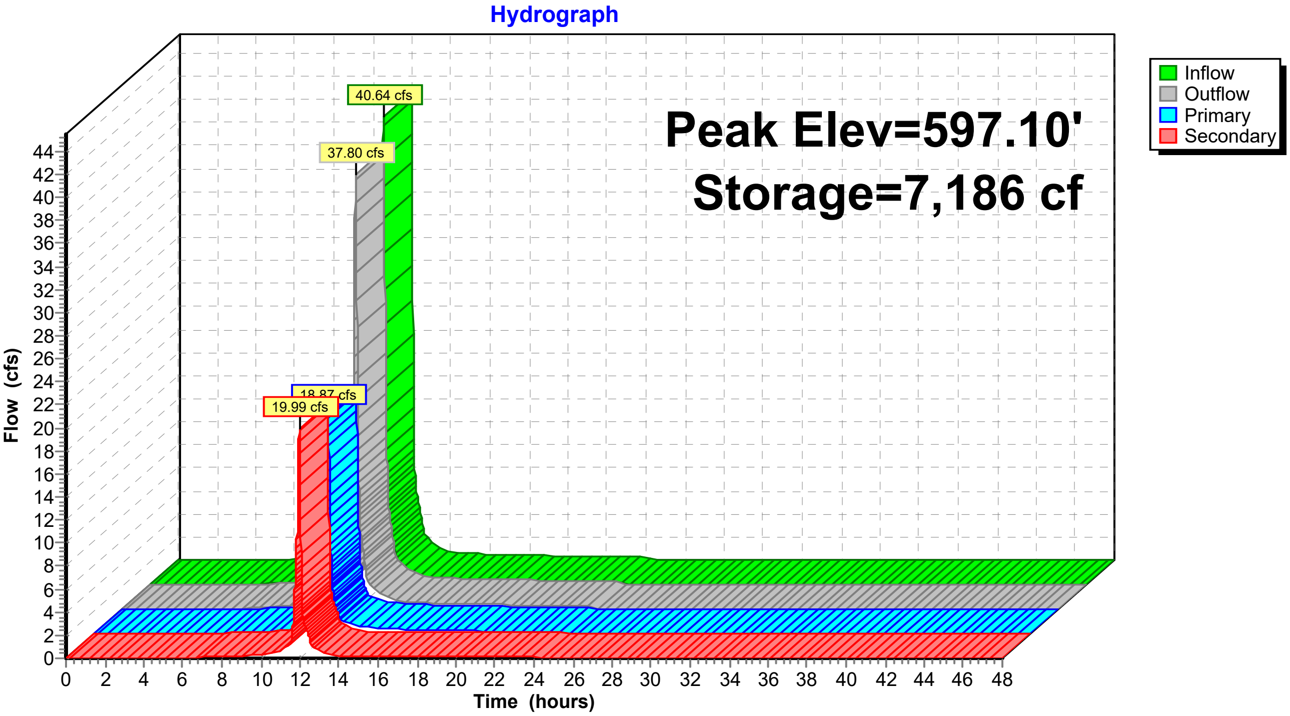
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 50.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=18.84 cfs @ 12.00 hrs HW=597.10' TW=596.40' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 18.84 cfs @ 2.26 fps)

Secondary OutFlow Max=10.36 cfs @ 11.96 hrs HW=597.07' TW=597.07' (Dynamic Tailwater)
↑—**2=overflow weir** (Weir Controls 10.36 cfs @ 0.34 fps)

Pond 1P: forebay 100 bypass



Summary for Pond 2P: forebay 100 bypass

Inflow = 19.99 cfs @ 11.96 hrs, Volume= 0.854 af
Outflow = 18.15 cfs @ 12.00 hrs, Volume= 0.854 af, Atten= 9%, Lag= 1.9 min
Primary = 18.15 cfs @ 12.00 hrs, Volume= 0.854 af
Routed to Pond 118b : bioretention 101

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.09' @ 12.00 hrs Surf.Area= 8,129 sf Storage= 7,078 cf (4,273 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 82.5 min calculated for 0.790 af (92% of inflow)
Center-of-Mass det. time= 19.9 min (793.3 - 773.4)

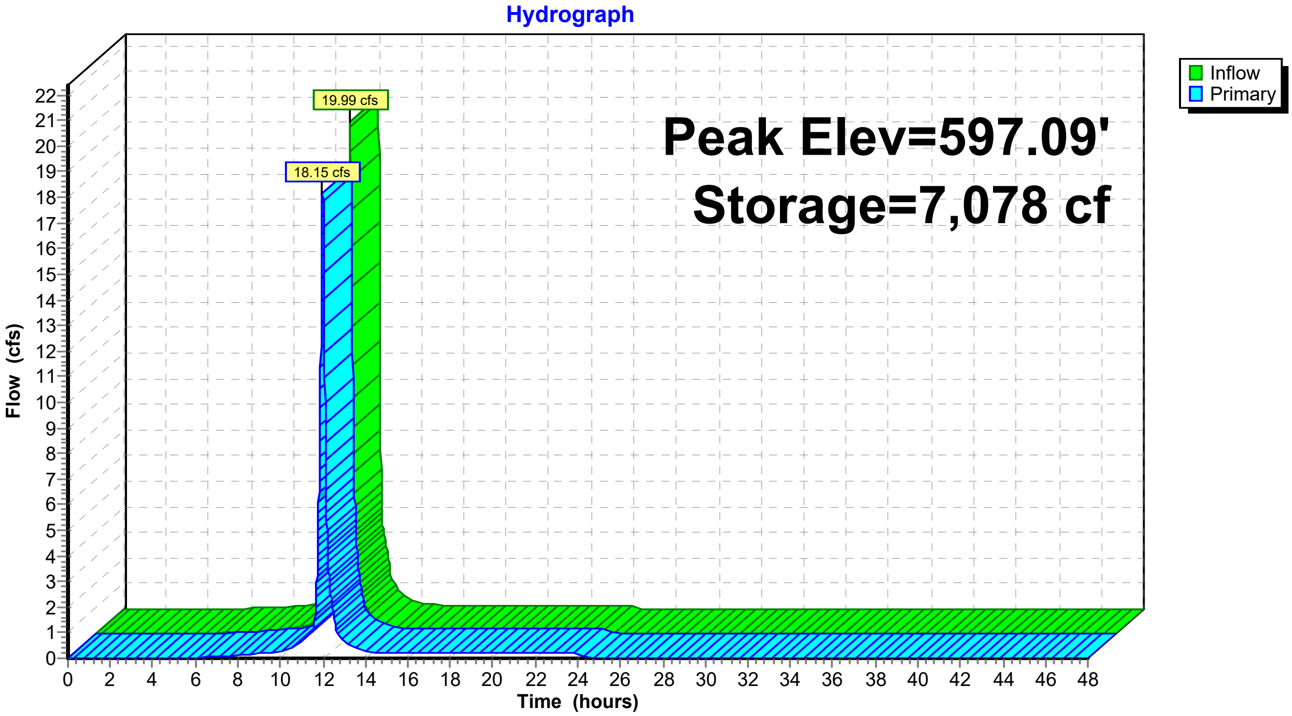
Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=18.12 cfs @ 12.00 hrs HW=597.09' TW=596.42' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 18.12 cfs @ 2.24 fps)

Pond 2P: forebay 100 bypass



Summary for Pond 10d: depression

Inflow Area = 24.040 ac, 21.88% Impervious, Inflow Depth = 0.54" for 1-yr event
Inflow = 8.22 cfs @ 12.41 hrs, Volume= 1.088 af
Outflow = 6.83 cfs @ 12.62 hrs, Volume= 1.087 af, Atten= 17%, Lag= 12.9 min
Primary = 0.43 cfs @ 12.62 hrs, Volume= 0.338 af
Routed to Reach DP1 : DP1
Secondary = 6.40 cfs @ 12.62 hrs, Volume= 0.750 af
Routed to Reach DP2 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 593.34' @ 12.62 hrs Surf.Area= 28,556 sf Storage= 6,871 cf

Plug-Flow detention time= 48.2 min calculated for 1.087 af (100% of inflow)
Center-of-Mass det. time= 48.2 min (943.6 - 895.4)

Volume	Invert	Avail.Storage	Storage Description
#1	592.75'	157,748 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

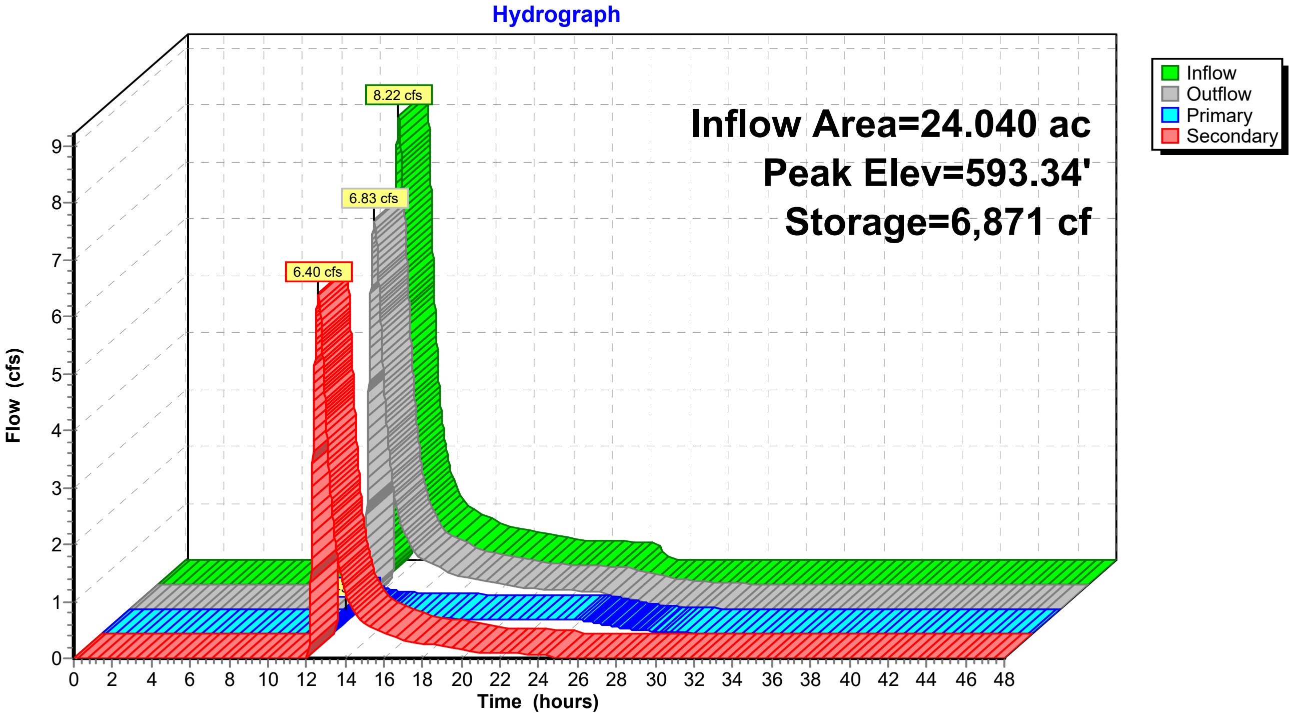
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.75	1,300	0	0
593.00	6,400	963	963
594.00	71,940	39,170	40,133
595.00	163,290	117,615	157,748

Device	Routing	Invert	Outlet Devices
#1	Primary	592.75'	**6.0" Round Pipe to DA 12** L= 250.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.75' / 591.00' S= 0.0070 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	593.10'	**22.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.43 cfs @ 12.62 hrs HW=593.34' TW=0.00' (Dynamic Tailwater)
└─**1=Pipe to DA 12** (Inlet Controls 0.43 cfs @ 2.21 fps)

Secondary OutFlow Max=6.40 cfs @ 12.62 hrs HW=593.34' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 6.40 cfs @ 1.22 fps)

Pond 10d: depression



Summary for Pond 102d: depression

Inflow Area = 11.170 ac, 37.42% Impervious, Inflow Depth = 0.78" for 1-yr event
Inflow = 8.41 cfs @ 12.19 hrs, Volume= 0.729 af
Outflow = 8.39 cfs @ 12.20 hrs, Volume= 0.729 af, Atten= 0%, Lag= 0.5 min
Primary = 8.39 cfs @ 12.20 hrs, Volume= 0.729 af
Routed to Pond DMH142 : DMH-142

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 598.35' @ 12.20 hrs Surf.Area= 322 sf Storage= 284 cf
Flood Elev= 604.00' Surf.Area= 41,000 sf Storage= 42,050 cf

Plug-Flow detention time= 1.2 min calculated for 0.729 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (857.5 - 856.5)

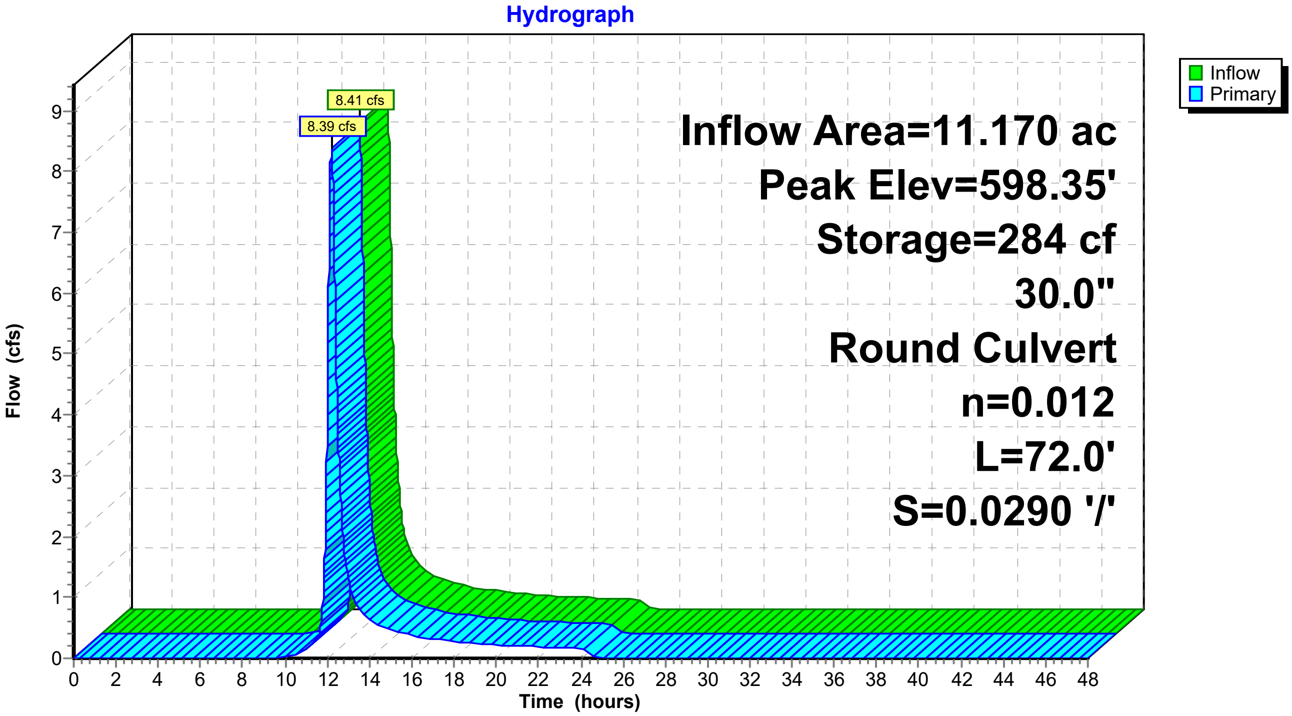
Volume	Invert	Avail.Storage	Storage Description
#1	597.00'	42,050 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.00	100	0	0
601.00	760	1,720	1,720
602.00	4,450	2,605	4,325
603.00	15,000	9,725	14,050
604.00	41,000	28,000	42,050

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**30.0" Round Pipe to DMH-142** L= 72.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 597.00' / 594.91' S= 0.0290 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=8.39 cfs @ 12.20 hrs HW=598.34' TW=596.09' (Dynamic Tailwater)
↑—**1=Pipe to DMH-142** (Inlet Controls 8.39 cfs @ 3.12 fps)

Pond 102d: depression



Summary for Pond 110P: dry pond 30

Inflow Area = 116.540 ac, 49.26% Impervious, Inflow Depth > 0.19" for 1-yr event
Inflow = 3.73 cfs @ 12.29 hrs, Volume= 1.837 af
Outflow = 0.37 cfs @ 48.00 hrs, Volume= 0.422 af, Atten= 90%, Lag= 2,142.7 min
Primary = 0.37 cfs @ 48.00 hrs, Volume= 0.422 af
Routed to Reach DP1 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 591.28' @ 48.00 hrs Surf.Area= 219,185 sf Storage= 61,656 cf
Flood Elev= 595.00' Surf.Area= 250,140 sf Storage= 933,940 cf

Plug-Flow detention time= 1,416.6 min calculated for 0.422 af (23% of inflow)
Center-of-Mass det. time= 462.4 min (2,278.0 - 1,815.6)

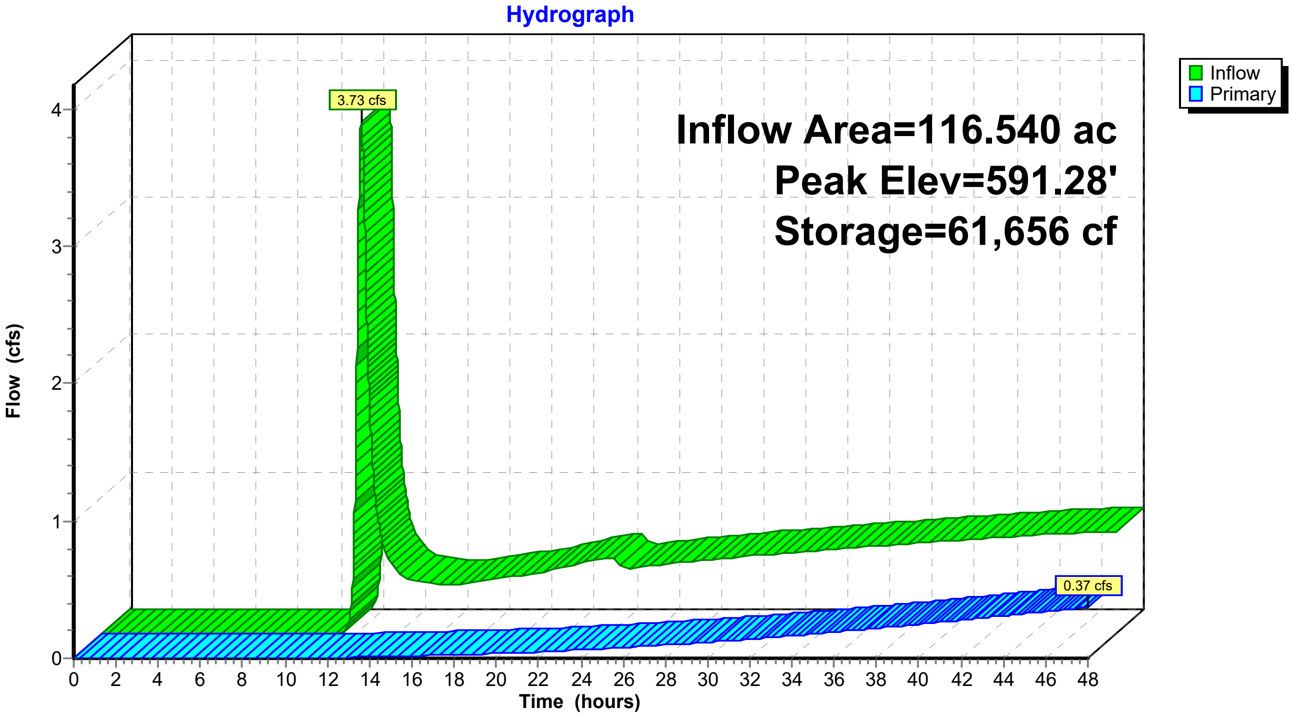
Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	933,940 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	216,830	0	0
595.00	250,140	933,940	933,940

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**24.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 590.90' S= 0.0059 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	594.00'	**30.0" x 48.0" Horiz. 30 x 48 Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	591.00'	**15.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.37 cfs @ 48.00 hrs HW=591.28' TW=0.00' (Dynamic Tailwater)
↑└─**1=Culvert** (Barrel Controls 0.37 cfs @ 2.08 fps)
  ↑├─**2=30 x 48 Grate** (Controls 0.00 cfs)
  └─**3=Orifice** (Passes 0.37 cfs of 0.38 cfs potential flow)

Pond 110P: dry pond 30



Summary for Pond 111P: dry pond 20

```
Inflow Area =      107.740 ac,  53.29% Impervious,  Inflow Depth >   0.81"    for  1-yr event
Inflow      =        11.72 cfs @   12.50 hrs,  Volume=          7.306 af
Outflow     =         0.74 cfs @   47.97 hrs,  Volume=          1.439 af,  Atten= 94%,  Lag= 2,128.2 min
Primary     =         0.74 cfs @   47.97 hrs,  Volume=          1.439 af
    Routed to Pond 110P : dry pond 30

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 591.70' @ 47.97 hrs   Surf.Area= 374,662 sf   Storage= 255,567 cf
Flood Elev= 595.00'   Surf.Area= 389,765 sf   Storage= 1,652,719 cf

Plug-Flow detention time= 1,329.3 min calculated for 1.439 af (20% of inflow)
Center-of-Mass det. time= 719.5 min ( 2,072.9 - 1,353.4 )

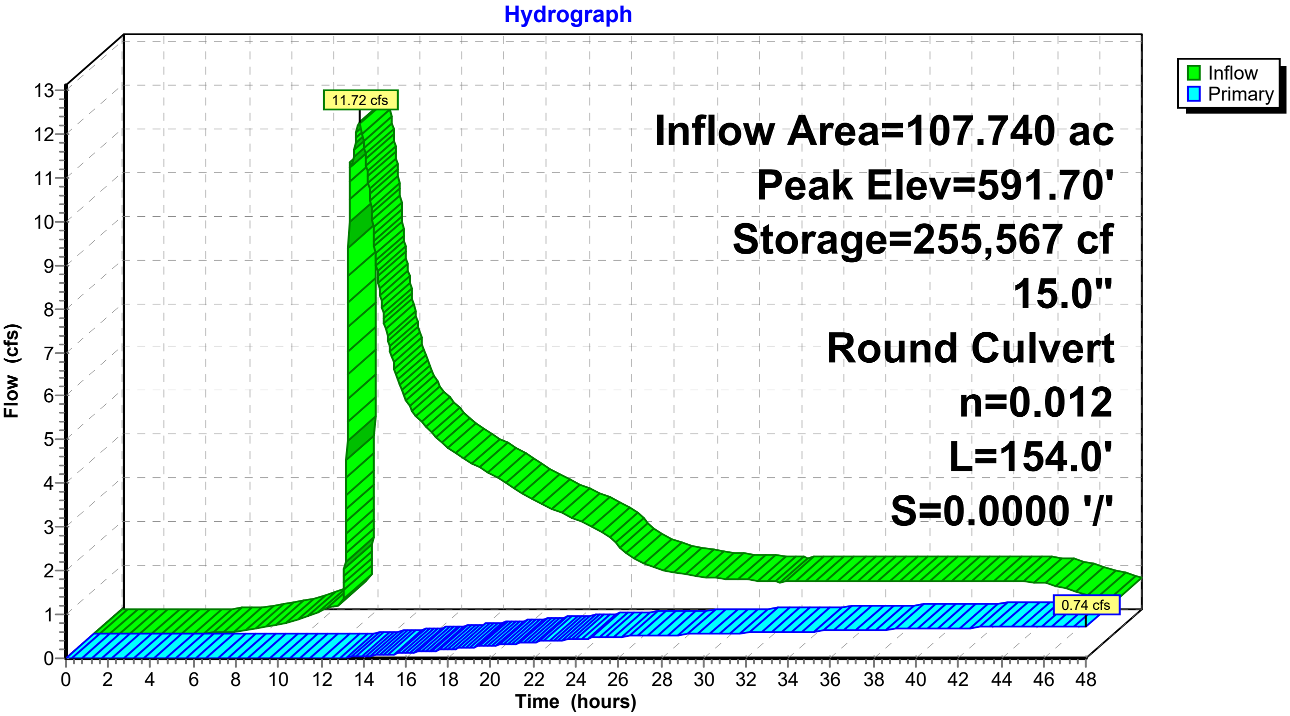
Volume        Invert     Avail.Storage   Storage Description
   #1         591.00'     2,199,782 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

 Elevation          Surf.Area           Inc.Store          Cum.Store
    (feet)            (sq-ft)        (cubic-feet)       (cubic-feet)
    591.00            350,875                   0                  0
    592.00            384,640             367,758            367,758
    593.00            468,584             426,612            794,370
    596.00            350,356           1,228,410          2,022,780
    596.50            357,654             177,003          2,199,782

Device   Routing          Invert   Outlet Devices
   #1    Primary          591.00'  15.0"  Round Culvert
                                   L= 154.0'   CPP, square edge headwall,  Ke= 0.500
                                   Inlet / Outlet Invert= 591.00' / 591.00'   S= 0.0000 '/'   Cc= 0.900
                                   n= 0.012  Corrugated PP, smooth interior,  Flow Area= 1.23 sf

Primary OutFlow  Max=0.74 cfs @ 47.97 hrs  HW=591.70'  TW=591.28'   (Dynamic Tailwater)
└─1=Culvert  (Barrel Controls 0.74 cfs @ 1.50 fps)
```

Pond 111P: dry pond 20



Summary for Pond 112F: forebay 200

Inflow Area = 22.280 ac, 93.27% Impervious, Inflow Depth = 1.45" for 1-yr event
Inflow = 52.60 cfs @ 11.97 hrs, Volume= 2.685 af
Outflow = 42.37 cfs @ 12.02 hrs, Volume= 2.685 af, Atten= 19%, Lag= 3.0 min
Primary = 17.07 cfs @ 12.02 hrs, Volume= 1.256 af
Routed to Pond 115b : bioretention 201
Secondary = 17.07 cfs @ 12.02 hrs, Volume= 1.255 af
Routed to Pond 116P : bioretention 202
Tertiary = 8.22 cfs @ 12.02 hrs, Volume= 0.174 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 35,272 sf Storage= 108,848 cf
Peak Elev= 597.07' @ 12.02 hrs Surf.Area= 37,648 sf Storage= 129,604 cf (20,756 cf above start)
Flood Elev= 598.00' Surf.Area= 41,532 sf Storage= 166,451 cf (57,603 cf above start)

Plug-Flow detention time= 893.4 min calculated for 0.186 af (7% of inflow)
Center-of-Mass det. time= 28.5 min (808.0 - 779.5)

Volume	Invert	Avail.Storage	Storage Description
#1	592.50'	166,451 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.50	19,200	0	0
596.00	33,215	91,726	91,726
596.50	35,272	17,122	108,848
598.00	41,532	57,603	166,451

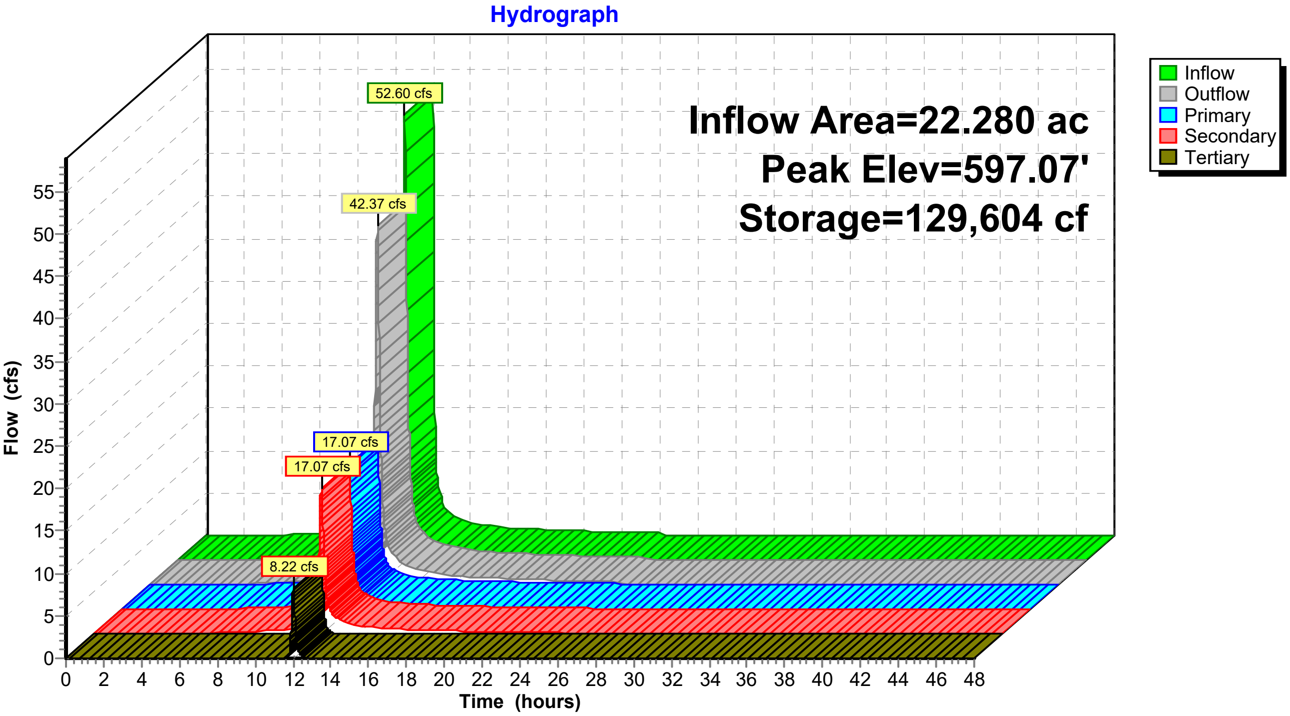
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Tertiary	596.70'	**162.0 deg x 10.0' long x 1.30' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=17.06 cfs @ 12.02 hrs HW=597.07' TW=596.44' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 17.06 cfs @ 2.21 fps)

Secondary OutFlow Max=17.06 cfs @ 12.02 hrs HW=597.07' TW=596.44' (Dynamic Tailwater)
↑—**2=overflow weir** (Weir Controls 17.06 cfs @ 2.21 fps)

Tertiary OutFlow Max=8.21 cfs @ 12.02 hrs HW=597.07' TW=591.03' (Dynamic Tailwater)
↑—**3=overflow weir** (Weir Controls 8.21 cfs @ 1.80 fps)

Pond 112F: forebay 200



Summary for Pond 113F: forebay 300

```
Inflow Area =        4.290 ac, 88.58% Impervious, Inflow Depth =  1.35"   for 1-yr event
Inflow      =        9.70 cfs @  11.97 hrs, Volume=         0.484 af
Outflow     =        8.74 cfs @  12.00 hrs, Volume=         0.484 af, Atten= 10%, Lag= 1.8 min
Primary     =        8.74 cfs @  12.00 hrs, Volume=         0.484 af
    Routed to Pond 114b : bioretention 301
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 597.50' Surf.Area= 5,588 sf Storage= 16,727 cf
Peak Elev= 597.88' @ 12.00 hrs Surf.Area= 5,901 sf Storage= 18,938 cf (2,211 cf above start)
Flood Elev= 599.00' Surf.Area= 6,810 sf Storage= 26,025 cf (9,298 cf above start)

Plug-Flow detention time= 512.6 min calculated for 0.100 af (21% of inflow)
Center-of-Mass det. time= 16.9 min (806.3 - 789.5)

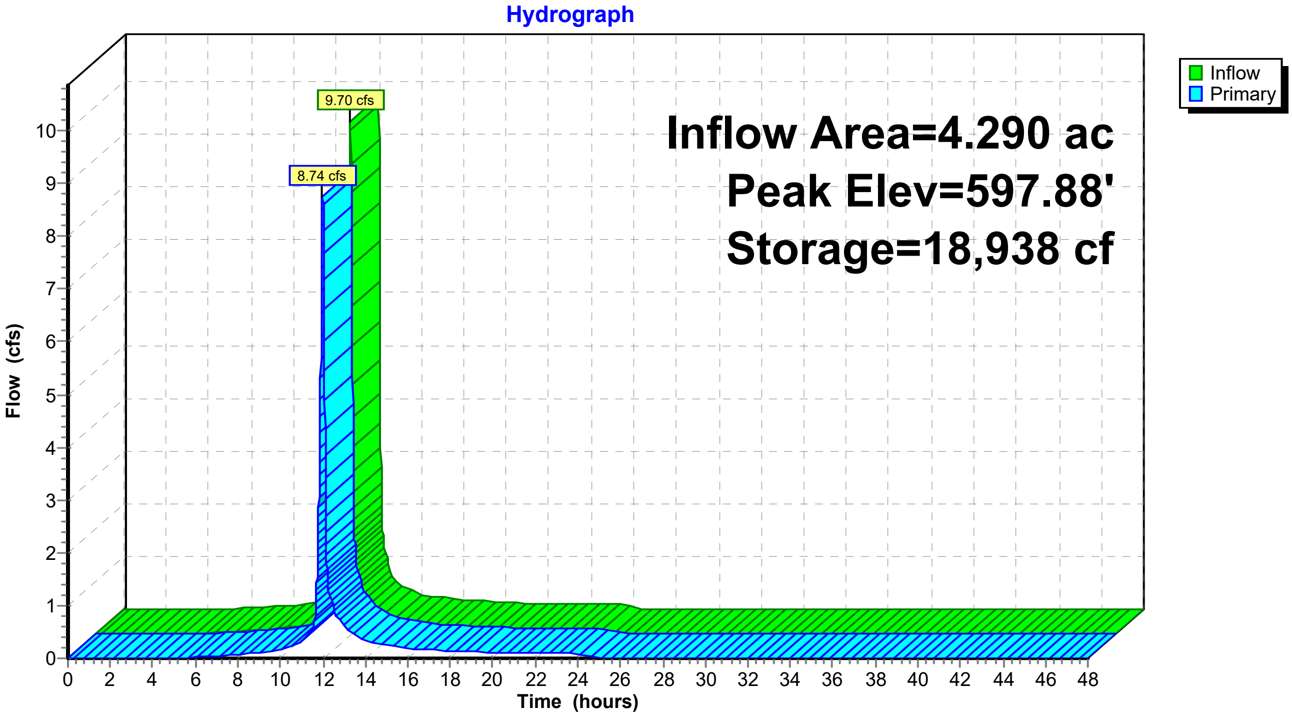
Volume	Invert	Avail.Storage	Storage Description
#1	593.50'	26,025 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.50	2,840	0	0
597.00	5,180	14,035	14,035
599.00	6,810	11,990	26,025

Device	Routing	Invert	Outlet Devices
#1	Primary	597.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=8.67 cfs @ 12.00 hrs HW=597.88' TW=597.58' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 8.67 cfs @ 1.81 fps)

Pond 113F: forebay 300



Summary for Pond 114b: bioretention 301

Inflow Area = 13.020 ac, 68.36% Impervious, Inflow Depth = 1.14" for 1-yr event
Inflow = 24.33 cfs @ 11.98 hrs, Volume= 1.235 af
Outflow = 4.20 cfs @ 12.19 hrs, Volume= 1.201 af, Atten= 83%, Lag= 12.3 min
Primary = 0.20 cfs @ 12.19 hrs, Volume= 0.604 af
Routed to Pond 111P : dry pond 20
Secondary = 4.00 cfs @ 12.19 hrs, Volume= 0.597 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.74' @ 12.19 hrs Surf.Area= 35,107 sf Storage= 25,283 cf
Flood Elev= 599.00' Surf.Area= 37,972 sf Storage= 71,411 cf

Plug-Flow detention time= 482.9 min calculated for 1.201 af (97% of inflow)
Center-of-Mass det. time= 466.1 min (1,279.5 - 813.4)

Volume	Invert	Avail.Storage	Storage Description
#1	597.00'	71,411 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

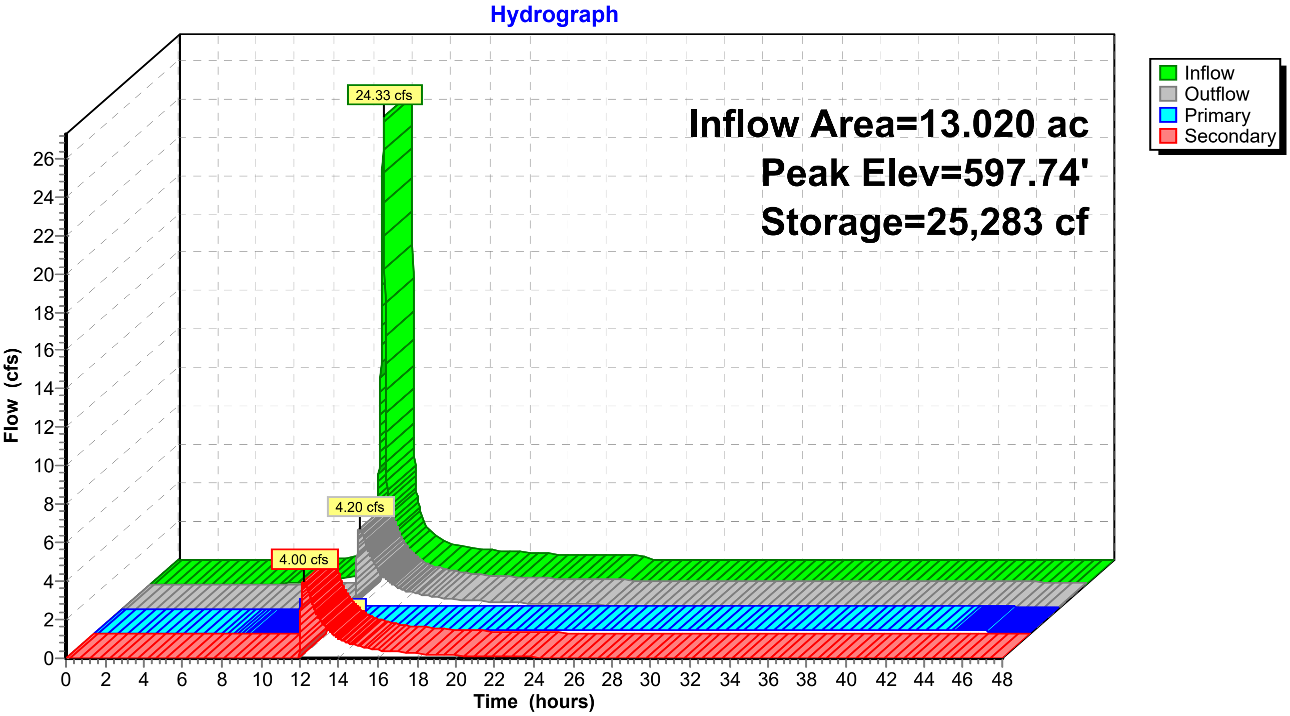
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.00	33,470	0	0
598.00	35,690	34,580	34,580
599.00	37,972	36,831	71,411

Device	Routing	Invert	Outlet Devices
#1	Primary	593.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	597.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	597.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.20 cfs @ 12.19 hrs HW=597.74' TW=591.05' (Dynamic Tailwater)
└─**1=Underdrain** (Passes 0.20 cfs of 1.87 cfs potential flow)
  └─**3=Exfiltration through bioretention media** (Exfiltration Controls 0.20 cfs)

Secondary OutFlow Max=4.00 cfs @ 12.19 hrs HW=597.74' TW=591.05' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 4.00 cfs @ 1.46 fps)

Pond 114b: bioretention 301



Summary for Pond 115b: bioretention 201

Inflow Area = 23.360 ac, 88.96% Impervious, Inflow Depth = 0.67" for 1-yr event
Inflow = 18.06 cfs @ 12.01 hrs, Volume= 1.309 af
Outflow = 2.98 cfs @ 12.48 hrs, Volume= 1.266 af, Atten= 83%, Lag= 27.7 min
Primary = 0.23 cfs @ 12.48 hrs, Volume= 0.704 af
Routed to Pond 111P : dry pond 20
Secondary = 2.75 cfs @ 12.48 hrs, Volume= 0.562 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.69' @ 12.48 hrs Surf.Area= 39,410 sf Storage= 26,550 cf
Flood Elev= 598.00' Surf.Area= 42,580 sf Storage= 80,330 cf

Plug-Flow detention time= 525.8 min calculated for 1.266 af (97% of inflow)
Center-of-Mass det. time= 504.6 min (1,320.3 - 815.7)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	80,330 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

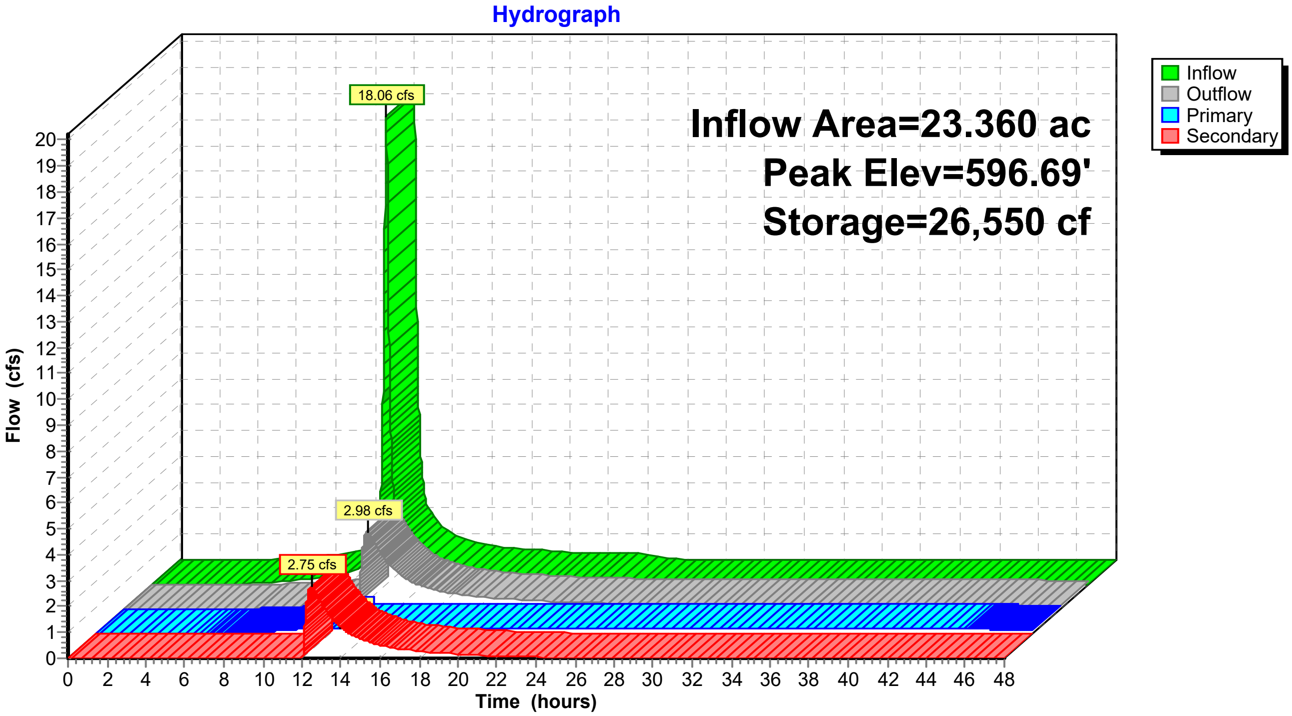
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	37,780	0	0
597.00	40,150	38,965	38,965
598.00	42,580	41,365	80,330

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.23 cfs @ 12.48 hrs HW=596.69' TW=591.08' (Dynamic Tailwater)
↑—**1=Underdrain** (Passes 0.23 cfs of 1.86 cfs potential flow)
  ↑—**3=Exfiltration through bioretention media**(Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=2.75 cfs @ 12.48 hrs HW=596.69' TW=591.08' (Dynamic Tailwater)
↑—**2=overflow weir** (Weir Controls 2.75 cfs @ 1.31 fps)

Pond 115b: bioretention 201



Summary for Pond 116P: bioretention 202

```
Inflow Area =         1.100 ac,    0.00% Impervious,  Inflow Depth = 14.28"    for  1-yr event
Inflow      =       18.08 cfs @   12.01 hrs,  Volume=          1.309 af
Outflow     =        2.99 cfs @   12.47 hrs,  Volume=          1.266 af,  Atten= 83%,  Lag= 27.6 min
Primary     =        0.23 cfs @   12.47 hrs,  Volume=          0.704 af
    Routed to Pond 111P : dry pond 20
Secondary =          2.76 cfs @   12.47 hrs,  Volume=          0.562 af
    Routed to Pond 111P : dry pond 20
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.69' @ 12.47 hrs Surf.Area= 39,411 sf Storage= 26,558 cf
Flood Elev= 598.00' Surf.Area= 42,580 sf Storage= 80,330 cf

Plug-Flow detention time= 525.6 min calculated for 1.266 af (97% of inflow)
Center-of-Mass det. time= 504.4 min (1,320.1 - 815.7)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	80,330 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

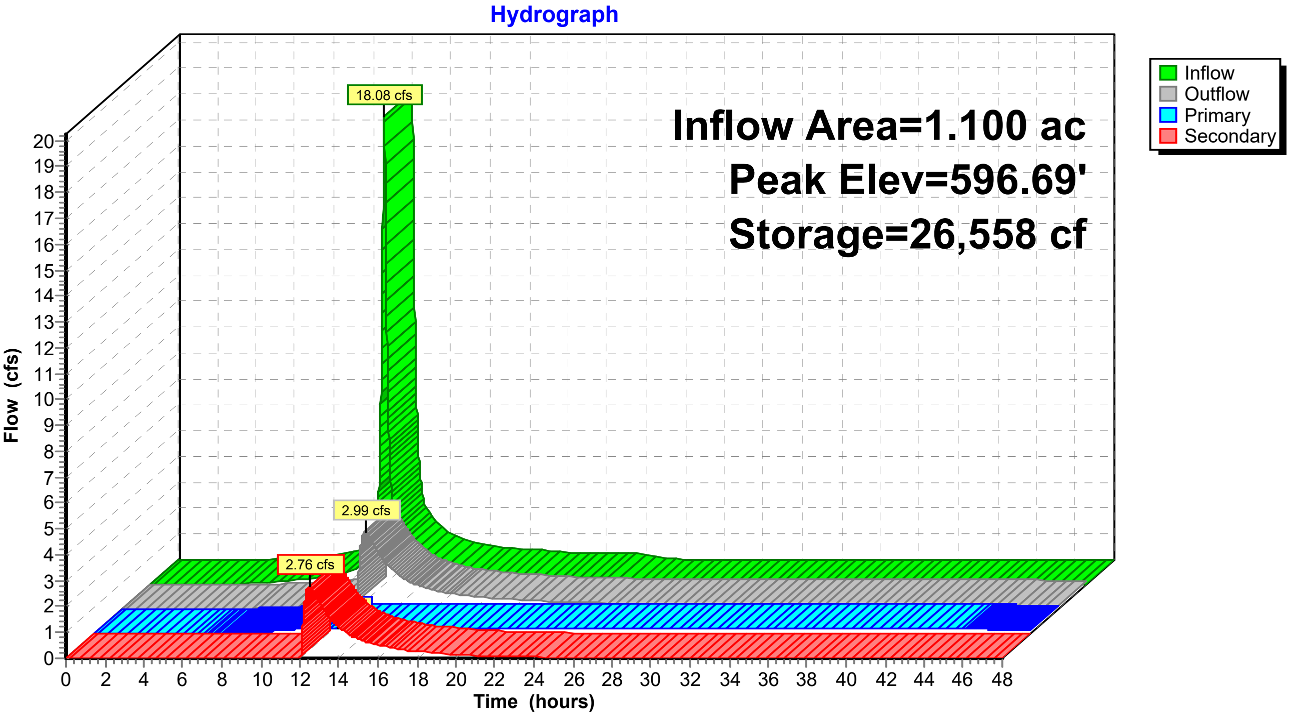
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	37,780	0	0
597.00	40,150	38,965	38,965
598.00	42,580	41,365	80,330

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.23 cfs @ 12.47 hrs HW=596.69' TW=591.08' (Dynamic Tailwater)
└—**1=Underdrain** (Passes 0.23 cfs of 1.86 cfs potential flow)
  └—**3=Exfiltration through bioretention media**(Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=2.76 cfs @ 12.47 hrs HW=596.69' TW=591.08' (Dynamic Tailwater)
└—**2=overflow weir** (Weir Controls 2.76 cfs @ 1.31 fps)

Pond 116P: bioretention 202



Summary for Pond 117P: depression

Inflow Area = 6.250 ac, 0.00% Impervious, Inflow Depth = 0.36" for 1-yr event
Inflow = 3.72 cfs @ 11.99 hrs, Volume= 0.188 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 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 599.26' @ 24.34 hrs Surf.Area= 46,913 sf Storage= 8,194 cf
Flood Elev= 602.00' Surf.Area= 232,521 sf Storage= 253,427 cf

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

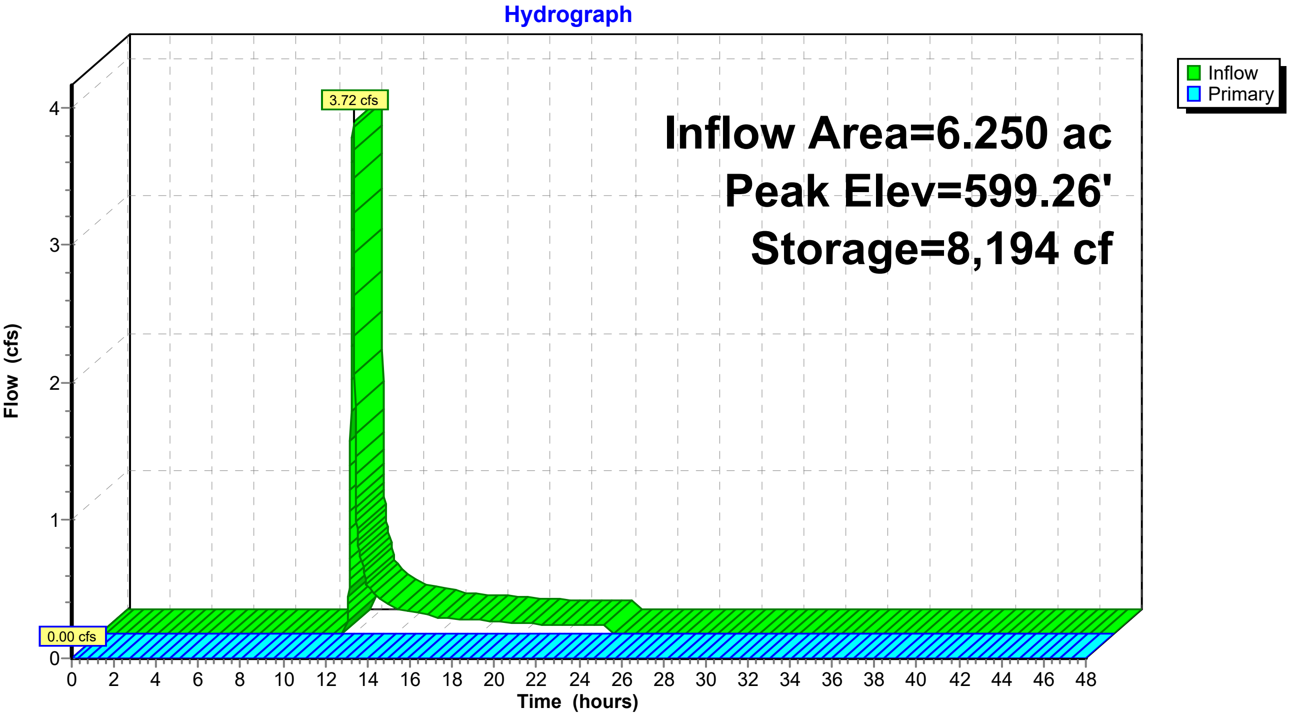
Volume	Invert	Avail.Storage	Storage Description
#1	599.00'	253,427 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	16,745	0	0
599.50	75,340	23,021	23,021
599.75	104,880	22,528	45,549
600.00	125,550	28,804	74,353
600.25	152,370	34,740	109,093
601.00	232,521	144,334	253,427

Device	Routing	Invert	Outlet Devices
#1	Primary	600.50'	**162.0 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=599.00' TW=591.00' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 117P: depression



Summary for Pond 118b: bioretention 101

```
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

Inflow Area =       1.450 ac,   0.00% Impervious,  Inflow Depth =  7.66"   for  1-yr event
Inflow      =      19.62 cfs @  12.00 hrs,  Volume=         0.925 af
Outflow     =       0.98 cfs @  12.17 hrs,  Volume=         0.879 af,  Atten= 95%,  Lag= 10.4 min
Primary     =       0.22 cfs @  12.95 hrs,  Volume=         0.654 af
    Routed to Pond 121p : dry pond 10
Secondary =         0.76 cfs @  12.17 hrs,  Volume=         0.225 af
    Routed to Pond 119P : bioretention 102

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.72' @ 12.95 hrs   Surf.Area= 37,403 sf   Storage= 26,282 cf
Flood Elev= 598.00'   Surf.Area= 40,598 sf   Storage= 76,209 cf

Plug-Flow detention time= 752.4 min calculated for 0.879 af (95% of inflow)
Center-of-Mass det. time= 721.3 min ( 1,519.5 - 798.2 )

Volume      Invert    Avail.Storage   Storage Description
  #1       596.00'        76,209 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

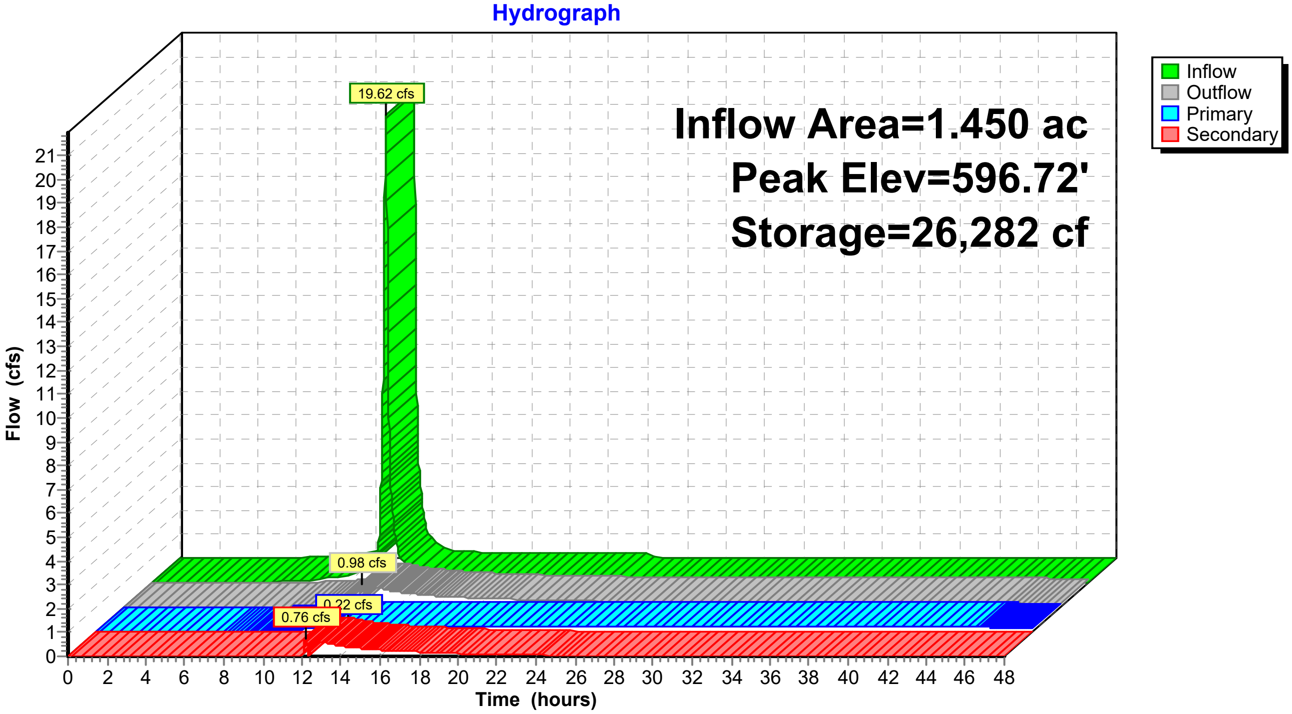
 Elevation      Surf.Area        Inc.Store       Cum.Store
    (feet)         (sq-ft)     (cubic-feet)    (cubic-feet)
   596.00          35,640                0               0
   597.00          38,090           36,865          36,865
   598.00          40,598           39,344          76,209

Device   Routing          Invert    Outlet Devices
   #1    Primary         592.58'    6.0" Vert. Underdrain   C= 0.600   Limited to weir flow at low heads
   #2    Secondary       596.50'    162.0 deg x 10.0' long x 1.50' rise overflow weir Cv= 2.47 (C= 3.09)
   #3    Device 1        596.00'    0.250 in/hr Exfiltration through bioretention media over Surface area
                                      Phase-In= 0.10'

Primary OutFlow Max=0.22 cfs @ 12.95 hrs  HW=596.72'  TW=591.49'   (Dynamic Tailwater)
└─1=Underdrain  (Passes 0.22 cfs of 1.86 cfs potential flow)
   └─3=Exfiltration through bioretention media(Exfiltration Controls 0.22 cfs)

Secondary OutFlow Max=0.62 cfs @ 12.17 hrs  HW=596.62'  TW=596.61'   (Dynamic Tailwater)
└─2=overflow weir  (Weir Controls 0.62 cfs @ 0.49 fps)
```

Pond 118b: bioretention 101



Summary for Pond 119P: bioretention 102

Inflow Area = 1.070 ac, 0.00% Impervious, Inflow Depth = 14.20" for 1-yr event
Inflow = 19.92 cfs @ 12.00 hrs, Volume= 1.266 af
Outflow = 1.65 cfs @ 12.90 hrs, Volume= 1.218 af, Atten= 92%, Lag= 53.9 min
Primary = 0.23 cfs @ 12.96 hrs, Volume= 0.692 af
Routed to Pond 121p : dry pond 10
Secondary = 1.42 cfs @ 12.90 hrs, Volume= 0.525 af
Routed to Pond 120P : bioretention 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.72' @ 12.96 hrs Surf.Area= 39,566 sf Storage= 27,787 cf
Flood Elev= 598.00' Surf.Area= 42,500 sf Storage= 80,430 cf

Plug-Flow detention time= 576.1 min calculated for 1.217 af (96% of inflow)
Center-of-Mass det. time= 553.2 min (1,389.7 - 836.5)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	80,430 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

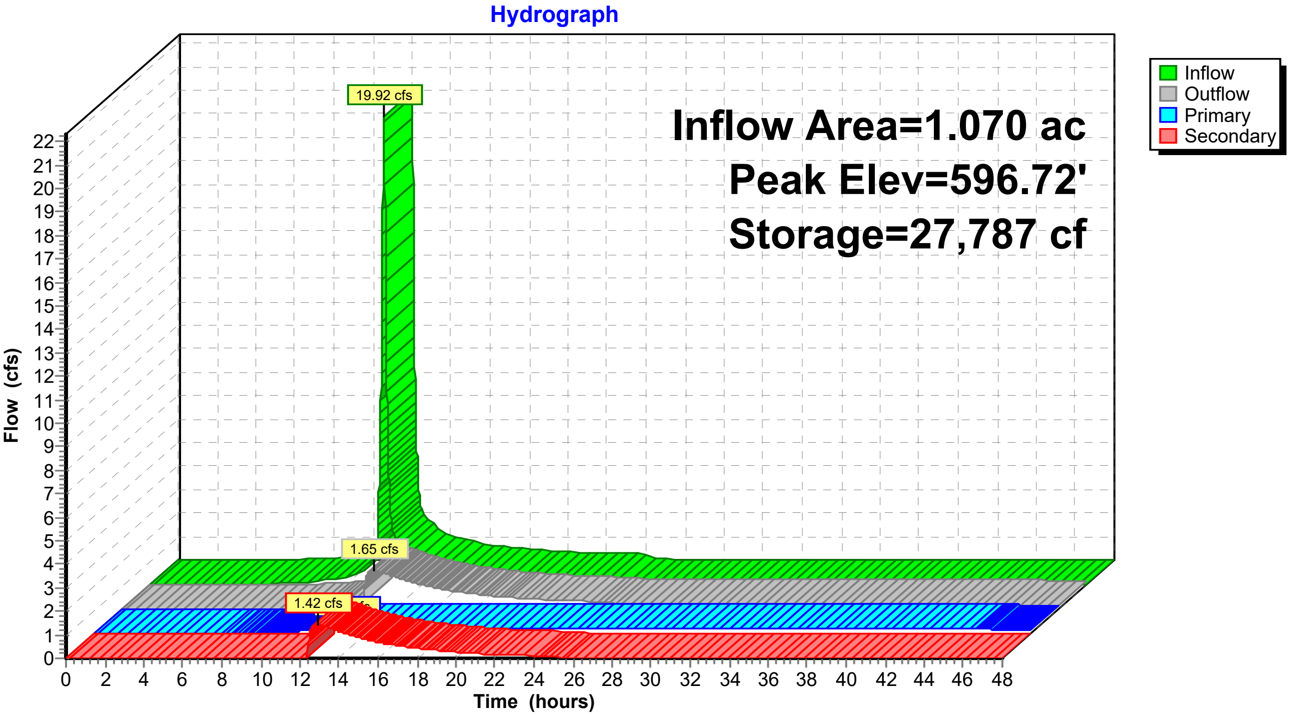
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	37,960	0	0
597.00	40,200	39,080	39,080
598.00	42,500	41,350	80,430

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.23 cfs @ 12.96 hrs HW=596.72' TW=591.49' (Dynamic Tailwater)
└─**1=Underdrain** (Passes 0.23 cfs of 1.86 cfs potential flow)
  └─**3=Exfiltration through bioretention media** (Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=1.42 cfs @ 12.90 hrs HW=596.72' TW=596.70' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 1.42 cfs @ 0.58 fps)

Pond 119P: bioretention 102



Summary for Pond 120P: bioretention 103

```
[80] Warning: Exceeded Pond 119P by 0.11' @ 12.08 hrs (1.56 cfs 0.061 af)

Inflow Area =      32.080 ac,  72.32% Impervious,  Inflow Depth =  0.74"    for  1-yr event
Inflow      =      23.06 cfs @   12.00 hrs,  Volume=          1.965 af
Outflow     =       3.43 cfs @   12.26 hrs,  Volume=          1.920 af,  Atten= 85%,  Lag= 15.7 min
Primary     =       0.22 cfs @   12.26 hrs,  Volume=          0.671 af
    Routed to Pond 121p : dry pond 10
Secondary =         3.21 cfs @   12.26 hrs,  Volume=          1.249 af
    Routed to Pond 121p : dry pond 10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.71' @ 12.26 hrs   Surf.Area= 38,152 sf   Storage= 26,414 cf
Flood Elev= 598.00'   Surf.Area= 40,070 sf   Storage= 77,130 cf

Plug-Flow detention time= 351.5 min calculated for 1.920 af (98% of inflow)
Center-of-Mass det. time= 338.0 min ( 1,205.6 - 867.6 )

Volume       Invert    Avail.Storage   Storage Description
   #1        596.00'       77,130 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

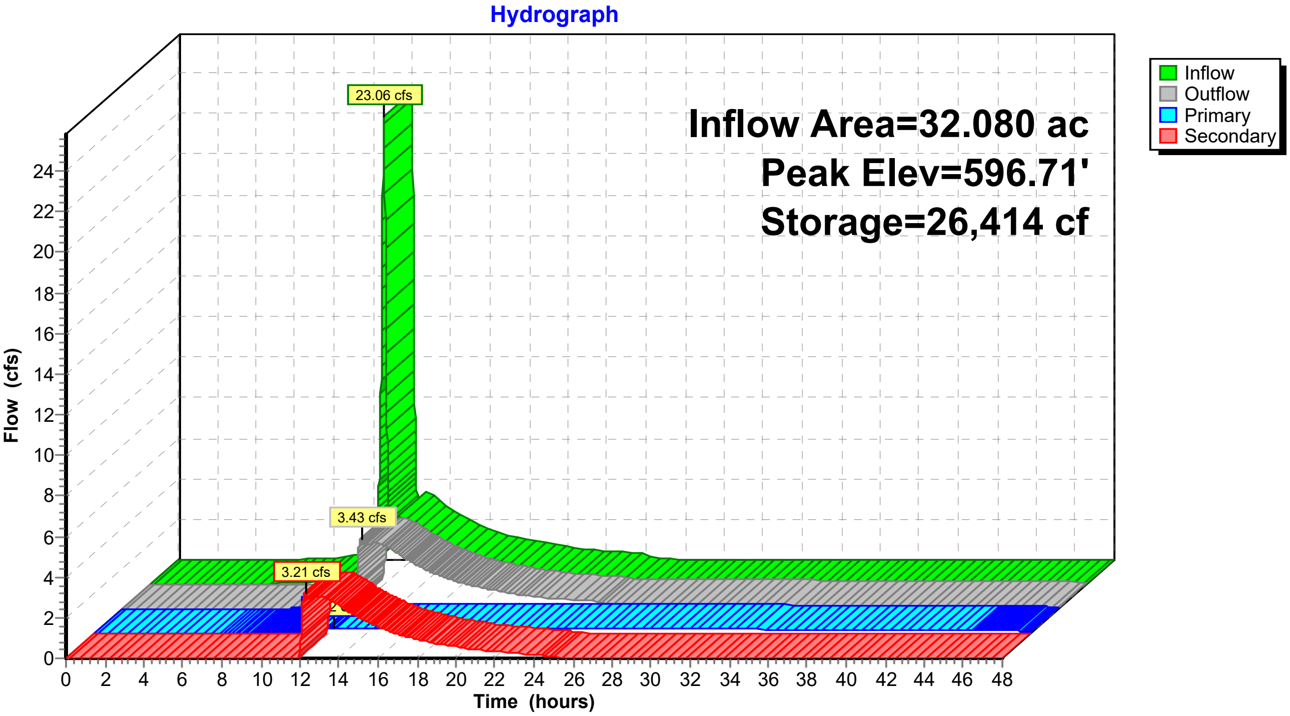
 Elevation        Surf.Area        Inc.Store       Cum.Store
    (feet)           (sq-ft)     (cubic-feet)    (cubic-feet)
    596.00            36,590                0               0
    597.00            38,800           37,695          37,695
    598.00            40,070           39,435          77,130

Device   Routing          Invert   Outlet Devices
   #1    Primary         592.58'   6.0" Vert. Underdrain   C= 0.600   Limited to weir flow at low heads
   #2    Secondary       596.50'   162.0 deg x 10.0' long x 1.50' rise overflow weir Cv= 2.47 (C= 3.09)
   #3    Device 1        596.00'   0.250 in/hr Exfiltration through bioretention media over Surface area
                                     Phase-In= 0.10'

Primary OutFlow Max=0.22 cfs @ 12.26 hrs  HW=596.71'  TW=591.26'   (Dynamic Tailwater)
└─1=Underdrain (Passes 0.22 cfs of 1.86 cfs potential flow)
   └─3=Exfiltration through bioretention media(Exfiltration Controls 0.22 cfs)

Secondary OutFlow Max=3.21 cfs @ 12.26 hrs  HW=596.71'  TW=591.26'   (Dynamic Tailwater)
└─2=overflow weir (Weir Controls 3.21 cfs @ 1.37 fps)
```

Pond 120P: bioretention 103



Summary for Pond 121p: dry pond 10

Inflow Area = 48.470 ac, 56.49% Impervious, Inflow Depth > 1.03" for 1-yr event
Inflow = 12.64 cfs @ 12.20 hrs, Volume= 4.148 af
Outflow = 2.15 cfs @ 17.25 hrs, Volume= 2.889 af, Atten= 83%, Lag= 302.7 min
Primary = 2.15 cfs @ 17.25 hrs, Volume= 2.889 af
Routed to Pond 111P : dry pond 20
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 10d : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 591.82' @ 17.25 hrs Surf.Area= 78,055 sf Storage= 62,888 cf
Flood Elev= 598.00' Surf.Area= 100,533 sf Storage= 613,798 cf

Plug-Flow detention time= 592.8 min calculated for 2.888 af (70% of inflow)
Center-of-Mass det. time= 228.1 min (1,524.0 - 1,295.8)

Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	613,798 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

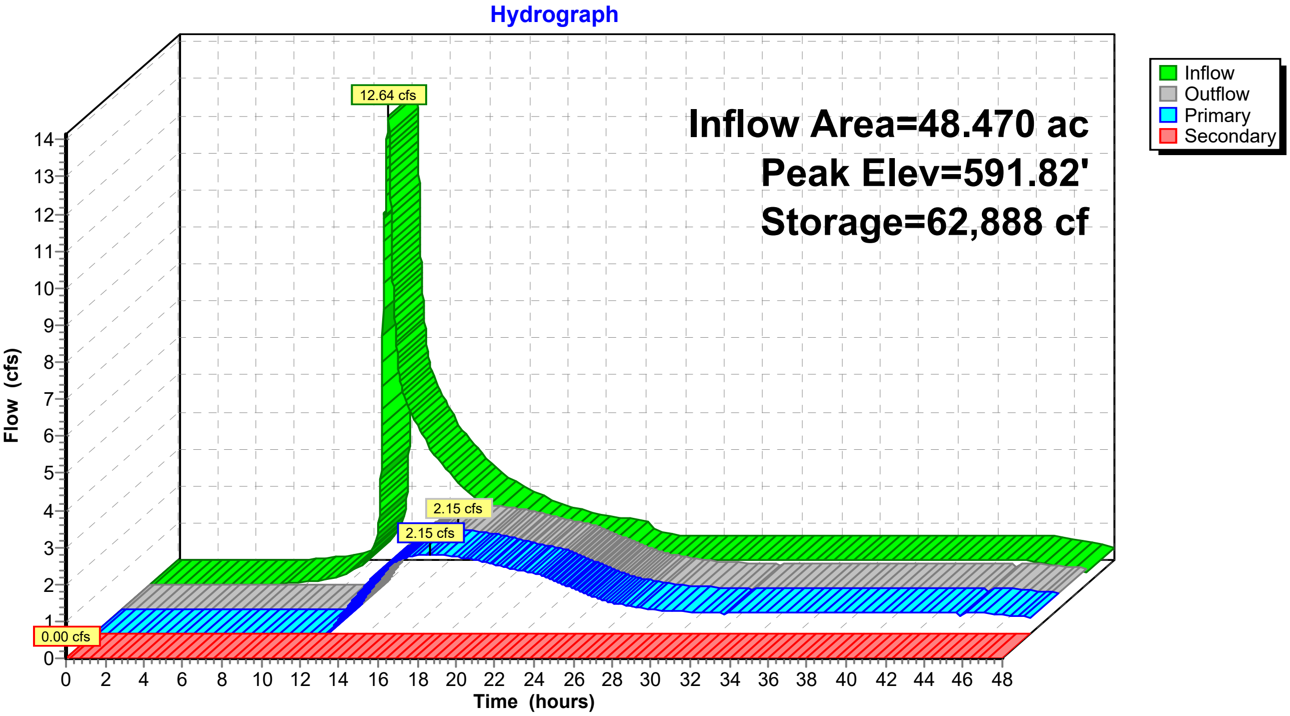
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	75,120	0	0
596.00	92,990	420,275	420,275
598.00	100,533	193,523	613,798

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**36.0" Round Culvert** L= 103.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 591.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	596.00'	**162.0 deg x 10.0' long x 2.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=2.15 cfs @ 17.25 hrs HW=591.82' TW=591.37' (Dynamic Tailwater)
↳**1=Culvert** (Barrel Controls 2.15 cfs @ 2.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=591.00' TW=592.75' (Dynamic Tailwater)
↳**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 121p: dry pond 10



Summary for Pond 122f: forebay 100 bypass

Inflow Area = 30.720 ac, 75.42% Impervious, Inflow Depth = 1.26" for 1-yr event
Inflow = 66.22 cfs @ 11.97 hrs, Volume= 3.238 af
Outflow = 63.71 cfs @ 11.98 hrs, Volume= 3.238 af, Atten= 4%, Lag= 0.5 min
Primary = 21.69 cfs @ 12.00 hrs, Volume= 1.373 af
  Routed to Pond 120P : bioretention 103
Secondary = 40.64 cfs @ 11.97 hrs, Volume= 1.843 af
  Routed to Pond 1P : forebay 100 bypass
Tertiary = 2.55 cfs @ 12.00 hrs, Volume= 0.022 af
  Routed to Pond DMH140 : DMH-140

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.15' @ 12.00 hrs Surf.Area= 8,320 sf Storage= 7,601 cf (4,796 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 24.8 min calculated for 3.173 af (98% of inflow)
Center-of-Mass det. time= 5.4 min (803.3 - 797.9)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

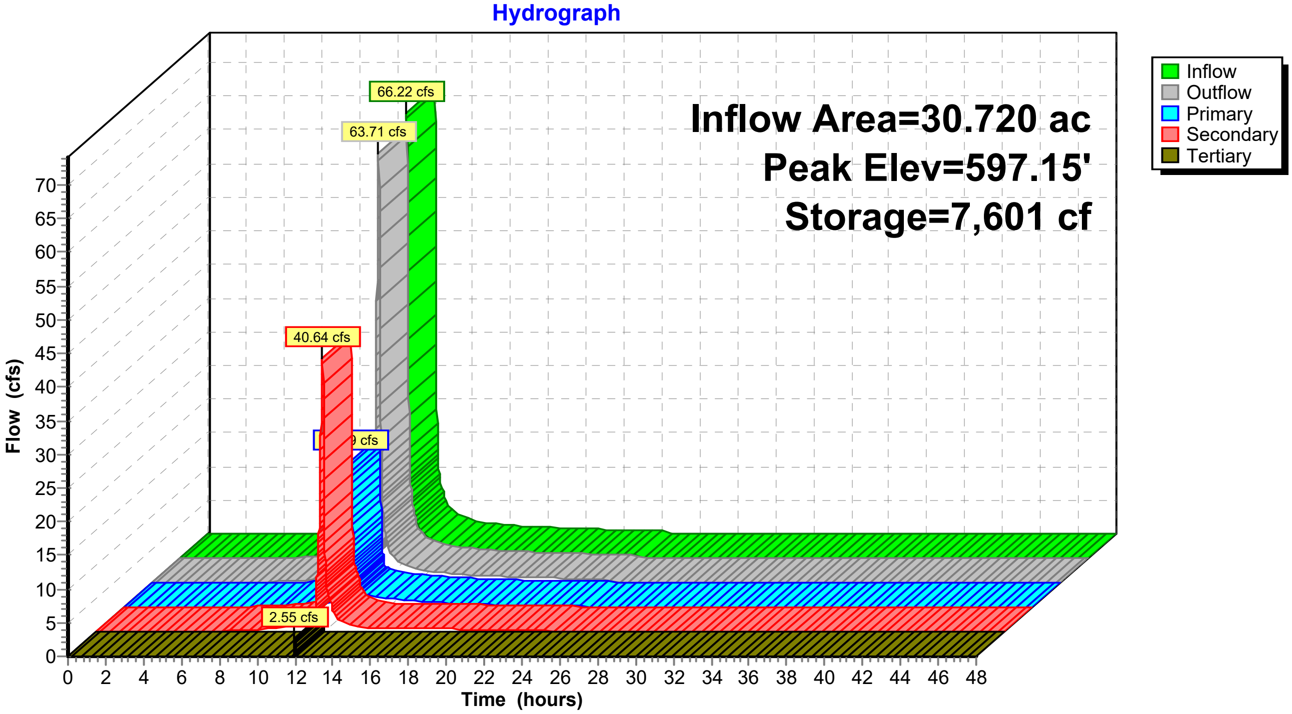
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 50.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Tertiary	595.00'	**12.0" Round Culvert to DMH-140** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 595.00' / 594.30' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Device 3	597.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=21.67 cfs @ 12.00 hrs HW=597.15' TW=596.48' (Dynamic Tailwater)
└─**1=overflow weir** (Weir Controls 21.67 cfs @ 2.35 fps)

Secondary OutFlow Max=36.23 cfs @ 11.97 hrs HW=597.13' TW=597.08' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 36.23 cfs @ 1.06 fps)

Tertiary OutFlow Max=2.55 cfs @ 12.00 hrs HW=597.15' TW=593.84' (Dynamic Tailwater)
└─**3=Culvert to DMH-140** (Passes 2.55 cfs of 4.86 cfs potential flow)
  └─**4=Grate** (Weir Controls 2.55 cfs @ 1.28 fps)

Pond 122f: forebay 100 bypass



Summary for Pond 301f: forebay 400

```
Inflow Area =         3.840 ac, 67.97% Impervious,  Inflow Depth =   1.18"    for  1-yr event
Inflow      =        7.85 cfs @   11.97 hrs,  Volume=          0.378 af
Outflow     =        6.49 cfs @   12.01 hrs,  Volume=          0.378 af,  Atten= 17%,  Lag= 2.1 min
Primary     =        6.49 cfs @   12.01 hrs,  Volume=          0.378 af
    Routed to Pond 302b : bioretention 401
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 605.00' Surf.Area= 7,090 sf Storage= 21,930 cf
Peak Elev= 605.33' @ 12.02 hrs Surf.Area= 7,396 sf Storage= 24,285 cf (2,355 cf above start)
Flood Elev= 606.50' Surf.Area= 8,500 sf Storage= 33,623 cf (11,693 cf above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 20.6 min (825.9 - 805.3)

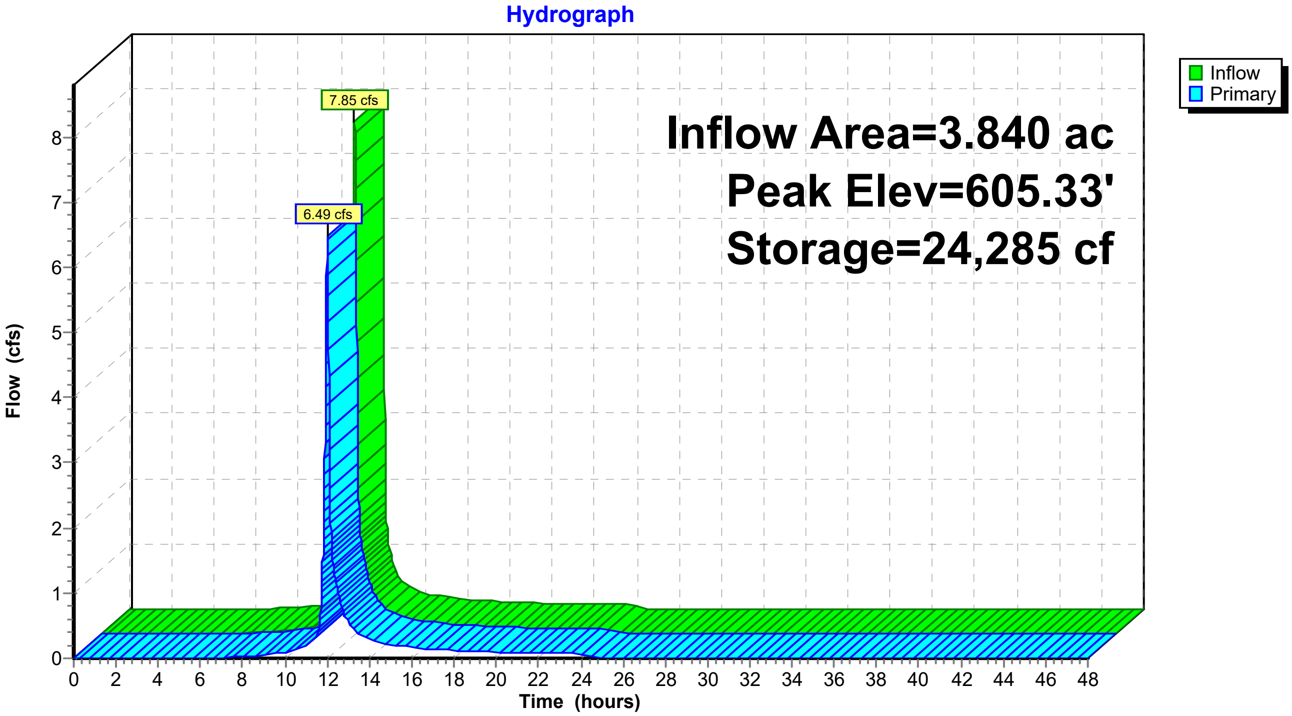
Volume	Invert	Avail.Storage	Storage Description
#1	601.00'	33,623 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.00	3,930	0	0
604.50	6,640	18,498	18,498
605.00	7,090	3,433	21,930
606.50	8,500	11,693	33,623

Device	Routing	Invert	Outlet Devices
#1	Primary	605.00'	**162.0 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=6.38 cfs @ 12.01 hrs HW=605.32' TW=605.10' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 6.38 cfs @ 1.64 fps)

Pond 301f: forebay 400



Summary for Pond 302b: bioretention 401

Inflow Area = 10.830 ac, 48.29% Impervious, Inflow Depth = 0.96" for 1-yr event
Inflow = 16.69 cfs @ 11.99 hrs, Volume= 0.868 af
Outflow = 4.84 cfs @ 12.13 hrs, Volume= 0.848 af, Atten= 71%, Lag= 8.9 min
Primary = 4.84 cfs @ 12.13 hrs, Volume= 0.848 af
Routed to Reach DP3 : DP1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach DP3 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 605.23' @ 12.13 hrs Surf.Area= 21,416 sf Storage= 15,041 cf
Flood Elev= 606.50' Surf.Area= 24,360 sf Storage= 44,085 cf

Plug-Flow detention time= 400.1 min calculated for 0.848 af (98% of inflow)
Center-of-Mass det. time= 385.9 min (1,216.3 - 830.4)

Volume	Invert	Avail.Storage	Storage Description
#1	604.50'	44,085 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

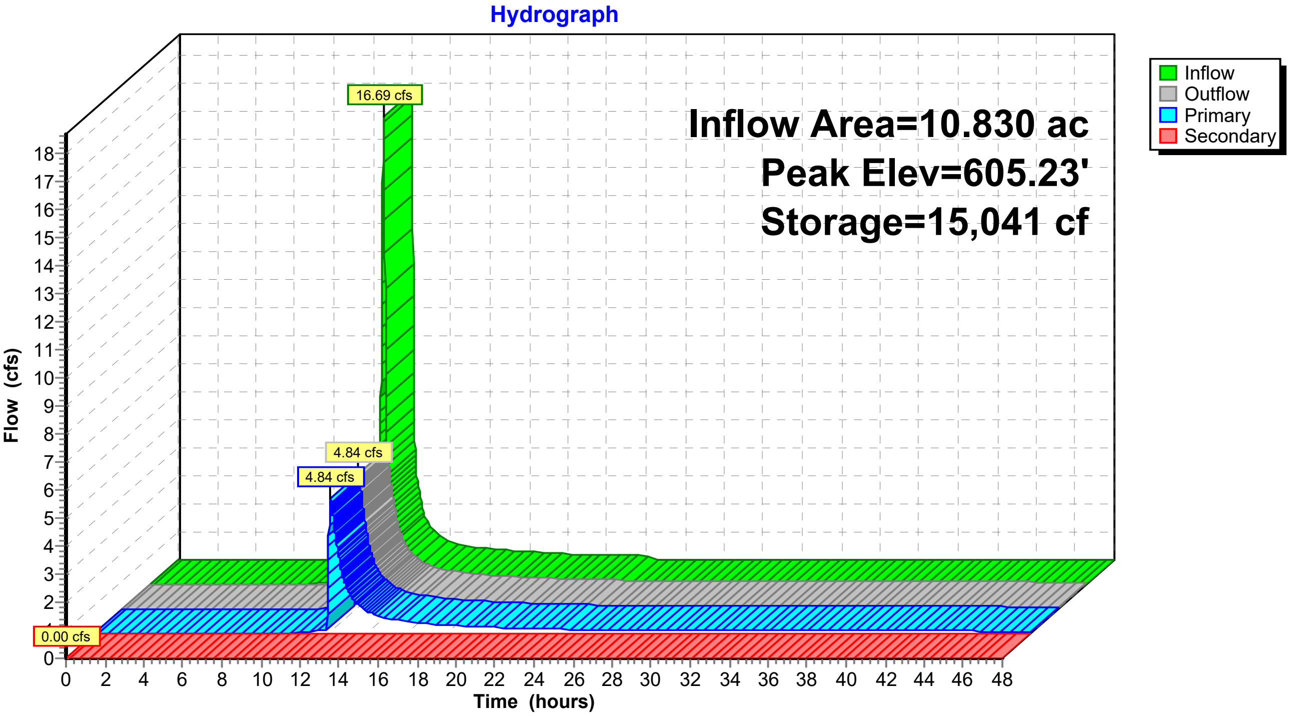
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
604.50	19,750	0	0
605.50	22,030	20,890	20,890
606.50	24,360	23,195	44,085

Device	Routing	Invert	Outlet Devices
#1	Primary	601.08'	**12.0" Round Culvert** L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 601.08' / 600.08' S= 0.0147 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	605.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	605.50'	**162.0 deg x 10.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#4	Device 1	601.08'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 4	604.50'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=4.83 cfs @ 12.13 hrs HW=605.23' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 4.83 cfs of 7.05 cfs potential flow)
  ├─**2=Grate** (Weir Controls 4.71 cfs @ 1.57 fps)
  └─**4=Underdrain** (Passes 0.12 cfs of 1.87 cfs potential flow)
    └─**5=Exfiltration through bioretention media**(Exfiltration Controls 0.12 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=604.50' TW=0.00' (Dynamic Tailwater)
└─**3=Sharp-Crested Vee/Trap Weir**(Controls 0.00 cfs)

Pond 302b: bioretention 401



Summary for Pond DMH140: DMH-140

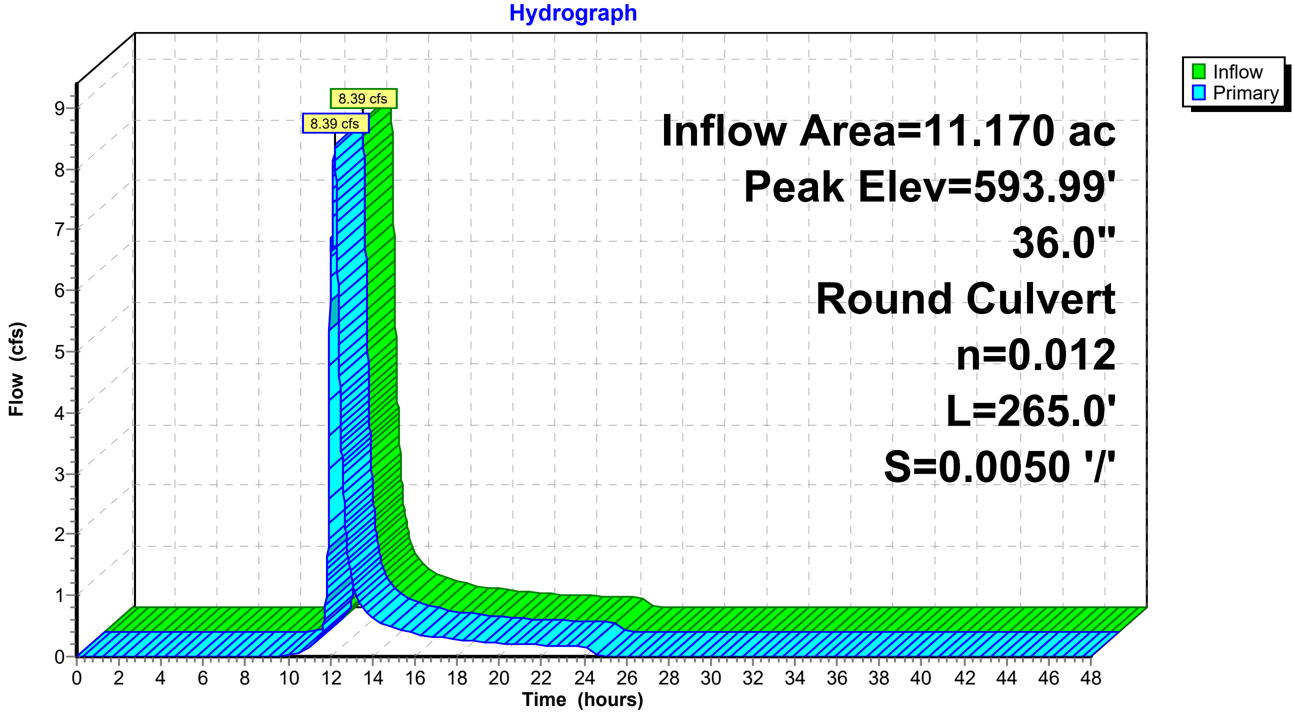
```
Inflow Area =       11.170 ac,  37.42% Impervious,  Inflow Depth =  0.81"    for  1-yr event
Inflow      =        8.39 cfs @   12.20 hrs,  Volume=            0.751 af
Outflow     =        8.39 cfs @   12.20 hrs,  Volume=            0.751 af,  Atten= 0%,  Lag= 0.0 min
Primary     =        8.39 cfs @   12.20 hrs,  Volume=            0.751 af
    Routed to Pond 121p : dry pond 10
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 593.99' @ 12.20 hrs
Flood Elev= 601.50'

```
Device  Routing          Invert  Outlet Devices
   #1   Primary         592.83'  36.0"  Round Culvert
                                 L= 265.0'   CPP, square edge headwall,  Ke= 0.500
                                 Inlet / Outlet Invert= 592.83' / 591.50'   S= 0.0050 '/'   Cc= 0.900
                                 n= 0.012  Corrugated PP, smooth interior,  Flow Area= 7.07 sf
```

Primary OutFlow Max=8.39 cfs @ 12.20 hrs HW=593.99' TW=591.23' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 8.39 cfs @ 4.92 fps)

Pond DMH140: DMH-140



Summary for Pond DMH142: DMH-142

Inflow Area =	11.170 ac, 37.42% Impervious, Inflow Depth = 0.78" for 1-yr event		
Inflow =	8.39 cfs @ 12.20 hrs, Volume=	0.729 af	
Outflow =	8.39 cfs @ 12.20 hrs, Volume=	0.729 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.39 cfs @ 12.20 hrs, Volume=	0.729 af	

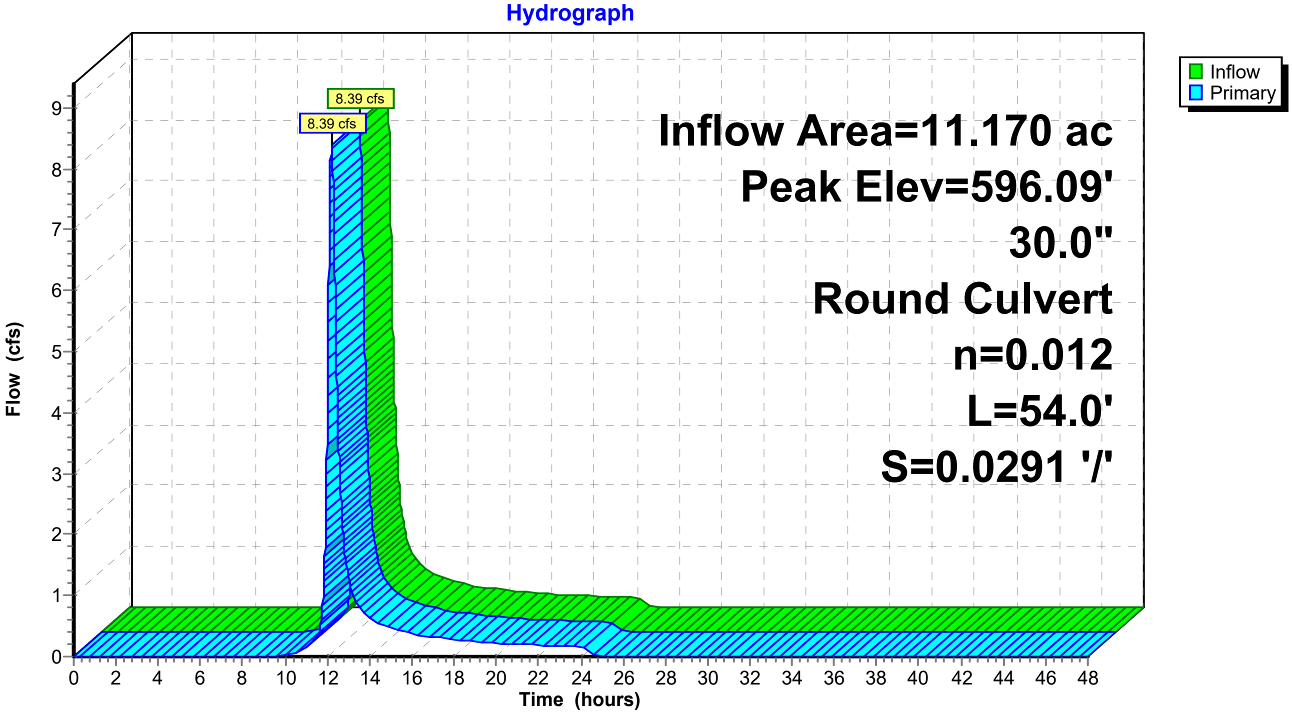
Routed to Pond DMH140 : DMH-140

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.09' @ 12.20 hrs
Flood Elev= 601.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	594.91'	**30.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 594.91' / 593.34' S= 0.0291 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=8.39 cfs @ 12.20 hrs HW=596.09' TW=593.99' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 8.39 cfs @ 3.69 fps)

Pond DMH142: DMH-142



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment100: Runoff Area=24.040 ac 21.88% Impervious Runoff Depth=1.41"
Flow Length=870' Tc=41.8 min CN=83 Runoff=23.33 cfs 2.834 af

Subcatchment101: Runoff Area=26.590 ac 6.54% Impervious Runoff Depth=1.35"
Flow Length=2,403' Tc=81.0 min CN=82 Runoff=14.92 cfs 2.986 af

Subcatchment102: Runoff Area=11.170 ac 37.42% Impervious Runoff Depth=1.78"
Flow Length=810' Tc=25.1 min CN=88 Runoff=19.41 cfs 1.659 af

Subcatchment110: Runoff Area=8.800 ac 0.00% Impervious Runoff Depth=1.41"
Flow Length=175' Tc=31.0 min CN=83 Runoff=10.46 cfs 1.037 af

Subcatchment111: Runoff Area=15.540 ac 2.25% Impervious Runoff Depth=1.16"
Flow Length=405' Tc=69.9 min CN=79 Runoff=8.22 cfs 1.501 af

Subcatchment112: Runoff Area=22.280 ac 93.27% Impervious Runoff Depth=2.62"
Tc=6.0 min CN=97 Runoff=91.63 cfs 4.862 af

Subcatchment113: Runoff Area=4.290 ac 88.58% Impervious Runoff Depth=2.51"
Tc=6.0 min CN=96 Runoff=17.30 cfs 0.898 af

Subcatchment114: Runoff Area=8.730 ac 58.42% Impervious Runoff Depth=2.12"
Tc=6.0 min CN=92 Runoff=31.56 cfs 1.545 af

Subcatchment115: Runoff Area=1.080 ac 0.00% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=84 Runoff=2.86 cfs 0.134 af

Subcatchment116: Runoff Area=1.100 ac 0.00% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=84 Runoff=2.91 cfs 0.136 af

Subcatchment117: Runoff Area=6.250 ac 0.00% Impervious Runoff Depth=1.10"
Tc=6.0 min CN=78 Runoff=12.30 cfs 0.573 af

Subcatchment118: Runoff Area=1.450 ac 0.00% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=84 Runoff=3.84 cfs 0.179 af

Subcatchment119: Runoff Area=1.070 ac 0.00% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=84 Runoff=2.84 cfs 0.132 af

Subcatchment120: Runoff Area=1.360 ac 2.21% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=84 Runoff=3.60 cfs 0.168 af

Subcatchment121: Runoff Area=2.700 ac 0.00% Impervious Runoff Depth=1.48"
Tc=6.0 min CN=84 Runoff=7.15 cfs 0.334 af

Subcatchment122: Runoff Area=30.720 ac 75.42% Impervious Runoff Depth=2.41"
Tc=6.0 min CN=95 Runoff=121.04 cfs 6.170 af

```
Subcatchment200:                    Runoff Area=21.200 ac  20.19% Impervious  Runoff Depth=1.41"
                           Flow Length=1,930'  Tc=118.0 min  CN=83  Runoff=9.46 cfs  2.499 af

Subcatchment300:                    Runoff Area=29.510 ac  12.27% Impervious  Runoff Depth=1.41"
                           Flow Length=1,170'  Tc=56.0 min  CN=83  Runoff=23.07 cfs  3.478 af

Subcatchment301:                     Runoff Area=3.840 ac  67.97% Impervious  Runoff Depth=2.31"
                                             Tc=6.0 min  CN=94  Runoff=14.74 cfs  0.740 af

Subcatchment302:                     Runoff Area=6.990 ac  37.48% Impervious  Runoff Depth=1.86"
                                             Tc=6.0 min  CN=89  Runoff=22.76 cfs  1.086 af

Subcatchment400:                    Runoff Area=19.850 ac  5.84% Impervious  Runoff Depth=1.22"
                           Flow Length=1,438'  Tc=66.6 min  CN=80  Runoff=11.54 cfs  2.018 af

Reach DP1: DP1                                                     Inflow=15.50 cfs  6.850 af
                                                                  Outflow=15.50 cfs  6.850 af

Reach DP2: DP1                                                     Inflow=23.57 cfs  4.916 af
                                                                  Outflow=23.57 cfs  4.916 af

Reach DP3: DP1                                                     Inflow=30.37 cfs  5.281 af
                                                                  Outflow=30.37 cfs  5.281 af

Reach DP4: DP1                                                     Inflow=11.54 cfs  2.018 af
                                                                  Outflow=11.54 cfs  2.018 af

Pond 1P: forebay 100 bypass           Peak Elev=597.37'  Storage=9,514 cf  Inflow=73.52 cfs  2.938 af
              Primary=34.07 cfs  1.649 af  Secondary=36.07 cfs  1.289 af  Outflow=69.01 cfs  2.938 af

Pond 2P: forebay 100 bypass           Peak Elev=597.36'  Storage=9,343 cf  Inflow=36.07 cfs  1.289 af
                                                                  Outflow=32.77 cfs  1.289 af

Pond 10d: depression                 Peak Elev=593.58'  Storage=15,896 cf  Inflow=23.33 cfs  2.834 af
               Primary=0.53 cfs  0.416 af  Secondary=19.43 cfs  2.417 af  Outflow=19.95 cfs  2.833 af

Pond 102d: depression                   Peak Elev=599.31'  Storage=670 cf  Inflow=19.41 cfs  1.659 af
                     30.0"  Round Culvert  n=0.012  L=72.0'  S=0.0290 '/'  Outflow=19.33 cfs  1.659 af

Pond 110P: dry pond 30               Peak Elev=591.67'  Storage=146,154 cf  Inflow=10.52 cfs  6.803 af
                                                                   Outflow=1.84 cfs  3.448 af

Pond 111P: dry pond 20              Peak Elev=592.27'  Storage=473,056 cf  Inflow=65.76 cfs  15.366 af
                    15.0"  Round Culvert  n=0.012  L=154.0'  S=0.0000 '/'  Outflow=2.29 cfs  5.766 af

Pond 112F: forebay 200              Peak Elev=597.31'  Storage=138,610 cf  Inflow=91.63 cfs  4.862 af
Primary=29.29 cfs  2.140 af  Secondary=29.28 cfs  2.139 af  Tertiary=18.99 cfs  0.584 af  Outflow=77.49 cfs  4.862 af

Pond 113F: forebay 300               Peak Elev=598.21'  Storage=20,920 cf  Inflow=17.30 cfs  0.898 af
                                                                  Outflow=13.72 cfs  0.898 af
```

Pond 114b: bioretention 301 Peak Elev=598.18' Storage=41,005 cf Inflow=45.11 cfs 2.443 af
Primary=0.21 cfs 0.650 af Secondary=23.20 cfs 1.753 af Outflow=23.41 cfs 2.403 af

Pond 115b: bioretention 201 Peak Elev=596.99' Storage=38,717 cf Inflow=31.97 cfs 2.273 af
Primary=0.23 cfs 0.758 af Secondary=13.39 cfs 1.463 af Outflow=13.62 cfs 2.222 af

Pond 116P: bioretention 202 Peak Elev=596.99' Storage=38,737 cf Inflow=32.01 cfs 2.275 af
Primary=0.23 cfs 0.758 af Secondary=13.41 cfs 1.465 af Outflow=13.64 cfs 2.223 af

Pond 117P: depression Peak Elev=599.53' Storage=24,966 cf Inflow=12.30 cfs 0.573 af
Outflow=0.00 cfs 0.000 af

Pond 118b: bioretention 101 Peak Elev=597.16' Storage=43,133 cf Inflow=36.52 cfs 1.468 af
Primary=0.22 cfs 0.706 af Secondary=4.16 cfs 0.698 af Outflow=4.38 cfs 1.403 af

Pond 119P: bioretention 102 Peak Elev=597.16' Storage=45,482 cf Inflow=40.92 cfs 2.478 af
Primary=0.23 cfs 0.747 af Secondary=8.31 cfs 1.663 af Outflow=8.54 cfs 2.410 af

Pond 120P: bioretention 103 Peak Elev=597.13' Storage=42,593 cf Inflow=42.28 cfs 4.857 af
Primary=0.23 cfs 0.725 af Secondary=20.13 cfs 4.068 af Outflow=20.35 cfs 4.793 af

Pond 121p: dry pond 10 Peak Elev=592.67' Storage=130,835 cf Inflow=44.29 cfs 8.447 af
Primary=9.72 cfs 6.434 af Secondary=0.00 cfs 0.000 af Outflow=9.72 cfs 6.434 af

Pond 122f: forebay 100 bypass Peak Elev=597.45' Storage=10,176 cf Inflow=121.04 cfs 6.170 af
Primary=38.75 cfs 3.026 af Secondary=73.52 cfs 2.938 af Tertiary=5.28 cfs 0.207 af Outflow=116.69 cfs 6.170 af

Pond 301f: forebay 400 Peak Elev=605.80' Storage=27,866 cf Inflow=14.74 cfs 0.740 af
Outflow=8.50 cfs 0.740 af

Pond 302b: bioretention 401 Peak Elev=605.79' Storage=27,339 cf Inflow=31.25 cfs 1.825 af
Primary=7.51 cfs 1.680 af Secondary=5.48 cfs 0.123 af Outflow=12.98 cfs 1.803 af

Pond DMH140: DMH-140 Peak Elev=594.86' Inflow=22.25 cfs 1.866 af
36.0" Round Culvert n=0.012 L=265.0' S=0.0050 '/' Outflow=22.25 cfs 1.866 af

Pond DMH142: DMH-142 Peak Elev=596.85' Inflow=19.33 cfs 1.659 af
30.0" Round Culvert n=0.012 L=54.0' S=0.0291 '/' Outflow=19.33 cfs 1.659 af

Total Runoff Area = 248.560 ac Runoff Volume = 34.970 af Average Runoff Depth = 1.69"
68.34% Pervious = 169.860 ac 31.66% Impervious = 78.700 ac

Summary for Subcatchment 100:

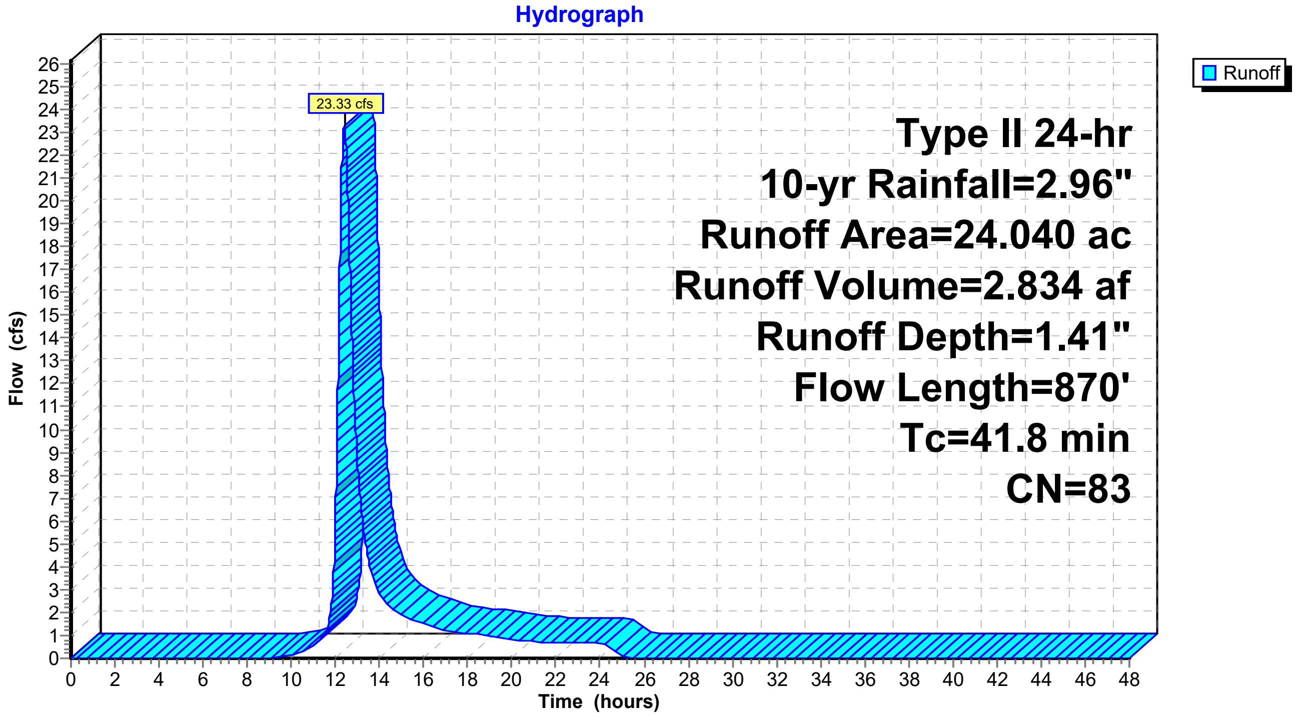
Runoff = 23.33 cfs @ 12.40 hrs, Volume= 2.834 af, Depth= 1.41"
Routed to Pond 10d : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	1.200	79	Woods, Fair, HSG D
	14.030	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	2.670	79	Woods, Fair, HSG D Offsite
*	0.870	84	50-75% Grass cover, Fair, HSG D Offsite
*	5.260	98	Impervious Offsite
*	0.010	91	Gravel roads, HSG D Offsite
	24.040	83	Weighted Average
	18.780		78.12% Pervious Area
	5.260		21.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	100	0.0100	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
25.9	770	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
41.8	870	Total			

Subcatchment 100:



Summary for Subcatchment 101:

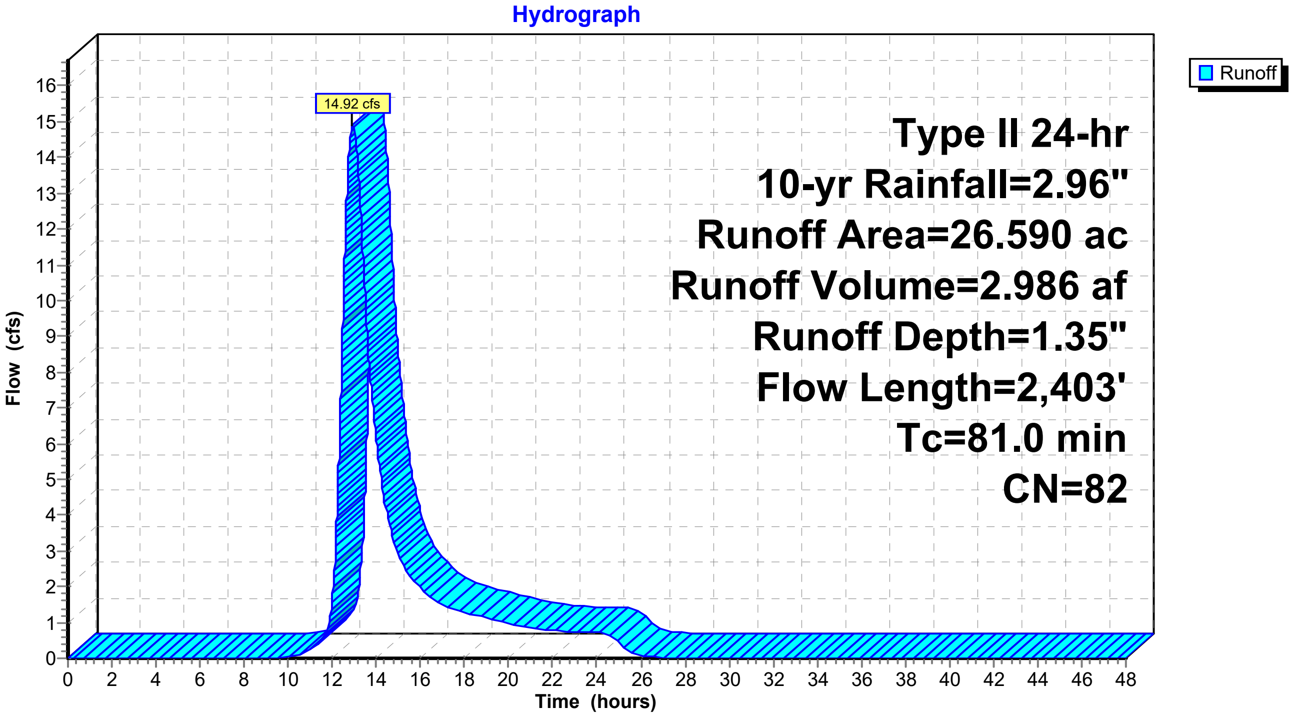
Runoff = 14.92 cfs @ 12.88 hrs, Volume= 2.986 af, Depth= 1.35"
Routed to Reach DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	5.590	79	Woods, Fair, HSG D
	9.870	78	Meadow, non-grazed, HSG D
*	0.480	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	9.390	84	50-75% Grass cover, Fair, HSG D Offsite
*	1.260	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	26.590	82	Weighted Average
	24.850		93.46% Pervious Area
	1.740		6.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
66.6	100	0.0079	0.03		**Sheet Flow, A-B** Woods: Dense underbrush n= 0.800 P2= 2.12"
4.4	160	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.0	113	0.0010	0.47		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
1.2	520	0.0070	6.99	136.26	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.025 Earth, clean & winding
4.8	1,510	0.0030	5.20	101.36	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
81.0	2,403	Total			

Subcatchment 101:



Summary for Subcatchment 102:

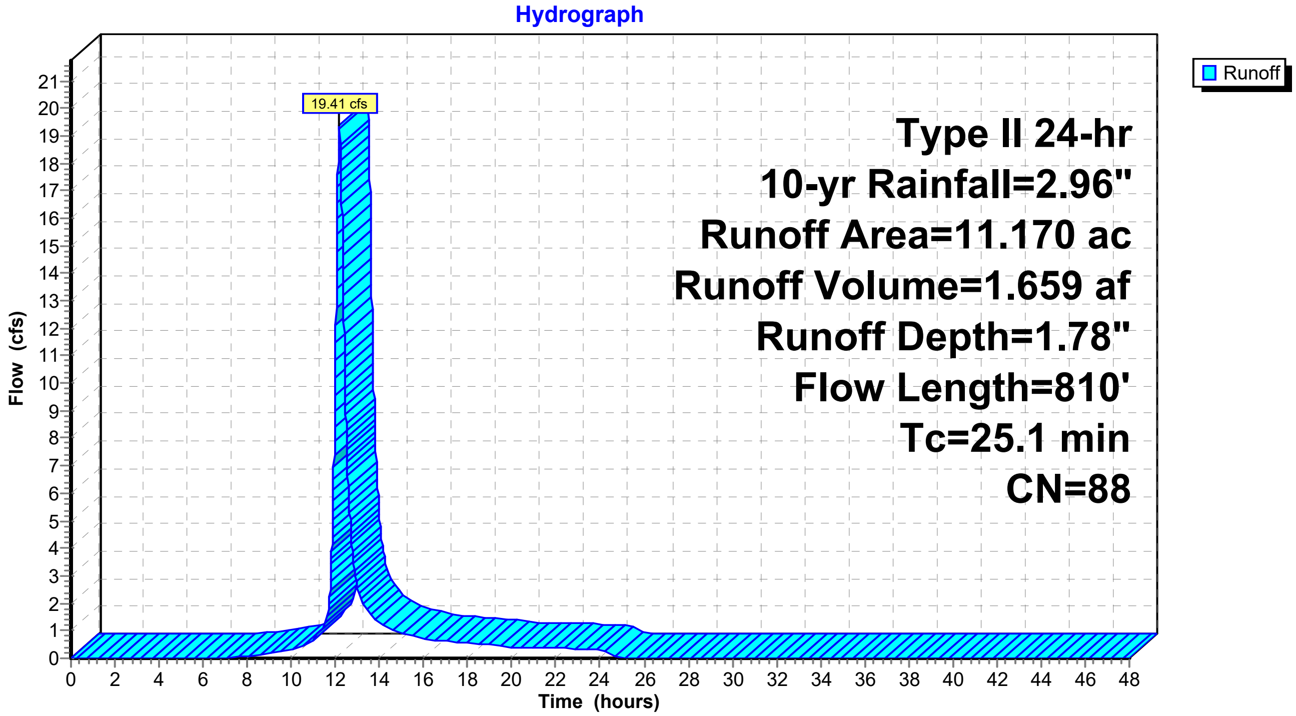
```
Runoff      =       19.41 cfs @   12.19 hrs,  Volume=          1.659 af,  Depth=  1.78"
    Routed to Pond 102d : depression
```

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	1.010	79	Woods, Fair, HSG D
	0.880	78	Meadow, non-grazed, HSG D
	2.320	84	50-75% Grass cover, Fair, HSG D
*	0.040	98	Impervious
	0.030	91	Gravel roads, HSG D
*	0.620	79	Woods, Fair, HSG D Offsite
*	2.130	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.140	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	11.170	88	Weighted Average
	6.990		62.58% Pervious Area
	4.180		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0700	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
9.1	420	0.0120	0.77		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	130	0.0250	1.11		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.4	160	0.0125	0.78		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
25.1	810	Total			

Subcatchment 102:



Summary for Subcatchment 110:

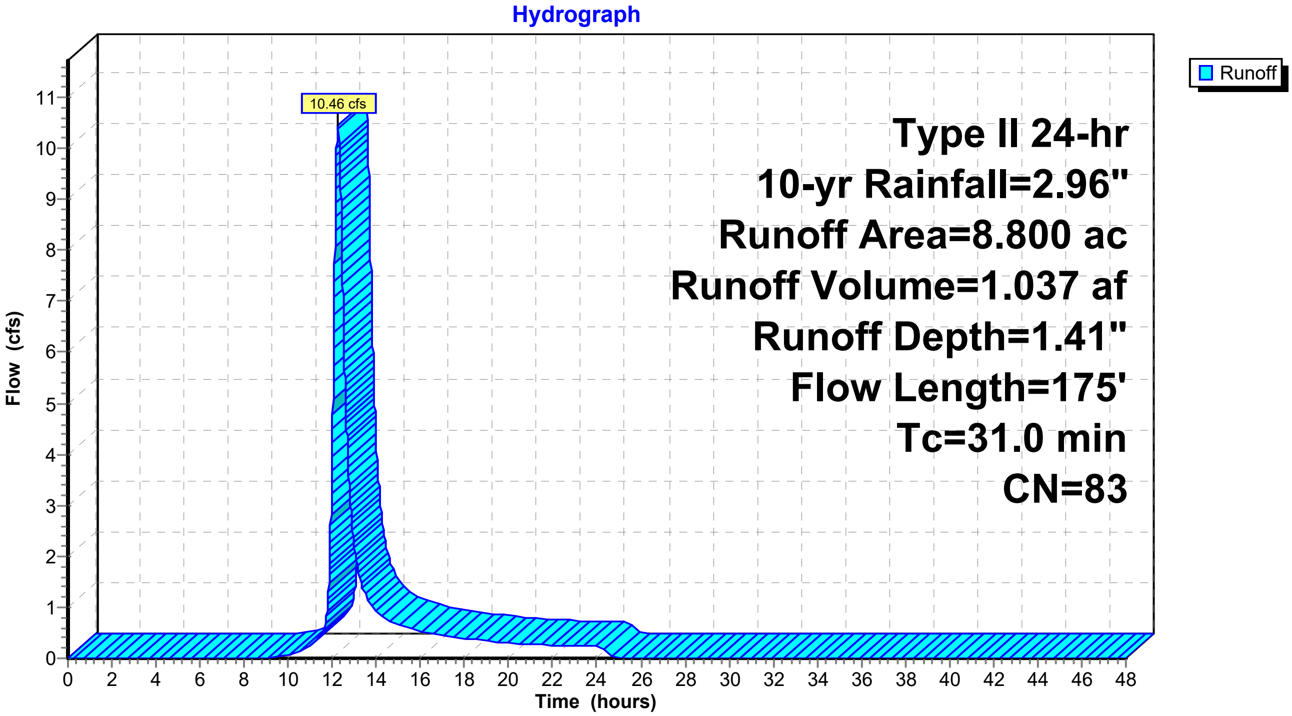
Runoff = 10.46 cfs @ 12.26 hrs, Volume= 1.037 af, Depth= 1.41"
Routed to Pond 110P : dry pond 30

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.950	78	Meadow, non-grazed, HSG D
	6.850	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	8.800	83	Weighted Average
	8.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.7	100	0.0021	0.06		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
1.3	75	0.0180	0.94		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
31.0	175	Total			

Subcatchment 110:



Summary for Subcatchment 111:

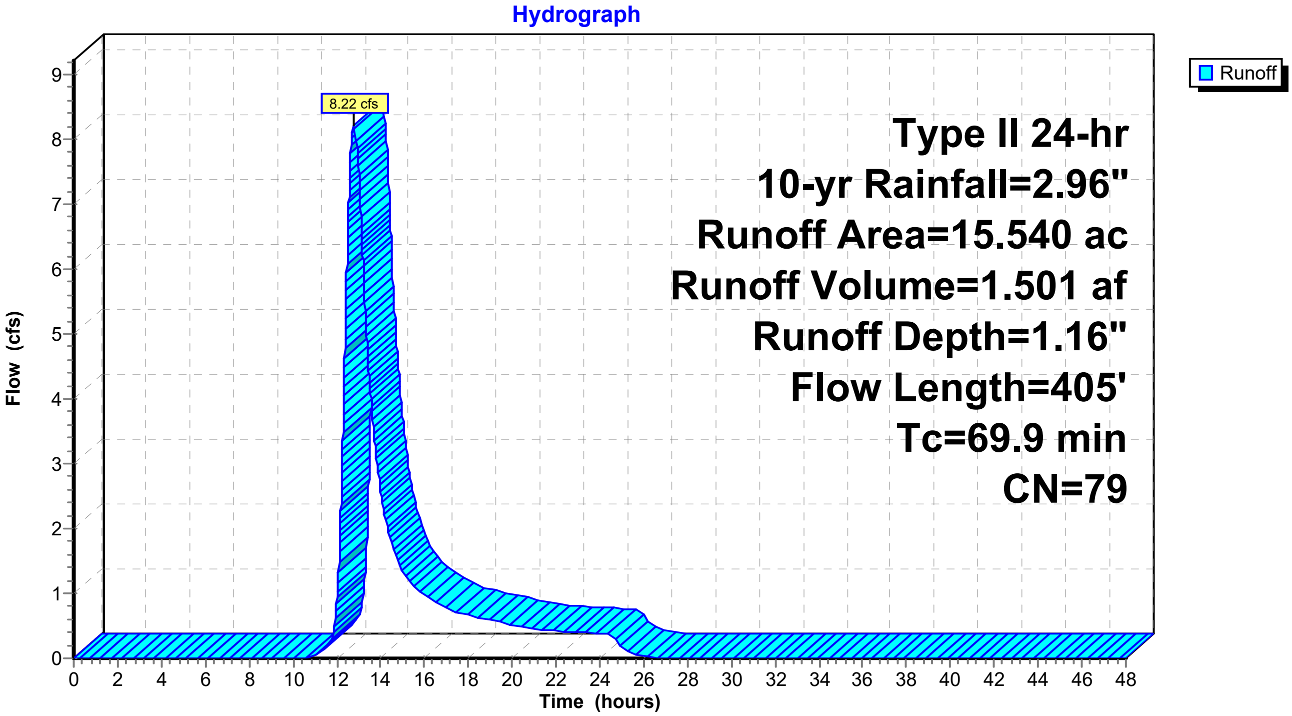
Runoff = 8.22 cfs @ 12.81 hrs, Volume= 1.501 af, Depth= 1.16"
Routed to Pond 111P : dry pond 20

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	1.040	79	Woods, Fair, HSG D
	14.150	78	Meadow, non-grazed, HSG D
*	0.350	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	15.540	79	Weighted Average
	15.190		97.75% Pervious Area
	0.350		2.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.8	100	0.0027	0.03		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
9.5	255	0.0080	0.45		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.6	50	0.0054	0.51		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
69.9	405	Total			

Subcatchment 111:



Summary for Subcatchment 112:

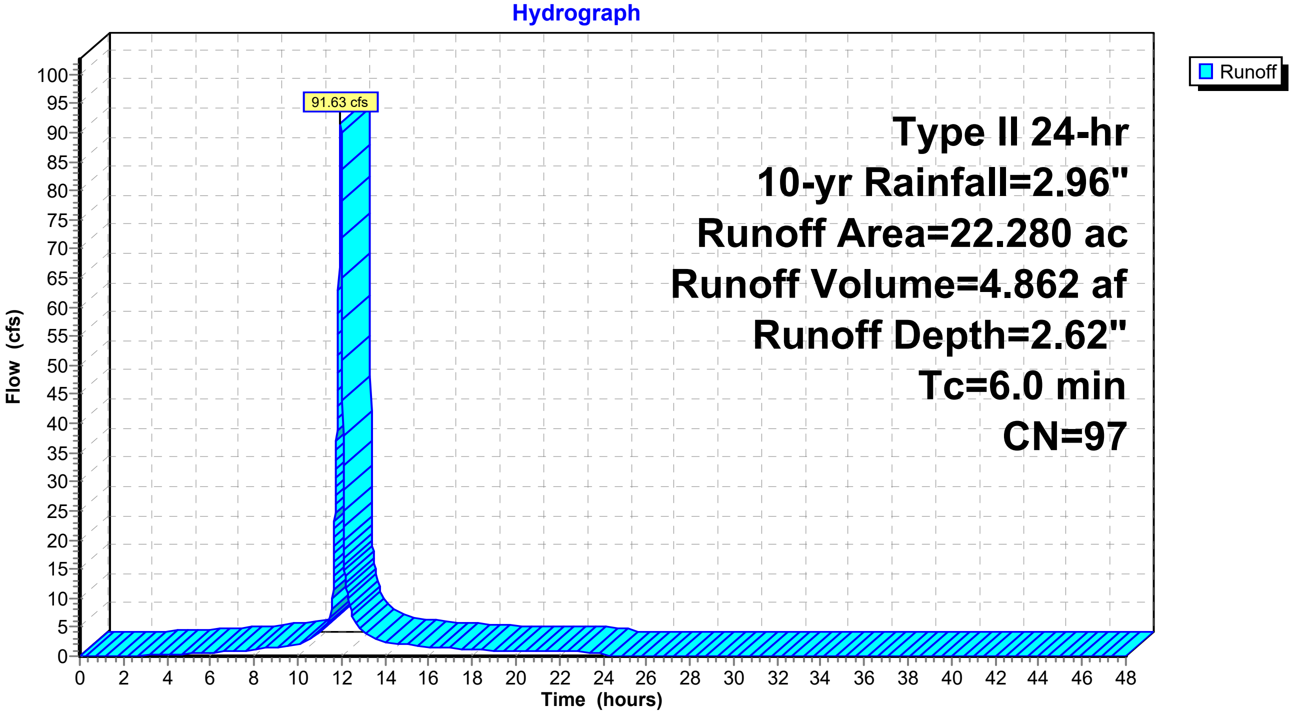
Runoff = 91.63 cfs @ 11.97 hrs, Volume= 4.862 af, Depth= 2.62"
Routed to Pond 112F : forebay 200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.480	84	50-75% Grass cover, Fair, HSG D
*	19.970	98	Impervious
*	0.810	98	Forebay WSE
	0.020	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	22.280	97	Weighted Average
	1.500		6.73% Pervious Area
	20.780		93.27% Impervious Area

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

Subcatchment 112:



Summary for Subcatchment 113:

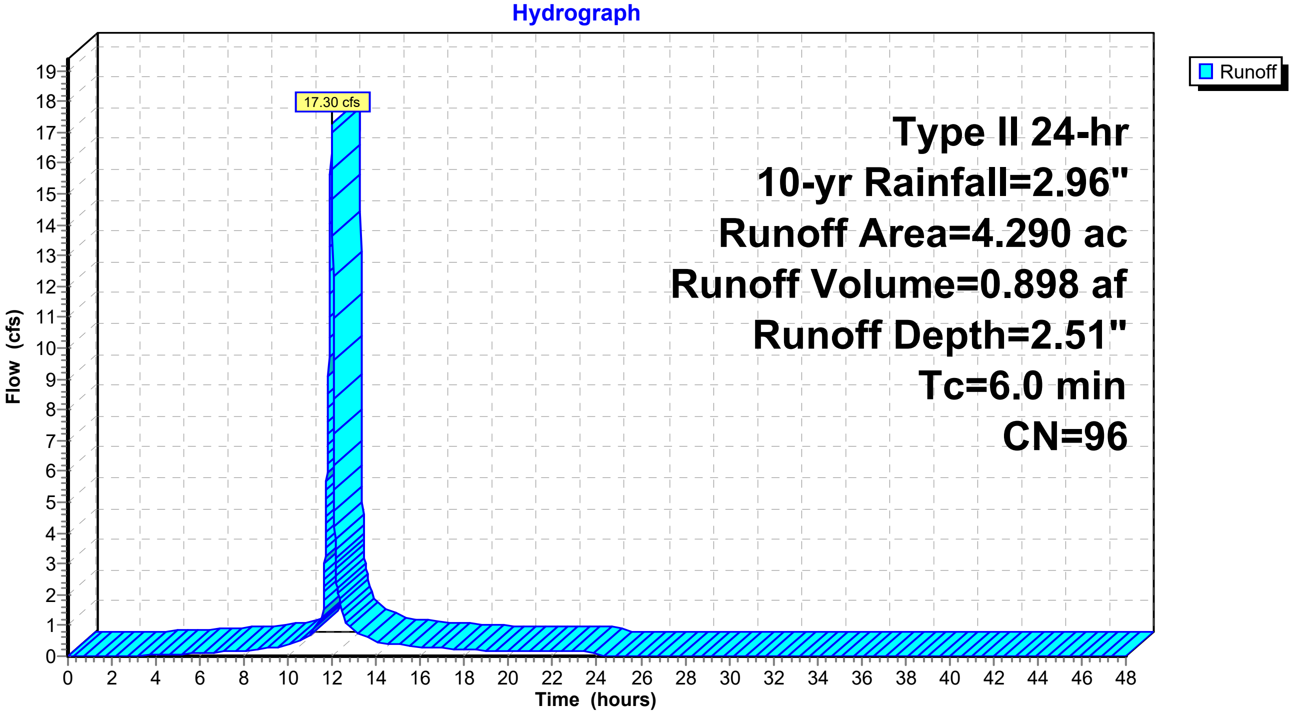
Runoff = 17.30 cfs @ 11.97 hrs, Volume= 0.898 af, Depth= 2.51"
Routed to Pond 113F : forebay 300

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	0.490	84	50-75% Grass cover, Fair, HSG D
*	3.680	98	Impervious
*	0.120	98	Forebay WSE
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	4.290	96	Weighted Average
	0.490		11.42% Pervious Area
	3.800		88.58% Impervious Area

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

Subcatchment 113:



Summary for Subcatchment 114:

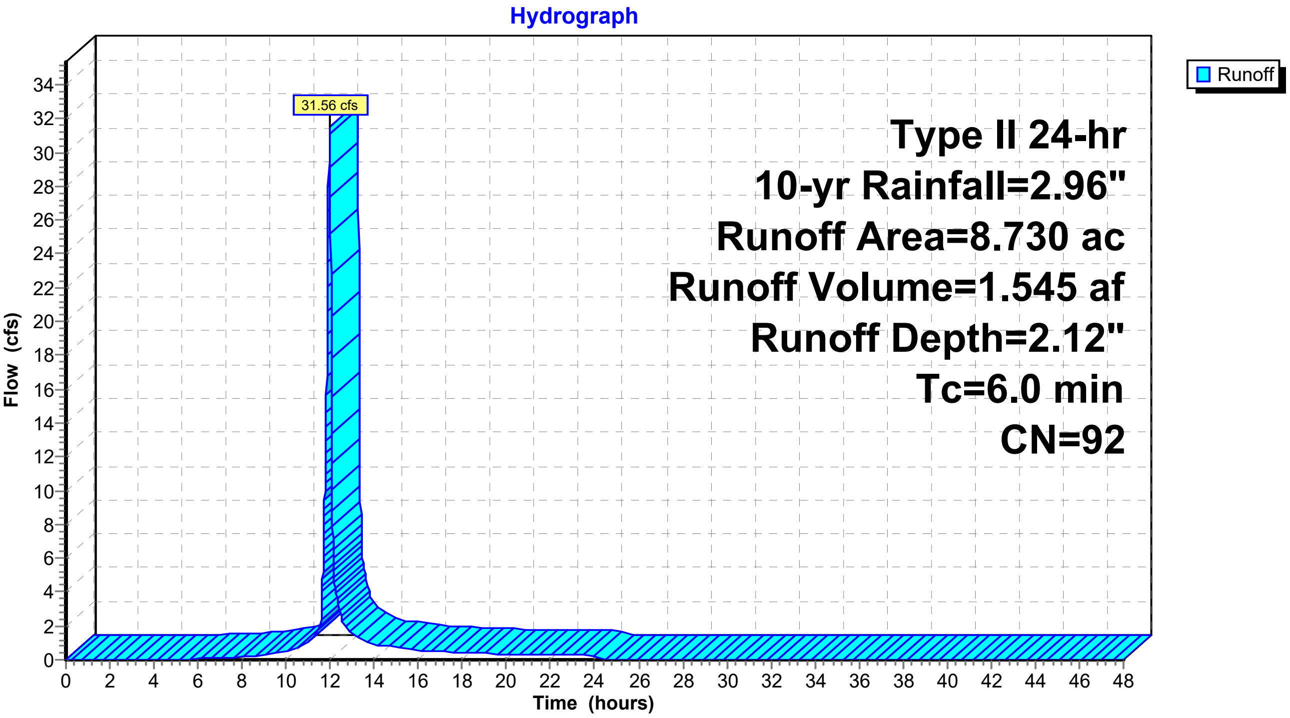
Runoff = 31.56 cfs @ 11.97 hrs, Volume= 1.545 af, Depth= 2.12"
Routed to Pond 114b : bioretention 301

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	3.560	84	50-75% Grass cover, Fair, HSG D
*	5.100	98	Impervious
	0.070	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	8.730	92	Weighted Average
	3.630		41.58% Pervious Area
	5.100		58.42% Impervious Area

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

Subcatchment 114:



Summary for Subcatchment 115:

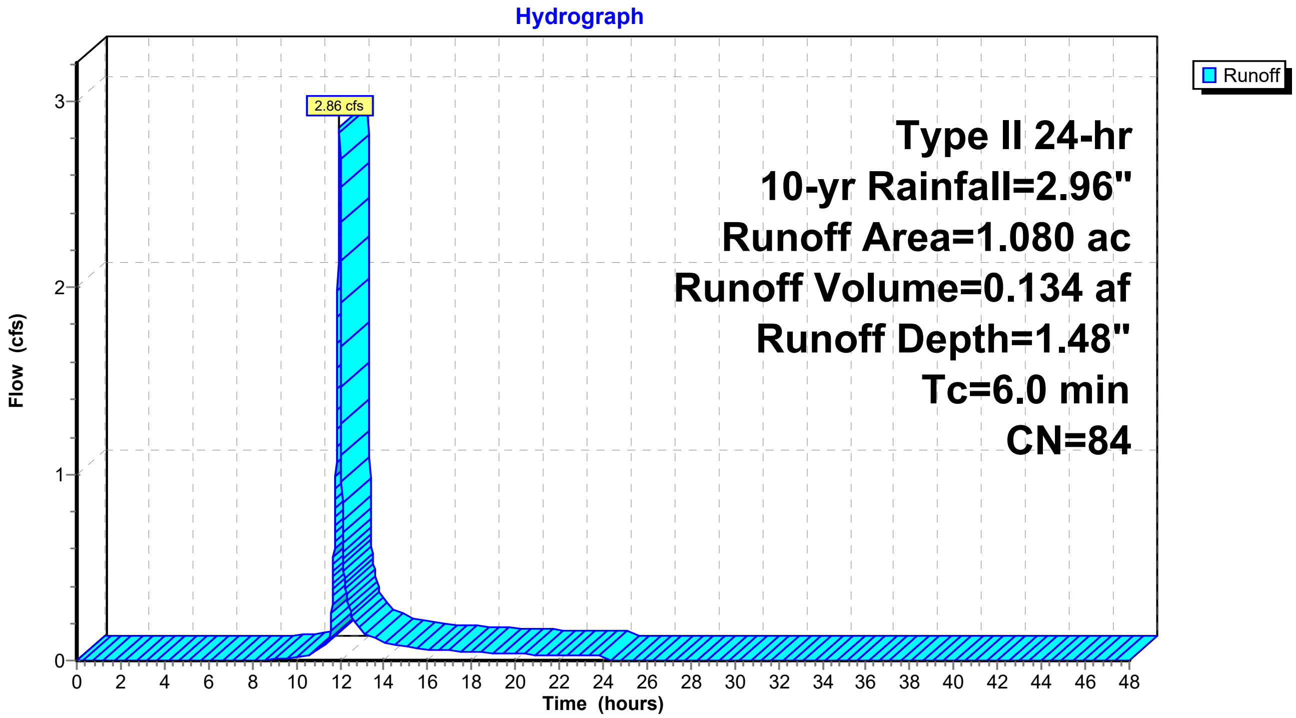
Runoff = 2.86 cfs @ 11.97 hrs, Volume= 0.134 af, Depth= 1.48"
Routed to Pond 115b : bioretention 201

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.080	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.080	84	Weighted Average
	1.080		100.00% Pervious Area

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

Subcatchment 115:



Summary for Subcatchment 116:

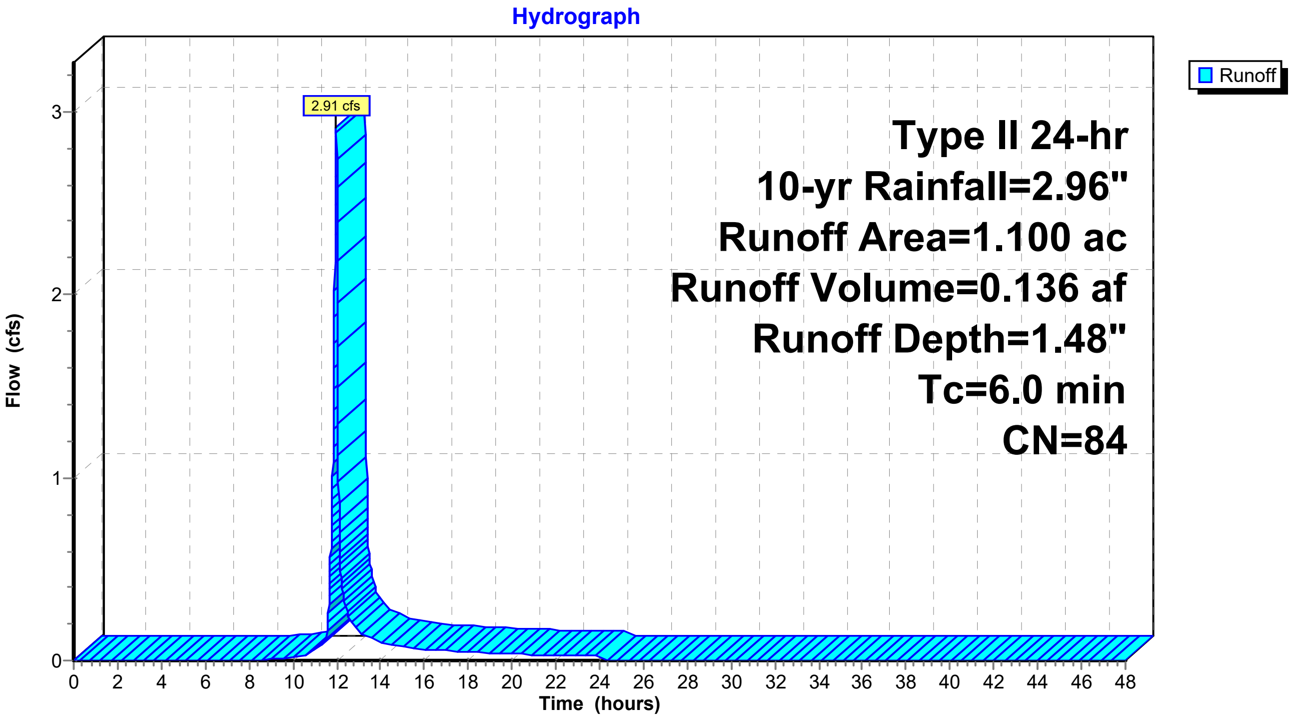
Runoff = 2.91 cfs @ 11.97 hrs, Volume= 0.136 af, Depth= 1.48"
Routed to Pond 116P : bioretention 202

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.100	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.100	84	Weighted Average
	1.100		100.00% Pervious Area

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

Subcatchment 116:



Summary for Subcatchment 117:

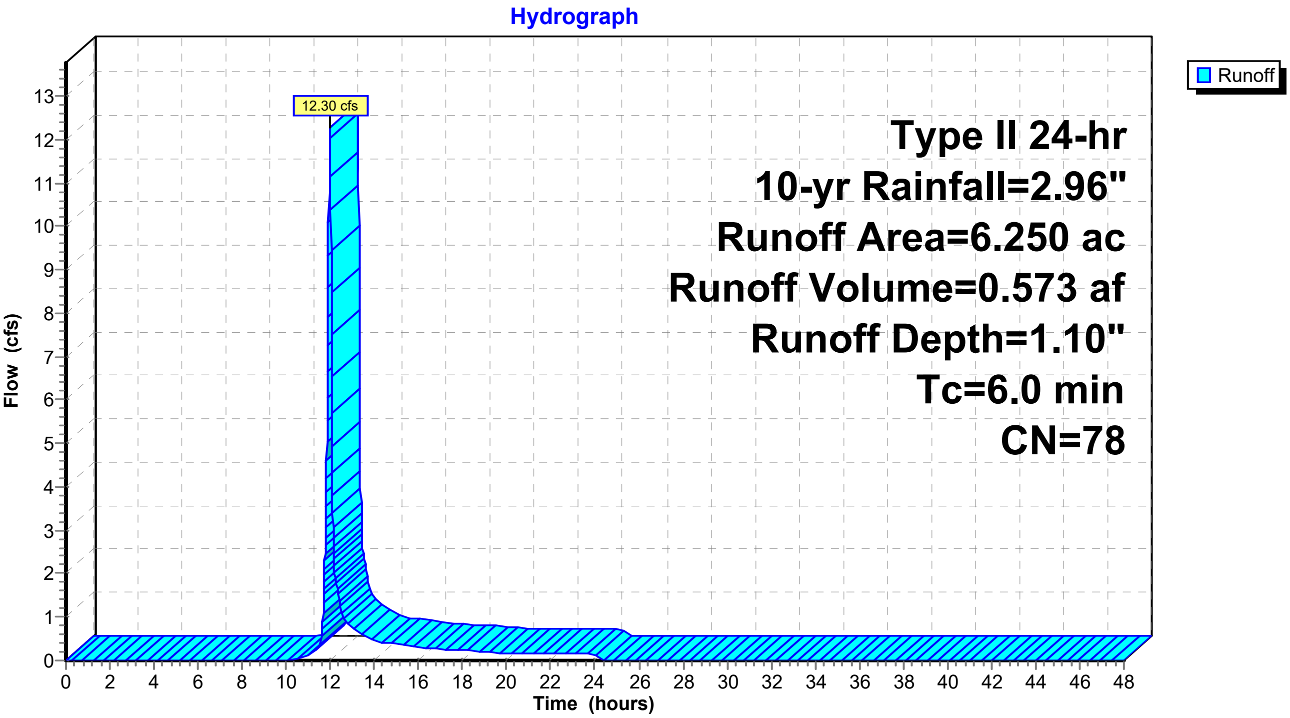
Runoff = 12.30 cfs @ 11.98 hrs, Volume= 0.573 af, Depth= 1.10"
Routed to Pond 117P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	6.250	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	6.250	78	Weighted Average
	6.250		100.00% Pervious Area

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

Subcatchment 117:



Summary for Subcatchment 118:

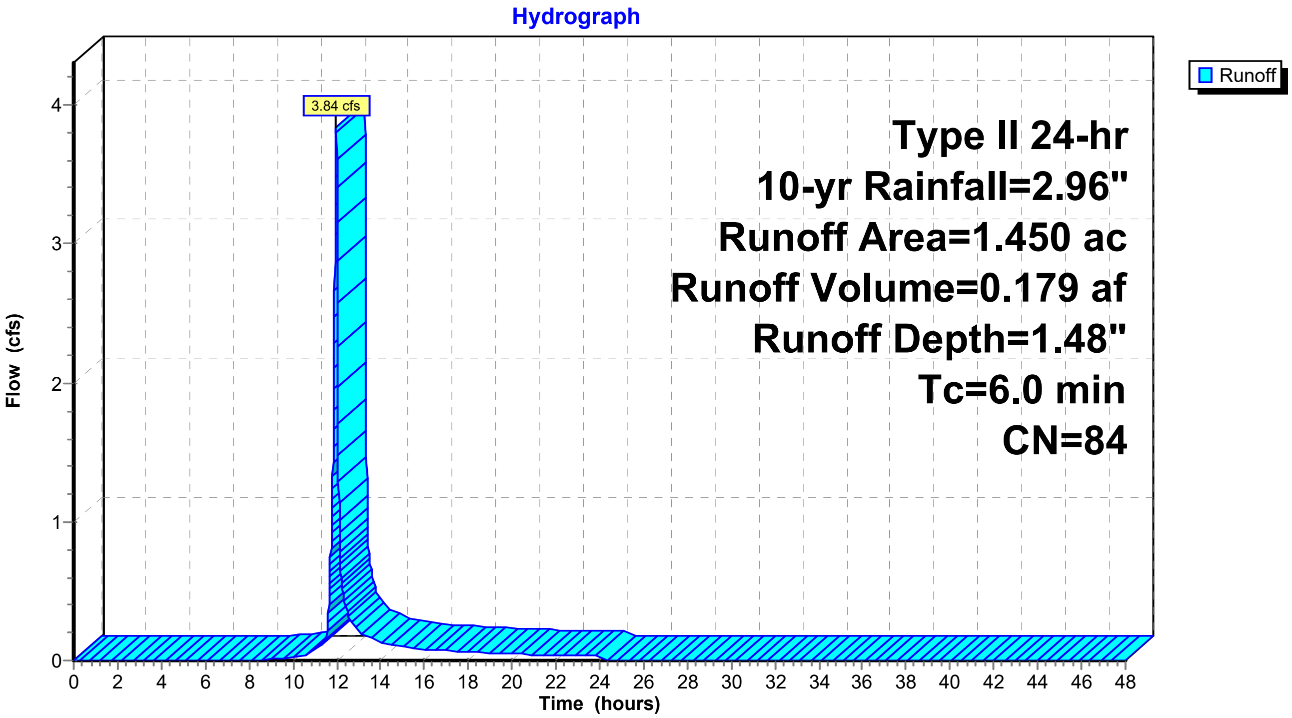
Runoff = 3.84 cfs @ 11.97 hrs, Volume= 0.179 af, Depth= 1.48"
Routed to Pond 118b : bioretention 101

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.450	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.450	84	Weighted Average
	1.450		100.00% Pervious Area

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

Subcatchment 118:



Summary for Subcatchment 119:

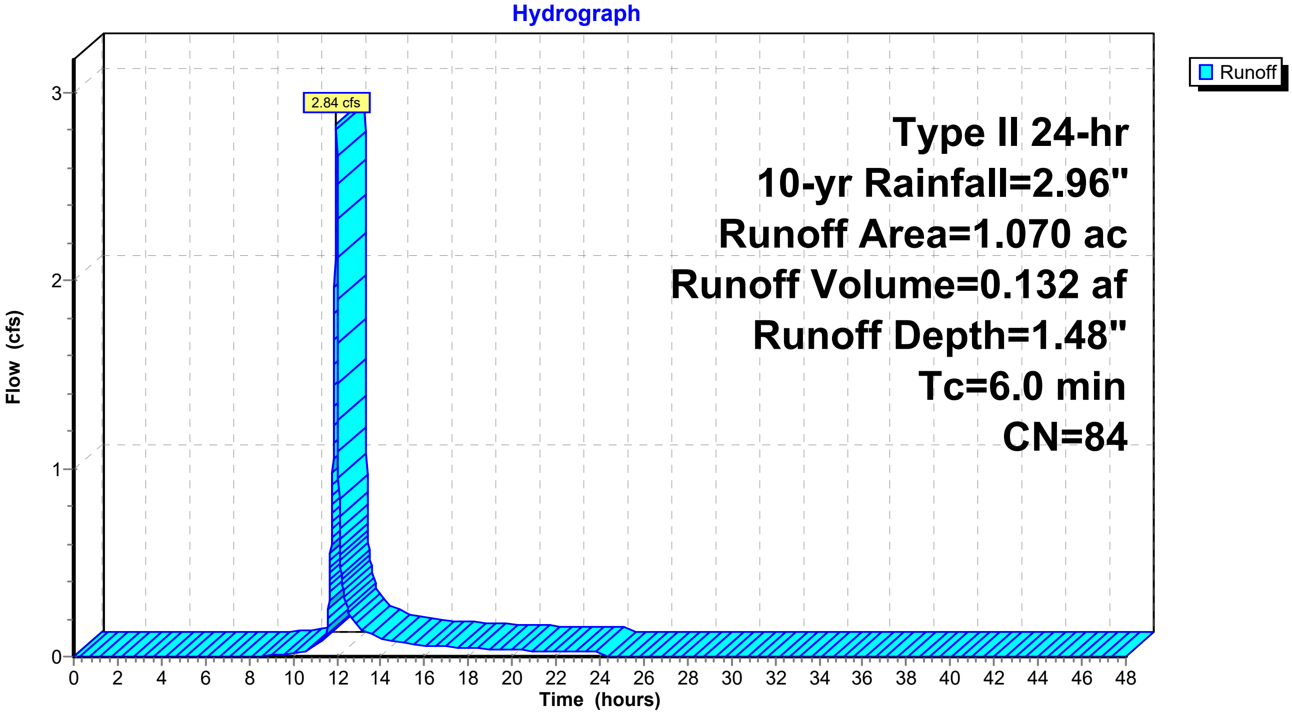
Runoff = 2.84 cfs @ 11.97 hrs, Volume= 0.132 af, Depth= 1.48"
Routed to Pond 119P : bioretention 102

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.070	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.070	84	Weighted Average
	1.070		100.00% Pervious Area

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

Subcatchment 119:



Summary for Subcatchment 120:

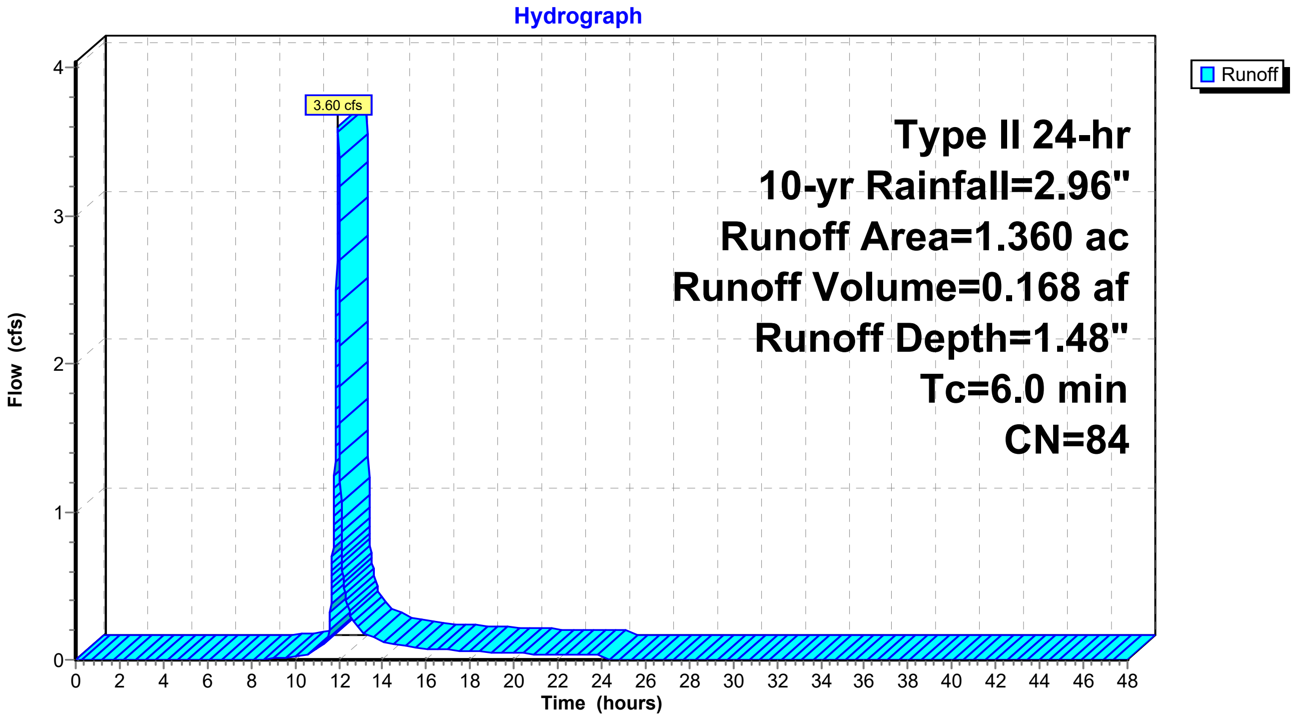
Runoff = 3.60 cfs @ 11.97 hrs, Volume= 0.168 af, Depth= 1.48"
Routed to Pond 120P : bioretention 103

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.330	84	50-75% Grass cover, Fair, HSG D
*	0.030	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.360	84	Weighted Average
	1.330		97.79% Pervious Area
	0.030		2.21% Impervious Area

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

Subcatchment 120:



Summary for Subcatchment 121:

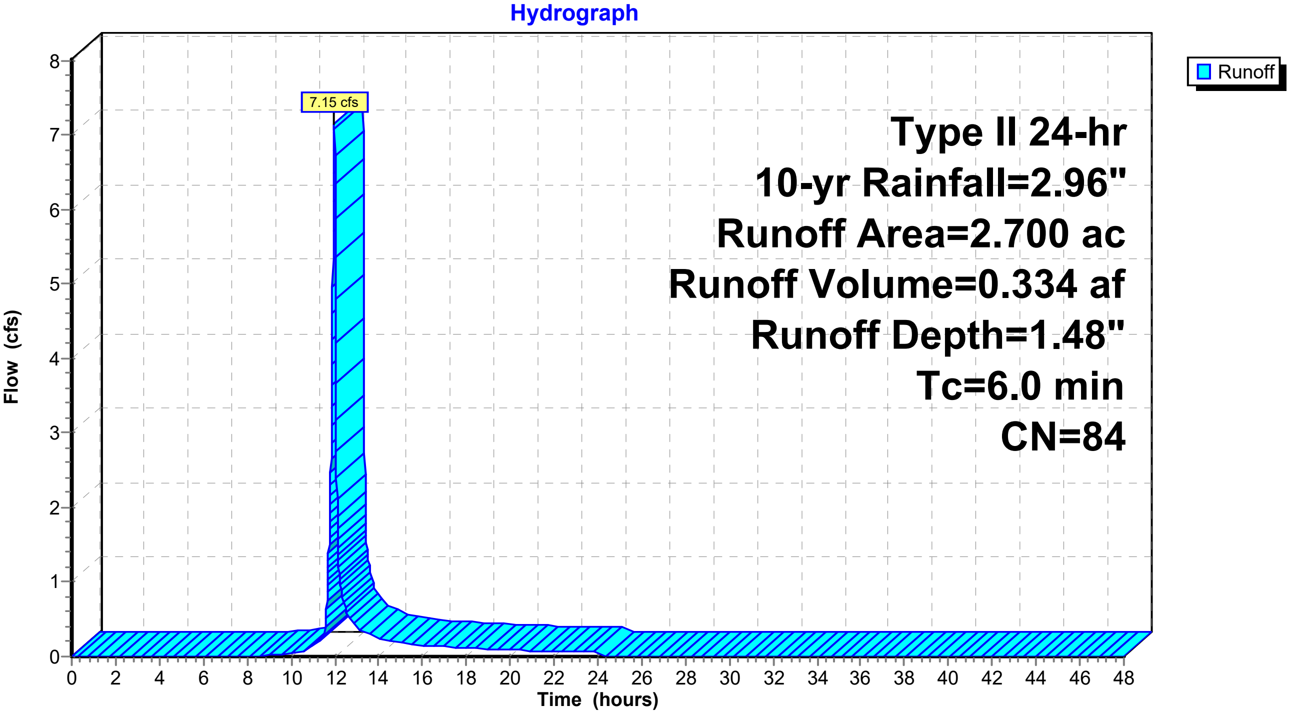
Runoff = 7.15 cfs @ 11.97 hrs, Volume= 0.334 af, Depth= 1.48"
Routed to Pond 121p : dry pond 10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	2.700	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	2.700	84	Weighted Average
	2.700		100.00% Pervious Area

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

Subcatchment 121:



Summary for Subcatchment 122:

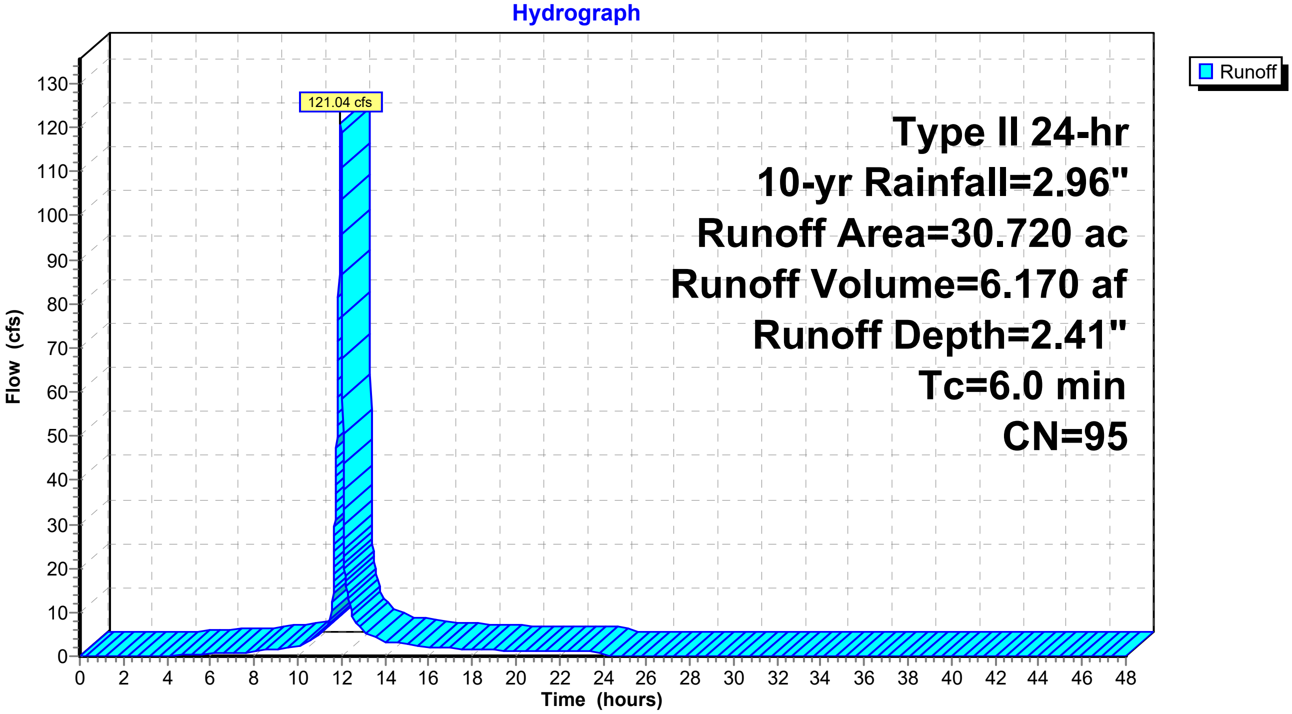
Runoff = 121.04 cfs @ 11.97 hrs, Volume= 6.170 af, Depth= 2.41"
Routed to Pond 122f : forebay 100 bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	7.510	84	50-75% Grass cover, Fair, HSG D
*	22.580	98	Impervious
*	0.590	98	Forebay WSE
	0.040	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	30.720	95	Weighted Average
	7.550		24.58% Pervious Area
	23.170		75.42% Impervious Area

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

Subcatchment 122:



Summary for Subcatchment 200:

[47] Hint: Peak is 108% of capacity of segment #5
[47] Hint: Peak is 147% of capacity of segment #7

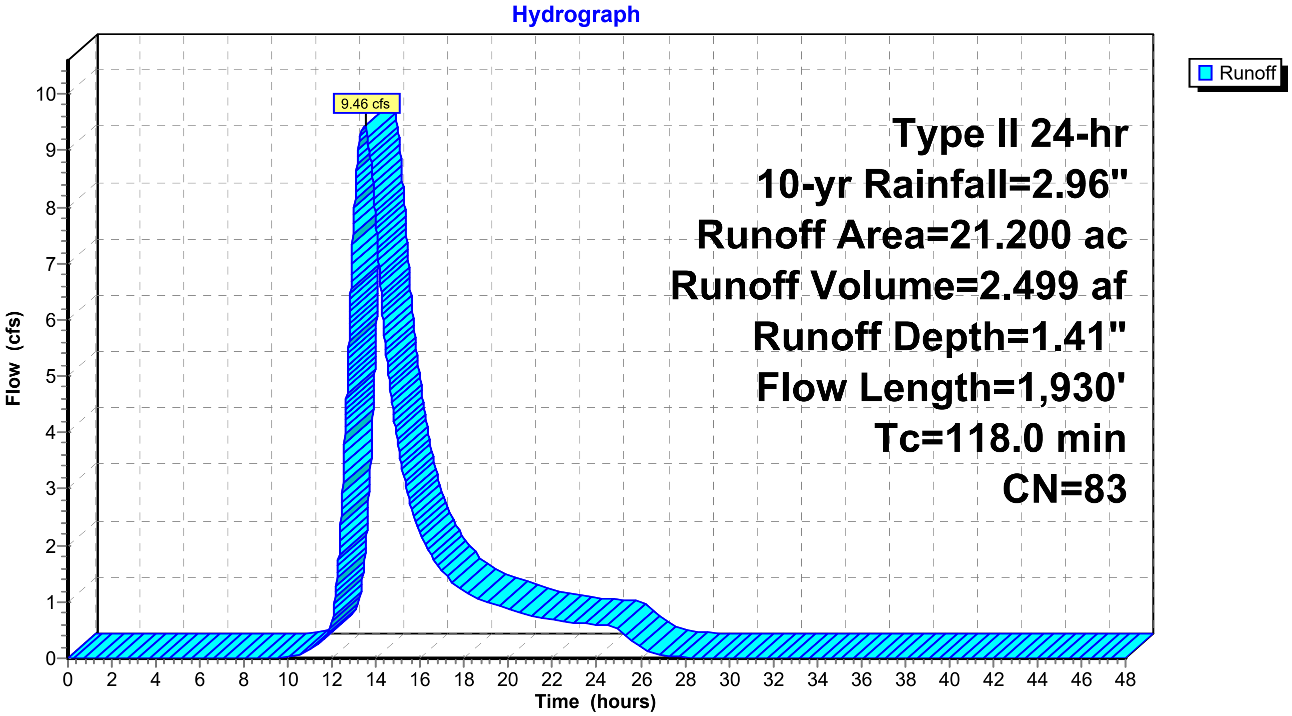
Runoff = 9.46 cfs @ 13.50 hrs, Volume= 2.499 af, Depth= 1.41"
Routed to Reach DP2 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	7.720	79	Woods, Fair, HSG D
	4.040	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.270	91	Gravel roads, HSG D
*	2.760	79	Woods, Fair, HSG D Offsite
*	2.100	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.280	98	Impervious Offsite
*	0.030	91	Gravel roads, HSG D Offsite
	21.200	83	Weighted Average
	16.920		79.81% Pervious Area
	4.280		20.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	60	0.0400	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
16.7	40	0.0100	0.04		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.12"
13.4	615	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
52.5	630	0.0016	0.20		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
0.2	40	0.0055	2.78	8.72	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
4.2	155	0.0077	0.61		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0030	2.05	6.44	**Pipe Channel, G-H** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
17.3	340	0.0022	0.33		**Shallow Concentrated Flow, H-I** Short Grass Pasture Kv= 7.0 fps
118.0	1,930	Total			

Subcatchment 200:



Summary for Subcatchment 300:

[47] Hint: Peak is 311% of capacity of segment #4

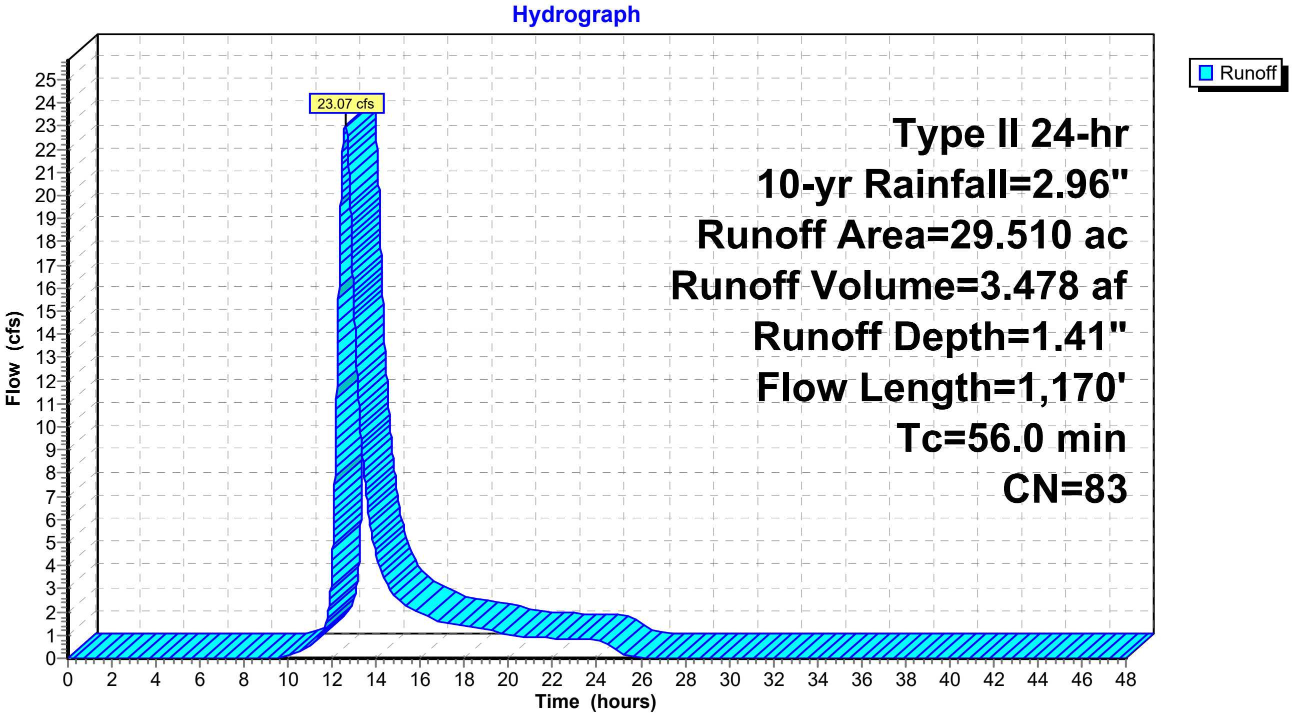
Runoff = 23.07 cfs @ 12.57 hrs, Volume= 3.478 af, Depth= 1.41"
Routed to Reach DP3 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.940	79	Woods, Fair, HSG D
	10.780	78	Meadow, non-grazed, HSG D
	2.970	84	50-75% Grass cover, Fair, HSG D
*	1.090	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.050	79	Woods, Fair, HSG D Offsite
*	11.150	84	50-75% Grass cover, Fair, HSG D Offsite
*	2.530	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	29.510	83	Weighted Average
	25.890		87.73% Pervious Area
	3.620		12.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	100	0.0120	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
8.8	370	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.1	440	0.0030	0.38		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0050	4.20	7.43	**Pipe Channel, D-E** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
6.5	230	0.0070	0.59		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
56.0	1,170	Total			

Subcatchment 300:



Summary for Subcatchment 301:

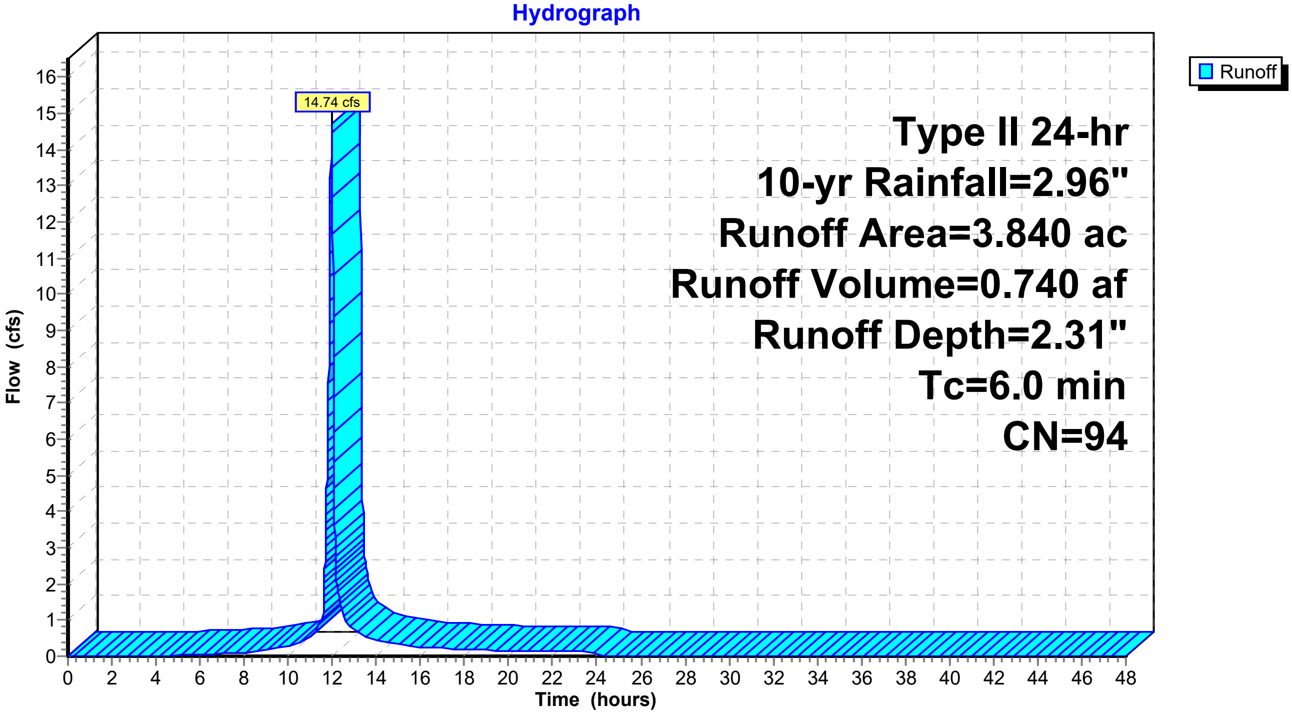
Runoff = 14.74 cfs @ 11.97 hrs, Volume= 0.740 af, Depth= 2.31"
Routed to Pond 301f : forebay 400

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.170	84	50-75% Grass cover, Fair, HSG D
*	2.460	98	Impervious
*	0.150	98	Forebay WSE
	0.060	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	3.840	94	Weighted Average
	1.230		32.03% Pervious Area
	2.610		67.97% Impervious Area

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

Subcatchment 301:



Summary for Subcatchment 302:

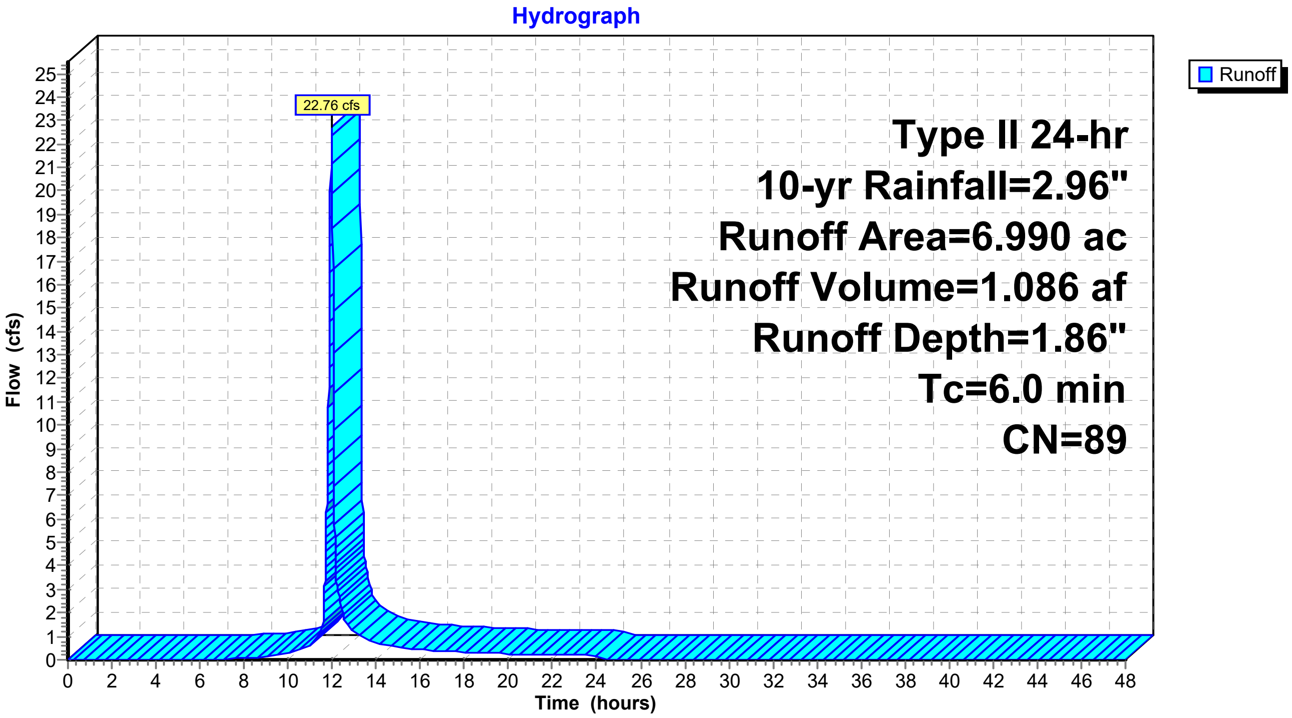
Runoff = 22.76 cfs @ 11.97 hrs, Volume= 1.086 af, Depth= 1.86"
Routed to Pond 302b : bioretention 401

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	4.370	84	50-75% Grass cover, Fair, HSG D
*	2.620	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	6.990	89	Weighted Average
	4.370		62.52% Pervious Area
	2.620		37.48% Impervious Area

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

Subcatchment 302:



Summary for Subcatchment 400:

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Runoff      =       11.54 cfs @   12.73 hrs,  Volume=          2.018 af,  Depth=  1.22"
    Routed to Reach DP4 : DP1
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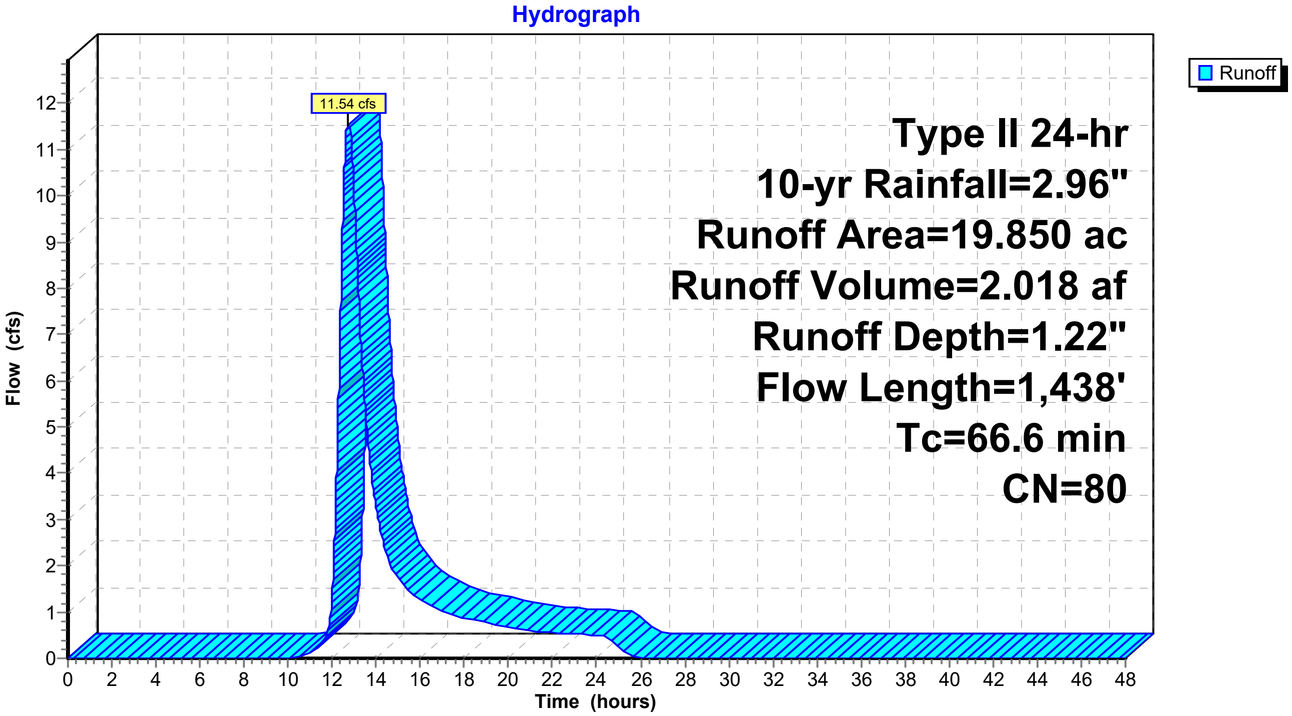
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-yr Rainfall=2.96"

	Area (ac)	CN	Description
	11.650	79	Woods, Fair, HSG D
	6.730	78	Meadow, non-grazed, HSG D
*	1.160	98	Impervious
	0.310	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	19.850	80	Weighted Average
	18.690		94.16% Pervious Area
	1.160		5.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0120	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
6.3	306	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.8	389	0.0043	0.33		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.0	96	0.0063	1.61		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
7.8	199	0.0073	0.43		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
16.9	348	0.0024	0.34		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
66.6	1,438	Total			

Subcatchment 400:



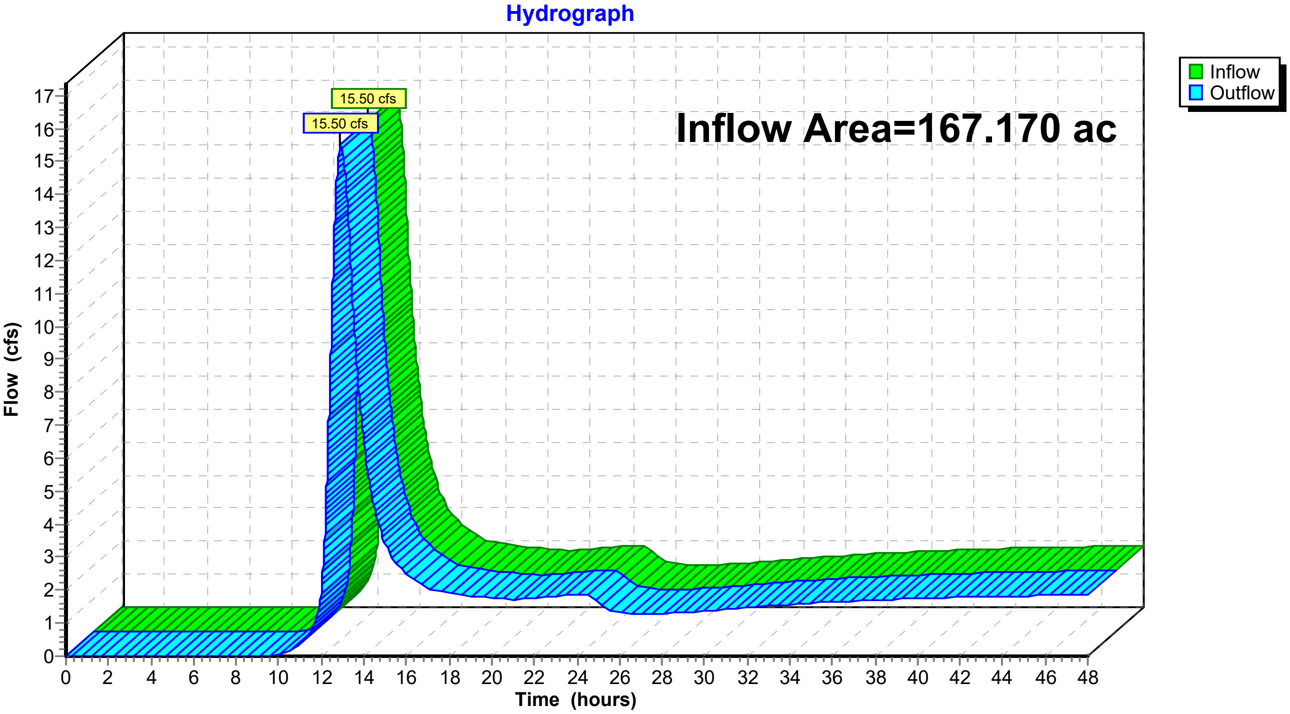
Summary for Reach DP1: DP1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      167.170 ac,  38.53% Impervious,  Inflow Depth >   0.49"    for  10-yr event
Inflow      =        15.50 cfs @   12.88 hrs,  Volume=            6.850 af
Outflow     =        15.50 cfs @   12.88 hrs,  Volume=            6.850 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP1: DP1



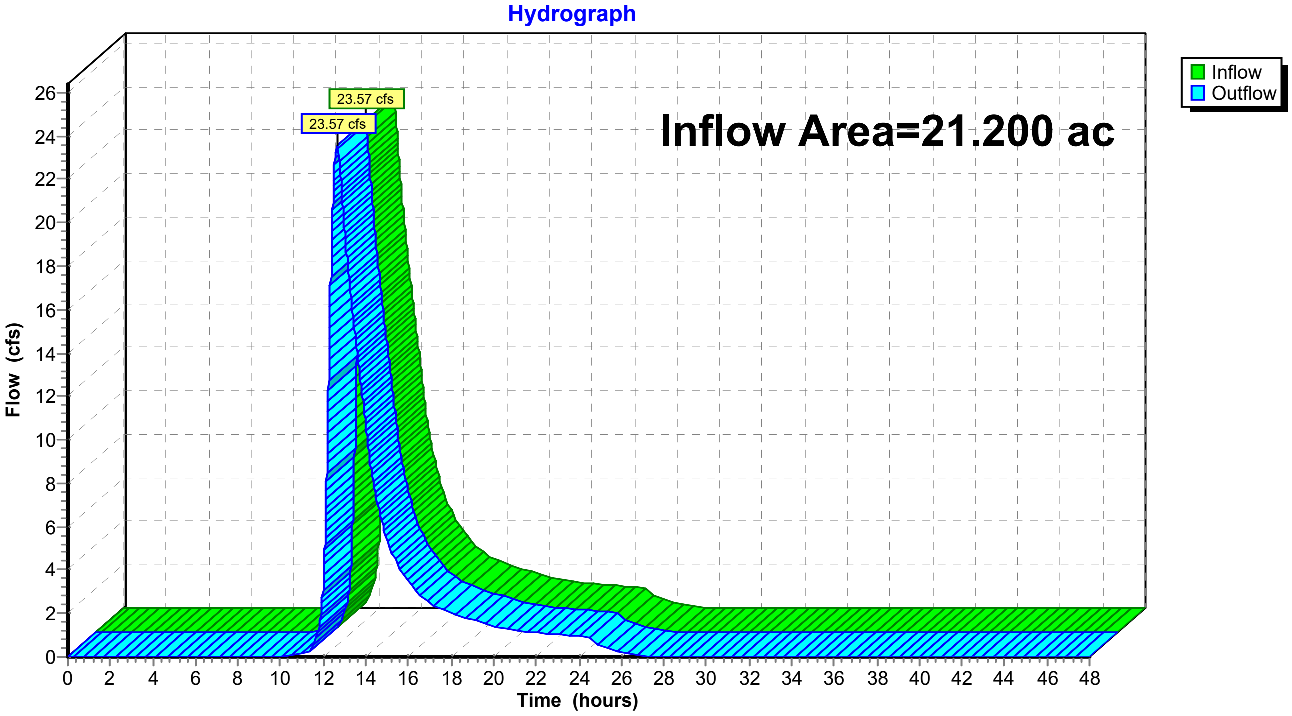
Summary for Reach DP2: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 21.200 ac, 20.19% Impervious, Inflow Depth = 2.78" for 10-yr event
Inflow = 23.57 cfs @ 12.64 hrs, Volume= 4.916 af
Outflow = 23.57 cfs @ 12.64 hrs, Volume= 4.916 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP2: DP1



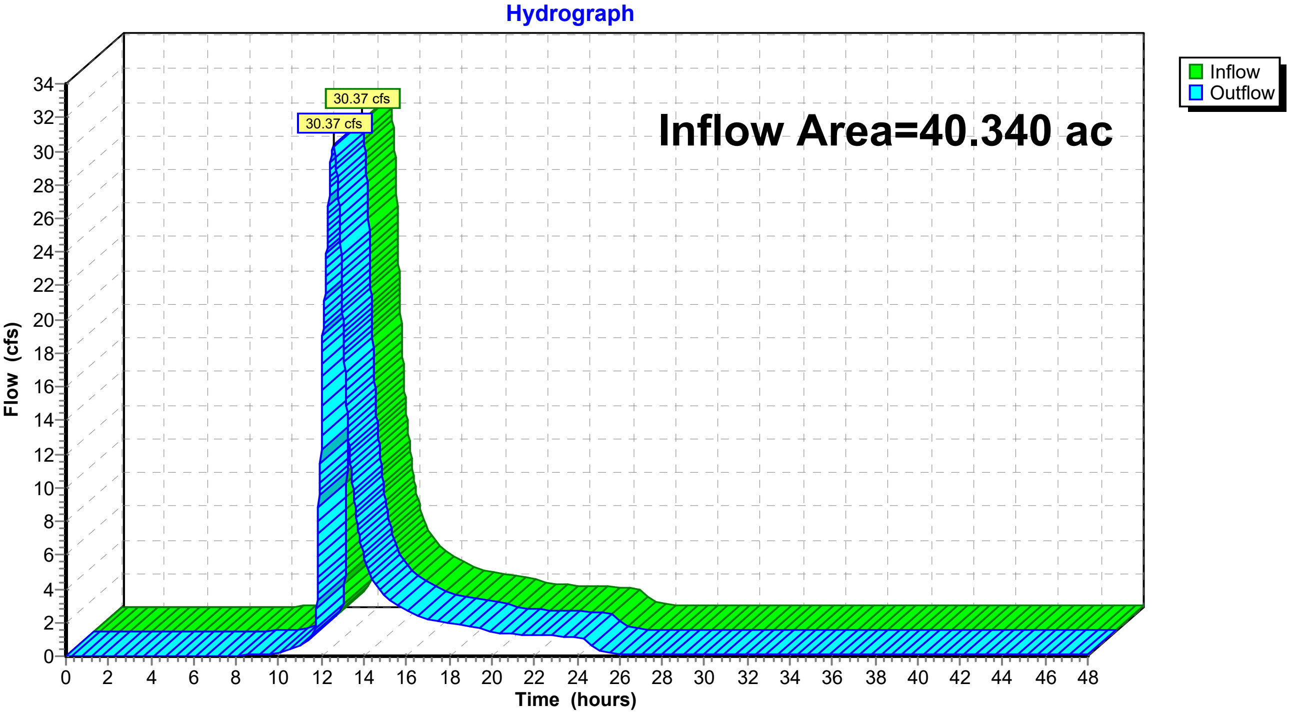
Summary for Reach DP3: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area =	40.340 ac, 21.94% Impervious, Inflow Depth > 1.57"		for 10-yr event
Inflow =	30.37 cfs @ 12.57 hrs, Volume=	5.281 af	
Outflow =	30.37 cfs @ 12.57 hrs, Volume=	5.281 af, Atten= 0%, Lag= 0.0 min	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP3: DP1



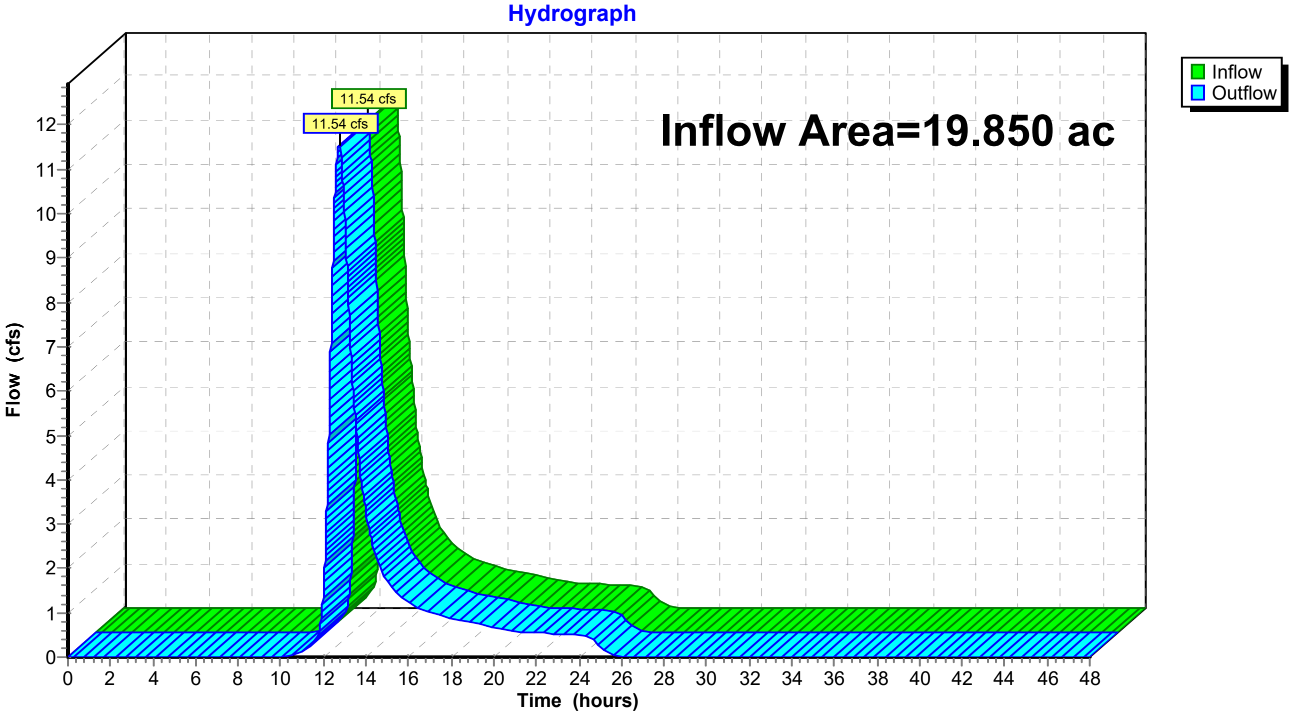
Summary for Reach DP4: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.850 ac, 5.84% Impervious, Inflow Depth = 1.22" for 10-yr event
Inflow = 11.54 cfs @ 12.73 hrs, Volume= 2.018 af
Outflow = 11.54 cfs @ 12.73 hrs, Volume= 2.018 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP4: DP1



Summary for Pond 1P: forebay 100 bypass

[80] Warning: Exceeded Pond 122f by 0.01' @ 24.76 hrs (1.31 cfs 0.197 af)

Inflow = 73.52 cfs @ 11.97 hrs, Volume= 2.938 af
Outflow = 69.01 cfs @ 11.98 hrs, Volume= 2.938 af, Atten= 6%, Lag= 0.6 min
Primary = 34.07 cfs @ 11.99 hrs, Volume= 1.649 af
Routed to Pond 119P : bioretention 102
Secondary = 36.07 cfs @ 11.97 hrs, Volume= 1.289 af
Routed to Pond 2P : forebay 100 bypass

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.37' @ 12.01 hrs Surf.Area= 8,984 sf Storage= 9,514 cf (6,709 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 35.1 min calculated for 2.873 af (98% of inflow)
Center-of-Mass det. time= 11.2 min (764.7 - 753.4)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

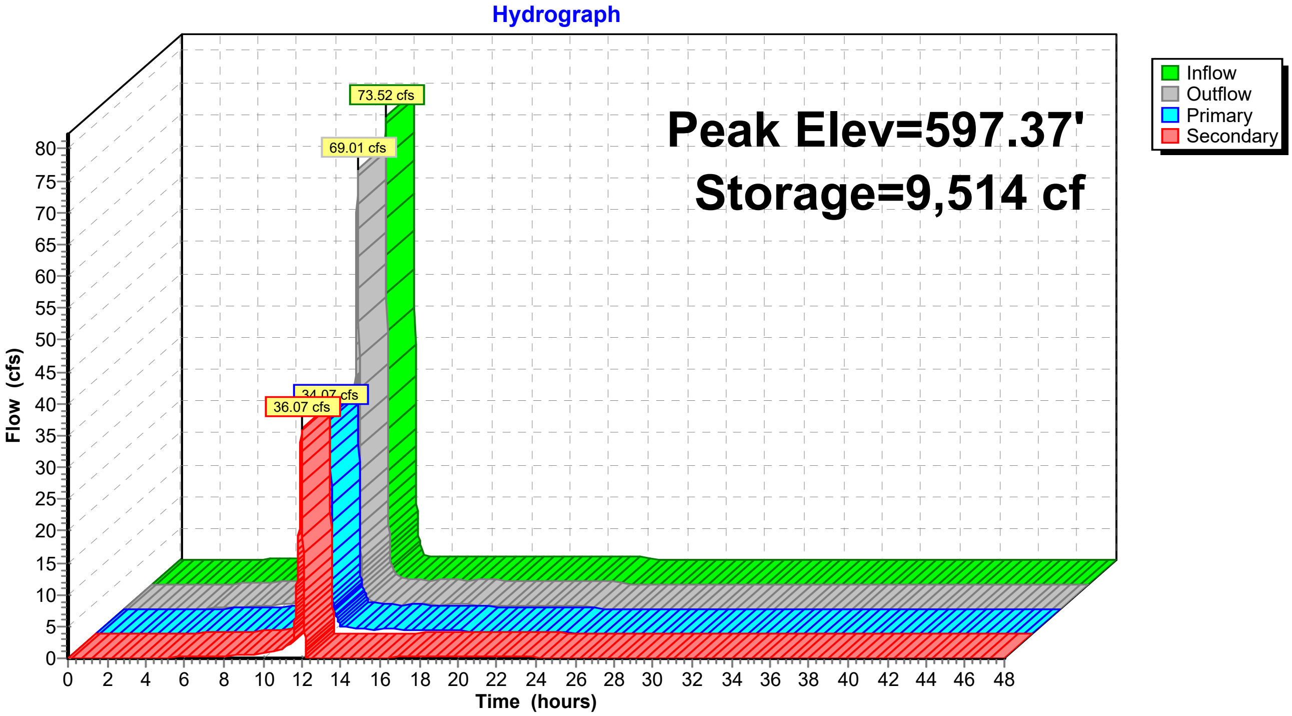
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 50.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=33.46 cfs @ 11.99 hrs HW=597.37' TW=596.89' (Dynamic Tailwater)
↑**1=overflow weir** (Weir Controls 33.46 cfs @ 2.48 fps)

Secondary OutFlow Max=19.61 cfs @ 11.97 hrs HW=597.33' TW=597.32' (Dynamic Tailwater)
↑**2=overflow weir** (Weir Controls 19.61 cfs @ 0.43 fps)

Pond 1P: forebay 100 bypass



Summary for Pond 2P: forebay 100 bypass

[80] Warning: Exceeded Pond 1P by 0.01' @ 12.63 hrs (12.99 cfs 1.626 af)

```
Inflow    =    36.07 cfs @  11.97 hrs,  Volume=        1.289 af
Outflow   =    32.77 cfs @  11.99 hrs,  Volume=        1.289 af,  Atten= 9%,  Lag= 1.4 min
Primary   =    32.77 cfs @  11.99 hrs,  Volume=        1.289 af
   Routed to Pond 118b : bioretention 101
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.36' @ 12.00 hrs Surf.Area= 8,926 sf Storage= 9,343 cf (6,538 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 76.1 min calculated for 1.224 af (95% of inflow)
Center-of-Mass det. time= 25.6 min (759.2 - 733.6)

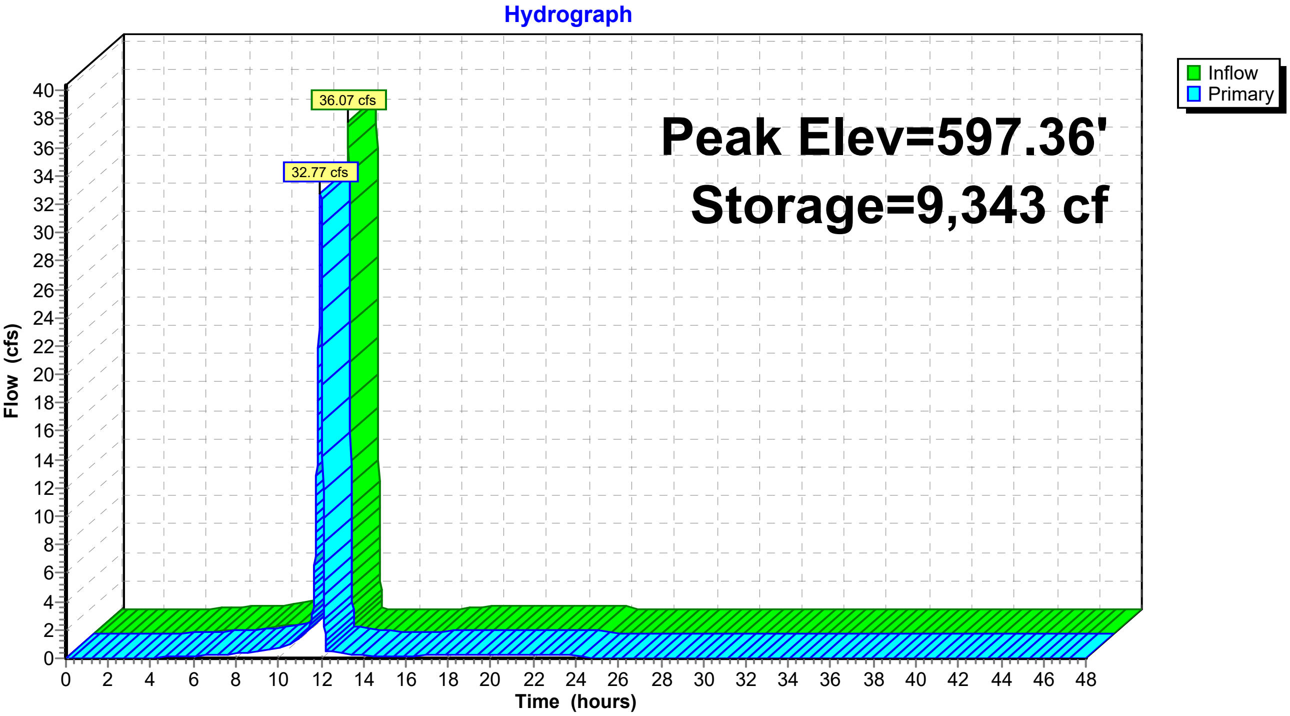
Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=32.30 cfs @ 11.99 hrs HW=597.35' TW=596.88' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 32.30 cfs @ 2.46 fps)

Pond 2P: forebay 100 bypass



Summary for Pond 10d: depression

Inflow Area = 24.040 ac, 21.88% Impervious, Inflow Depth = 1.41" for 10-yr event
Inflow = 23.33 cfs @ 12.40 hrs, Volume= 2.834 af
Outflow = 19.95 cfs @ 12.57 hrs, Volume= 2.833 af, Atten= 14%, Lag= 10.3 min
Primary = 0.53 cfs @ 12.57 hrs, Volume= 0.416 af
Routed to Reach DP1 : DP1
Secondary = 19.43 cfs @ 12.57 hrs, Volume= 2.417 af
Routed to Reach DP2 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 593.58' @ 12.57 hrs Surf.Area= 44,704 sf Storage= 15,896 cf

Plug-Flow detention time= 27.7 min calculated for 2.833 af (100% of inflow)
Center-of-Mass det. time= 27.6 min (894.2 - 866.7)

Volume	Invert	Avail.Storage	Storage Description
#1	592.75'	157,748 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

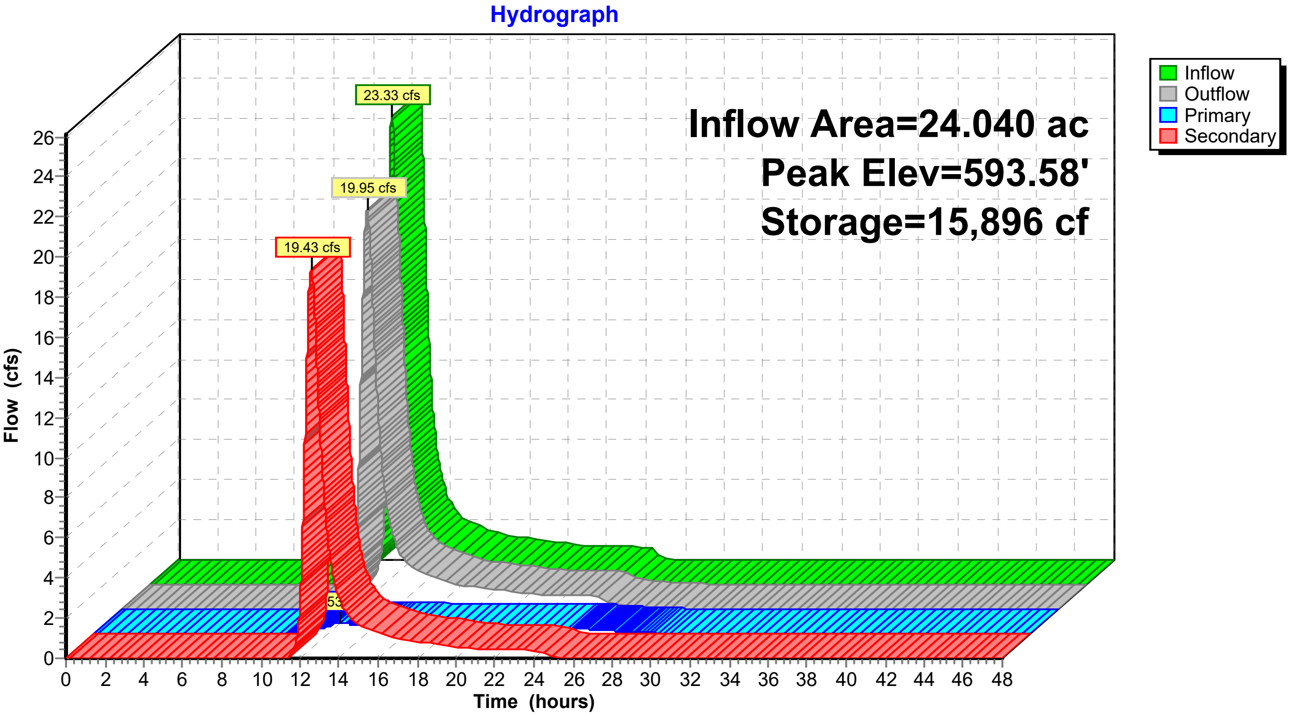
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.75	1,300	0	0
593.00	6,400	963	963
594.00	71,940	39,170	40,133
595.00	163,290	117,615	157,748

Device	Routing	Invert	Outlet Devices
#1	Primary	592.75'	**6.0" Round Pipe to DA 12** L= 250.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.75' / 591.00' S= 0.0070 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	593.10'	**22.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.53 cfs @ 12.57 hrs HW=593.58' TW=0.00' (Dynamic Tailwater)
└─**1=Pipe to DA 12** (Barrel Controls 0.53 cfs @ 2.68 fps)

Secondary OutFlow Max=19.43 cfs @ 12.57 hrs HW=593.58' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 19.43 cfs @ 1.82 fps)

Pond 10d: depression



Summary for Pond 102d: depression

```
Inflow Area =        11.170 ac,  37.42% Impervious,  Inflow Depth =   1.78"    for  10-yr event
Inflow      =       19.41 cfs @   12.19 hrs,  Volume=           1.659 af
Outflow     =       19.33 cfs @   12.20 hrs,  Volume=           1.659 af,  Atten= 0%,  Lag= 0.6 min
Primary     =       19.33 cfs @   12.20 hrs,  Volume=           1.659 af
    Routed to Pond DMH142 : DMH-142
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 599.31' @ 12.20 hrs Surf.Area= 481 sf Storage= 670 cf
Flood Elev= 604.00' Surf.Area= 41,000 sf Storage= 42,050 cf

Plug-Flow detention time= 0.8 min calculated for 1.659 af (100% of inflow)
Center-of-Mass det. time= 0.8 min (833.8 - 832.9)

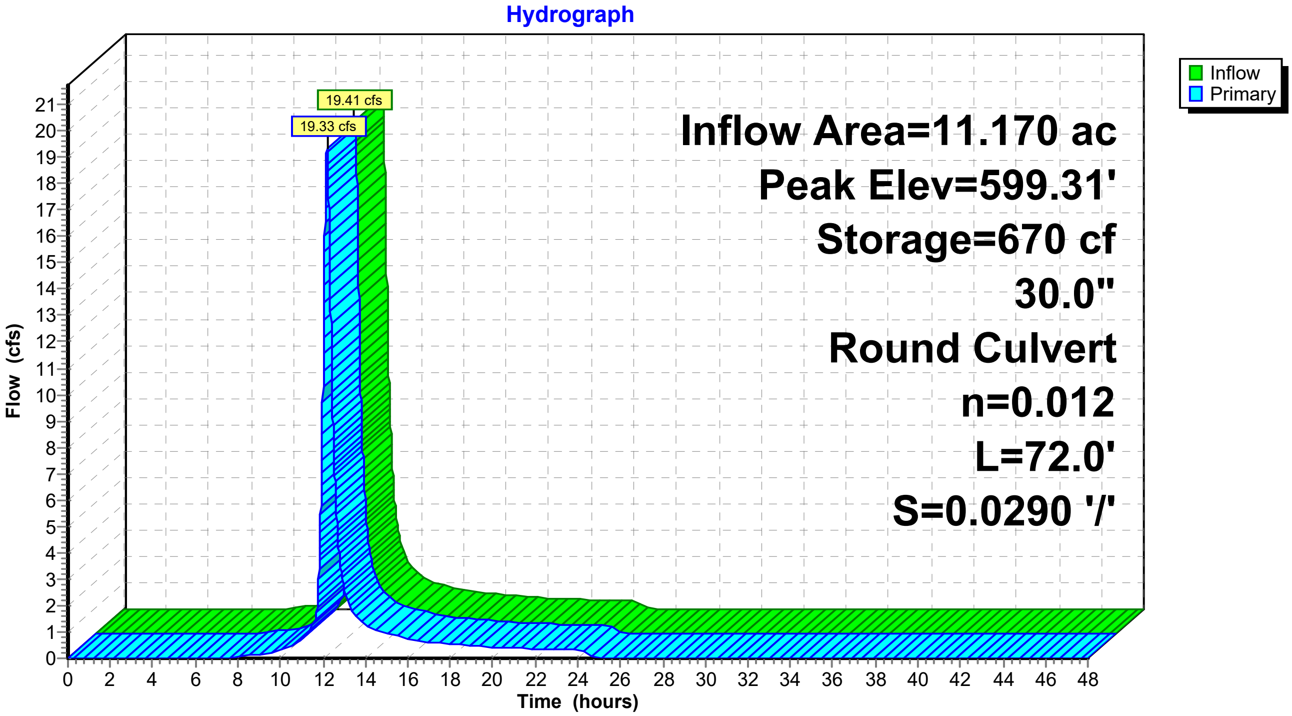
Volume	Invert	Avail.Storage	Storage Description
#1	597.00'	42,050 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.00	100	0	0
601.00	760	1,720	1,720
602.00	4,450	2,605	4,325
603.00	15,000	9,725	14,050
604.00	41,000	28,000	42,050

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**30.0" Round Pipe to DMH-142** L= 72.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 597.00' / 594.91' S= 0.0290 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=19.32 cfs @ 12.20 hrs HW=599.31' TW=596.85' (Dynamic Tailwater)
↑—**1=Pipe to DMH-142** (Inlet Controls 19.32 cfs @ 4.08 fps)

Pond 102d: depression



Summary for Pond 110P: dry pond 30

Inflow Area = 116.540 ac, 49.26% Impervious, Inflow Depth > 0.70" for 10-yr event
Inflow = 10.52 cfs @ 12.26 hrs, Volume= 6.803 af
Outflow = 1.84 cfs @ 48.00 hrs, Volume= 3.448 af, Atten= 82%, Lag= 2,144.3 min
Primary = 1.84 cfs @ 48.00 hrs, Volume= 3.448 af
Routed to Reach DP1 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 591.67' @ 48.00 hrs Surf.Area= 222,372 sf Storage= 146,154 cf
Flood Elev= 595.00' Surf.Area= 250,140 sf Storage= 933,940 cf

Plug-Flow detention time= 954.6 min calculated for 3.447 af (51% of inflow)
Center-of-Mass det. time= 408.3 min (2,120.0 - 1,711.7)

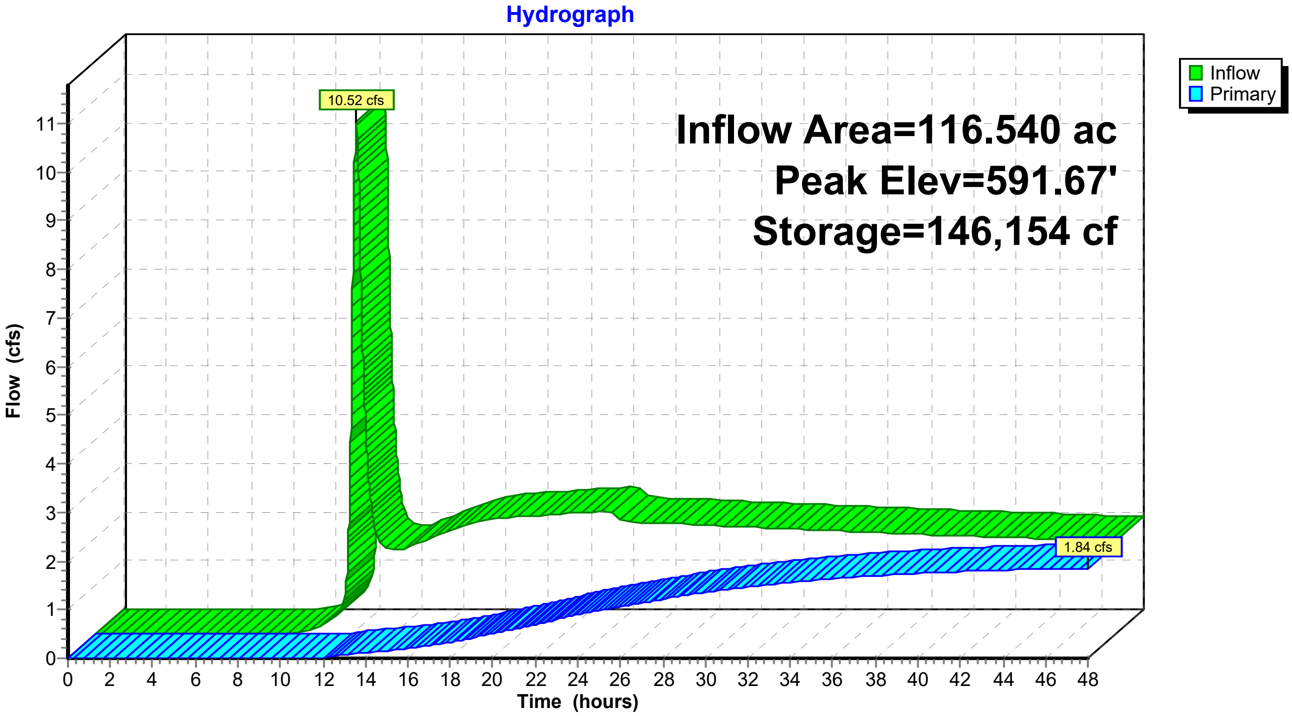
Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	933,940 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	216,830	0	0
595.00	250,140	933,940	933,940

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**24.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 590.90' S= 0.0059 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	594.00'	**30.0" x 48.0" Horiz. 30 x 48 Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	591.00'	**15.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.84 cfs @ 48.00 hrs HW=591.67' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Passes 1.84 cfs of 1.86 cfs potential flow)
  ├─**2=30 x 48 Grate** (Controls 0.00 cfs)
  └─**3=Orifice** (Orifice Controls 1.84 cfs @ 2.78 fps)

Pond 110P: dry pond 30



Summary for Pond 111P: dry pond 20

```
Inflow Area =      107.740 ac,  53.29% Impervious,  Inflow Depth >   1.71"    for  10-yr event
Inflow      =       65.76 cfs @   12.07 hrs,  Volume=          15.366 af
Outflow     =        2.29 cfs @   24.95 hrs,  Volume=           5.766 af,  Atten= 97%,  Lag= 772.9 min
Primary     =        2.29 cfs @   24.95 hrs,  Volume=           5.766 af
    Routed to Pond 110P : dry pond 30
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 592.27' @ 24.95 hrs Surf.Area= 406,972 sf Storage= 473,056 cf
Flood Elev= 595.00' Surf.Area= 389,765 sf Storage= 1,652,719 cf

Plug-Flow detention time= 1,116.2 min calculated for 5.765 af (38% of inflow)
Center-of-Mass det. time= 731.6 min (1,865.5 - 1,133.9)

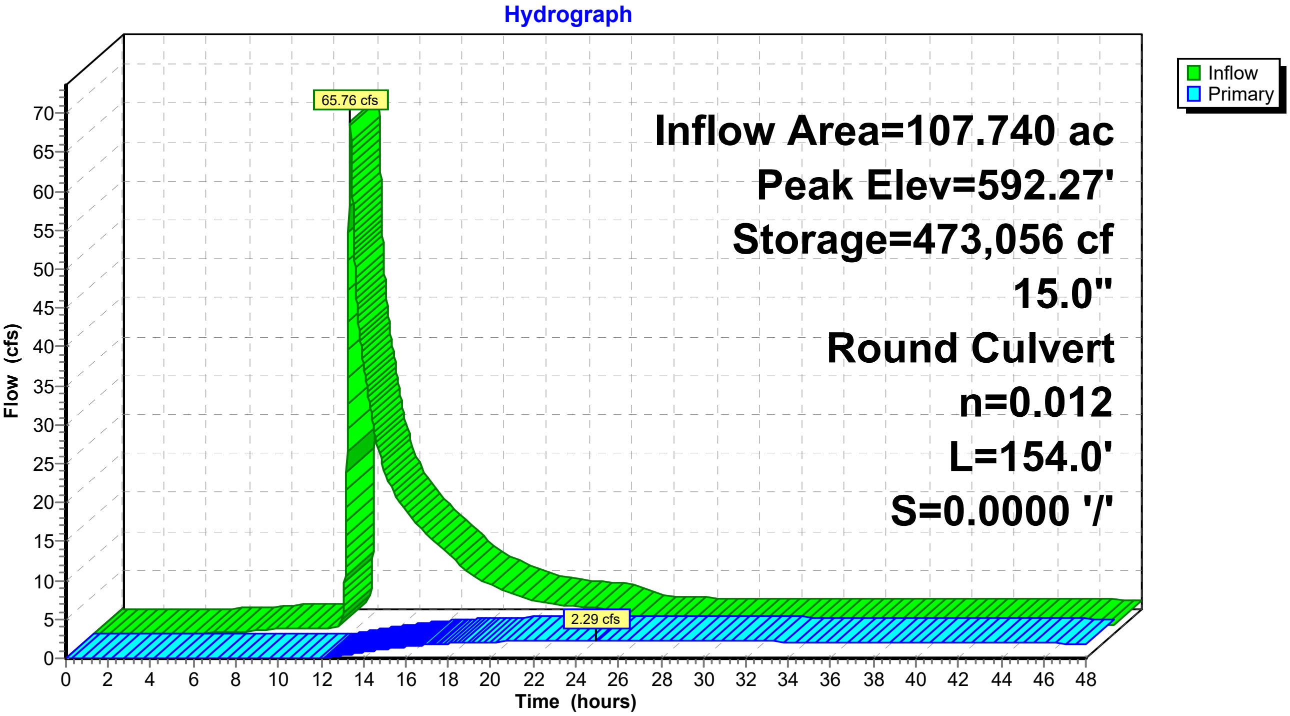
Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	2,199,782 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	350,875	0	0
592.00	384,640	367,758	367,758
593.00	468,584	426,612	794,370
596.00	350,356	1,228,410	2,022,780
596.50	357,654	177,003	2,199,782

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**15.0" Round Culvert** L= 154.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 591.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=2.29 cfs @ 24.95 hrs HW=592.27' TW=591.47' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 2.29 cfs @ 2.29 fps)

Pond 111P: dry pond 20



Summary for Pond 112F: forebay 200

Inflow Area = 22.280 ac, 93.27% Impervious, Inflow Depth = 2.62" for 10-yr event
Inflow = 91.63 cfs @ 11.97 hrs, Volume= 4.862 af
Outflow = 77.49 cfs @ 12.01 hrs, Volume= 4.862 af, Atten= 15%, Lag= 2.3 min
Primary = 29.29 cfs @ 12.00 hrs, Volume= 2.140 af
Routed to Pond 115b : bioretention 201
Secondary = 29.28 cfs @ 12.00 hrs, Volume= 2.139 af
Routed to Pond 116P : bioretention 202
Tertiary = 18.99 cfs @ 12.01 hrs, Volume= 0.584 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 35,272 sf Storage= 108,848 cf
Peak Elev= 597.31' @ 12.01 hrs Surf.Area= 38,633 sf Storage= 138,610 cf (29,762 cf above start)
Flood Elev= 598.00' Surf.Area= 41,532 sf Storage= 166,451 cf (57,603 cf above start)

Plug-Flow detention time= 279.1 min calculated for 2.363 af (49% of inflow)
Center-of-Mass det. time= 24.4 min (788.8 - 764.4)

Volume	Invert	Avail.Storage	Storage Description
#1	592.50'	166,451 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.50	19,200	0	0
596.00	33,215	91,726	91,726
596.50	35,272	17,122	108,848
598.00	41,532	57,603	166,451

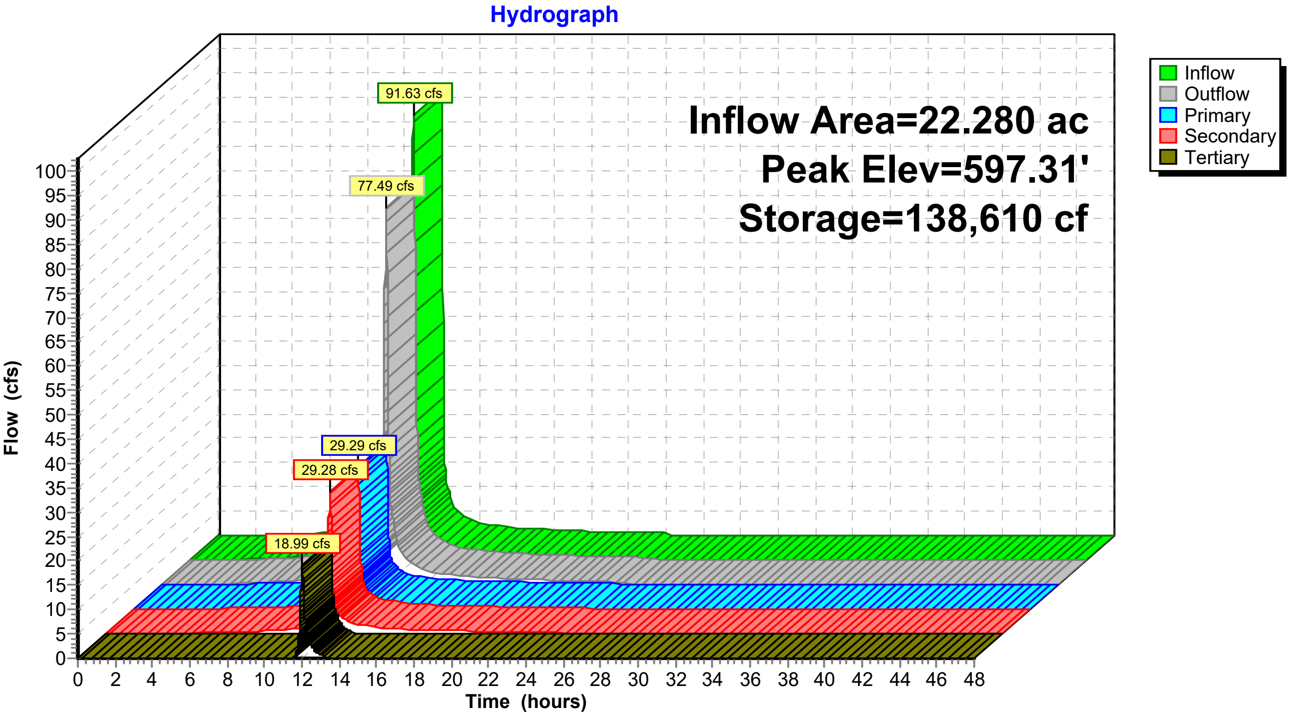
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Tertiary	596.70'	**162.0 deg x 10.0' long x 1.30' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=28.94 cfs @ 12.00 hrs HW=597.30' TW=596.86' (Dynamic Tailwater)
└─**1=overflow weir** (Weir Controls 28.94 cfs @ 2.39 fps)

Secondary OutFlow Max=28.93 cfs @ 12.00 hrs HW=597.30' TW=596.86' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 28.93 cfs @ 2.39 fps)

Tertiary OutFlow Max=18.97 cfs @ 12.01 hrs HW=597.31' TW=591.09' (Dynamic Tailwater)
└─**3=overflow weir** (Weir Controls 18.97 cfs @ 2.27 fps)

Pond 112F: forebay 200



Summary for Pond 113F: forebay 300

```
Inflow Area =         4.290 ac,  88.58% Impervious,  Inflow Depth =   2.51"    for  10-yr event
Inflow       =       17.30 cfs @   11.97 hrs,  Volume=           0.898 af
Outflow      =       13.72 cfs @   11.98 hrs,  Volume=           0.898 af,  Atten= 21%,  Lag= 1.0 min
Primary      =       13.72 cfs @   11.98 hrs,  Volume=           0.898 af
    Routed to Pond 114b : bioretention 301
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 597.50' Surf.Area= 5,588 sf Storage= 16,727 cf
Peak Elev= 598.21' @ 12.05 hrs Surf.Area= 6,169 sf Storage= 20,920 cf (4,194 cf above start)
Flood Elev= 599.00' Surf.Area= 6,810 sf Storage= 26,025 cf (9,298 cf above start)

Plug-Flow detention time= 224.0 min calculated for 0.514 af (57% of inflow)
Center-of-Mass det. time= 15.7 min (788.6 - 772.8)

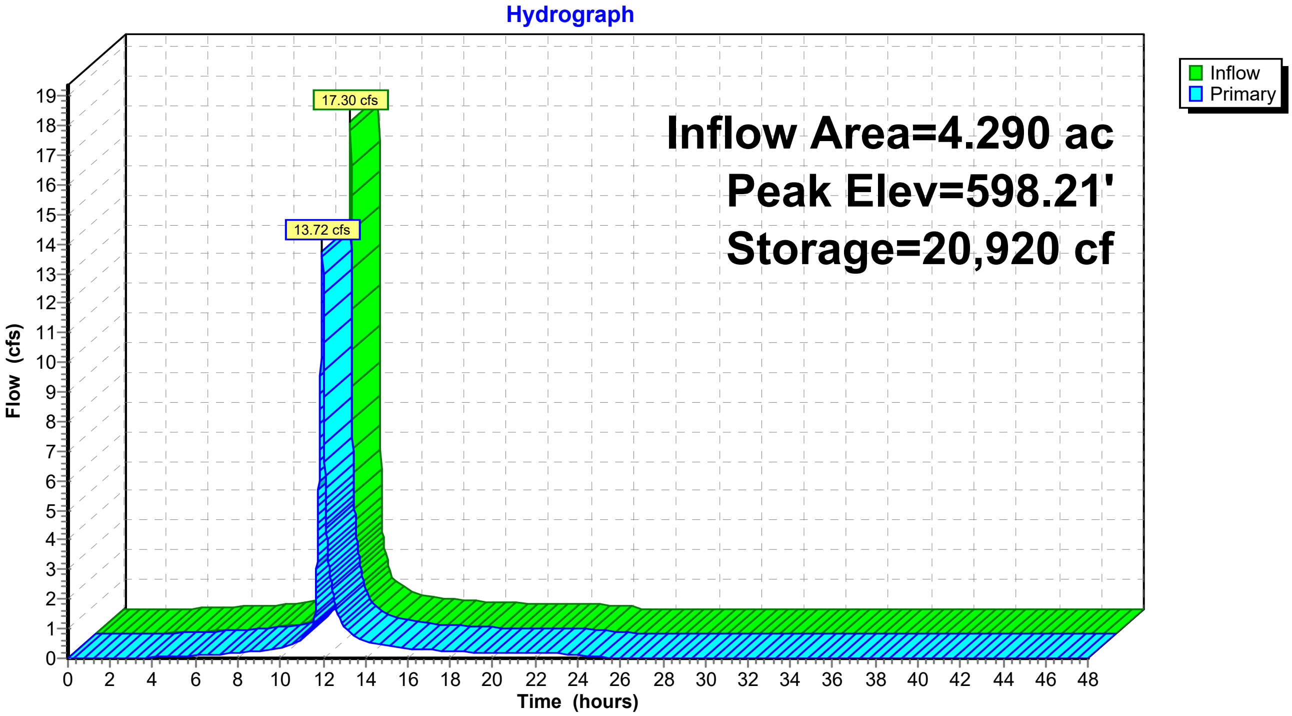
Volume	Invert	Avail.Storage	Storage Description
#1	593.50'	26,025 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.50	2,840	0	0
597.00	5,180	14,035	14,035
599.00	6,810	11,990	26,025

Device	Routing	Invert	Outlet Devices
#1	Primary	597.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=12.18 cfs @ 11.98 hrs HW=598.16' TW=598.07' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 12.18 cfs @ 1.31 fps)

Pond 113F: forebay 300



Summary for Pond 114b: bioretention 301

Inflow Area = 13.020 ac, 68.36% Impervious, Inflow Depth = 2.25" for 10-yr event
Inflow = 45.11 cfs @ 11.97 hrs, Volume= 2.443 af
Outflow = 23.41 cfs @ 12.06 hrs, Volume= 2.403 af, Atten= 48%, Lag= 5.4 min
Primary = 0.21 cfs @ 12.06 hrs, Volume= 0.650 af
 Routed to Pond 111P : dry pond 20
Secondary = 23.20 cfs @ 12.06 hrs, Volume= 1.753 af
 Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 598.18' @ 12.06 hrs Surf.Area= 36,098 sf Storage= 41,005 cf
Flood Elev= 599.00' Surf.Area= 37,972 sf Storage= 71,411 cf

Plug-Flow detention time= 268.3 min calculated for 2.403 af (98% of inflow)
Center-of-Mass det. time= 258.1 min (1,052.3 - 794.2)

Volume	Invert	Avail.Storage	Storage Description
#1	597.00'	71,411 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

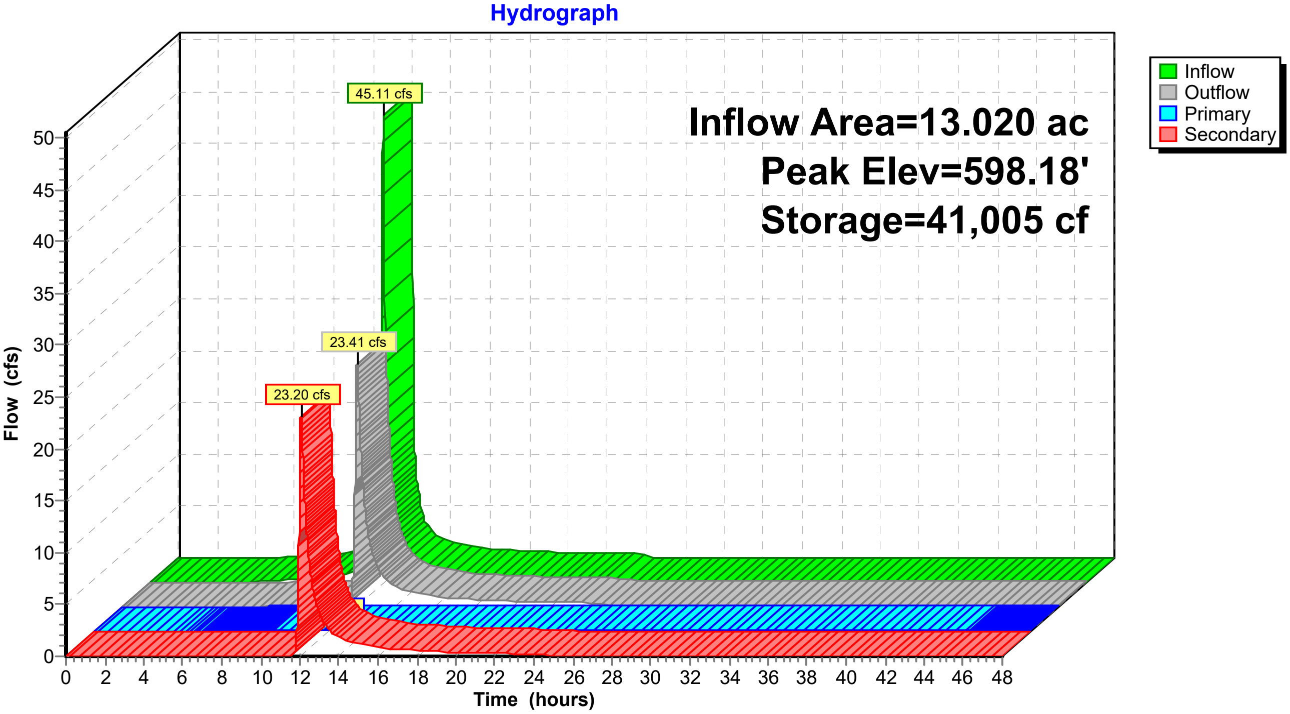
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.00	33,470	0	0
598.00	35,690	34,580	34,580
599.00	37,972	36,831	71,411

Device	Routing	Invert	Outlet Devices
#1	Primary	593.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	597.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	597.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.21 cfs @ 12.06 hrs HW=598.18' TW=591.13' (Dynamic Tailwater)
└─**1=Underdrain** (Passes 0.21 cfs of 1.97 cfs potential flow)
  └─**3=Exfiltration through bioretention media**(Exfiltration Controls 0.21 cfs)

Secondary OutFlow Max=23.18 cfs @ 12.06 hrs HW=598.18' TW=591.13' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 23.18 cfs @ 2.39 fps)

Pond 114b: bioretention 301



Summary for Pond 115b: bioretention 201

Inflow Area = 23.360 ac, 88.96% Impervious, Inflow Depth = 1.17" for 10-yr event
Inflow = 31.97 cfs @ 12.00 hrs, Volume= 2.273 af
Outflow = 13.62 cfs @ 12.13 hrs, Volume= 2.222 af, Atten= 57%, Lag= 7.8 min
Primary = 0.23 cfs @ 12.13 hrs, Volume= 0.758 af
Routed to Pond 111P : dry pond 20
Secondary = 13.39 cfs @ 12.13 hrs, Volume= 1.463 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.99' @ 12.13 hrs Surf.Area= 40,135 sf Storage= 38,717 cf
Flood Elev= 598.00' Surf.Area= 42,580 sf Storage= 80,330 cf

Plug-Flow detention time= 333.7 min calculated for 2.222 af (98% of inflow)
Center-of-Mass det. time= 318.1 min (1,116.9 - 798.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	80,330 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

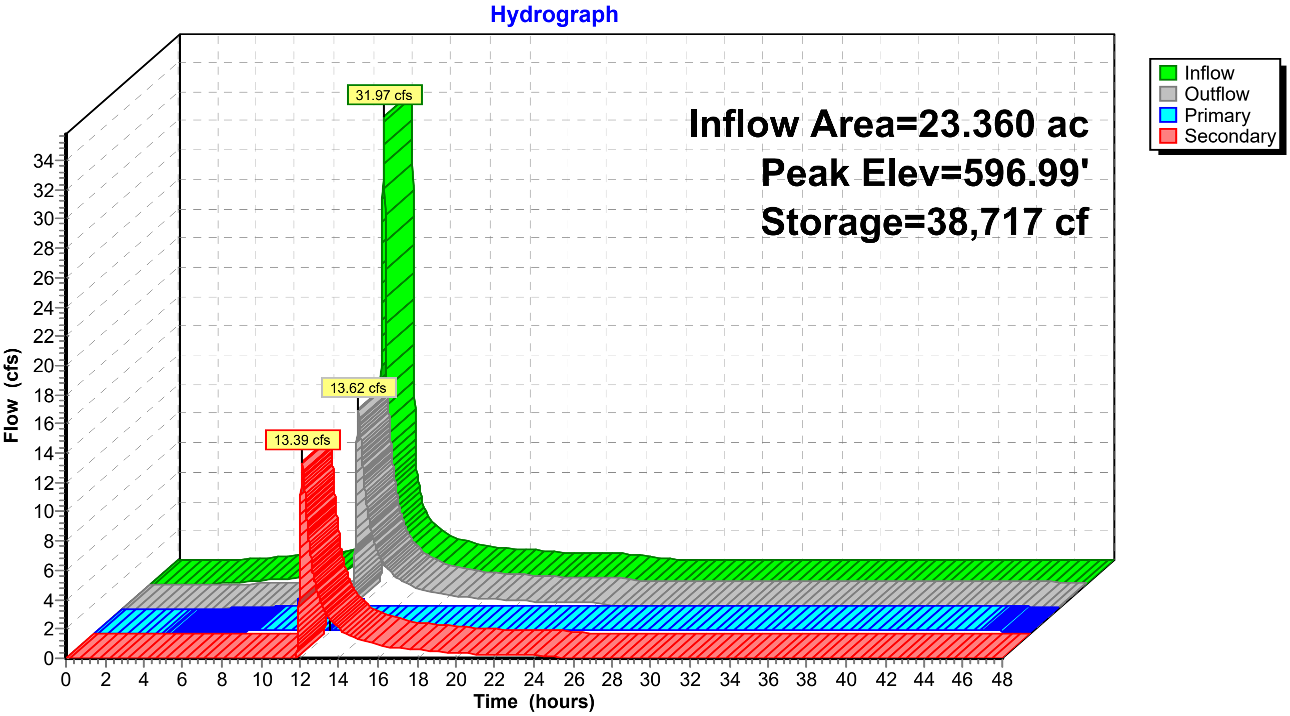
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	37,780	0	0
597.00	40,150	38,965	38,965
598.00	42,580	41,365	80,330

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.23 cfs @ 12.13 hrs HW=596.99' TW=591.17' (Dynamic Tailwater)
└─**1=Underdrain** (Passes 0.23 cfs of 1.93 cfs potential flow)
  └─**3=Exfiltration through bioretention media** (Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=13.38 cfs @ 12.13 hrs HW=596.99' TW=591.17' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 13.38 cfs @ 2.07 fps)

Pond 115b: bioretention 201



Summary for Pond 116P: bioretention 202

```
Inflow Area =        1.100 ac,   0.00% Impervious,  Inflow Depth = 24.81"    for  10-yr event
Inflow      =       32.01 cfs @  12.00 hrs,  Volume=          2.275 af
Outflow     =       13.64 cfs @  12.13 hrs,  Volume=          2.223 af,  Atten= 57%,  Lag= 7.7 min
Primary     =        0.23 cfs @  12.13 hrs,  Volume=          0.758 af
    Routed to Pond 111P : dry pond 20
Secondary =         13.41 cfs @  12.13 hrs,  Volume=          1.465 af
    Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.99' @ 12.13 hrs   Surf.Area= 40,137 sf   Storage= 38,737 cf
Flood Elev= 598.00'   Surf.Area= 42,580 sf   Storage= 80,330 cf

Plug-Flow detention time= 333.5 min calculated for 2.223 af (98% of inflow)
Center-of-Mass det. time= 317.9 min ( 1,116.7 - 798.8 )

Volume        Invert    Avail.Storage   Storage Description
   #1        596.00'        80,330 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

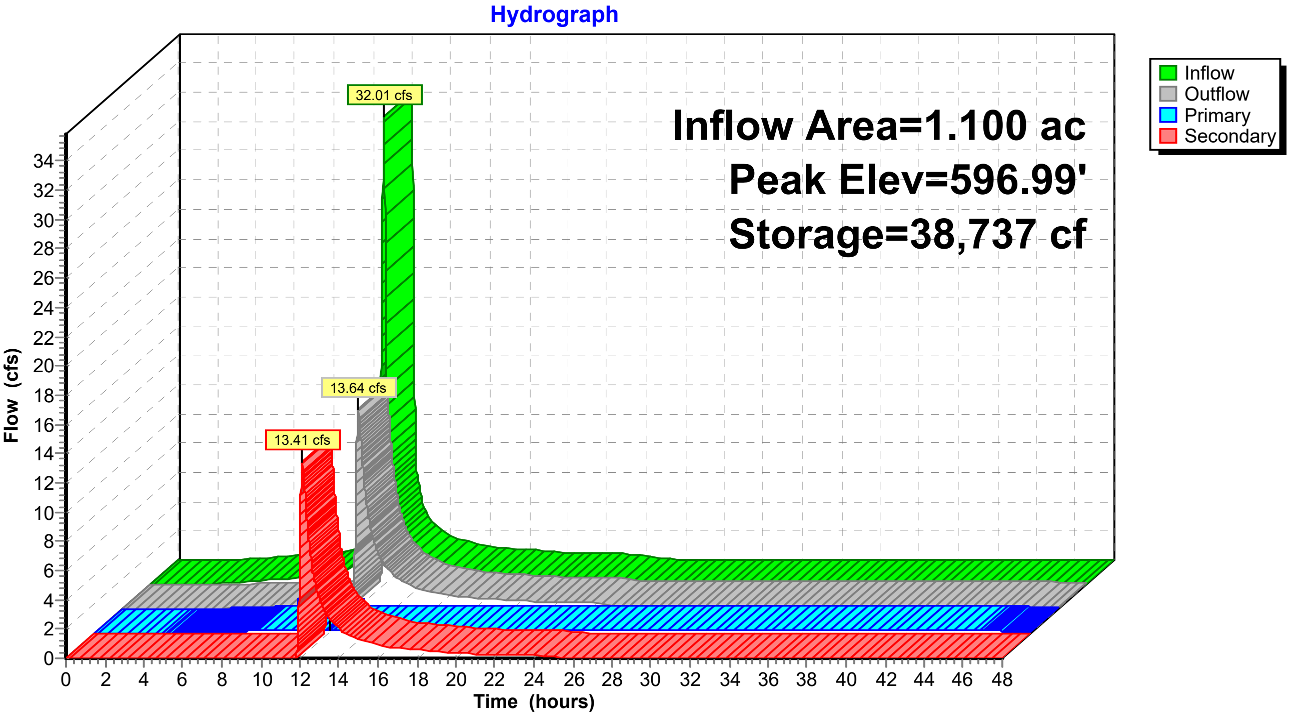
 Elevation        Surf.Area          Inc.Store          Cum.Store
    (feet)          (sq-ft)      (cubic-feet)       (cubic-feet)
    596.00           37,780                 0                  0
    597.00           40,150            38,965             38,965
    598.00           42,580            41,365             80,330

Device   Routing           Invert   Outlet Devices
   #1    Primary          592.58'   6.0" Vert. Underdrain   C= 0.600   Limited to weir flow at low heads
   #2    Secondary        596.50'   162.0 deg x 10.0' long x 1.50' rise overflow weir Cv= 2.47 (C= 3.09)
   #3    Device 1         596.00'   0.250 in/hr Exfiltration through bioretention media over Surface area
                                      Phase-In= 0.10'

Primary OutFlow Max=0.23 cfs @ 12.13 hrs  HW=596.99'  TW=591.17'   (Dynamic Tailwater)
└─1=Underdrain  (Passes 0.23 cfs of 1.93 cfs potential flow)
    └─3=Exfiltration through bioretention media(Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=13.41 cfs @ 12.13 hrs  HW=596.99'  TW=591.17'   (Dynamic Tailwater)
└─2=overflow weir  (Weir Controls 13.41 cfs @ 2.07 fps)
```

Pond 116P: bioretention 202



Summary for Pond 117P: depression

Inflow Area = 6.250 ac, 0.00% Impervious, Inflow Depth = 1.10" for 10-yr event
Inflow = 12.30 cfs @ 11.98 hrs, Volume= 0.573 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 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 599.53' @ 24.34 hrs Surf.Area= 78,331 sf Storage= 24,966 cf
Flood Elev= 602.00' Surf.Area= 232,521 sf Storage= 253,427 cf

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

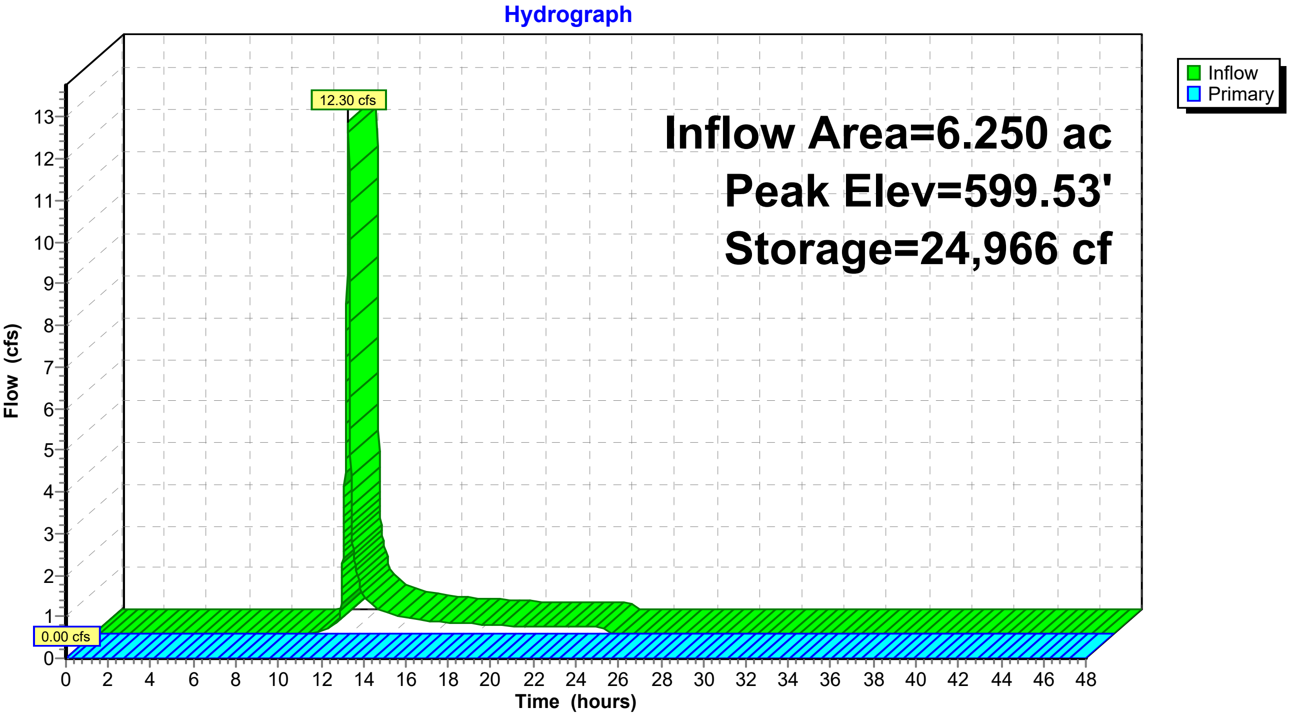
Volume	Invert	Avail.Storage	Storage Description
#1	599.00'	253,427 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
599.00	16,745	0	0
599.50	75,340	23,021	23,021
599.75	104,880	22,528	45,549
600.00	125,550	28,804	74,353
600.25	152,370	34,740	109,093
601.00	232,521	144,334	253,427

Device	Routing	Invert	Outlet Devices
#1	Primary	600.50'	**162.0 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=599.00' TW=591.00' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 117P: depression



Summary for Pond 118b: bioretention 101

Inflow Area = 1.450 ac, 0.00% Impervious, Inflow Depth = 12.15" for 10-yr event
Inflow = 36.52 cfs @ 11.99 hrs, Volume= 1.468 af
Outflow = 4.38 cfs @ 12.00 hrs, Volume= 1.403 af, Atten= 88%, Lag= 0.7 min
Primary = 0.22 cfs @ 12.17 hrs, Volume= 0.706 af
Routed to Pond 121p : dry pond 10
Secondary = 4.16 cfs @ 12.00 hrs, Volume= 0.698 af
Routed to Pond 119P : bioretention 102

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.16' @ 12.17 hrs Surf.Area= 38,501 sf Storage= 43,133 cf
Flood Elev= 598.00' Surf.Area= 40,598 sf Storage= 76,209 cf

Plug-Flow detention time= 548.1 min calculated for 1.403 af (96% of inflow)
Center-of-Mass det. time= 518.4 min (1,286.2 - 767.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	76,209 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

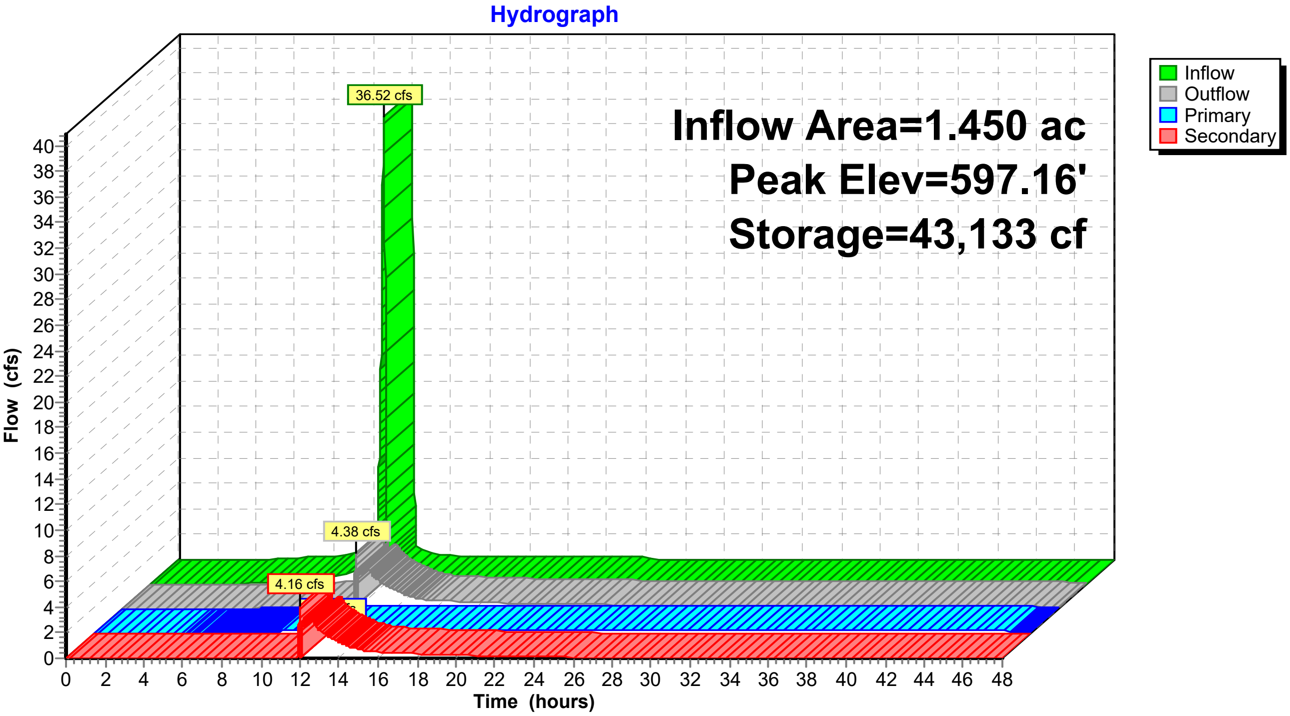
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	35,640	0	0
597.00	38,090	36,865	36,865
598.00	40,598	39,344	76,209

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.22 cfs @ 12.17 hrs HW=597.16' TW=591.75' (Dynamic Tailwater)
↑—**1=Underdrain** (Passes 0.22 cfs of 1.97 cfs potential flow)
  ↑—**3=Exfiltration through bioretention media**(Exfiltration Controls 0.22 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.00 hrs HW=596.91' TW=596.91' (Dynamic Tailwater)
↑—**2=overflow weir** (Controls 0.00 cfs)

Pond 118b: bioretention 101



Summary for Pond 119P: bioretention 102

```
[80] Warning: Exceeded Pond 118b by 0.03' @ 12.05 hrs (5.77 cfs 0.044 af)

Inflow Area =       1.070 ac,   0.00% Impervious,  Inflow Depth = 27.79"    for  10-yr event
Inflow      =      40.92 cfs @  11.99 hrs,  Volume=         2.478 af
Outflow     =       8.54 cfs @  12.20 hrs,  Volume=         2.410 af,  Atten= 79%,  Lag= 12.4 min
Primary     =       0.23 cfs @  12.16 hrs,  Volume=         0.747 af
    Routed to Pond 121p : dry pond 10
Secondary =         8.31 cfs @  12.20 hrs,  Volume=         1.663 af
    Routed to Pond 120P : bioretention 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.16' @ 12.16 hrs   Surf.Area= 40,565 sf   Storage= 45,482 cf
Flood Elev= 598.00'   Surf.Area= 42,500 sf   Storage= 80,430 cf

Plug-Flow detention time= 338.9 min calculated for 2.410 af (97% of inflow)
Center-of-Mass det. time= 320.9 min ( 1,145.9 - 825.1 )

Volume      Invert    Avail.Storage   Storage Description
   #1       596.00'       80,430 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

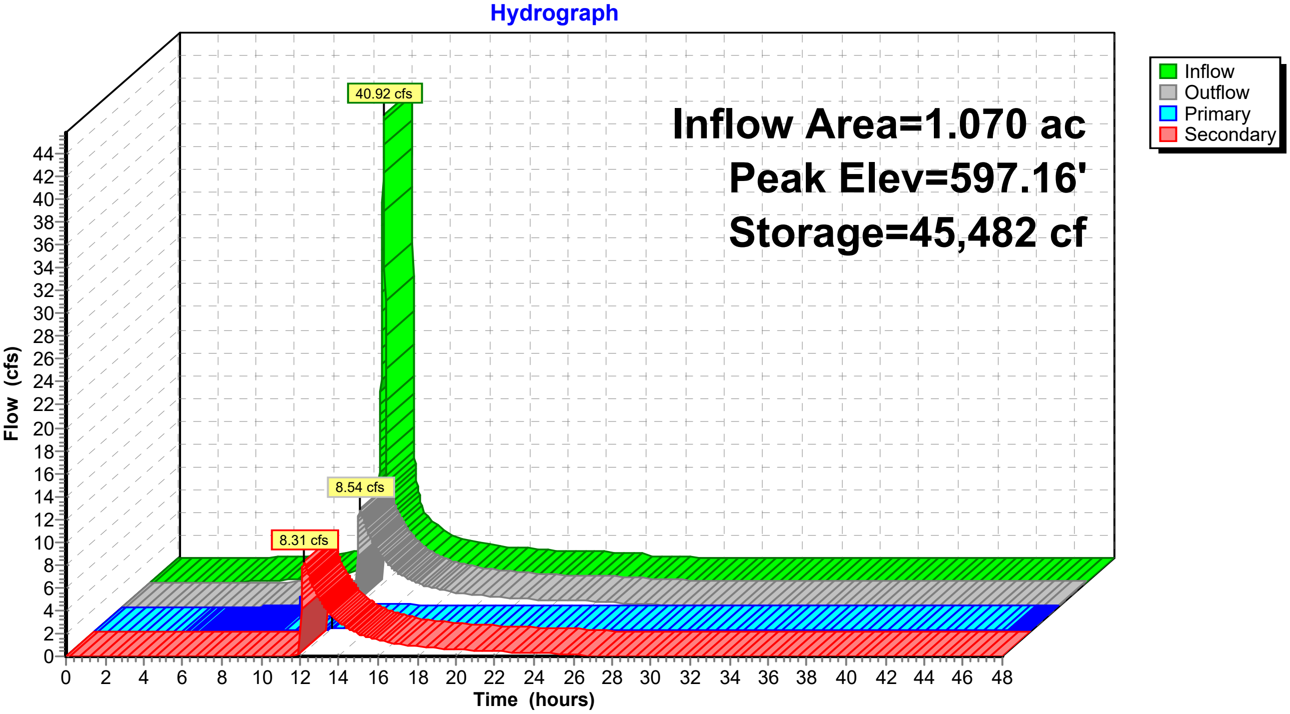
 Elevation        Surf.Area         Inc.Store        Cum.Store
    (feet)           (sq-ft)      (cubic-feet)     (cubic-feet)
    596.00            37,960                 0                0
    597.00            40,200            39,080           39,080
    598.00            42,500            41,350           80,430

Device   Routing          Invert   Outlet Devices
   #1    Primary         592.58'   6.0" Vert. Underdrain   C= 0.600   Limited to weir flow at low heads
   #2    Secondary       596.50'   162.0 deg x 10.0' long x 1.50' rise overflow weir Cv= 2.47 (C= 3.09)
   #3    Device 1        596.00'   0.250 in/hr Exfiltration through bioretention media over Surface area
                                     Phase-In= 0.10'

Primary OutFlow  Max=0.23 cfs @ 12.16 hrs  HW=597.16'  TW=591.72'   (Dynamic Tailwater)
└─1=Underdrain  (Passes 0.23 cfs of 1.97 cfs potential flow)
    └─3=Exfiltration through bioretention media(Exfiltration Controls 0.23 cfs)

Secondary OutFlow  Max=8.43 cfs @ 12.20 hrs  HW=597.16'  TW=597.12'   (Dynamic Tailwater)
└─2=overflow weir  (Weir Controls 8.43 cfs @ 0.91 fps)
```

Pond 119P: bioretention 102



Summary for Pond 120P: bioretention 103

[80] Warning: Exceeded Pond 119P by 0.11' @ 11.91 hrs (3.39 cfs 0.087 af)

Inflow Area = 32.080 ac, 72.32% Impervious, Inflow Depth = 1.82" for 10-yr event
Inflow = 42.28 cfs @ 11.99 hrs, Volume= 4.857 af
Outflow = 20.35 cfs @ 12.12 hrs, Volume= 4.793 af, Atten= 52%, Lag= 7.8 min
Primary = 0.23 cfs @ 12.12 hrs, Volume= 0.725 af
Routed to Pond 121p : dry pond 10
Secondary = 20.13 cfs @ 12.12 hrs, Volume= 4.068 af
Routed to Pond 121p : dry pond 10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.13' @ 12.12 hrs Surf.Area= 38,960 sf Storage= 42,593 cf
Flood Elev= 598.00' Surf.Area= 40,070 sf Storage= 77,130 cf

Plug-Flow detention time= 164.0 min calculated for 4.793 af (99% of inflow)
Center-of-Mass det. time= 155.4 min (1,008.4 - 853.0)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	77,130 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

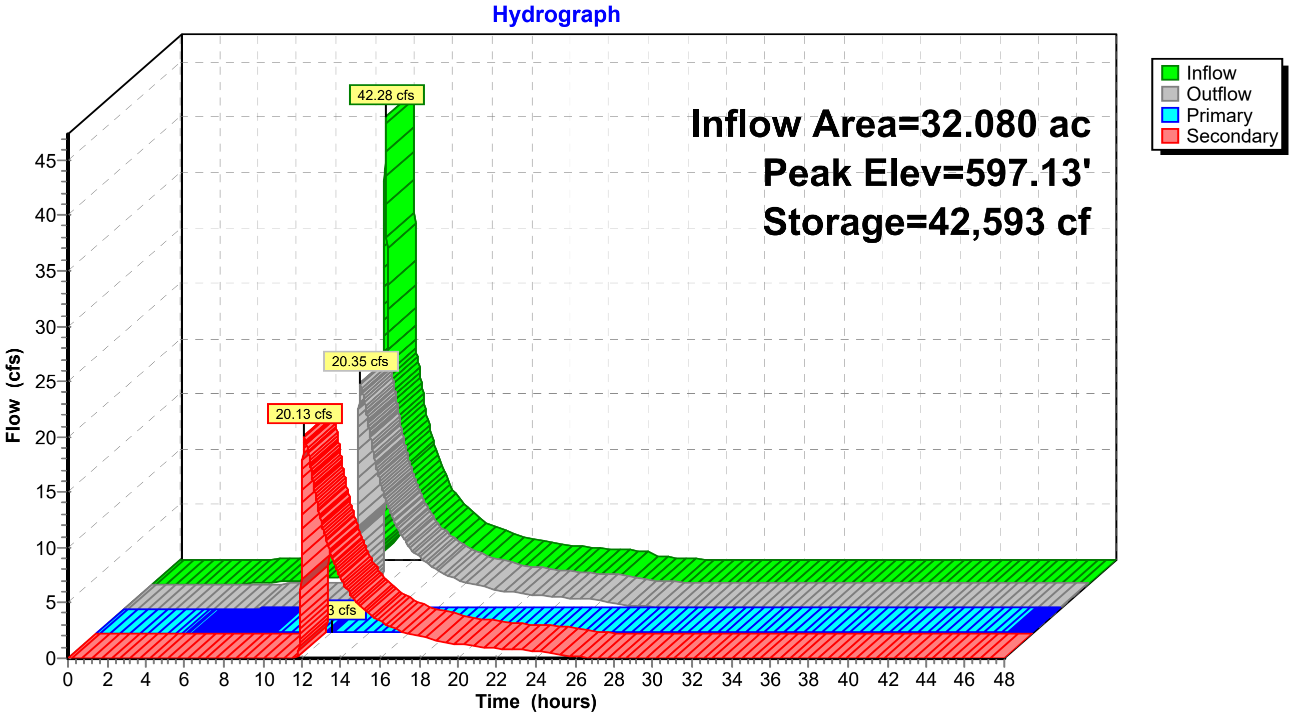
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	36,590	0	0
597.00	38,800	37,695	37,695
598.00	40,070	39,435	77,130

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.23 cfs @ 12.12 hrs HW=597.13' TW=591.64' (Dynamic Tailwater)
↑—**1=Underdrain** (Passes 0.23 cfs of 1.96 cfs potential flow)
  ↑—**3=Exfiltration through bioretention media**(Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=20.12 cfs @ 12.12 hrs HW=597.13' TW=591.64' (Dynamic Tailwater)
↑—**2=overflow weir** (Weir Controls 20.12 cfs @ 2.30 fps)

Pond 120P: bioretention 103



Summary for Pond 121p: dry pond 10

```
Inflow Area =        48.470 ac,  56.49% Impervious,  Inflow Depth >   2.09"    for  10-yr event
Inflow      =        44.29 cfs @   12.10 hrs,  Volume=          8.447 af
Outflow     =         9.72 cfs @   13.92 hrs,  Volume=          6.434 af,  Atten= 78%,  Lag= 109.4 min
Primary     =         9.72 cfs @   13.92 hrs,  Volume=          6.434 af
    Routed to Pond 111P : dry pond 20
Secondary =           0.00 cfs @    0.00 hrs,  Volume=          0.000 af
    Routed to Pond 10d : depression
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 592.67' @ 13.92 hrs Surf.Area= 81,106 sf Storage= 130,835 cf
Flood Elev= 598.00' Surf.Area= 100,533 sf Storage= 613,798 cf

Plug-Flow detention time= 438.8 min calculated for 6.434 af (76% of inflow)
Center-of-Mass det. time= 193.8 min (1,266.1 - 1,072.3)

Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	613,798 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

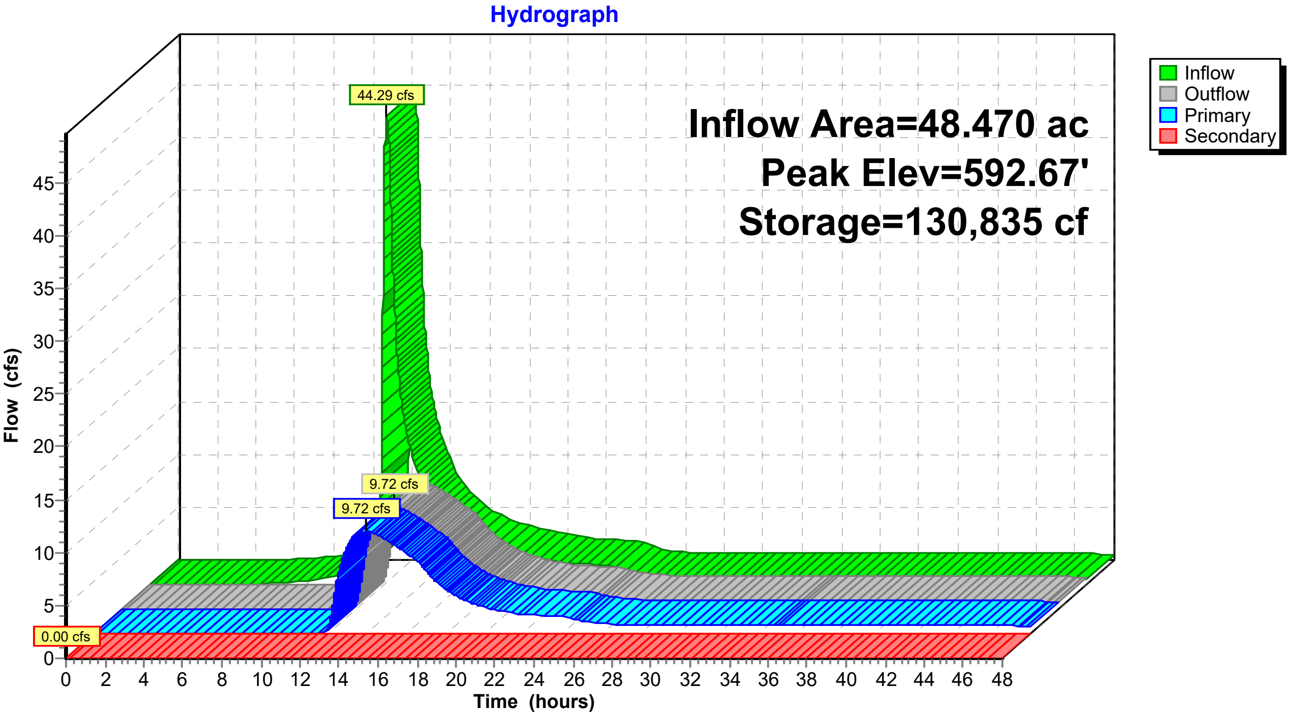
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	75,120	0	0
596.00	92,990	420,275	420,275
598.00	100,533	193,523	613,798

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**36.0" Round Culvert** L= 103.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 591.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	596.00'	**162.0 deg x 10.0' long x 2.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=9.72 cfs @ 13.92 hrs HW=592.67' TW=591.72' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 9.72 cfs @ 3.46 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=591.00' TW=592.75' (Dynamic Tailwater)
↑—**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 121p: dry pond 10



Summary for Pond 122f: forebay 100 bypass

Inflow Area = 30.720 ac, 75.42% Impervious, Inflow Depth = 2.41" for 10-yr event
Inflow = 121.04 cfs @ 11.97 hrs, Volume= 6.170 af
Outflow = 116.69 cfs @ 11.98 hrs, Volume= 6.170 af, Atten= 4%, Lag= 0.4 min
Primary = 38.75 cfs @ 11.99 hrs, Volume= 3.026 af
Routed to Pond 120P : bioretention 103
Secondary = 73.52 cfs @ 11.97 hrs, Volume= 2.938 af
Routed to Pond 1P : forebay 100 bypass
Tertiary = 5.28 cfs @ 12.00 hrs, Volume= 0.207 af
Routed to Pond DMH140 : DMH-140

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.45' @ 12.00 hrs Surf.Area= 9,202 sf Storage= 10,176 cf (7,371 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 17.1 min calculated for 6.105 af (99% of inflow)
Center-of-Mass det. time= 5.4 min (785.5 - 780.1)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

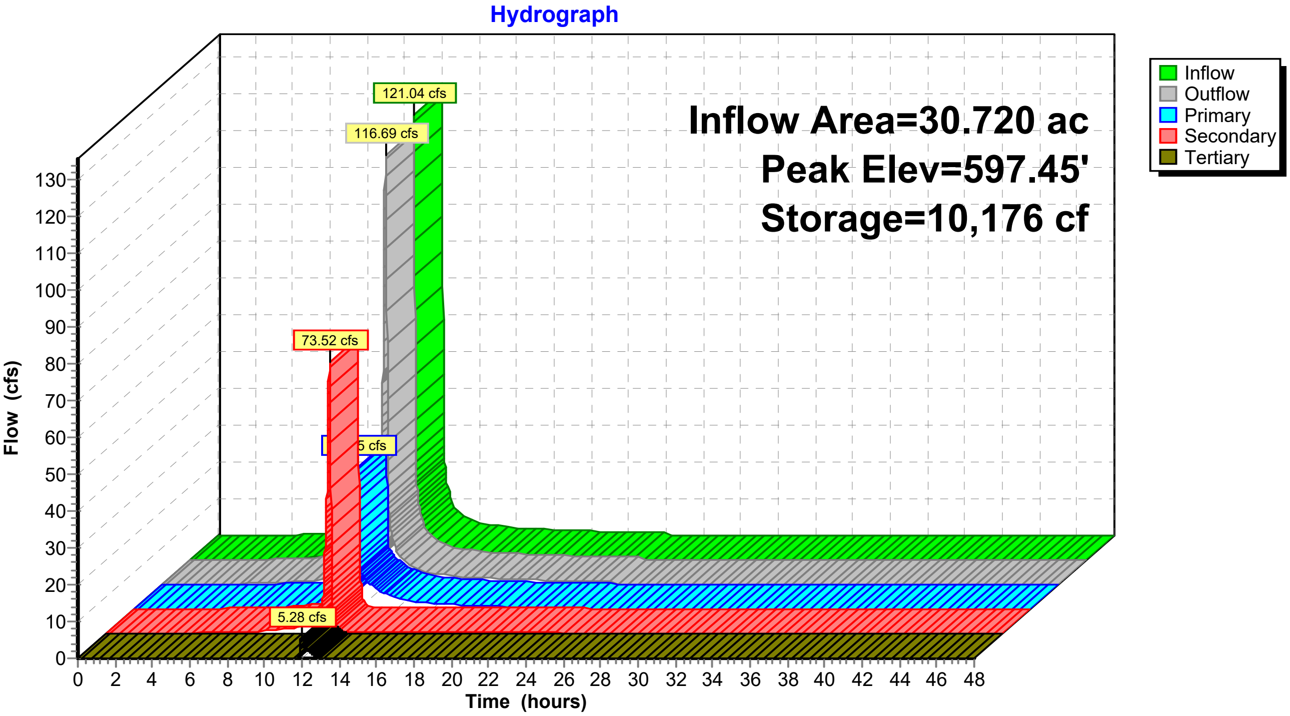
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 50.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Tertiary	595.00'	**12.0" Round Culvert to DMH-140** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 595.00' / 594.30' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Device 3	597.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=38.21 cfs @ 11.99 hrs HW=597.44' TW=596.96' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 38.21 cfs @ 2.53 fps)

Secondary OutFlow Max=65.91 cfs @ 11.97 hrs HW=597.42' TW=597.34' (Dynamic Tailwater)
↑—**2=overflow weir** (Weir Controls 65.91 cfs @ 1.29 fps)

Tertiary OutFlow Max=5.28 cfs @ 12.00 hrs HW=597.45' TW=594.47' (Dynamic Tailwater)
↑—**3=Culvert to DMH-140** (Inlet Controls 5.28 cfs @ 6.72 fps)
  ↑—**4=Grate** (Passes 5.28 cfs of 12.71 cfs potential flow)

Pond 122f: forebay 100 bypass



Summary for Pond 301f: forebay 400

Inflow Area = 3.840 ac, 67.97% Impervious, Inflow Depth = 2.31" for 10-yr event
Inflow = 14.74 cfs @ 11.97 hrs, Volume= 0.740 af
Outflow = 8.50 cfs @ 11.97 hrs, Volume= 0.740 af, Atten= 42%, Lag= 0.0 min
Primary = 8.50 cfs @ 11.97 hrs, Volume= 0.740 af
Routed to Pond 302b : bioretention 401

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 605.00' Surf.Area= 7,090 sf Storage= 21,930 cf
Peak Elev= 605.80' @ 12.09 hrs Surf.Area= 7,838 sf Storage= 27,866 cf (5,936 cf above start)
Flood Elev= 606.50' Surf.Area= 8,500 sf Storage= 33,623 cf (11,693 cf above start)

Plug-Flow detention time= 379.1 min calculated for 0.236 af (32% of inflow)
Center-of-Mass det. time= 21.8 min (808.2 - 786.5)

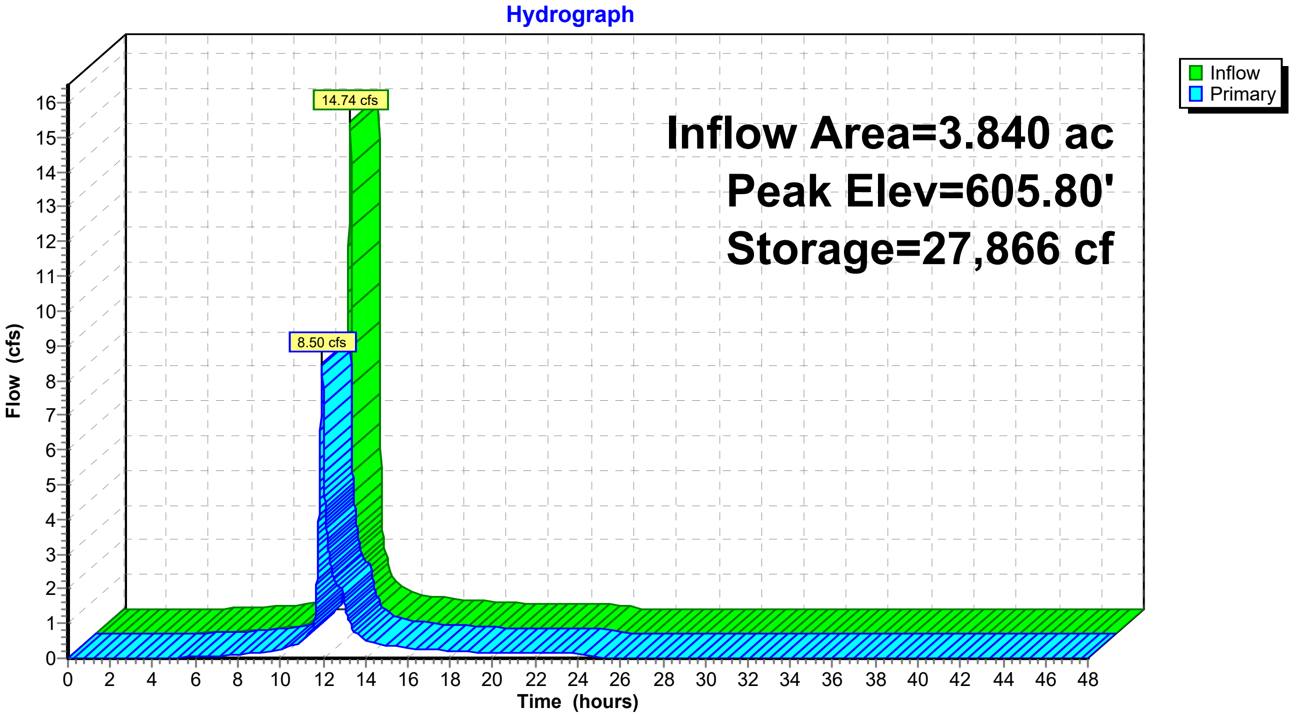
Volume	Invert	Avail.Storage	Storage Description
#1	601.00'	33,623 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.00	3,930	0	0
604.50	6,640	18,498	18,498
605.00	7,090	3,433	21,930
606.50	8,500	11,693	33,623

Device	Routing	Invert	Outlet Devices
#1	Primary	605.00'	**162.0 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=5.26 cfs @ 11.97 hrs HW=605.58' TW=605.55' (Dynamic Tailwater)
↑—**1=Sharp-Crested Vee/Trap Weir** (Weir Controls 5.26 cfs @ 0.67 fps)

Pond 301f: forebay 400



Summary for Pond 302b: bioretention 401

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Inflow Area =        10.830 ac,  48.29% Impervious,  Inflow Depth =   2.02"    for  10-yr event
Inflow      =        31.25 cfs @   11.97 hrs,  Volume=           1.825 af
Outflow     =        12.98 cfs @   12.08 hrs,  Volume=           1.803 af,  Atten= 58%,  Lag= 6.8 min
Primary     =         7.51 cfs @   12.08 hrs,  Volume=           1.680 af
    Routed to Reach DP3 : DP1
Secondary =           5.48 cfs @   12.08 hrs,  Volume=           0.123 af
    Routed to Reach DP3 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 605.79' @ 12.08 hrs   Surf.Area= 22,702 sf   Storage= 27,339 cf
Flood Elev= 606.50'   Surf.Area= 24,360 sf   Storage= 44,085 cf

Plug-Flow detention time= 210.0 min calculated for 1.803 af (99% of inflow)
Center-of-Mass det. time= 202.4 min ( 1,012.3 - 810.0 )

Volume        Invert     Avail.Storage   Storage Description
   #1         604.50'        44,085 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

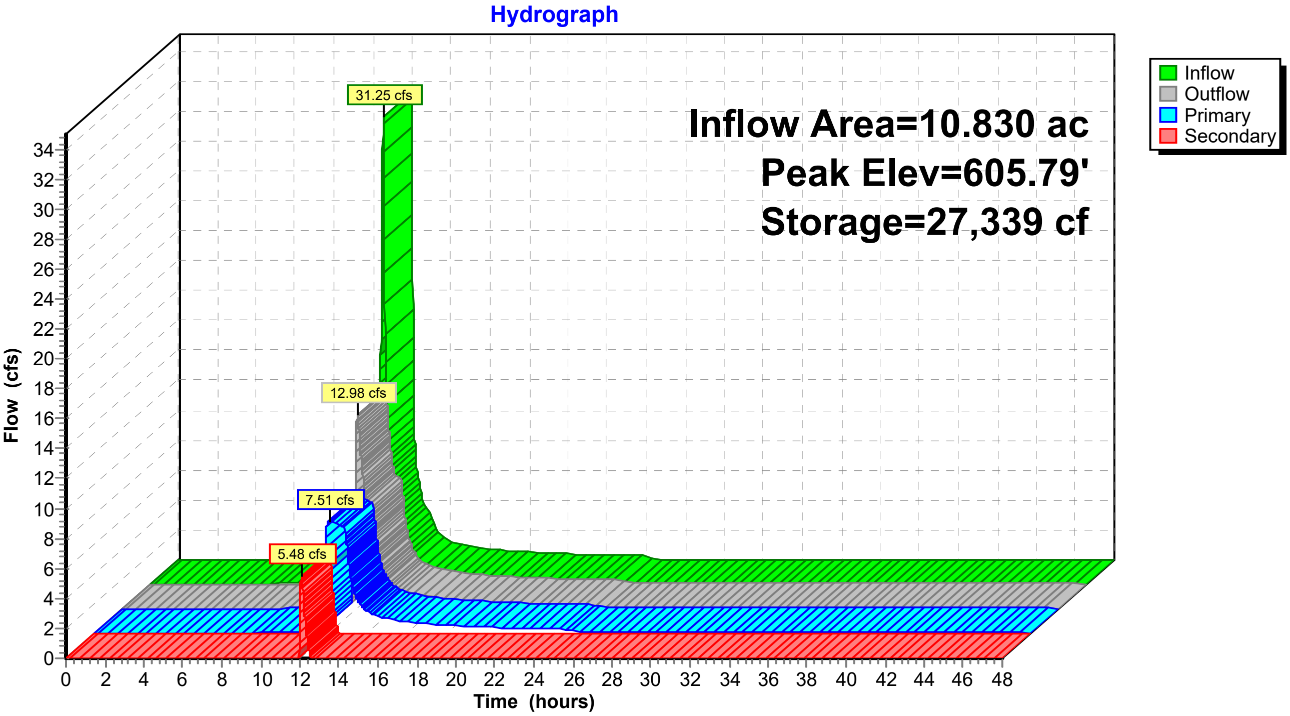
 Elevation          Surf.Area          Inc.Store          Cum.Store
    (feet)             (sq-ft)       (cubic-feet)       (cubic-feet)
    604.50              19,750                  0                  0
    605.50              22,030             20,890             20,890
    606.50              24,360             23,195             44,085

Device   Routing            Invert   Outlet Devices
   #1    Primary           601.08'   12.0"  Round Culvert
                                     L= 68.0'   CPP, square edge headwall,  Ke= 0.500
                                     Inlet / Outlet Invert= 601.08' / 600.08'   S= 0.0147 '/'   Cc= 0.900
                                     n= 0.012  Corrugated PP, smooth interior,  Flow Area= 0.79 sf
   #2    Device 1          605.00'   30.0" x 48.0" Horiz. Grate   C= 0.600
                                     Limited to weir flow at low heads
   #3    Secondary         605.50'   162.0 deg x 10.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir
                                     Cv= 2.47 (C= 3.09)
   #4    Device 1          601.08'   6.0" Vert. Underdrain   C= 0.600   Limited to weir flow at low heads
   #5    Device 4          604.50'   0.250 in/hr Exfiltration through bioretention media over Surface area
                                       Phase-In= 0.10'

Primary OutFlow Max=7.51 cfs @ 12.08 hrs  HW=605.79'  TW=0.00'   (Dynamic Tailwater)
↑
└─1=Culvert  (Barrel Controls 7.51 cfs @ 9.56 fps)
   ↑
   ├─2=Grate  (Passes < 29.74 cfs potential flow)
   └─4=Underdrain  (Passes < 2.00 cfs potential flow)
      ↑
      └─5=Exfiltration through bioretention media(Passes < 0.13 cfs potential flow)

Secondary OutFlow Max=5.47 cfs @ 12.08 hrs  HW=605.79'  TW=0.00'   (Dynamic Tailwater)
↑
└─3=Sharp-Crested Vee/Trap Weir(Weir Controls 5.47 cfs @ 1.61 fps)
```

Pond 302b: bioretention 401



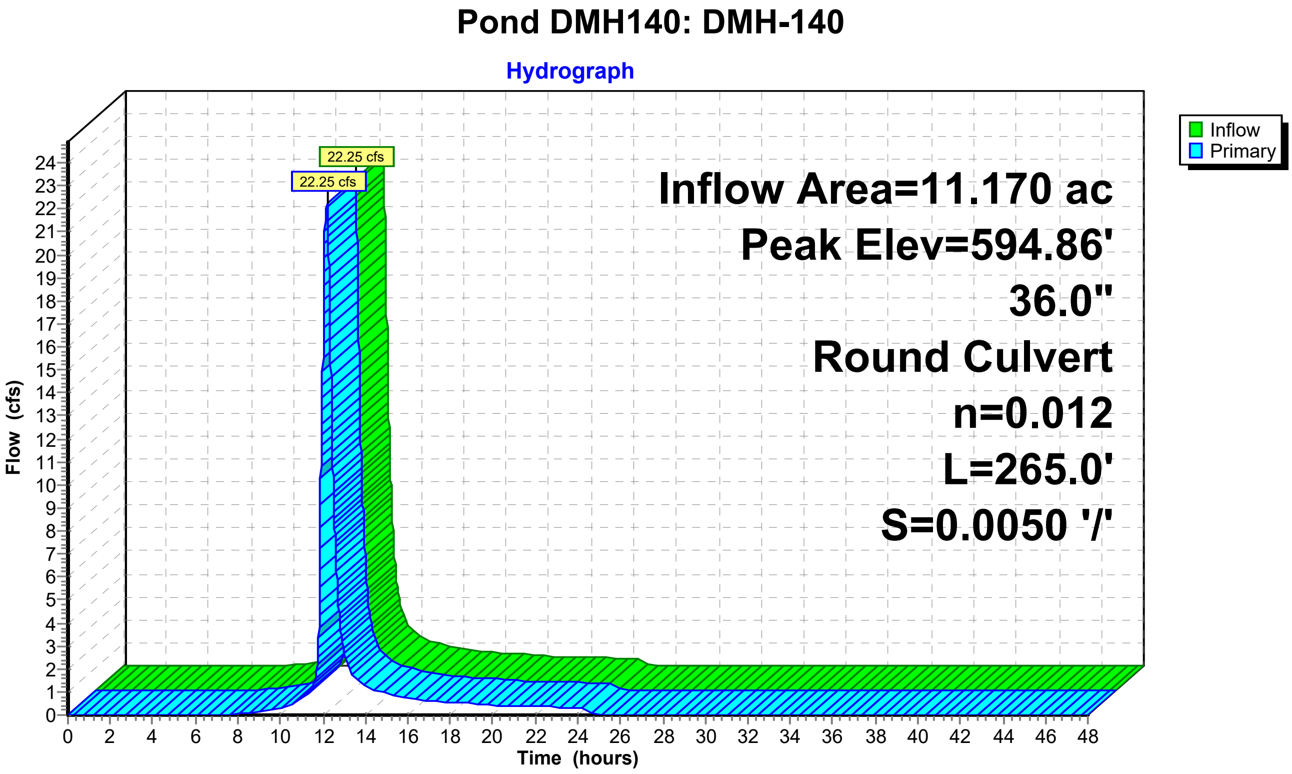
Summary for Pond DMH140: DMH-140

Inflow Area = 11.170 ac, 37.42% Impervious, Inflow Depth = 2.01" for 10-yr event
Inflow = 22.25 cfs @ 12.19 hrs, Volume= 1.866 af
Outflow = 22.25 cfs @ 12.19 hrs, Volume= 1.866 af, Atten= 0%, Lag= 0.0 min
Primary = 22.25 cfs @ 12.19 hrs, Volume= 1.866 af
Routed to Pond 121p : dry pond 10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 594.86' @ 12.19 hrs
Flood Elev= 601.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**36.0" Round Culvert** L= 265.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 592.83' / 591.50' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=22.24 cfs @ 12.19 hrs HW=594.86' TW=591.78' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 22.24 cfs @ 6.16 fps)



Summary for Pond DMH142: DMH-142

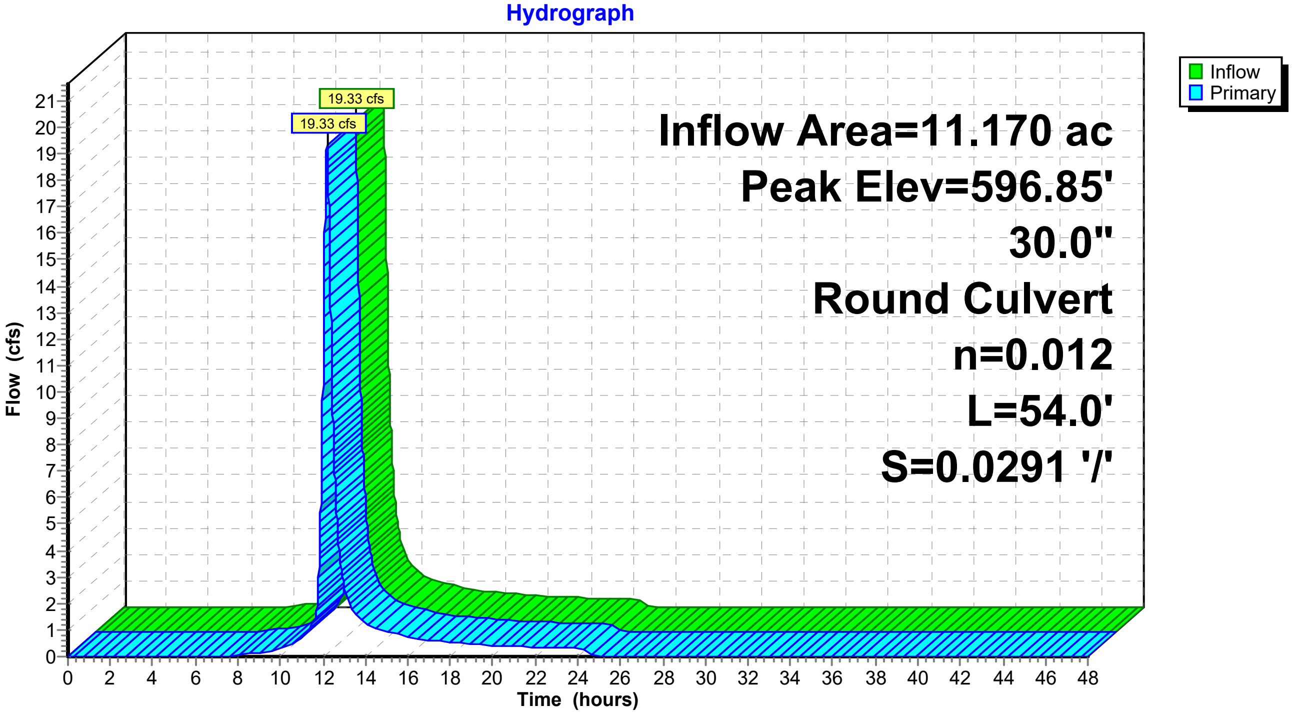
Inflow Area = 11.170 ac, 37.42% Impervious, Inflow Depth = 1.78" for 10-yr event
Inflow = 19.33 cfs @ 12.20 hrs, Volume= 1.659 af
Outflow = 19.33 cfs @ 12.20 hrs, Volume= 1.659 af, Atten= 0%, Lag= 0.0 min
Primary = 19.33 cfs @ 12.20 hrs, Volume= 1.659 af
Routed to Pond DMH140 : DMH-140

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 596.85' @ 12.20 hrs
Flood Elev= 601.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	594.91'	**30.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 594.91' / 593.34' S= 0.0291 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=19.32 cfs @ 12.20 hrs HW=596.85' TW=594.86' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 19.32 cfs @ 4.74 fps)

Pond DMH142: DMH-142



Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment100: Runoff Area=24.040 ac 21.88% Impervious Runoff Depth=2.98"
Flow Length=870' Tc=41.8 min CN=83 Runoff=49.74 cfs 5.961 af

Subcatchment101: Runoff Area=26.590 ac 6.54% Impervious Runoff Depth=2.88"
Flow Length=2,403' Tc=81.0 min CN=82 Runoff=32.84 cfs 6.388 af

Subcatchment102: Runoff Area=11.170 ac 37.42% Impervious Runoff Depth=3.46"
Flow Length=810' Tc=25.1 min CN=88 Runoff=37.10 cfs 3.221 af

Subcatchment110: Runoff Area=8.800 ac 0.00% Impervious Runoff Depth=2.98"
Flow Length=175' Tc=31.0 min CN=83 Runoff=22.23 cfs 2.182 af

Subcatchment111: Runoff Area=15.540 ac 2.25% Impervious Runoff Depth=2.61"
Flow Length=405' Tc=69.9 min CN=79 Runoff=19.30 cfs 3.384 af

Subcatchment112: Runoff Area=22.280 ac 93.27% Impervious Runoff Depth=4.43"
Tc=6.0 min CN=97 Runoff=150.50 cfs 8.221 af

Subcatchment113: Runoff Area=4.290 ac 88.58% Impervious Runoff Depth=4.31"
Tc=6.0 min CN=96 Runoff=28.72 cfs 1.542 af

Subcatchment114: Runoff Area=8.730 ac 58.42% Impervious Runoff Depth=3.87"
Tc=6.0 min CN=92 Runoff=55.39 cfs 2.819 af

Subcatchment115: Runoff Area=1.080 ac 0.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=84 Runoff=5.77 cfs 0.276 af

Subcatchment116: Runoff Area=1.100 ac 0.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=84 Runoff=5.88 cfs 0.281 af

Subcatchment117: Runoff Area=6.250 ac 0.00% Impervious Runoff Depth=2.53"
Tc=6.0 min CN=78 Runoff=28.11 cfs 1.316 af

Subcatchment118: Runoff Area=1.450 ac 0.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=84 Runoff=7.75 cfs 0.371 af

Subcatchment119: Runoff Area=1.070 ac 0.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=84 Runoff=5.72 cfs 0.274 af

Subcatchment120: Runoff Area=1.360 ac 2.21% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=84 Runoff=7.27 cfs 0.348 af

Subcatchment121: Runoff Area=2.700 ac 0.00% Impervious Runoff Depth=3.07"
Tc=6.0 min CN=84 Runoff=14.44 cfs 0.691 af

Subcatchment122: Runoff Area=30.720 ac 75.42% Impervious Runoff Depth=4.20"
Tc=6.0 min CN=95 Runoff=203.44 cfs 10.756 af

```
Subcatchment200:                Runoff Area=21.200 ac   20.19% Impervious   Runoff Depth=2.98"
                        Flow Length=1,930'   Tc=118.0 min   CN=83   Runoff=20.30 cfs  5.257 af

Subcatchment300:                Runoff Area=29.510 ac   12.27% Impervious   Runoff Depth=2.98"
                         Flow Length=1,170'   Tc=56.0 min   CN=83   Runoff=49.38 cfs  7.318 af

Subcatchment301:                 Runoff Area=3.840 ac   67.97% Impervious   Runoff Depth=4.09"
                                             Tc=6.0 min   CN=94   Runoff=25.11 cfs  1.309 af

Subcatchment302:                 Runoff Area=6.990 ac   37.48% Impervious   Runoff Depth=3.56"
                                             Tc=6.0 min   CN=89   Runoff=41.96 cfs  2.075 af

Subcatchment400:                Runoff Area=19.850 ac    5.84% Impervious   Runoff Depth=2.70"
                         Flow Length=1,438'   Tc=66.6 min   CN=80   Runoff=26.48 cfs  4.469 af

Reach DP1: DP1                                                     Inflow=33.73 cfs  15.789 af
                                                                  Outflow=33.73 cfs  15.789 af

Reach DP2: DP1                                                     Inflow=51.10 cfs  10.698 af
                                                                  Outflow=51.10 cfs  10.698 af

Reach DP3: DP1                                                     Inflow=60.31 cfs  10.678 af
                                                                  Outflow=60.31 cfs  10.678 af

Reach DP4: DP1                                                      Inflow=26.48 cfs  4.469 af
                                                                   Outflow=26.48 cfs  4.469 af

Pond 1P: forebay 100 bypass        Peak Elev=597.85'  Storage=14,097 cf   Inflow=124.05 cfs  4.886 af
             Primary=54.06 cfs  2.656 af   Secondary=61.99 cfs  2.230 af   Outflow=115.28 cfs  4.886 af

Pond 2P: forebay 100 bypass         Peak Elev=597.83'  Storage=13,956 cf   Inflow=61.99 cfs  2.230 af
                                                                   Outflow=54.37 cfs  2.230 af

Pond 10d: depression                Peak Elev=593.89'  Storage=32,322 cf   Inflow=49.74 cfs  5.961 af
               Primary=0.56 cfs  0.520 af   Secondary=41.21 cfs  5.441 af   Outflow=41.77 cfs  5.961 af

Pond 102d: depression                Peak Elev=601.68'  Storage=3,090 cf   Inflow=37.10 cfs  3.221 af
                     30.0"  Round Culvert  n=0.012  L=72.0'  S=0.0290 '/'   Outflow=34.41 cfs  3.221 af

Pond 110P: dry pond 30            Peak Elev=592.06'  Storage=233,855 cf   Inflow=22.89 cfs  14.161 af
                                                                   Outflow=3.87 cfs  8.880 af

Pond 111P: dry pond 20            Peak Elev=593.25'  Storage=911,451 cf   Inflow=161.74 cfs  28.462 af
                    15.0"  Round Culvert  n=0.012  L=154.0'  S=0.0000 '/'   Outflow=4.62 cfs  11.979 af

Pond 112F: forebay 200            Peak Elev=597.61'  Storage=150,446 cf   Inflow=150.50 cfs  8.221 af
Primary=46.76 cfs  3.438 af   Secondary=46.73 cfs  3.436 af   Tertiary=38.88 cfs  1.346 af   Outflow=132.05 cfs  8.221 af

Pond 113F: forebay 300              Peak Elev=598.64'  Storage=23,616 cf   Inflow=28.72 cfs  1.542 af
                                                                   Outflow=23.50 cfs  1.542 af
```

Pond 114b: bioretention 301 Peak Elev=598.60' Storage=56,263 cf Inflow=78.67 cfs 4.361 af
Primary=0.21 cfs 0.692 af Secondary=55.05 cfs 3.625 af Outflow=55.27 cfs 4.317 af

Pond 115b: bioretention 201 Peak Elev=597.31' Storage=51,451 cf Inflow=52.31 cfs 3.715 af
Primary=0.24 cfs 0.800 af Secondary=31.58 cfs 2.855 af Outflow=31.82 cfs 3.656 af

Pond 116P: bioretention 202 Peak Elev=597.31' Storage=51,481 cf Inflow=52.39 cfs 3.717 af
Primary=0.24 cfs 0.800 af Secondary=31.64 cfs 2.858 af Outflow=31.87 cfs 3.658 af

Pond 117P: depression Peak Elev=599.86' Storage=57,308 cf Inflow=28.11 cfs 1.316 af
Outflow=0.00 cfs 0.000 af

Pond 118b: bioretention 101 Peak Elev=597.81' Storage=68,476 cf Inflow=62.06 cfs 2.601 af
Primary=0.23 cfs 0.749 af Secondary=13.42 cfs 1.768 af Outflow=13.65 cfs 2.518 af

Pond 119P: bioretention 102 Peak Elev=597.80' Storage=71,923 cf Inflow=72.72 cfs 4.698 af
Primary=0.24 cfs 0.794 af Secondary=29.09 cfs 3.817 af Outflow=29.34 cfs 4.611 af

Pond 120P: bioretention 103 Peak Elev=597.72' Storage=66,144 cf Inflow=94.53 cfs 9.412 af
Primary=0.23 cfs 0.769 af Secondary=67.72 cfs 8.562 af Outflow=67.95 cfs 9.331 af

Pond 121p: dry pond 10 Peak Elev=594.13' Storage=252,620 cf Inflow=108.13 cfs 15.410 af
Primary=29.85 cfs 12.101 af Secondary=0.00 cfs 0.000 af Outflow=29.85 cfs 12.101 af

Pond 122f: forebay 100 bypass Peak Elev=597.91' Storage=14,741 cf Inflow=203.44 cfs 10.756 af
Primary=66.42 cfs 5.247 af Secondary=124.05 cfs 4.886 af Tertiary=5.87 cfs 0.624 af Outflow=195.31 cfs 10.756 af

Pond 301f: forebay 400 Peak Elev=606.32' Storage=32,105 cf Inflow=25.11 cfs 1.309 af
Outflow=15.44 cfs 1.309 af

Pond 302b: bioretention 401 Peak Elev=606.31' Storage=39,383 cf Inflow=56.95 cfs 3.384 af
Primary=7.91 cfs 2.530 af Secondary=31.38 cfs 0.830 af Outflow=39.29 cfs 3.360 af

Pond DMH140: DMH-140 Peak Elev=595.83' Inflow=39.56 cfs 3.845 af
36.0" Round Culvert n=0.012 L=265.0' S=0.0050 '/' Outflow=39.56 cfs 3.845 af

Pond DMH142: DMH-142 Peak Elev=598.28' Inflow=34.41 cfs 3.221 af
30.0" Round Culvert n=0.012 L=54.0' S=0.0291 '/' Outflow=34.41 cfs 3.221 af

Total Runoff Area = 248.560 ac Runoff Volume = 68.460 af Average Runoff Depth = 3.31"
68.34% Pervious = 169.860 ac 31.66% Impervious = 78.700 ac

Summary for Subcatchment 100:

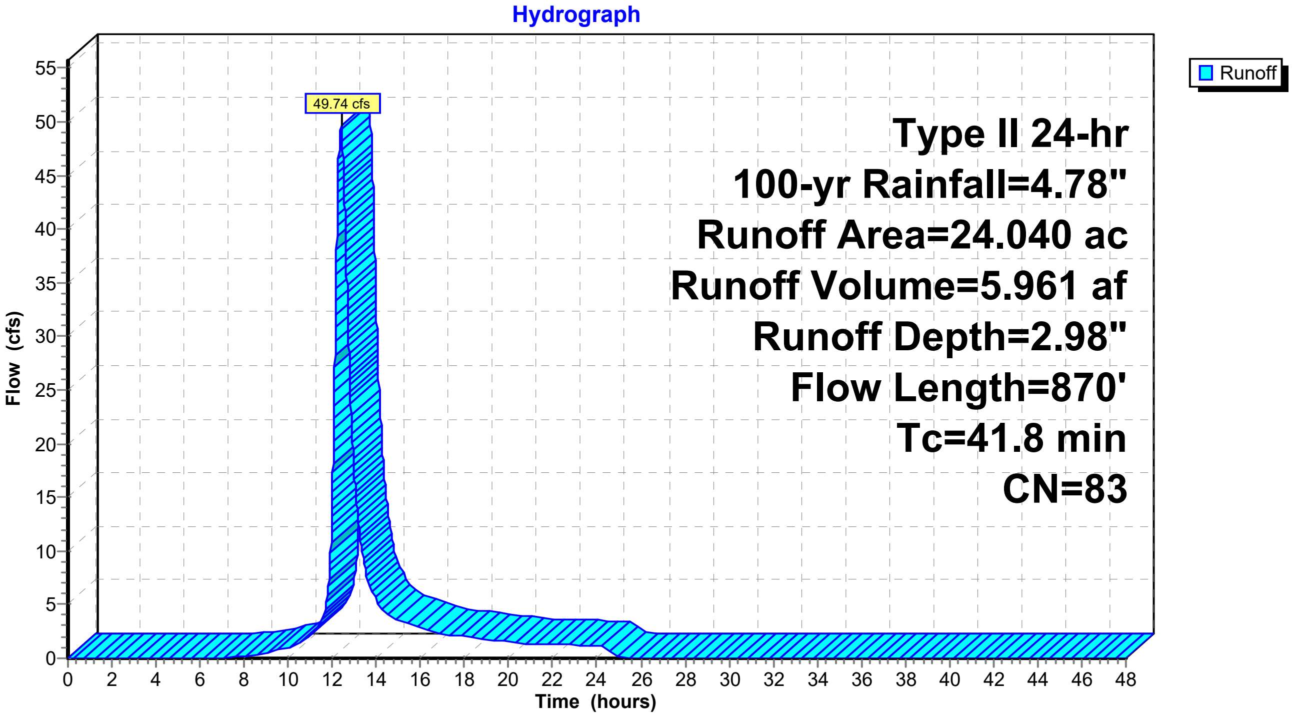
Runoff = 49.74 cfs @ 12.40 hrs, Volume= 5.961 af, Depth= 2.98"
Routed to Pond 10d : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	1.200	79	Woods, Fair, HSG D
	14.030	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	2.670	79	Woods, Fair, HSG D Offsite
*	0.870	84	50-75% Grass cover, Fair, HSG D Offsite
*	5.260	98	Impervious Offsite
*	0.010	91	Gravel roads, HSG D Offsite
	24.040	83	Weighted Average
	18.780		78.12% Pervious Area
	5.260		21.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.9	100	0.0100	0.10		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
25.9	770	0.0050	0.49		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
41.8	870	Total			

Subcatchment 100:



Summary for Subcatchment 101:

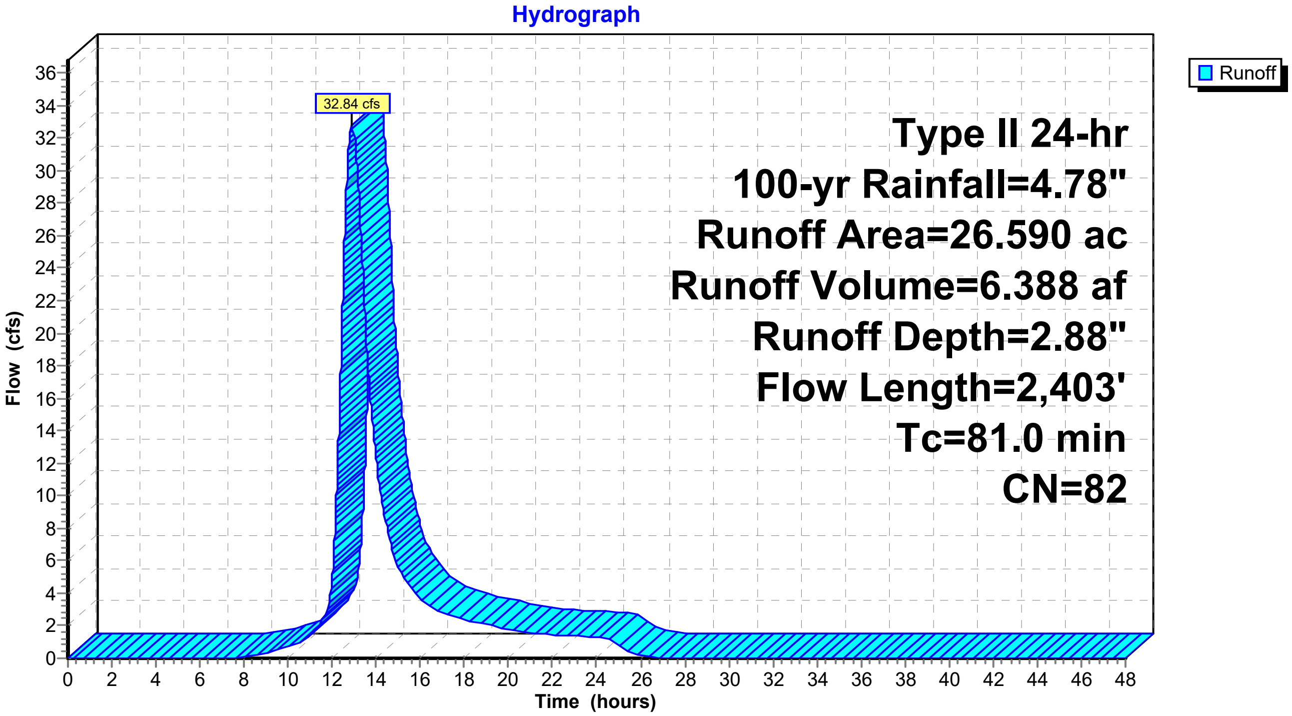
Runoff = 32.84 cfs @ 12.87 hrs, Volume= 6.388 af, Depth= 2.88"
Routed to Reach DP1 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	5.590	79	Woods, Fair, HSG D
	9.870	78	Meadow, non-grazed, HSG D
*	0.480	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	9.390	84	50-75% Grass cover, Fair, HSG D Offsite
*	1.260	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	26.590	82	Weighted Average
	24.850		93.46% Pervious Area
	1.740		6.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
66.6	100	0.0079	0.03		**Sheet Flow, A-B** Woods: Dense underbrush n= 0.800 P2= 2.12"
4.4	160	0.0150	0.61		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
4.0	113	0.0010	0.47		**Shallow Concentrated Flow, C-D** Grassed Waterway Kv= 15.0 fps
1.2	520	0.0070	6.99	136.26	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.025 Earth, clean & winding
4.8	1,510	0.0030	5.20	101.36	**Trap/Vee/Rect Channel Flow, D-E** Bot.W=5.00' D=3.00' Z= 0.5 '/' Top.W=8.00' n= 0.022 Earth, clean & straight
81.0	2,403	Total			

Subcatchment 101:



Summary for Subcatchment 102:

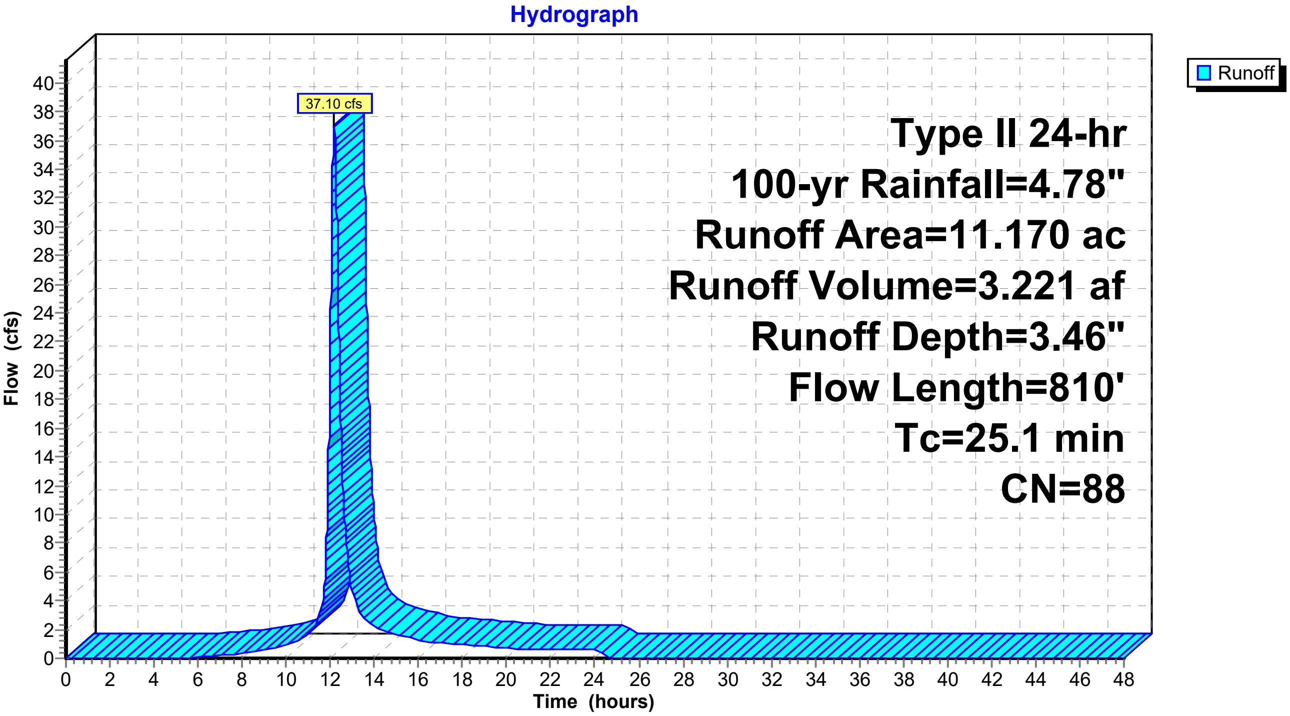
Runoff = 37.10 cfs @ 12.18 hrs, Volume= 3.221 af, Depth= 3.46"
Routed to Pond 102d : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	1.010	79	Woods, Fair, HSG D
	0.880	78	Meadow, non-grazed, HSG D
	2.320	84	50-75% Grass cover, Fair, HSG D
*	0.040	98	Impervious
	0.030	91	Gravel roads, HSG D
*	0.620	79	Woods, Fair, HSG D Offsite
*	2.130	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.140	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	11.170	88	Weighted Average
	6.990		62.58% Pervious Area
	4.180		37.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.6	100	0.0700	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
9.1	420	0.0120	0.77		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	130	0.0250	1.11		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
3.4	160	0.0125	0.78		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
25.1	810	Total			

Subcatchment 102:



Summary for Subcatchment 110:

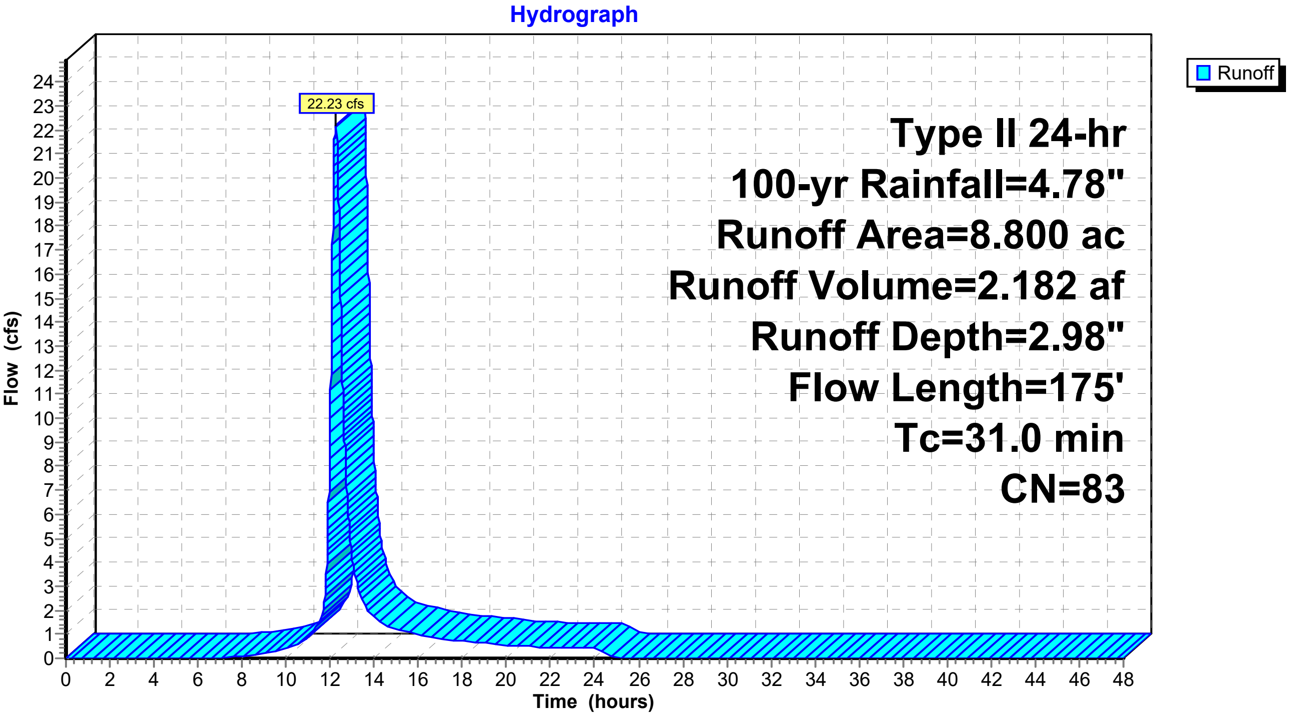
Runoff = 22.23 cfs @ 12.25 hrs, Volume= 2.182 af, Depth= 2.98"
Routed to Pond 110P : dry pond 30

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.950	78	Meadow, non-grazed, HSG D
	6.850	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	8.800	83	Weighted Average
	8.800		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
29.7	100	0.0021	0.06		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
1.3	75	0.0180	0.94		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
31.0	175	Total			

Subcatchment 110:



Summary for Subcatchment 111:

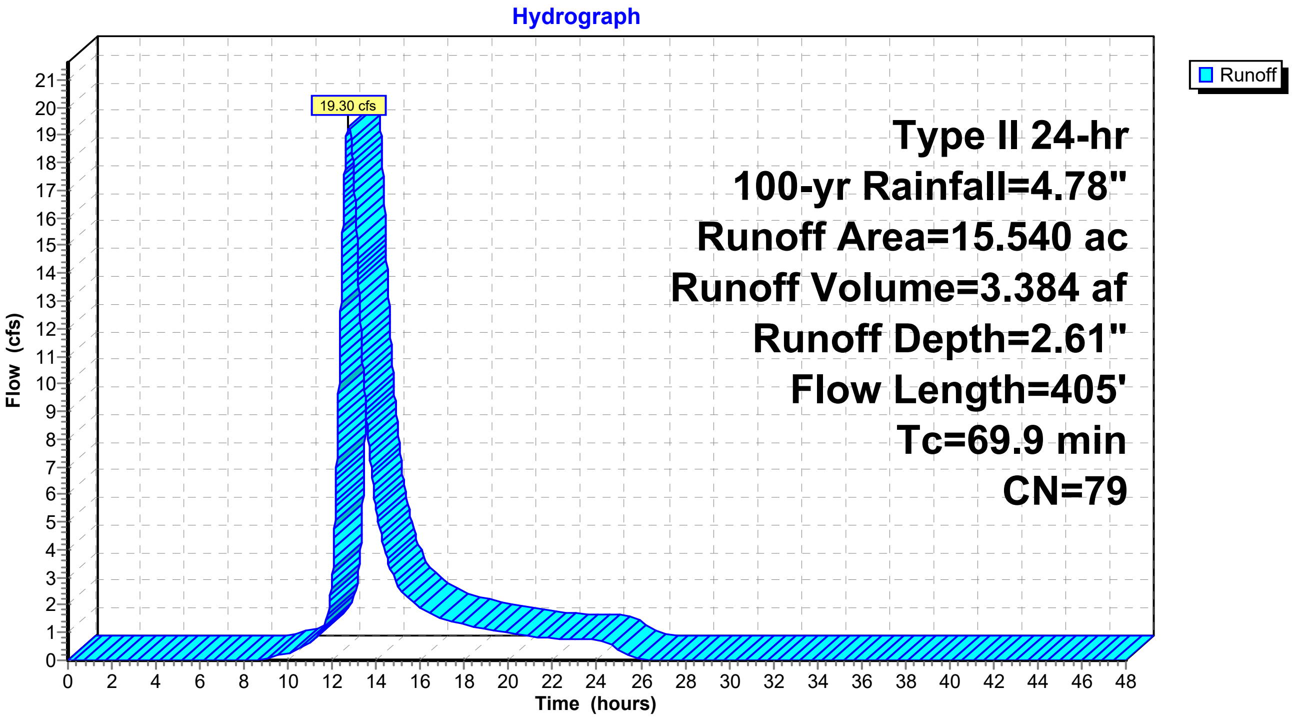
Runoff = 19.30 cfs @ 12.74 hrs, Volume= 3.384 af, Depth= 2.61"
Routed to Pond 111P : dry pond 20

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	1.040	79	Woods, Fair, HSG D
	14.150	78	Meadow, non-grazed, HSG D
*	0.350	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	15.540	79	Weighted Average
	15.190		97.75% Pervious Area
	0.350		2.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
58.8	100	0.0027	0.03		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
9.5	255	0.0080	0.45		**Shallow Concentrated Flow, B-C** Woodland Kv= 5.0 fps
1.6	50	0.0054	0.51		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
69.9	405	Total			

Subcatchment 111:



Summary for Subcatchment 112:

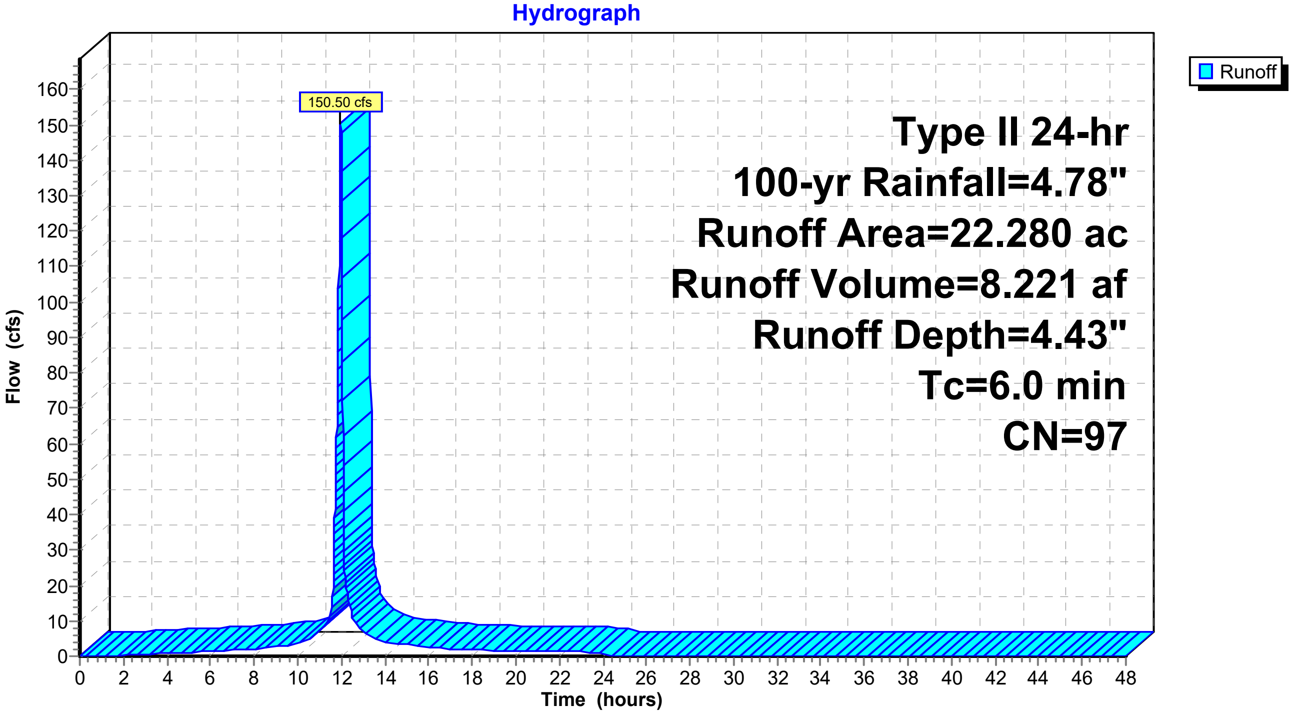
Runoff = 150.50 cfs @ 11.97 hrs, Volume= 8.221 af, Depth= 4.43"
Routed to Pond 112F : forebay 200

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.480	84	50-75% Grass cover, Fair, HSG D
*	19.970	98	Impervious
*	0.810	98	Forebay WSE
	0.020	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	22.280	97	Weighted Average
	1.500		6.73% Pervious Area
	20.780		93.27% Impervious Area

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

Subcatchment 112:



Summary for Subcatchment 113:

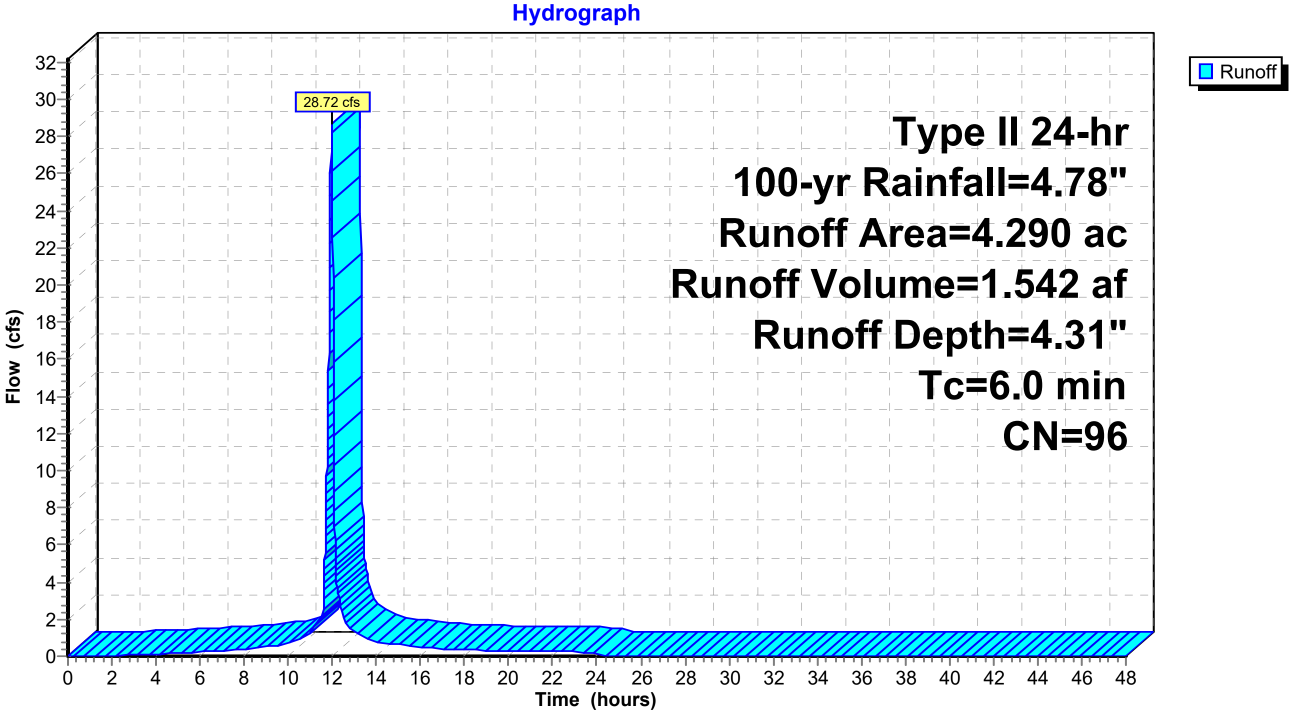
Runoff = 28.72 cfs @ 11.97 hrs, Volume= 1.542 af, Depth= 4.31"
Routed to Pond 113F : forebay 300

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	0.490	84	50-75% Grass cover, Fair, HSG D
*	3.680	98	Impervious
*	0.120	98	Forebay WSE
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	4.290	96	Weighted Average
	0.490		11.42% Pervious Area
	3.800		88.58% Impervious Area

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

Subcatchment 113:



Summary for Subcatchment 114:

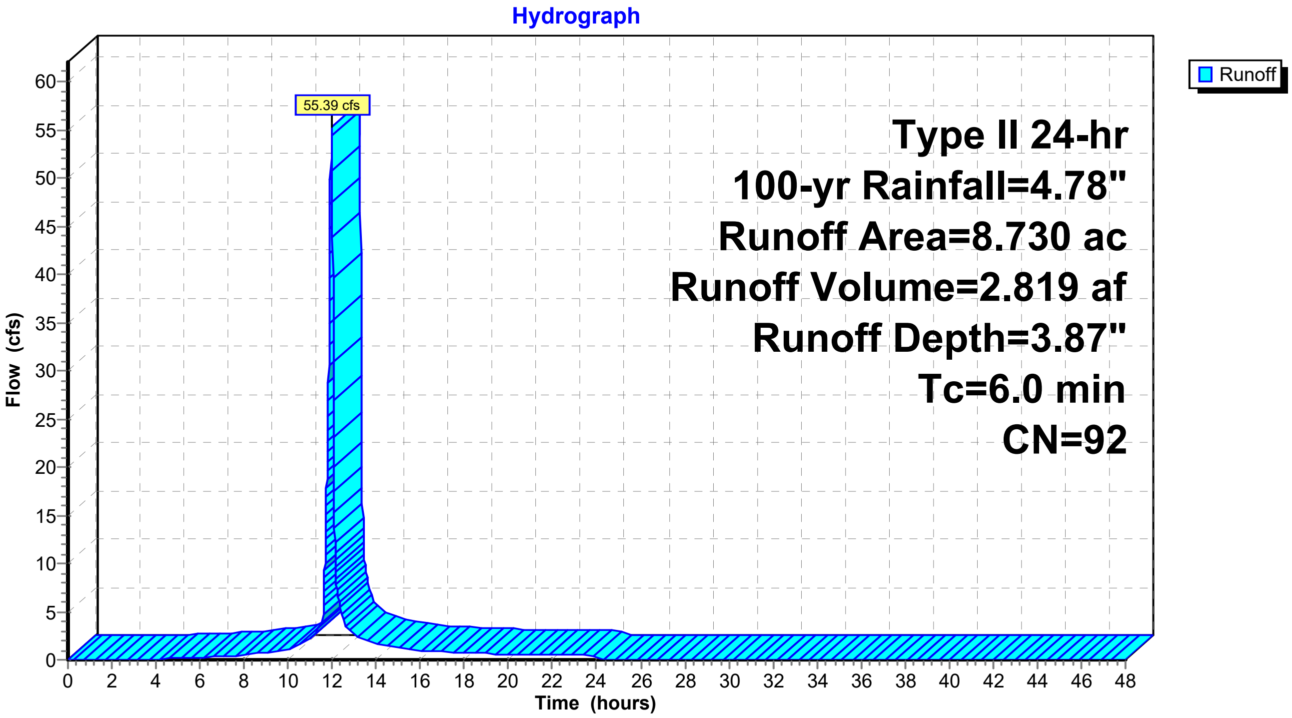
Runoff = 55.39 cfs @ 11.97 hrs, Volume= 2.819 af, Depth= 3.87"
Routed to Pond 114b : bioretention 301

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	3.560	84	50-75% Grass cover, Fair, HSG D
*	5.100	98	Impervious
	0.070	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	8.730	92	Weighted Average
	3.630		41.58% Pervious Area
	5.100		58.42% Impervious Area

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

Subcatchment 114:



Summary for Subcatchment 115:

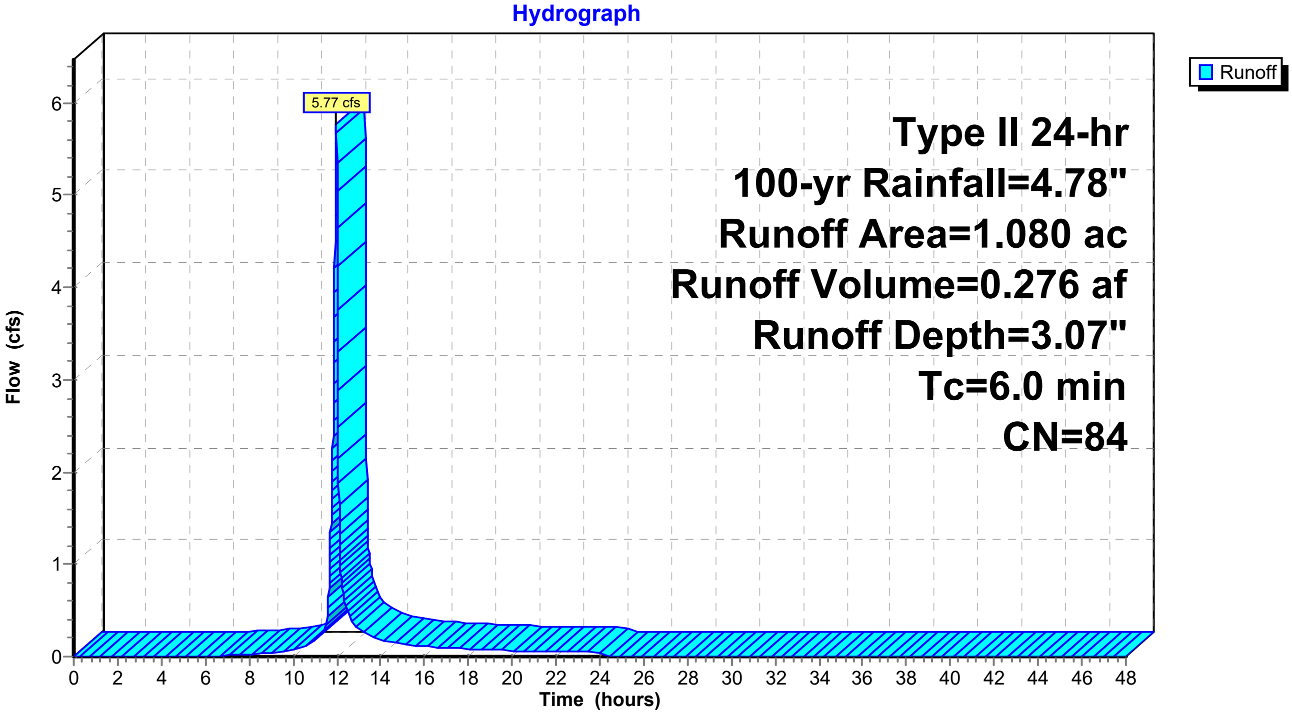
Runoff = 5.77 cfs @ 11.97 hrs, Volume= 0.276 af, Depth= 3.07"
Routed to Pond 115b : bioretention 201

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.080	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.080	84	Weighted Average
	1.080		100.00% Pervious Area

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

Subcatchment 115:



Summary for Subcatchment 116:

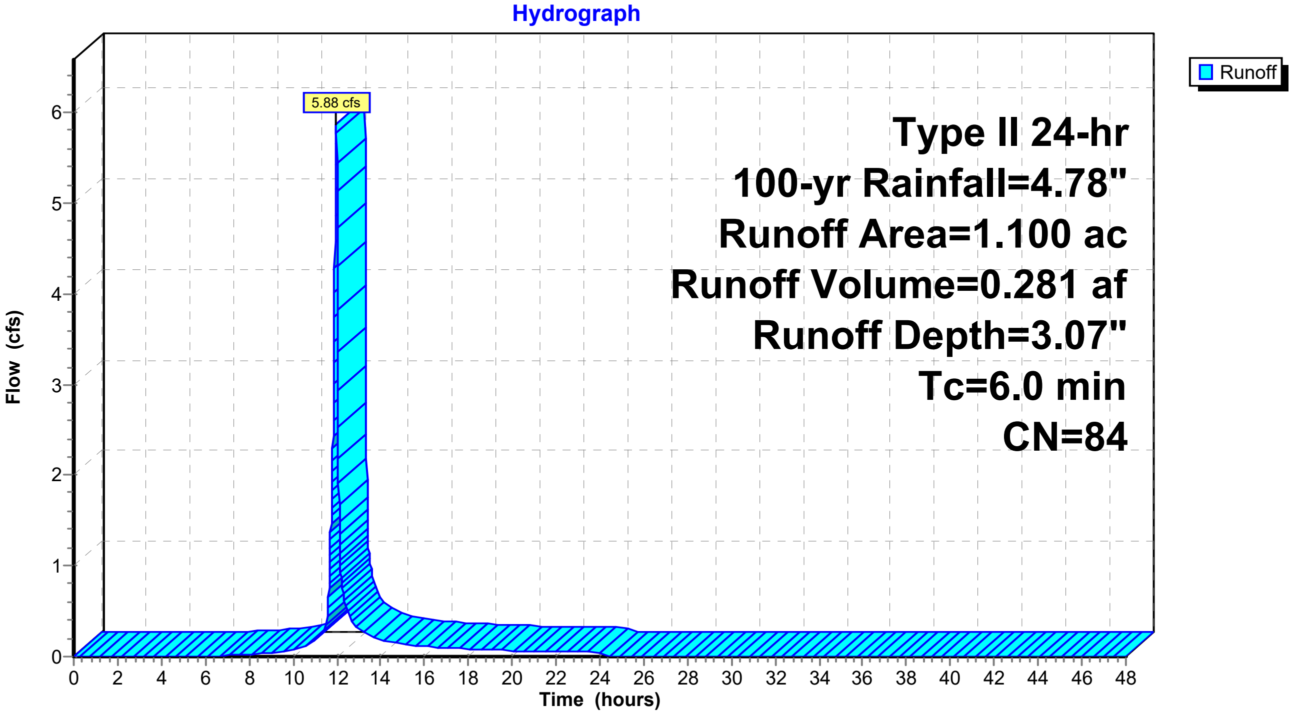
Runoff = 5.88 cfs @ 11.97 hrs, Volume= 0.281 af, Depth= 3.07"
Routed to Pond 116P : bioretention 202

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.100	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.100	84	Weighted Average
	1.100		100.00% Pervious Area

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

Subcatchment 116:



Summary for Subcatchment 117:

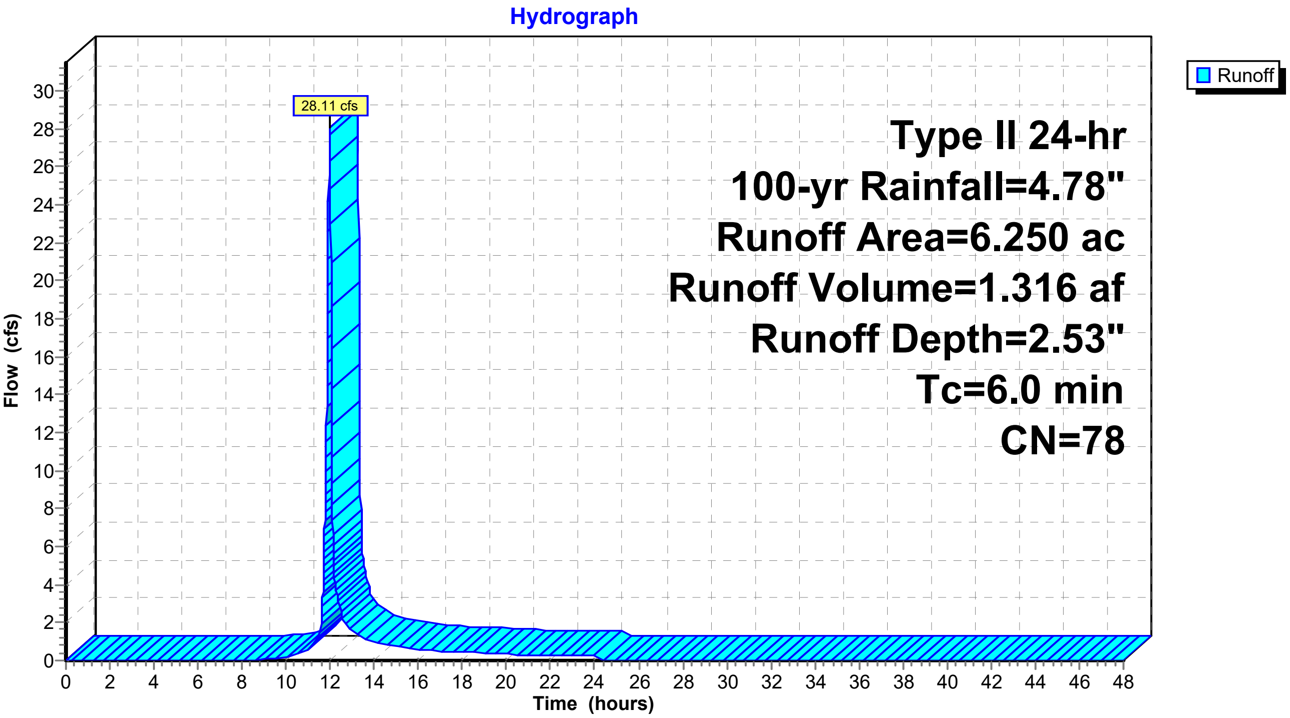
Runoff = 28.11 cfs @ 11.97 hrs, Volume= 1.316 af, Depth= 2.53"
Routed to Pond 117P : depression

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	6.250	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	6.250	78	Weighted Average
	6.250		100.00% Pervious Area

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

Subcatchment 117:



Summary for Subcatchment 118:

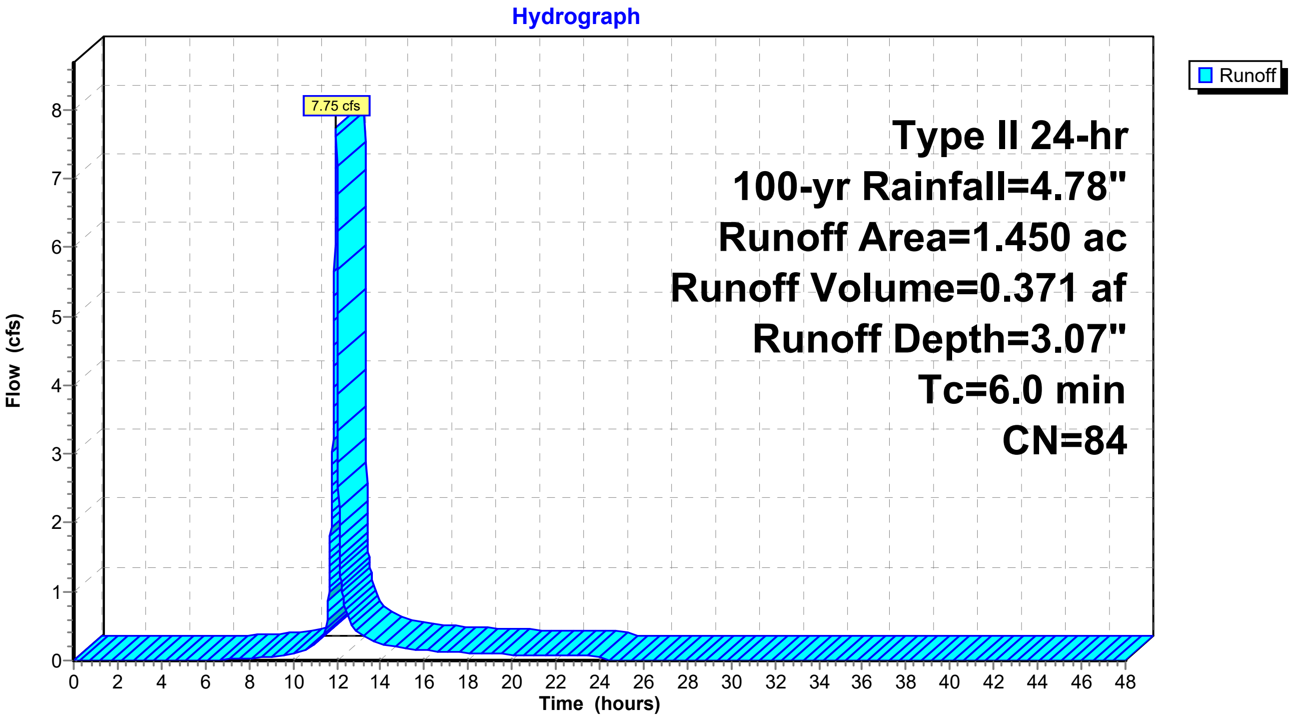
Runoff = 7.75 cfs @ 11.97 hrs, Volume= 0.371 af, Depth= 3.07"
Routed to Pond 118b : bioretention 101

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.450	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.450	84	Weighted Average
	1.450		100.00% Pervious Area

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

Subcatchment 118:



Summary for Subcatchment 119:

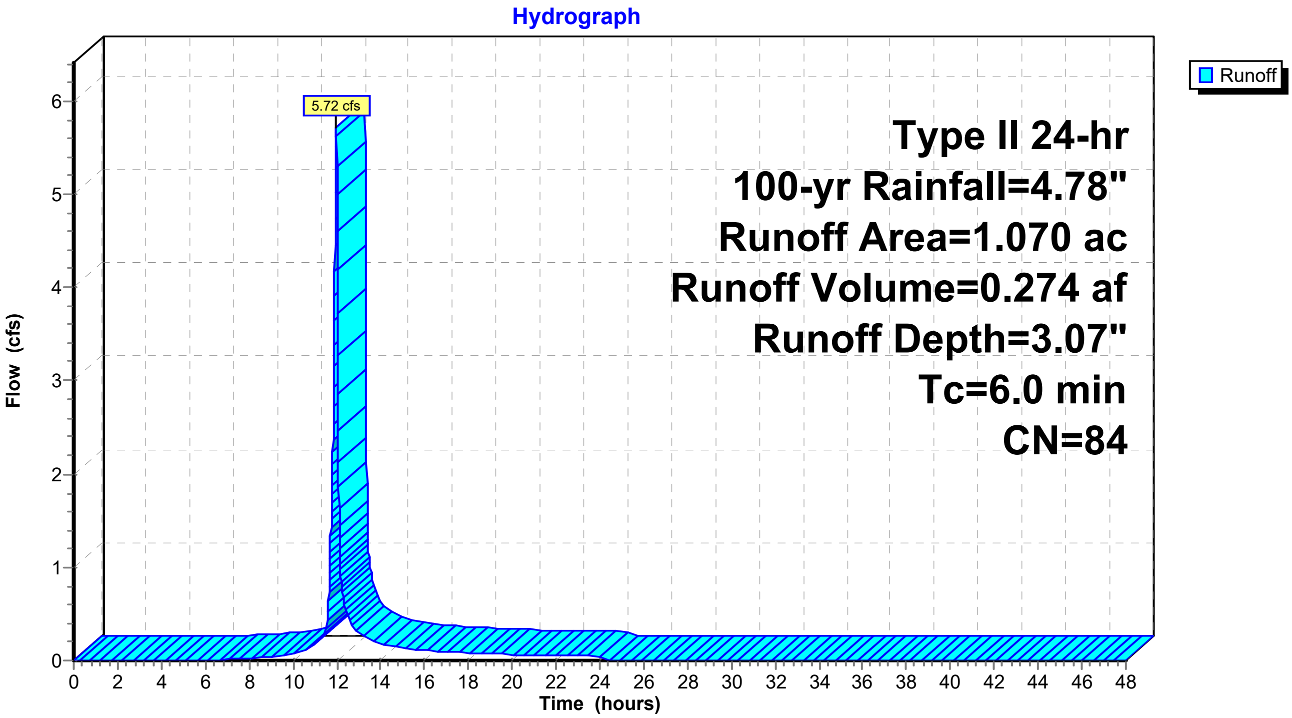
Runoff = 5.72 cfs @ 11.97 hrs, Volume= 0.274 af, Depth= 3.07"
Routed to Pond 119P : bioretention 102

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.070	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.070	84	Weighted Average
	1.070		100.00% Pervious Area

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

Subcatchment 119:



Summary for Subcatchment 120:

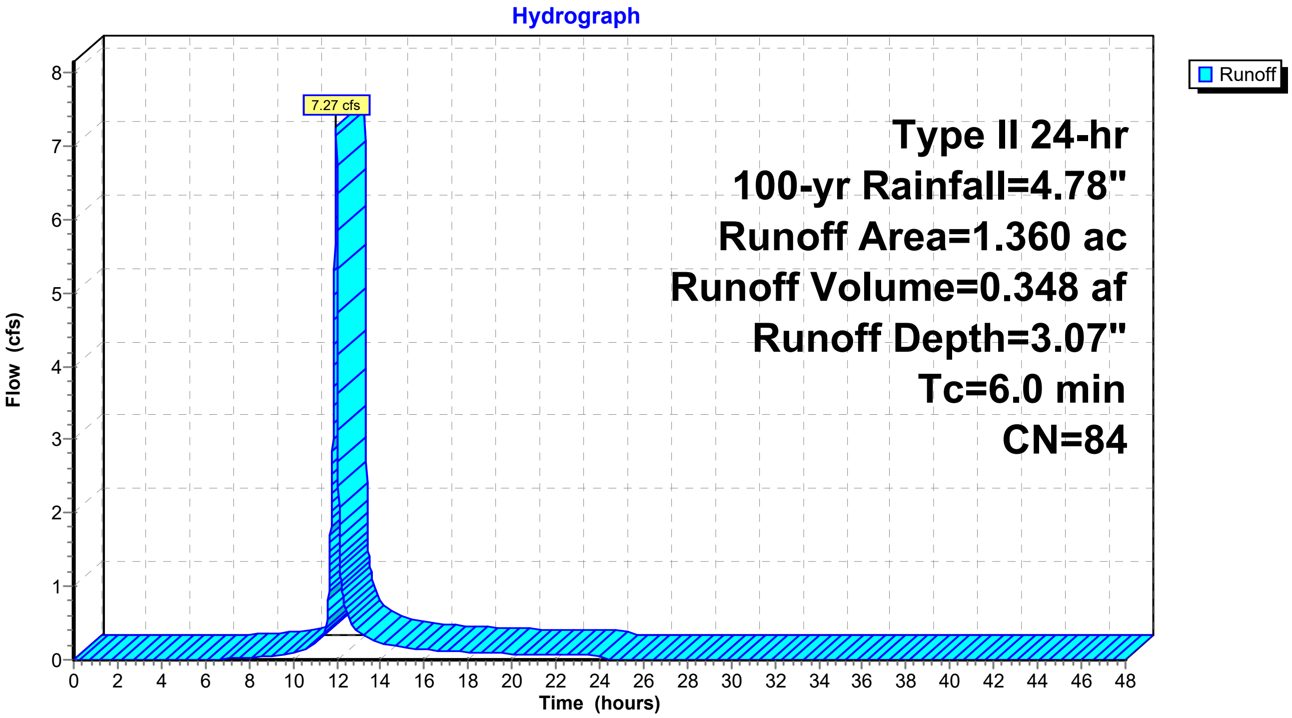
Runoff = 7.27 cfs @ 11.97 hrs, Volume= 0.348 af, Depth= 3.07"
Routed to Pond 120P : bioretention 103

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.330	84	50-75% Grass cover, Fair, HSG D
*	0.030	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	1.360	84	Weighted Average
	1.330		97.79% Pervious Area
	0.030		2.21% Impervious Area

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

Subcatchment 120:



Summary for Subcatchment 121:

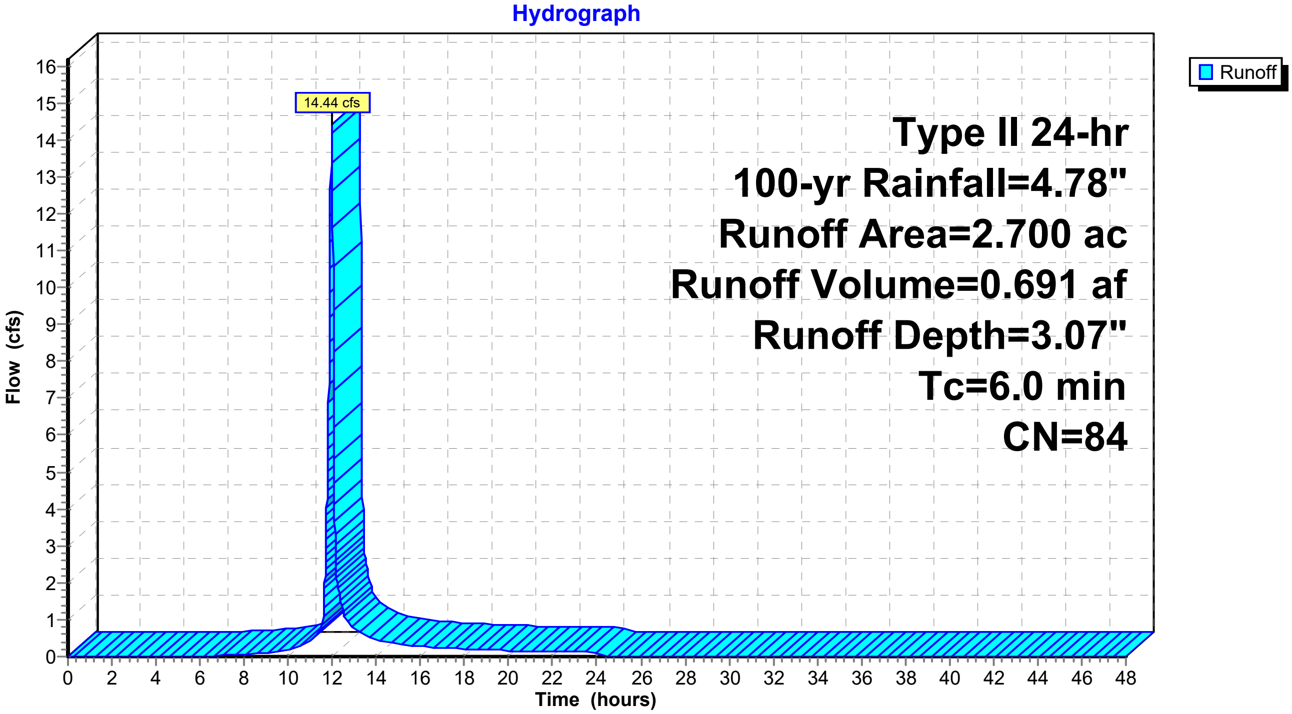
Runoff = 14.44 cfs @ 11.97 hrs, Volume= 0.691 af, Depth= 3.07"
Routed to Pond 121p : dry pond 10

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	2.700	84	50-75% Grass cover, Fair, HSG D
*	0.000	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	2.700	84	Weighted Average
	2.700		100.00% Pervious Area

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

Subcatchment 121:



Summary for Subcatchment 122:

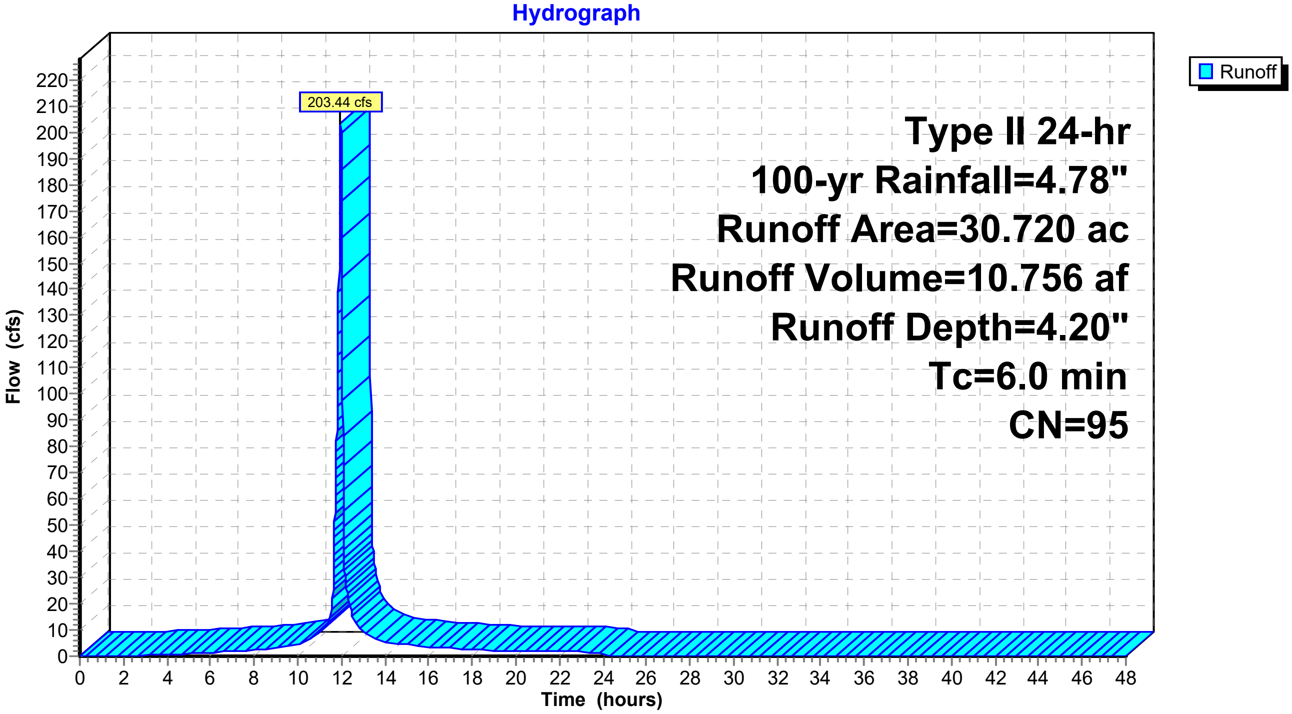
Runoff = 203.44 cfs @ 11.97 hrs, Volume= 10.756 af, Depth= 4.20"
Routed to Pond 122f : forebay 100 bypass

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	7.510	84	50-75% Grass cover, Fair, HSG D
*	22.580	98	Impervious
*	0.590	98	Forebay WSE
	0.040	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	30.720	95	Weighted Average
	7.550		24.58% Pervious Area
	23.170		75.42% Impervious Area

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

Subcatchment 122:



Summary for Subcatchment 200:

[47] Hint: Peak is 233% of capacity of segment #5
[47] Hint: Peak is 315% of capacity of segment #7

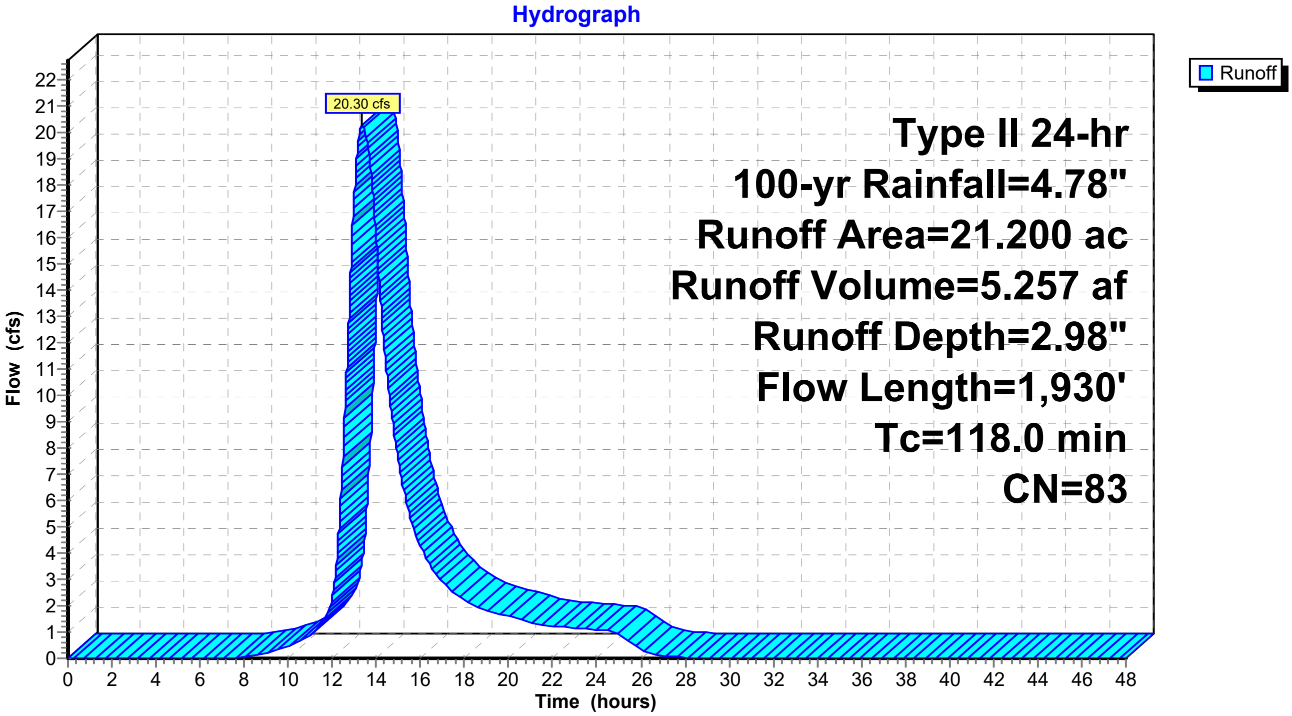
Runoff = 20.30 cfs @ 13.38 hrs, Volume= 5.257 af, Depth= 2.98"
Routed to Reach DP2 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	7.720	79	Woods, Fair, HSG D
	4.040	78	Meadow, non-grazed, HSG D
*	0.000	98	Impervious
	0.270	91	Gravel roads, HSG D
*	2.760	79	Woods, Fair, HSG D Offsite
*	2.100	84	50-75% Grass cover, Fair, HSG D Offsite
*	4.280	98	Impervious Offsite
*	0.030	91	Gravel roads, HSG D Offsite
	21.200	83	Weighted Average
	16.920		79.81% Pervious Area
	4.280		20.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	60	0.0400	0.08		**Sheet Flow, A-B** Woods: Light underbrush n= 0.400 P2= 2.12"
16.7	40	0.0100	0.04		**Sheet Flow, B-C** Woods: Light underbrush n= 0.400 P2= 2.12"
13.4	615	0.0120	0.77		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
52.5	630	0.0016	0.20		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
0.2	40	0.0055	2.78	8.72	**Pipe Channel, E-F** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
4.2	155	0.0077	0.61		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
0.4	50	0.0030	2.05	6.44	**Pipe Channel, G-H** 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.025 Corrugated metal
17.3	340	0.0022	0.33		**Shallow Concentrated Flow, H-I** Short Grass Pasture Kv= 7.0 fps
118.0	1,930	Total			

Subcatchment 200:



Summary for Subcatchment 300:

[47] Hint: Peak is 665% of capacity of segment #4

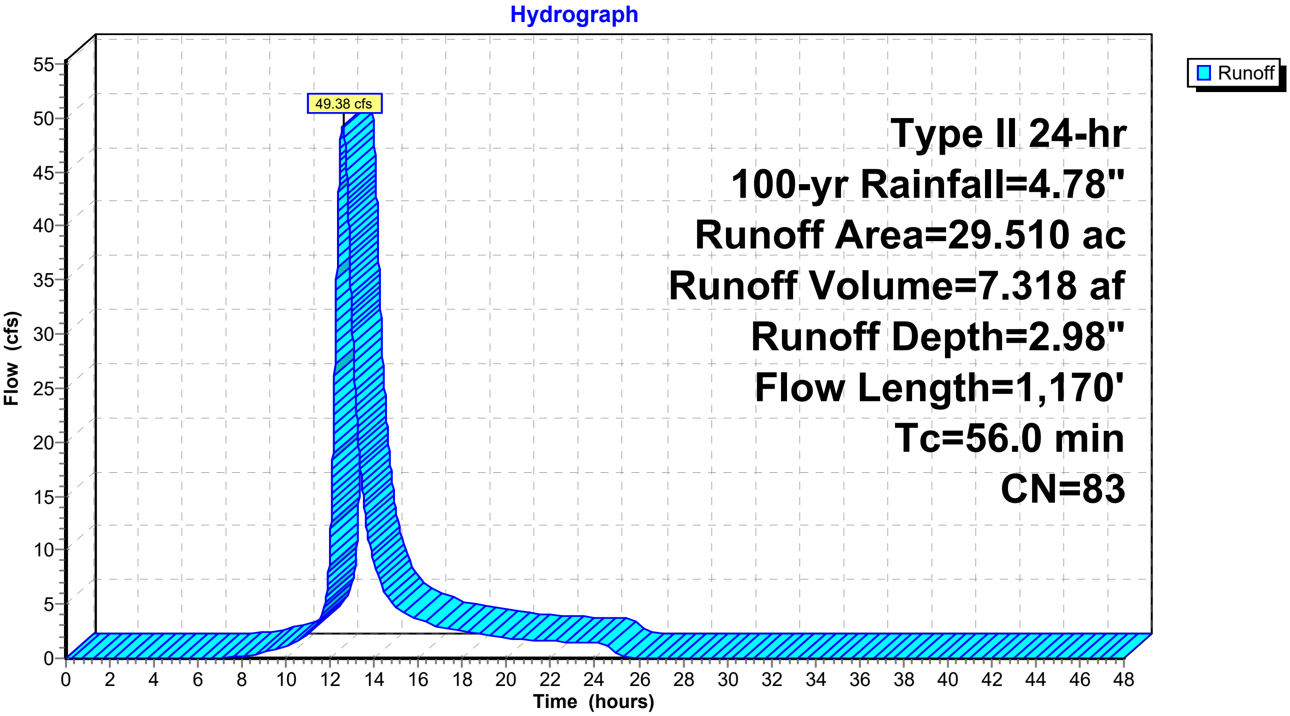
Runoff = 49.38 cfs @ 12.57 hrs, Volume= 7.318 af, Depth= 2.98"
Routed to Reach DP3 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.940	79	Woods, Fair, HSG D
	10.780	78	Meadow, non-grazed, HSG D
	2.970	84	50-75% Grass cover, Fair, HSG D
*	1.090	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.050	79	Woods, Fair, HSG D Offsite
*	11.150	84	50-75% Grass cover, Fair, HSG D Offsite
*	2.530	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	29.510	83	Weighted Average
	25.890		87.73% Pervious Area
	3.620		12.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.5	100	0.0120	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 2.12"
8.8	370	0.0100	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.1	440	0.0030	0.38		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	30	0.0050	4.20	7.43	**Pipe Channel, D-E** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
6.5	230	0.0070	0.59		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
56.0	1,170	Total			

Subcatchment 300:



Summary for Subcatchment 301:

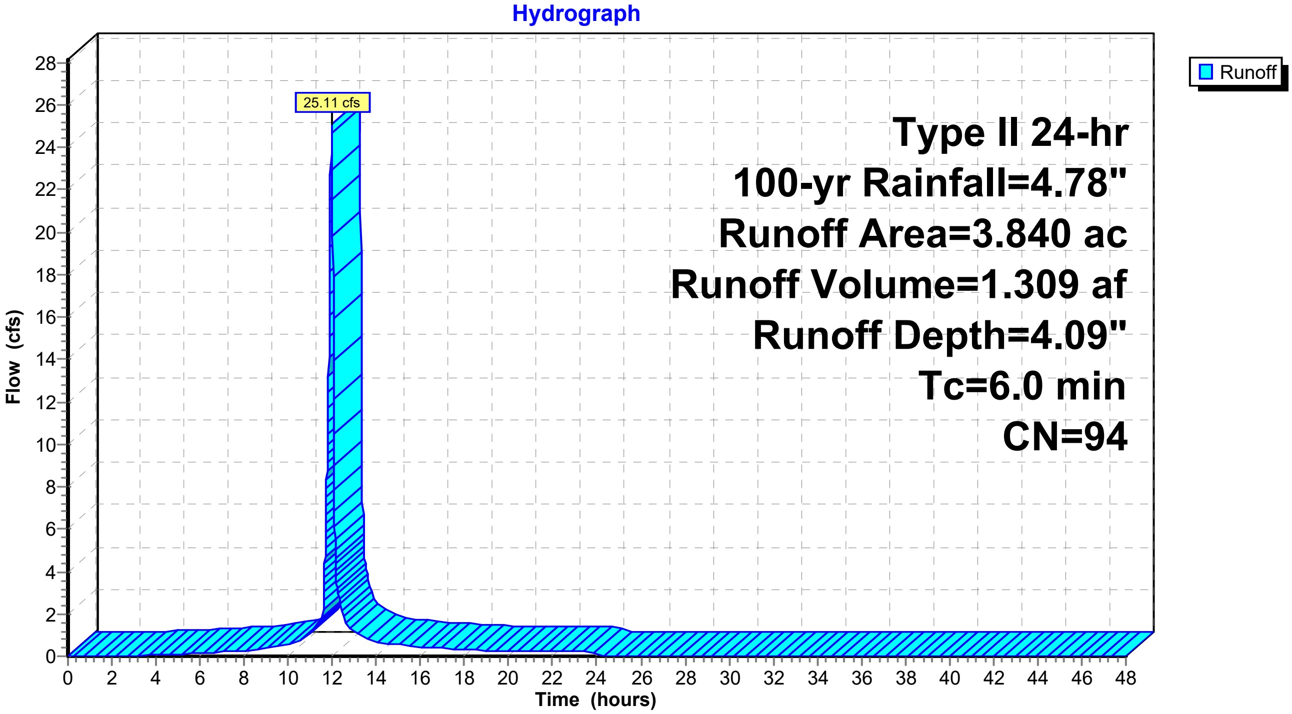
Runoff = 25.11 cfs @ 11.97 hrs, Volume= 1.309 af, Depth= 4.09"
Routed to Pond 301f : forebay 400

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	1.170	84	50-75% Grass cover, Fair, HSG D
*	2.460	98	Impervious
*	0.150	98	Forebay WSE
	0.060	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	3.840	94	Weighted Average
	1.230		32.03% Pervious Area
	2.610		67.97% Impervious Area

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

Subcatchment 301:



Summary for Subcatchment 302:

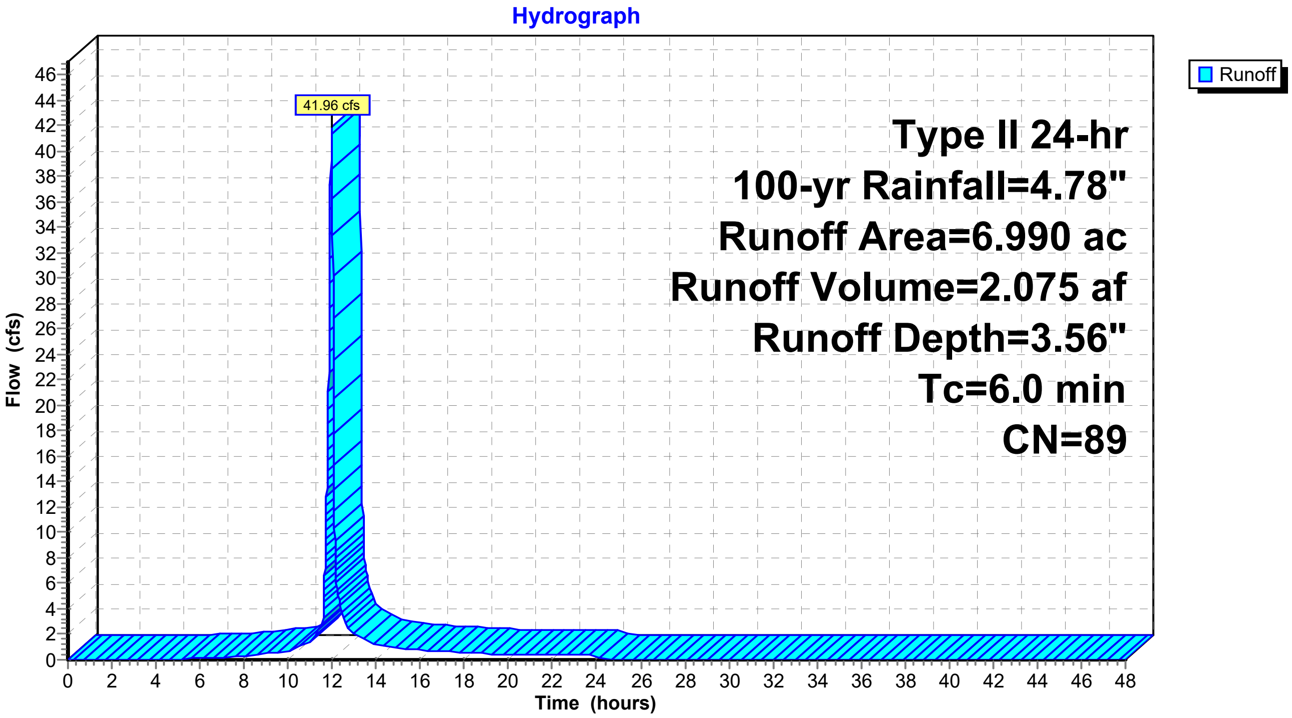
Runoff = 41.96 cfs @ 11.97 hrs, Volume= 2.075 af, Depth= 3.56"
Routed to Pond 302b : bioretention 401

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	0.000	79	Woods, Fair, HSG D
	4.370	84	50-75% Grass cover, Fair, HSG D
*	2.620	98	Impervious
	0.000	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	6.990	89	Weighted Average
	4.370		62.52% Pervious Area
	2.620		37.48% Impervious Area

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

Subcatchment 302:



Summary for Subcatchment 400:

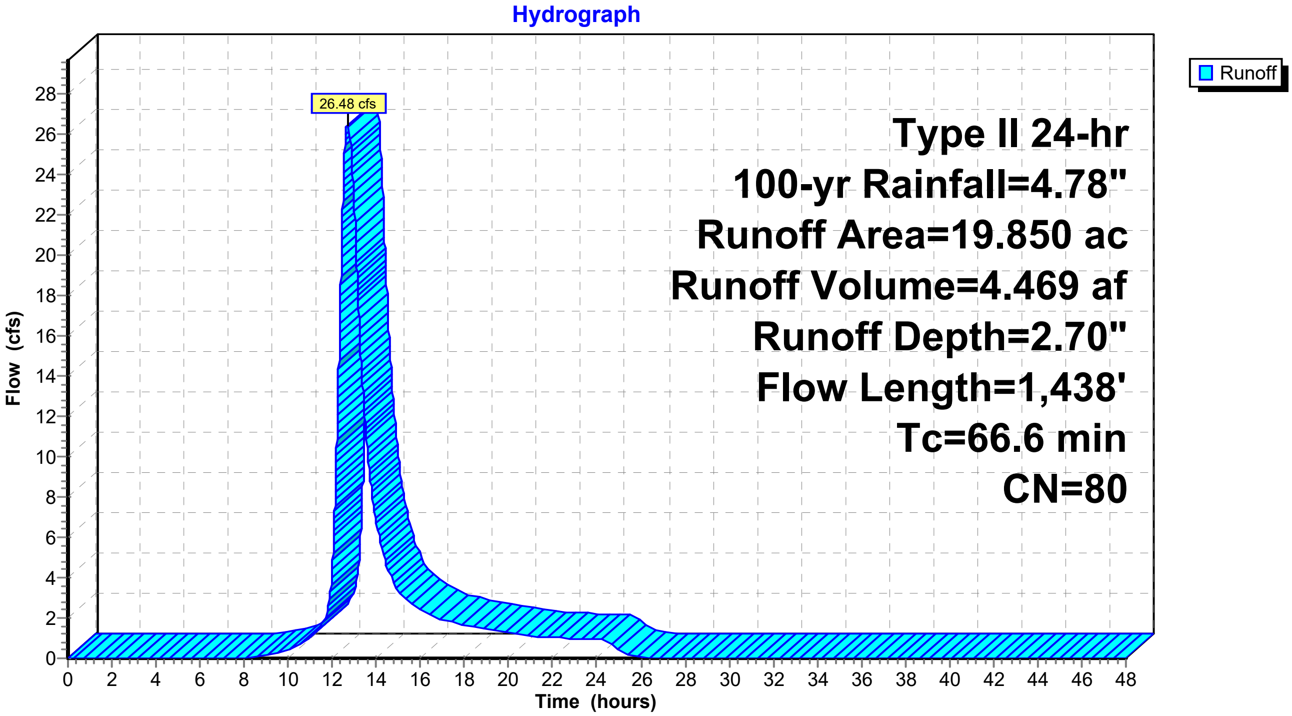
Runoff = 26.48 cfs @ 12.72 hrs, Volume= 4.469 af, Depth= 2.70"
Routed to Reach DP4 : DP1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-yr Rainfall=4.78"

	Area (ac)	CN	Description
	11.650	79	Woods, Fair, HSG D
	6.730	78	Meadow, non-grazed, HSG D
*	1.160	98	Impervious
	0.310	91	Gravel roads, HSG D
*	0.000	79	Woods, Fair, HSG D Offsite
*	0.000	84	50-75% Grass cover, Fair, HSG D Offsite
*	0.000	98	Impervious Offsite
*	0.000	91	Gravel roads, HSG D Offsite
	19.850	80	Weighted Average
	18.690		94.16% Pervious Area
	1.160		5.84% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.8	100	0.0120	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 2.12"
6.3	306	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
19.8	389	0.0043	0.33		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.0	96	0.0063	1.61		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
7.8	199	0.0073	0.43		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
16.9	348	0.0024	0.34		**Shallow Concentrated Flow, F-G** Short Grass Pasture Kv= 7.0 fps
66.6	1,438	Total			

Subcatchment 400:

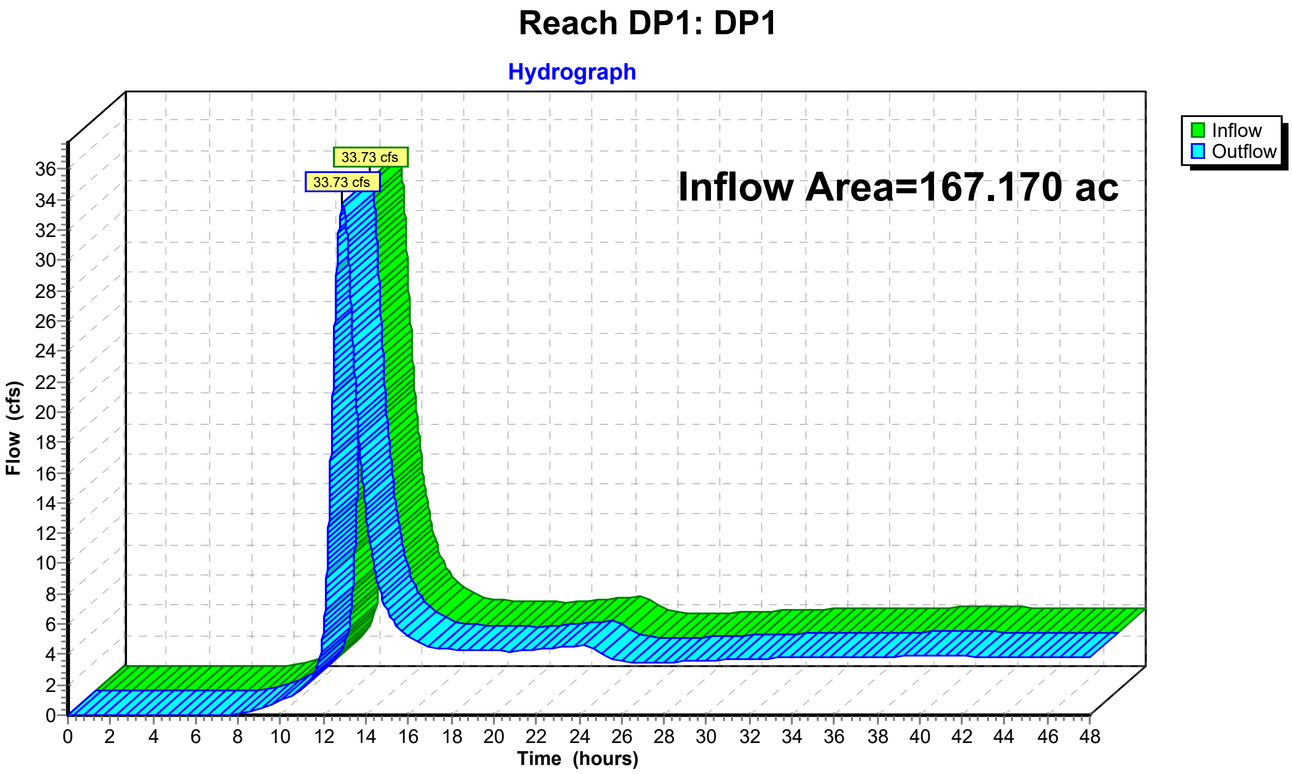


Summary for Reach DP1: DP1

[40] Hint: Not Described (Outflow=Inflow)

```
Inflow Area =      167.170 ac,  38.53% Impervious,  Inflow Depth >   1.13"    for  100-yr event
Inflow      =        33.73 cfs @   12.87 hrs,  Volume=          15.789 af
Outflow     =        33.73 cfs @   12.87 hrs,  Volume=          15.789 af,  Atten= 0%,  Lag= 0.0 min
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs



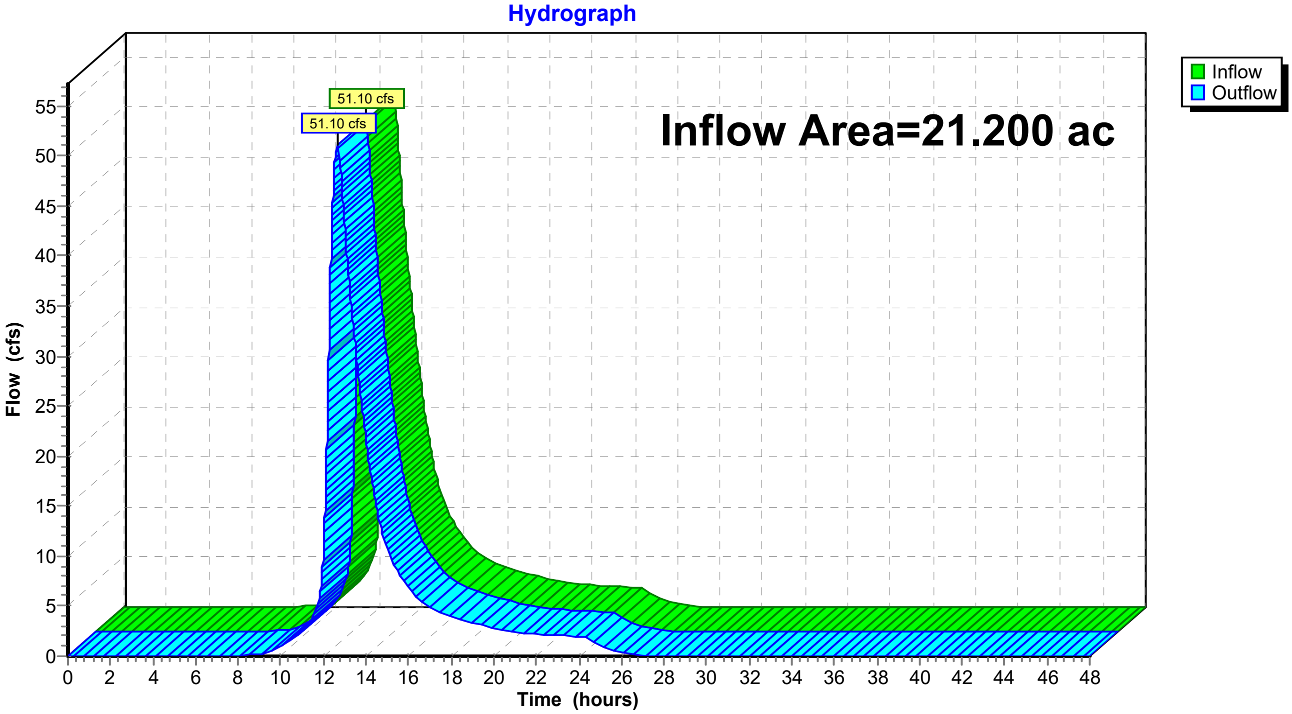
Summary for Reach DP2: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 21.200 ac, 20.19% Impervious, Inflow Depth = 6.06" for 100-yr event
Inflow = 51.10 cfs @ 12.64 hrs, Volume= 10.698 af
Outflow = 51.10 cfs @ 12.64 hrs, Volume= 10.698 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP2: DP1



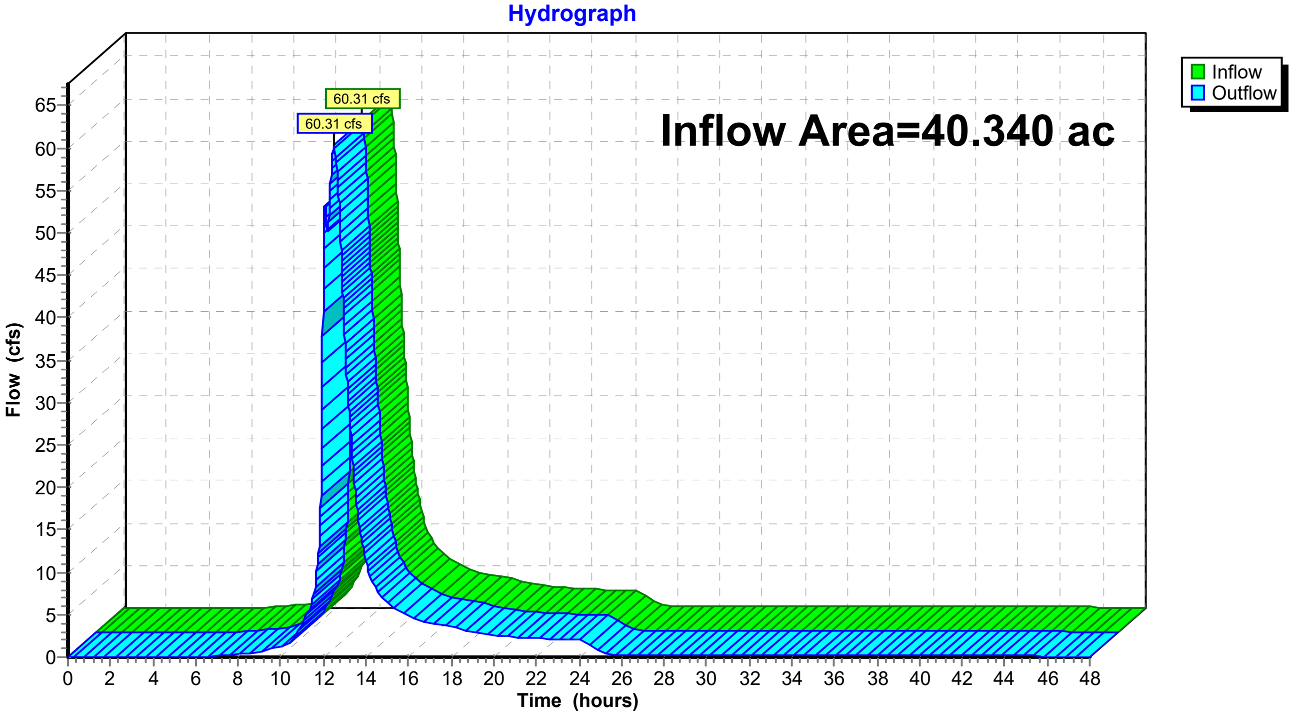
Summary for Reach DP3: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 40.340 ac, 21.94% Impervious, Inflow Depth > 3.18" for 100-yr event
Inflow = 60.31 cfs @ 12.51 hrs, Volume= 10.678 af
Outflow = 60.31 cfs @ 12.51 hrs, Volume= 10.678 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP3: DP1



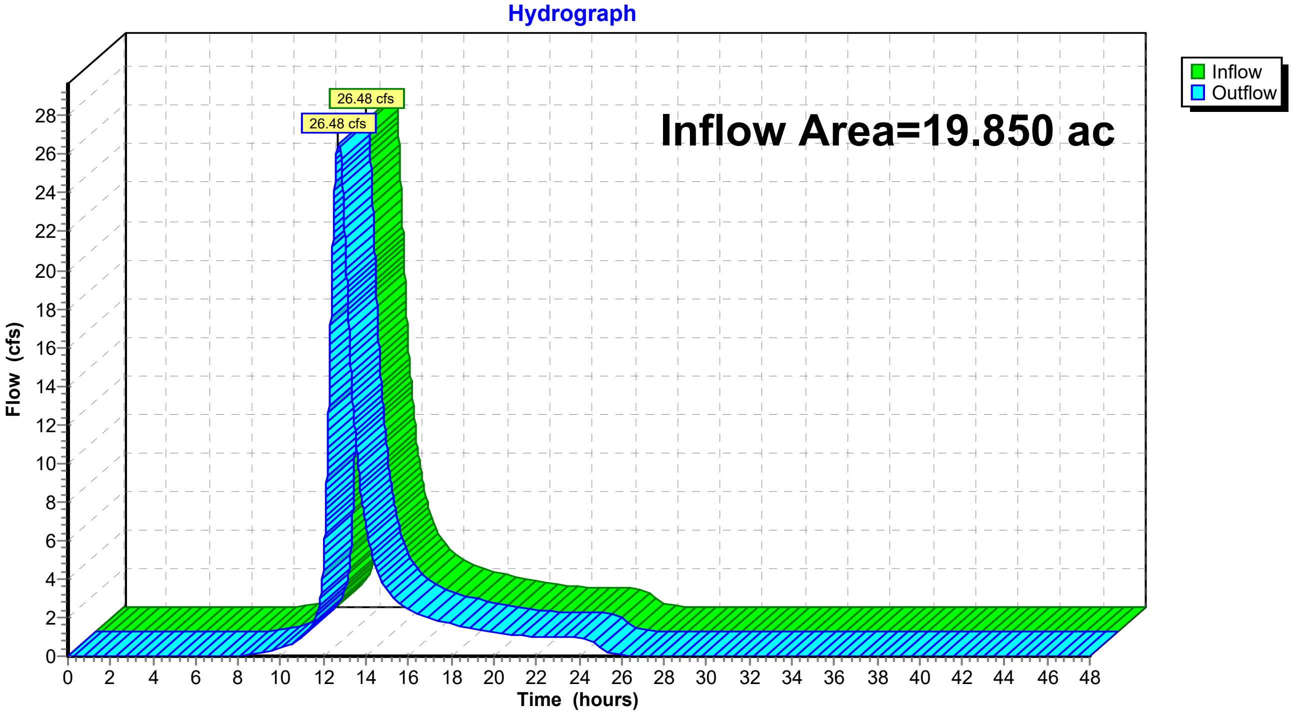
Summary for Reach DP4: DP1

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 19.850 ac, 5.84% Impervious, Inflow Depth = 2.70" for 100-yr event
Inflow = 26.48 cfs @ 12.72 hrs, Volume= 4.469 af
Outflow = 26.48 cfs @ 12.72 hrs, Volume= 4.469 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Reach DP4: DP1



Summary for Pond 1P: forebay 100 bypass

[80] Warning: Exceeded Pond 122f by 0.06' @ 12.66 hrs (55.15 cfs 4.526 af)

Inflow = 124.05 cfs @ 11.97 hrs, Volume= 4.886 af
Outflow = 115.28 cfs @ 11.97 hrs, Volume= 4.886 af, Atten= 7%, Lag= 0.4 min
Primary = 54.06 cfs @ 11.98 hrs, Volume= 2.656 af
Routed to Pond 119P : bioretention 102
Secondary = 61.99 cfs @ 11.97 hrs, Volume= 2.230 af
Routed to Pond 2P : forebay 100 bypass

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.85' @ 12.03 hrs Surf.Area= 10,402 sf Storage= 14,097 cf (11,292 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 26.3 min calculated for 4.820 af (99% of inflow)
Center-of-Mass det. time= 10.5 min (743.9 - 733.4)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

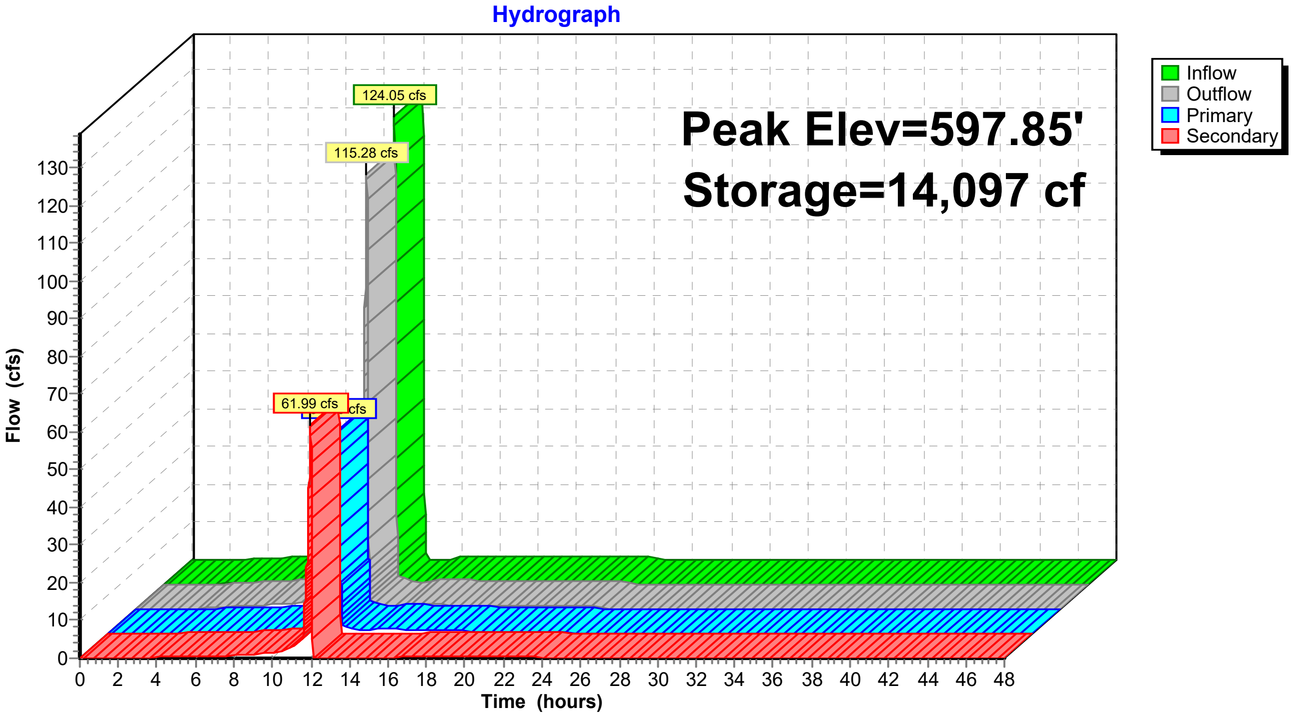
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 50.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=50.64 cfs @ 11.98 hrs HW=597.80' TW=597.54' (Dynamic Tailwater)
└─**1=overflow weir** (Weir Controls 50.64 cfs @ 2.14 fps)

Secondary OutFlow Max=14.24 cfs @ 11.97 hrs HW=597.75' TW=597.75' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 14.24 cfs @ 0.20 fps)

Pond 1P: forebay 100 bypass



Summary for Pond 2P: forebay 100 bypass

[80] Warning: Exceeded Pond 1P by 0.02' @ 12.34 hrs (45.56 cfs 4.713 af)

Inflow = 61.99 cfs @ 11.97 hrs, Volume= 2.230 af
Outflow = 54.37 cfs @ 11.98 hrs, Volume= 2.230 af, Atten= 12%, Lag= 0.9 min
Primary = 54.37 cfs @ 11.98 hrs, Volume= 2.230 af
Routed to Pond 118b : bioretention 101

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.83' @ 12.03 hrs Surf.Area= 10,361 sf Storage= 13,956 cf (11,151 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 56.0 min calculated for 2.165 af (97% of inflow)
Center-of-Mass det. time= 23.1 min (734.5 - 711.4)

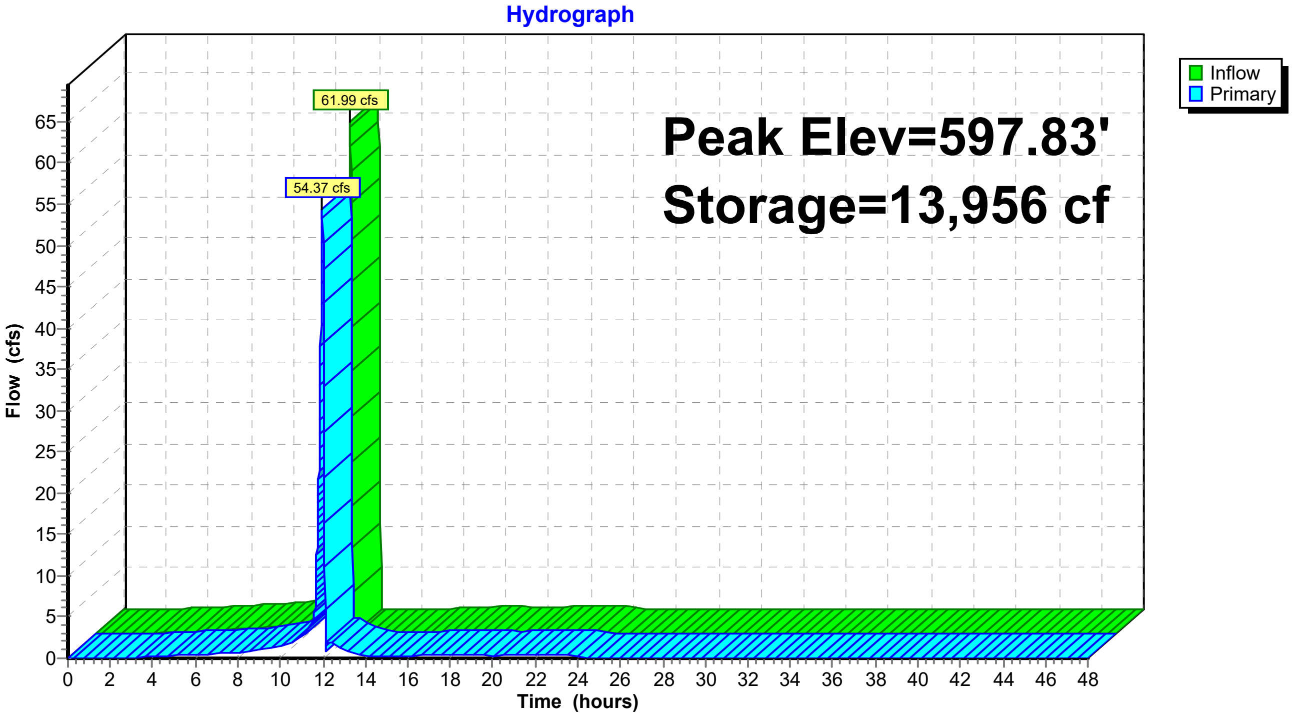
Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=51.25 cfs @ 11.98 hrs HW=597.79' TW=597.51' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 51.25 cfs @ 2.19 fps)

Pond 2P: forebay 100 bypass



Summary for Pond 10d: depression

```
Inflow Area =        24.040 ac,  21.88% Impervious,  Inflow Depth =   2.98"    for  100-yr event
Inflow       =       49.74 cfs @   12.40 hrs,  Volume=            5.961 af
Outflow      =       41.77 cfs @   12.57 hrs,  Volume=            5.961 af,  Atten= 16%,  Lag= 10.3 min
Primary      =         0.56 cfs @   12.57 hrs,  Volume=            0.520 af
    Routed to Reach DP1 : DP1
Secondary =          41.21 cfs @   12.57 hrs,  Volume=            5.441 af
    Routed to Reach DP2 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 593.89' @ 12.57 hrs   Surf.Area= 64,433 sf   Storage= 32,322 cf

Plug-Flow detention time= 20.6 min calculated for 5.961 af (100% of inflow)
Center-of-Mass det. time= 20.6 min ( 866.0 - 845.4 )
```

Volume	Invert	Avail.Storage	Storage Description
#1	592.75'	157,748 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

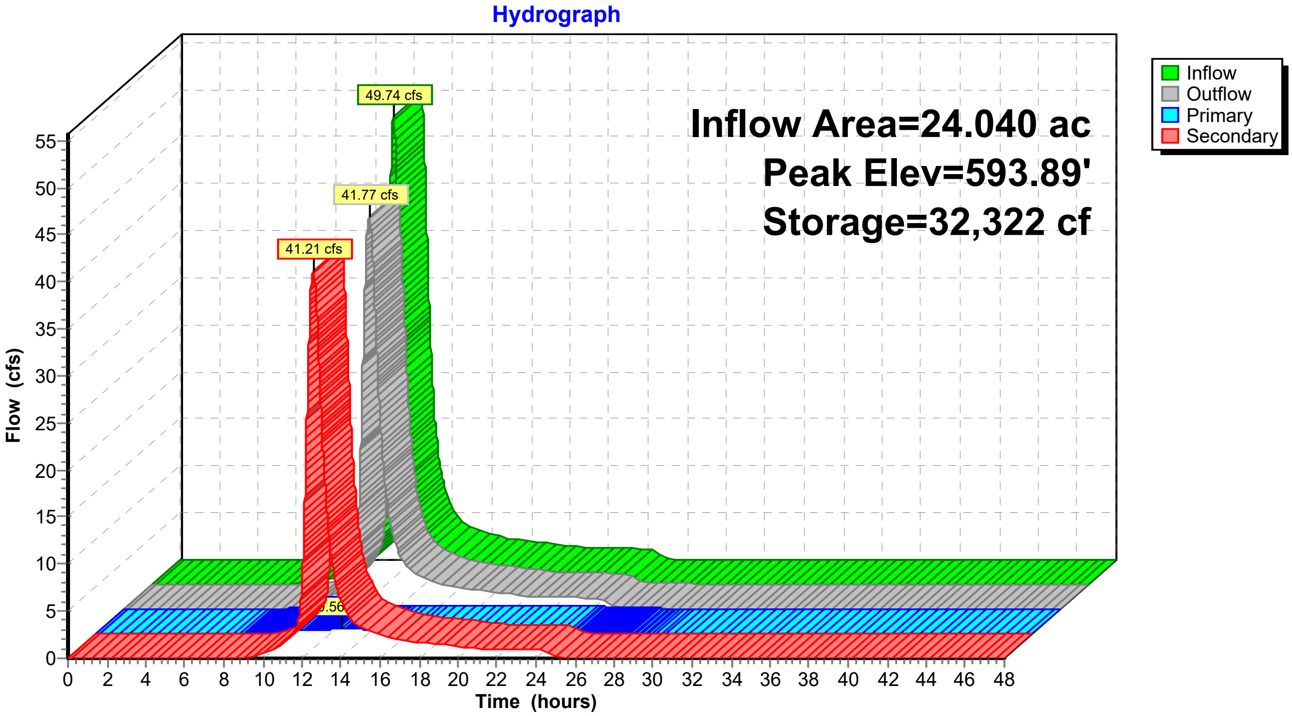
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.75	1,300	0	0
593.00	6,400	963	963
594.00	71,940	39,170	40,133
595.00	163,290	117,615	157,748

Device	Routing	Invert	Outlet Devices
#1	Primary	592.75'	**6.0" Round Pipe to DA 12** L= 250.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 592.75' / 591.00' S= 0.0070 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf
#2	Secondary	593.10'	**22.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.56 cfs @ 12.57 hrs HW=593.89' TW=0.00' (Dynamic Tailwater)
↑—**1=Pipe to DA 12** (Barrel Controls 0.56 cfs @ 2.86 fps)

Secondary OutFlow Max=41.21 cfs @ 12.57 hrs HW=593.89' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 41.21 cfs @ 2.38 fps)

Pond 10d: depression



Summary for Pond 102d: depression

Inflow Area = 11.170 ac, 37.42% Impervious, Inflow Depth = 3.46" for 100-yr event
Inflow = 37.10 cfs @ 12.18 hrs, Volume= 3.221 af
Outflow = 34.41 cfs @ 12.25 hrs, Volume= 3.221 af, Atten= 7%, Lag= 3.9 min
Primary = 34.41 cfs @ 12.25 hrs, Volume= 3.221 af
Routed to Pond DMH142 : DMH-142

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 601.68' @ 12.25 hrs Surf.Area= 3,269 sf Storage= 3,090 cf
Flood Elev= 604.00' Surf.Area= 41,000 sf Storage= 42,050 cf

Plug-Flow detention time= 0.9 min calculated for 3.220 af (100% of inflow)
Center-of-Mass det. time= 0.9 min (815.0 - 814.1)

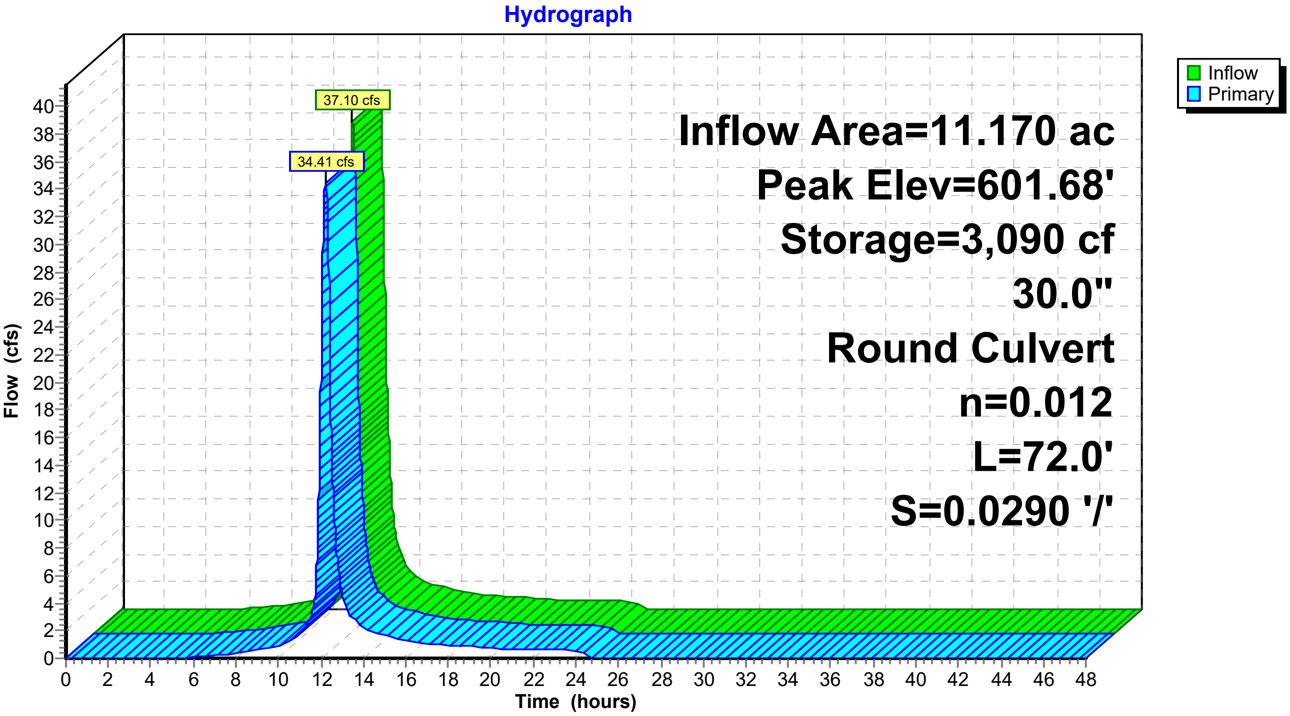
Volume	Invert	Avail.Storage	Storage Description
#1	597.00'	42,050 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.00	100	0	0
601.00	760	1,720	1,720
602.00	4,450	2,605	4,325
603.00	15,000	9,725	14,050
604.00	41,000	28,000	42,050

Device	Routing	Invert	Outlet Devices
#1	Primary	597.00'	**30.0" Round Pipe to DMH-142** L= 72.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 597.00' / 594.91' S= 0.0290 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=34.40 cfs @ 12.25 hrs HW=601.68' TW=598.28' (Dynamic Tailwater)
↑**1=Pipe to DMH-142** (Inlet Controls 34.40 cfs @ 7.01 fps)

Pond 102d: depression



Summary for Pond 110P: dry pond 30

Inflow Area = 116.540 ac, 49.26% Impervious, Inflow Depth > 1.46" for 100-yr event
Inflow = 22.89 cfs @ 12.26 hrs, Volume= 14.161 af
Outflow = 3.87 cfs @ 40.58 hrs, Volume= 8.880 af, Atten= 83%, Lag= 1,699.4 min
Primary = 3.87 cfs @ 40.58 hrs, Volume= 8.880 af
Routed to Reach DP1 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 592.06' @ 40.58 hrs Surf.Area= 225,633 sf Storage= 233,855 cf
Flood Elev= 595.00' Surf.Area= 250,140 sf Storage= 933,940 cf

Plug-Flow detention time= 780.8 min calculated for 8.879 af (63% of inflow)
Center-of-Mass det. time= 353.0 min (2,007.6 - 1,654.5)

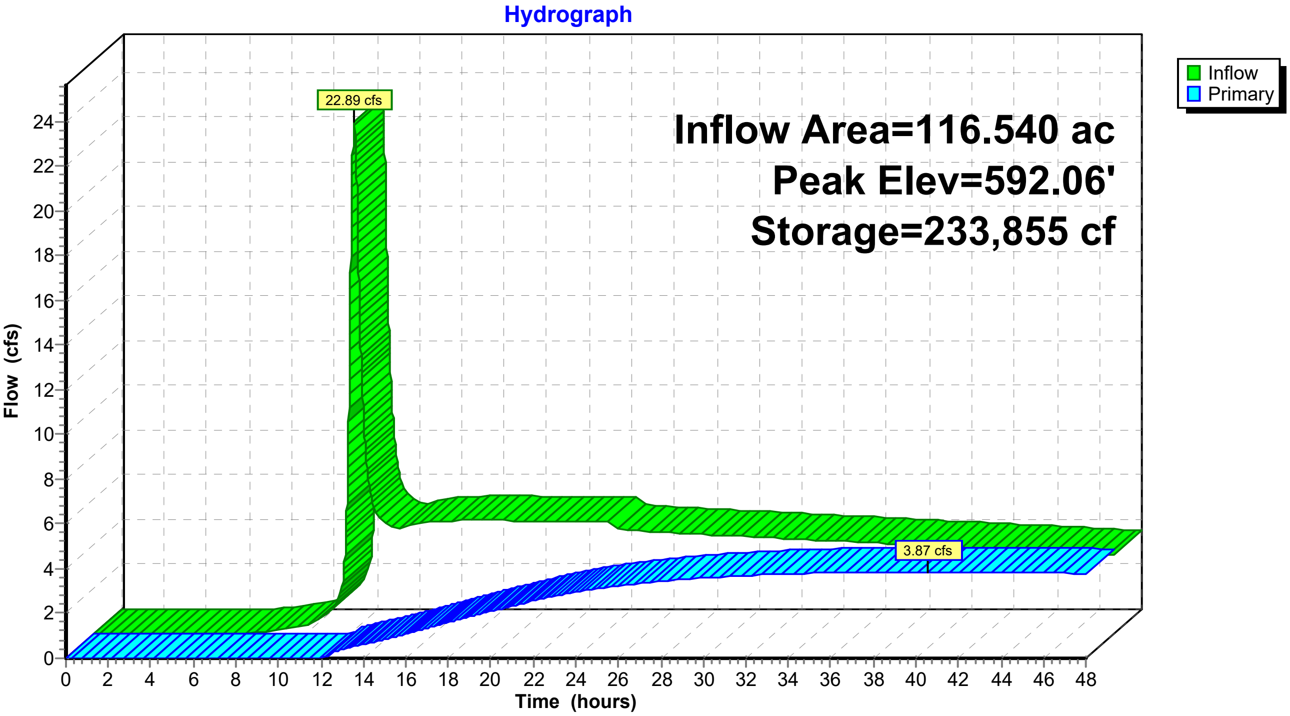
Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	933,940 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	216,830	0	0
595.00	250,140	933,940	933,940

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**24.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 590.90' S= 0.0059 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	594.00'	**30.0" x 48.0" Horiz. 30 x 48 Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	591.00'	**15.0" Vert. Orifice** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.87 cfs @ 40.58 hrs HW=592.06' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Passes 3.87 cfs of 4.28 cfs potential flow)
  ├**2=30 x 48 Grate** (Controls 0.00 cfs)
  └**3=Orifice** (Orifice Controls 3.87 cfs @ 3.50 fps)

Pond 110P: dry pond 30



Summary for Pond 111P: dry pond 20

```
Inflow Area =      107.740 ac, 53.29% Impervious, Inflow Depth >  3.17"   for 100-yr event
Inflow     =      161.74 cfs @  12.04 hrs, Volume=         28.462 af
Outflow    =        4.62 cfs @  24.43 hrs, Volume=         11.979 af, Atten= 97%, Lag= 743.2 min
Primary    =        4.62 cfs @  24.43 hrs, Volume=         11.979 af
    Routed to Pond 110P : dry pond 30
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 593.25' @ 24.43 hrs Surf.Area= 458,631 sf Storage= 911,451 cf
Flood Elev= 595.00' Surf.Area= 389,765 sf Storage= 1,652,719 cf

Plug-Flow detention time= 1,068.6 min calculated for 11.976 af (42% of inflow)
Center-of-Mass det. time= 779.4 min (1,803.8 - 1,024.4)

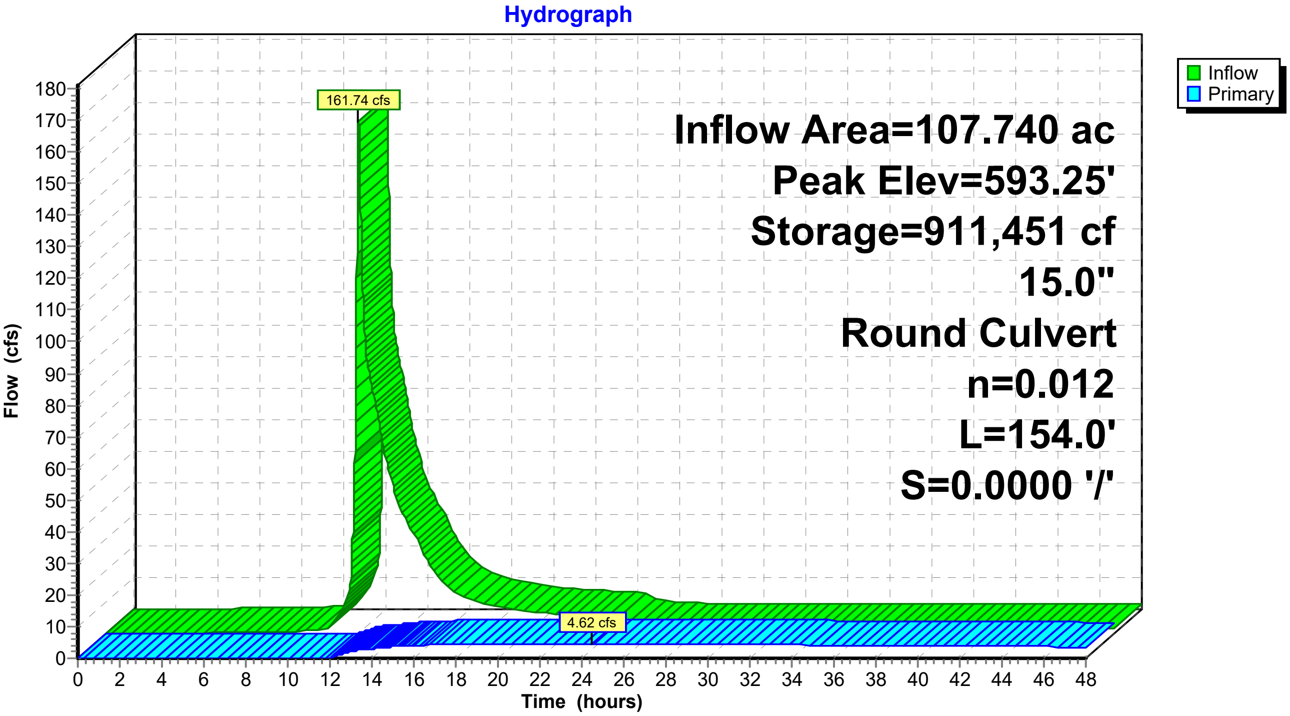
Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	2,199,782 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	350,875	0	0
592.00	384,640	367,758	367,758
593.00	468,584	426,612	794,370
596.00	350,356	1,228,410	2,022,780
596.50	357,654	177,003	2,199,782

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**15.0" Round Culvert** L= 154.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 591.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.62 cfs @ 24.43 hrs HW=593.25' TW=591.89' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.62 cfs @ 3.76 fps)

Pond 111P: dry pond 20



Summary for Pond 112F: forebay 200

Inflow Area = 22.280 ac, 93.27% Impervious, Inflow Depth = 4.43" for 100-yr event
Inflow = 150.50 cfs @ 11.97 hrs, Volume= 8.221 af
Outflow = 132.05 cfs @ 12.00 hrs, Volume= 8.221 af, Atten= 12%, Lag= 1.8 min
Primary = 46.76 cfs @ 11.99 hrs, Volume= 3.438 af
Routed to Pond 115b : bioretention 201
Secondary = 46.73 cfs @ 11.99 hrs, Volume= 3.436 af
Routed to Pond 116P : bioretention 202
Tertiary = 38.88 cfs @ 12.01 hrs, Volume= 1.346 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 35,272 sf Storage= 108,848 cf
Peak Elev= 597.61' @ 12.01 hrs Surf.Area= 39,891 sf Storage= 150,446 cf (41,598 cf above start)
Flood Elev= 598.00' Surf.Area= 41,532 sf Storage= 166,451 cf (57,603 cf above start)

Plug-Flow detention time= 195.8 min calculated for 5.721 af (70% of inflow)
Center-of-Mass det. time= 20.6 min (773.4 - 752.8)

Volume	Invert	Avail.Storage	Storage Description
#1	592.50'	166,451 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
592.50	19,200	0	0
596.00	33,215	91,726	91,726
596.50	35,272	17,122	108,848
598.00	41,532	57,603	166,451

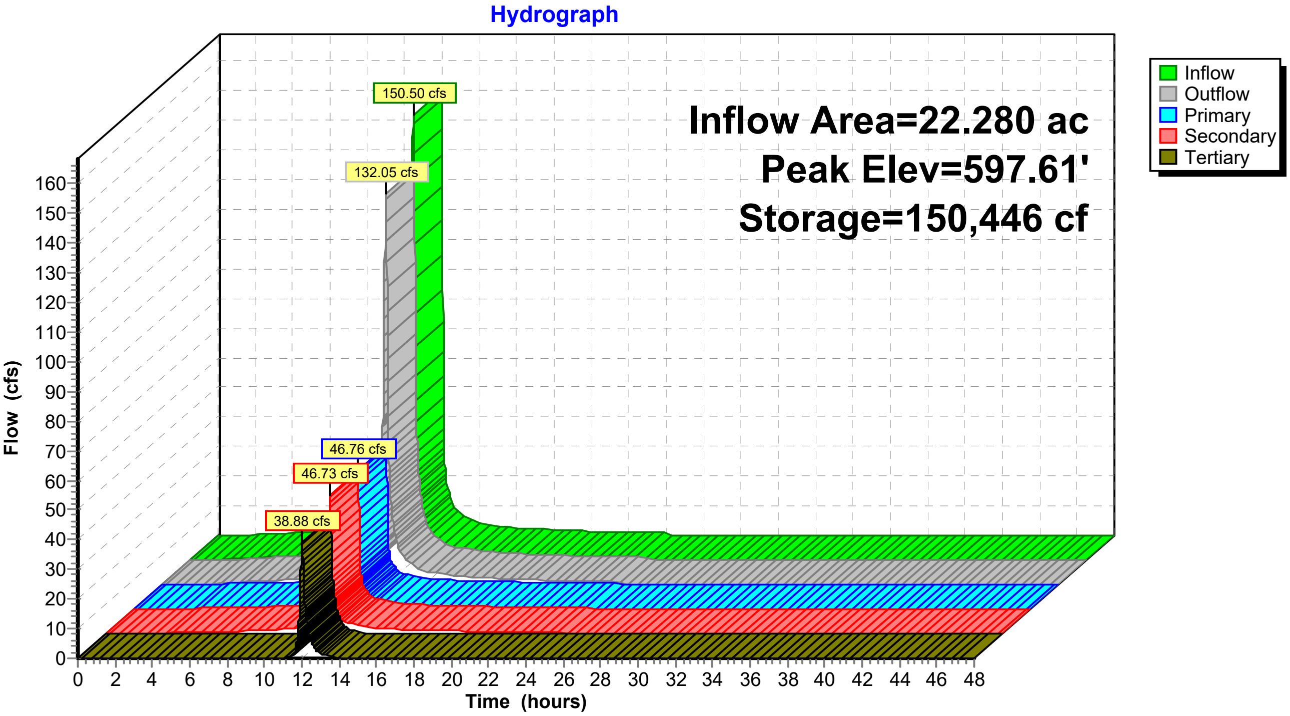
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Tertiary	596.70'	**162.0 deg x 10.0' long x 1.30' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=45.80 cfs @ 11.99 hrs HW=597.60' TW=597.20' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 45.80 cfs @ 2.46 fps)

Secondary OutFlow Max=45.77 cfs @ 11.99 hrs HW=597.60' TW=597.20' (Dynamic Tailwater)
↑—**2=overflow weir** (Weir Controls 45.77 cfs @ 2.45 fps)

Tertiary OutFlow Max=38.83 cfs @ 12.01 hrs HW=597.61' TW=591.33' (Dynamic Tailwater)
↑—**3=overflow weir** (Weir Controls 38.83 cfs @ 2.73 fps)

Pond 112F: forebay 200



Summary for Pond 113F: forebay 300

```
Inflow Area =        4.290 ac,  88.58% Impervious,  Inflow Depth =   4.31"    for  100-yr event
Inflow      =       28.72 cfs @   11.97 hrs,  Volume=           1.542 af
Outflow     =       23.50 cfs @   11.98 hrs,  Volume=           1.542 af,  Atten= 18%,  Lag= 0.8 min
Primary     =       23.50 cfs @   11.98 hrs,  Volume=           1.542 af
    Routed to Pond 114b : bioretention 301
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 597.50' Surf.Area= 5,588 sf Storage= 16,727 cf
Peak Elev= 598.64' @ 12.04 hrs Surf.Area= 6,515 sf Storage= 23,616 cf (6,889 cf above start)
Flood Elev= 599.00' Surf.Area= 6,810 sf Storage= 26,025 cf (9,298 cf above start)

Plug-Flow detention time= 168.4 min calculated for 1.158 af (75% of inflow)
Center-of-Mass det. time= 13.9 min (773.6 - 759.7)

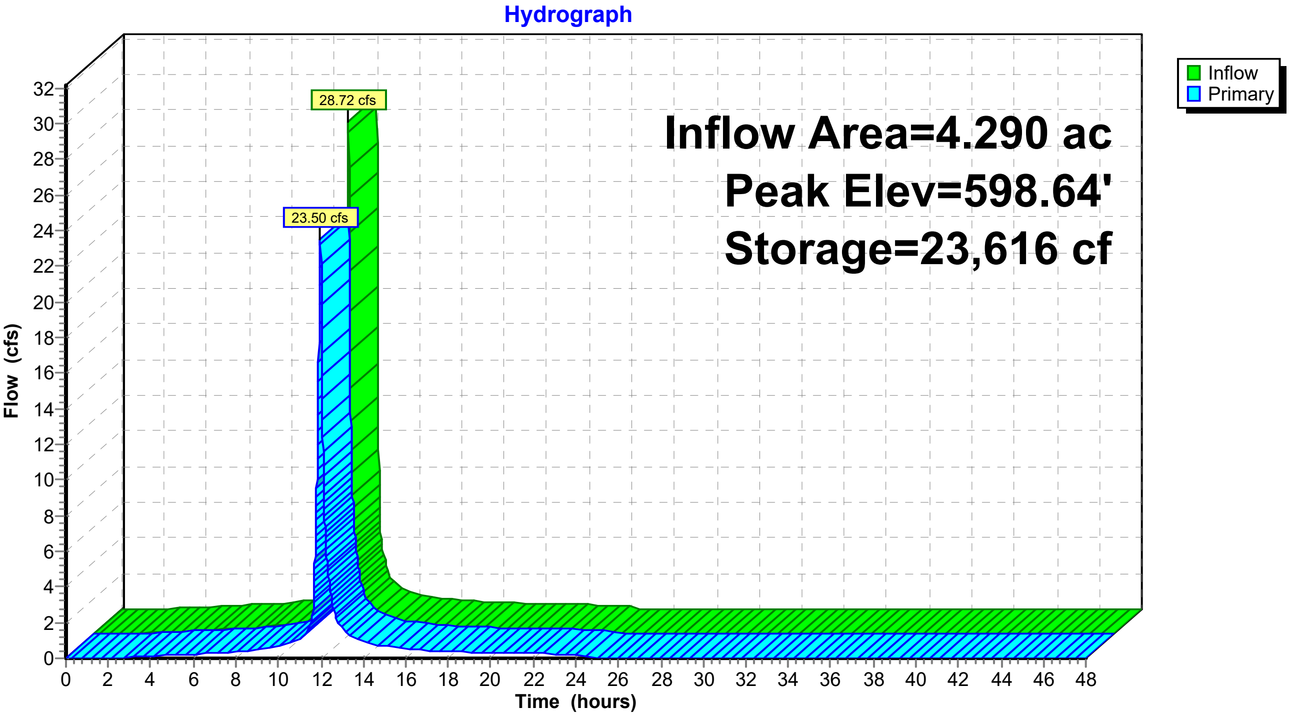
Volume	Invert	Avail.Storage	Storage Description
#1	593.50'	26,025 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
593.50	2,840	0	0
597.00	5,180	14,035	14,035
599.00	6,810	11,990	26,025

Device	Routing	Invert	Outlet Devices
#1	Primary	597.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=19.05 cfs @ 11.98 hrs HW=598.56' TW=598.51' (Dynamic Tailwater)
↑—**1=overflow weir** (Weir Controls 19.05 cfs @ 1.07 fps)

Pond 113F: forebay 300



Summary for Pond 114b: bioretention 301

Inflow Area = 13.020 ac, 68.36% Impervious, Inflow Depth = 4.02" for 100-yr event
Inflow = 78.67 cfs @ 11.97 hrs, Volume= 4.361 af
Outflow = 55.27 cfs @ 12.04 hrs, Volume= 4.317 af, Atten= 30%, Lag= 3.9 min
Primary = 0.21 cfs @ 12.04 hrs, Volume= 0.692 af
Routed to Pond 111P : dry pond 20
Secondary = 55.05 cfs @ 12.04 hrs, Volume= 3.625 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 598.60' @ 12.04 hrs Surf.Area= 37,050 sf Storage= 56,263 cf
Flood Elev= 599.00' Surf.Area= 37,972 sf Storage= 71,411 cf

Plug-Flow detention time= 170.4 min calculated for 4.316 af (99% of inflow)
Center-of-Mass det. time= 163.9 min (942.1 - 778.3)

Volume	Invert	Avail.Storage	Storage Description
#1	597.00'	71,411 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

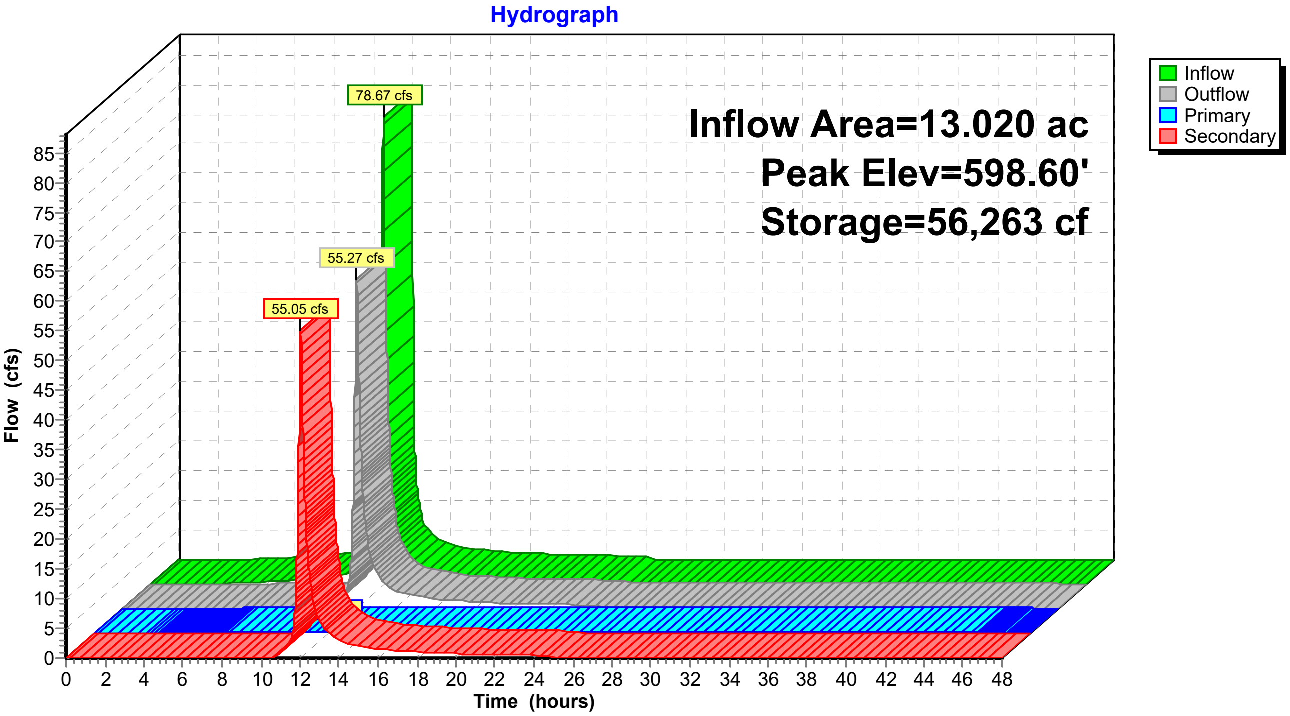
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
597.00	33,470	0	0
598.00	35,690	34,580	34,580
599.00	37,972	36,831	71,411

Device	Routing	Invert	Outlet Devices
#1	Primary	593.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	597.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	597.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.21 cfs @ 12.04 hrs HW=598.60' TW=591.38' (Dynamic Tailwater)
└—**1=Underdrain** (Passes 0.21 cfs of 2.06 cfs potential flow)
  └—**3=Exfiltration through bioretention media** (Exfiltration Controls 0.21 cfs)

Secondary OutFlow Max=55.01 cfs @ 12.04 hrs HW=598.60' TW=591.38' (Dynamic Tailwater)
└—**2=overflow weir** (Weir Controls 55.01 cfs @ 2.97 fps)

Pond 114b: bioretention 301



Summary for Pond 115b: bioretention 201

Inflow Area = 23.360 ac, 88.96% Impervious, Inflow Depth = 1.91" for 100-yr event
Inflow = 52.31 cfs @ 11.99 hrs, Volume= 3.715 af
Outflow = 31.82 cfs @ 12.07 hrs, Volume= 3.656 af, Atten= 39%, Lag= 5.0 min
Primary = 0.24 cfs @ 12.07 hrs, Volume= 0.800 af
Routed to Pond 111P : dry pond 20
Secondary = 31.58 cfs @ 12.07 hrs, Volume= 2.855 af
Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.31' @ 12.07 hrs Surf.Area= 40,899 sf Storage= 51,451 cf
Flood Elev= 598.00' Surf.Area= 42,580 sf Storage= 80,330 cf

Plug-Flow detention time= 230.5 min calculated for 3.656 af (98% of inflow)
Center-of-Mass det. time= 219.1 min (1,002.9 - 783.9)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	80,330 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

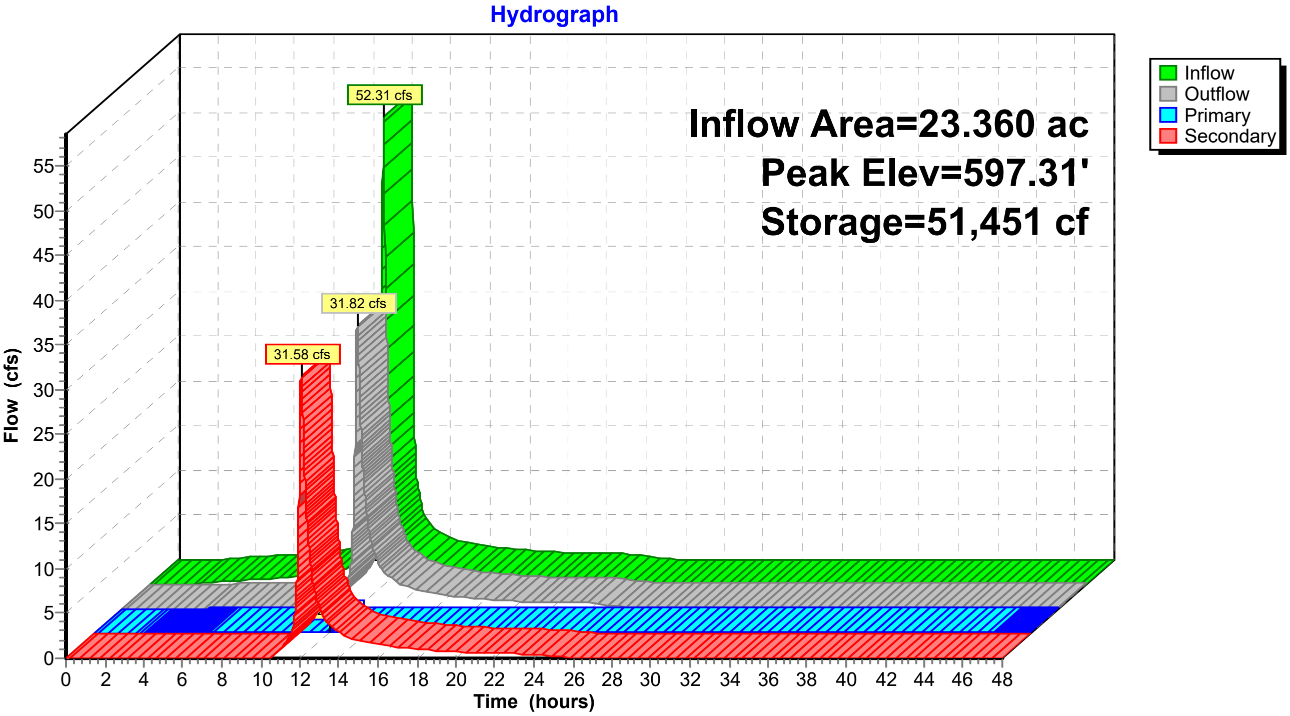
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	37,780	0	0
597.00	40,150	38,965	38,965
598.00	42,580	41,365	80,330

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.24 cfs @ 12.07 hrs HW=597.31' TW=591.44' (Dynamic Tailwater)
↑—**1=Underdrain** (Passes 0.24 cfs of 2.00 cfs potential flow)
  ↑—**3=Exfiltration through bioretention media** (Exfiltration Controls 0.24 cfs)

Secondary OutFlow Max=31.56 cfs @ 12.07 hrs HW=597.31' TW=591.44' (Dynamic Tailwater)
↑—**2=overflow weir** (Weir Controls 31.56 cfs @ 2.59 fps)

Pond 115b: bioretention 201



Summary for Pond 116P: bioretention 202

```
Inflow Area =        1.100 ac,   0.00% Impervious,  Inflow Depth = 40.55"   for  100-yr event
Inflow      =      52.39 cfs @  11.99 hrs,  Volume=          3.717 af
Outflow     =      31.87 cfs @  12.07 hrs,  Volume=          3.658 af,  Atten= 39%,  Lag= 5.0 min
Primary     =       0.24 cfs @  12.07 hrs,  Volume=          0.800 af
    Routed to Pond 111P : dry pond 20
Secondary =        31.64 cfs @  12.07 hrs,  Volume=          2.858 af
    Routed to Pond 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.31' @ 12.07 hrs   Surf.Area= 40,900 sf   Storage= 51,481 cf
Flood Elev= 598.00'   Surf.Area= 42,580 sf   Storage= 80,330 cf

Plug-Flow detention time= 230.1 min calculated for 3.658 af (98% of inflow)
Center-of-Mass det. time= 218.9 min ( 1,002.8 - 783.9 )

Volume      Invert    Avail.Storage   Storage Description
   #1       596.00'       80,330 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

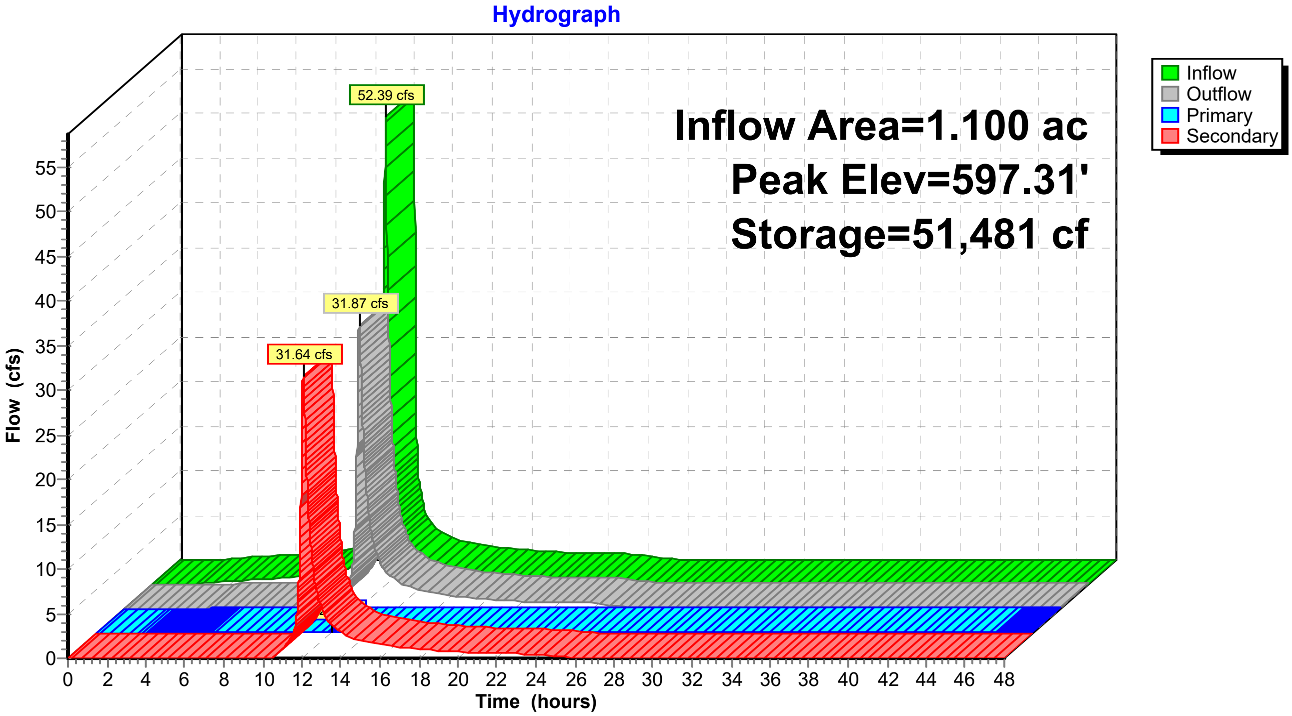
 Elevation        Surf.Area          Inc.Store        Cum.Store
    (feet)           (sq-ft)       (cubic-feet)      (cubic-feet)
    596.00            37,780                  0                0
    597.00            40,150             38,965           38,965
    598.00            42,580             41,365           80,330

Device   Routing           Invert   Outlet Devices
   #1    Primary          592.58'   6.0" Vert. Underdrain   C= 0.600   Limited to weir flow at low heads
   #2    Secondary        596.50'   162.0 deg x 10.0' long x 1.50' rise overflow weir Cv= 2.47 (C= 3.09)
   #3    Device 1         596.00'   0.250 in/hr Exfiltration through bioretention media over Surface area
                                      Phase-In= 0.10'

Primary OutFlow Max=0.24 cfs @ 12.07 hrs  HW=597.31'  TW=591.44'   (Dynamic Tailwater)
└─1=Underdrain  (Passes 0.24 cfs of 2.00 cfs potential flow)
    └─3=Exfiltration through bioretention media(Exfiltration Controls 0.24 cfs)

Secondary OutFlow Max=31.61 cfs @ 12.07 hrs  HW=597.31'  TW=591.44'   (Dynamic Tailwater)
└─2=overflow weir  (Weir Controls 31.61 cfs @ 2.59 fps)
```

Pond 116P: bioretention 202



Summary for Pond 117P: depression

```
Inflow Area =        6.250 ac,   0.00% Impervious,  Inflow Depth =  2.53"   for  100-yr event
Inflow      =       28.11 cfs @  11.97 hrs,  Volume=          1.316 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 111P : dry pond 20

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 599.86' @ 24.34 hrs   Surf.Area= 113,773 sf   Storage= 57,308 cf
Flood Elev= 602.00'   Surf.Area= 232,521 sf   Storage= 253,427 cf

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

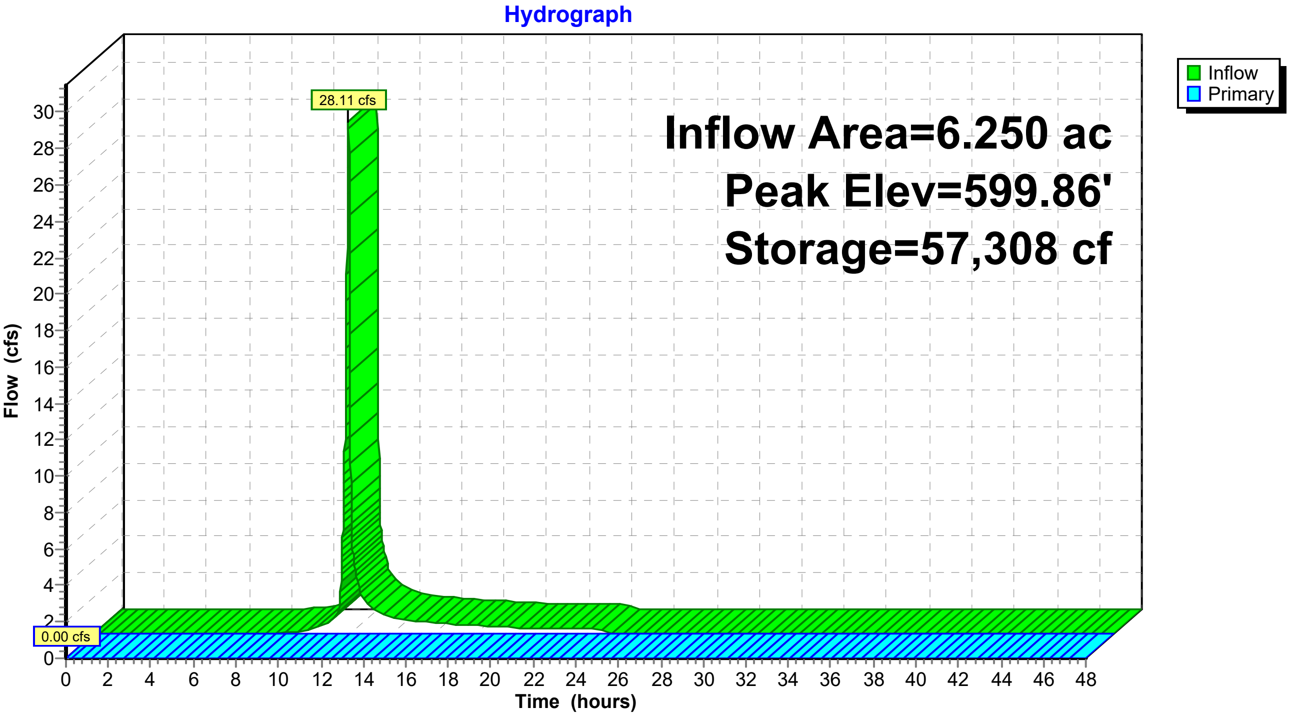
Volume       Invert    Avail.Storage   Storage Description
   #1       599.00'       253,427 cf   Custom Stage Data (Prismatic)Listed below (Recalc)

 Elevation        Surf.Area        Inc.Store       Cum.Store
    (feet)           (sq-ft)     (cubic-feet)    (cubic-feet)
    599.00            16,745                0               0
    599.50            75,340           23,021          23,021
    599.75           104,880           22,528          45,549
    600.00           125,550           28,804          74,353
    600.25           152,370           34,740         109,093
    601.00           232,521          144,334         253,427

Device   Routing          Invert   Outlet Devices
   #1    Primary         600.50'   162.0 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir
                                   Cv= 2.47 (C= 3.09)

Primary OutFlow  Max=0.00 cfs @ 0.00 hrs  HW=599.00'  TW=591.00'   (Dynamic Tailwater)
└─1=Sharp-Crested Vee/Trap Weir ( Controls 0.00 cfs)
```

Pond 117P: depression



Summary for Pond 118b: bioretention 101

```
Inflow Area =       1.450 ac,   0.00% Impervious,  Inflow Depth = 21.52"    for  100-yr event
Inflow      =     62.06 cfs @  11.98 hrs,  Volume=          2.601 af
Outflow     =     13.65 cfs @  12.01 hrs,  Volume=          2.518 af,  Atten= 78%,  Lag= 1.5 min
Primary     =      0.23 cfs @  12.09 hrs,  Volume=          0.749 af
    Routed to Pond 121p : dry pond 10
Secondary =       13.42 cfs @  12.01 hrs,  Volume=          1.768 af
    Routed to Pond 119P : bioretention 102

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.81' @ 12.09 hrs   Surf.Area= 40,117 sf   Storage= 68,476 cf
Flood Elev= 598.00'   Surf.Area= 40,598 sf   Storage= 76,209 cf

Plug-Flow detention time= 356.0 min calculated for 2.517 af (97% of inflow)
Center-of-Mass det. time= 333.6 min ( 1,078.7 - 745.1 )

Volume       Invert    Avail.Storage  Storage Description
   #1       596.00'        76,209 cf  Custom Stage Data (Prismatic)Listed below (Recalc)

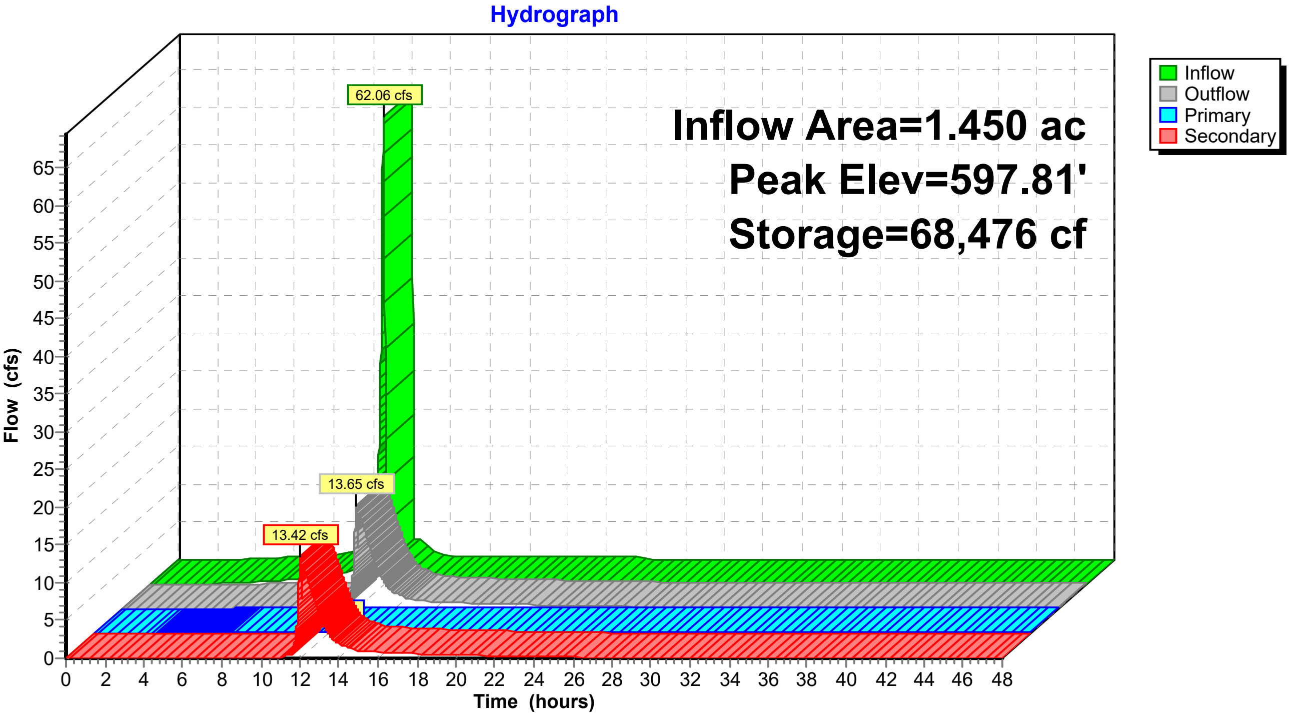
 Elevation        Surf.Area        Inc.Store        Cum.Store
    (feet)          (sq-ft)     (cubic-feet)     (cubic-feet)
    596.00           35,640                0                0
    597.00           38,090           36,865           36,865
    598.00           40,598           39,344           76,209

Device   Routing          Invert   Outlet Devices
   #1    Primary         592.58'   6.0" Vert. Underdrain   C= 0.600   Limited to weir flow at low heads
   #2    Secondary       596.50'   162.0 deg x 10.0' long x 1.50' rise overflow weir Cv= 2.47 (C= 3.09)
   #3    Device 1        596.00'   0.250 in/hr Exfiltration through bioretention media over Surface area
                                     Phase-In= 0.10'

Primary OutFlow  Max=0.23 cfs @ 12.09 hrs  HW=597.81'  TW=592.50'   (Dynamic Tailwater)
└─1=Underdrain  (Passes 0.23 cfs of 2.11 cfs potential flow)
    └─3=Exfiltration through bioretention media(Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=0.00 cfs @ 12.01 hrs  HW=597.62'  TW=597.63'   (Dynamic Tailwater)
└─2=overflow weir  ( Controls 0.00 cfs)
```

Pond 118b: bioretention 101



Summary for Pond 119P: bioretention 102

[80] Warning: Exceeded Pond 118b by 0.02' @ 12.00 hrs (11.76 cfs 0.153 af)

Inflow Area = 1.070 ac, 0.00% Impervious, Inflow Depth = 52.69" for 100-yr event
Inflow = 72.72 cfs @ 11.99 hrs, Volume= 4.698 af
Outflow = 29.34 cfs @ 12.08 hrs, Volume= 4.611 af, Atten= 60%, Lag= 5.6 min
Primary = 0.24 cfs @ 12.09 hrs, Volume= 0.794 af
Routed to Pond 121p : dry pond 10
Secondary = 29.09 cfs @ 12.08 hrs, Volume= 3.817 af
Routed to Pond 120P : bioretention 103

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.80' @ 12.09 hrs Surf.Area= 42,037 sf Storage= 71,923 cf
Flood Elev= 598.00' Surf.Area= 42,500 sf Storage= 80,430 cf

Plug-Flow detention time= 206.4 min calculated for 4.610 af (98% of inflow)
Center-of-Mass det. time= 193.3 min (1,000.0 - 806.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	80,430 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

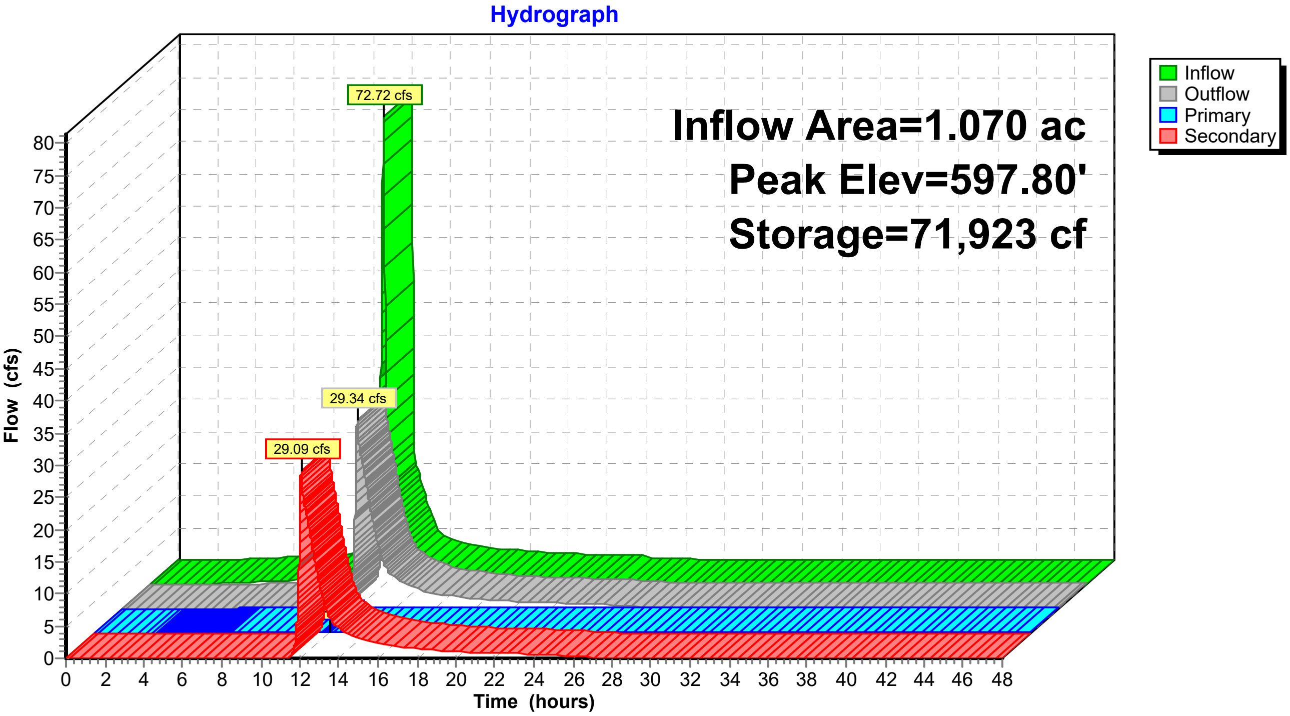
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	37,960	0	0
597.00	40,200	39,080	39,080
598.00	42,500	41,350	80,430

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.24 cfs @ 12.09 hrs HW=597.80' TW=592.48' (Dynamic Tailwater)
└─**1=Underdrain** (Passes 0.24 cfs of 2.11 cfs potential flow)
  └─**3=Exfiltration through bioretention media**(Exfiltration Controls 0.24 cfs)

Secondary OutFlow Max=28.70 cfs @ 12.08 hrs HW=597.80' TW=597.72' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 28.70 cfs @ 1.22 fps)

Pond 119P: bioretention 102



Summary for Pond 120P: bioretention 103

[80] Warning: Exceeded Pond 119P by 0.08' @ 10.97 hrs (0.40 cfs 0.055 af)

Inflow Area = 32.080 ac, 72.32% Impervious, Inflow Depth = 3.52" for 100-yr event
Inflow = 94.53 cfs @ 12.00 hrs, Volume= 9.412 af
Outflow = 67.95 cfs @ 12.08 hrs, Volume= 9.331 af, Atten= 28%, Lag= 5.2 min
Primary = 0.23 cfs @ 12.08 hrs, Volume= 0.769 af
Routed to Pond 121p : dry pond 10
Secondary = 67.72 cfs @ 12.08 hrs, Volume= 8.562 af
Routed to Pond 121p : dry pond 10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 597.72' @ 12.08 hrs Surf.Area= 39,720 sf Storage= 66,144 cf
Flood Elev= 598.00' Surf.Area= 40,070 sf Storage= 77,130 cf

Plug-Flow detention time= 98.0 min calculated for 9.329 af (99% of inflow)
Center-of-Mass det. time= 92.1 min (927.5 - 835.4)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	77,130 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

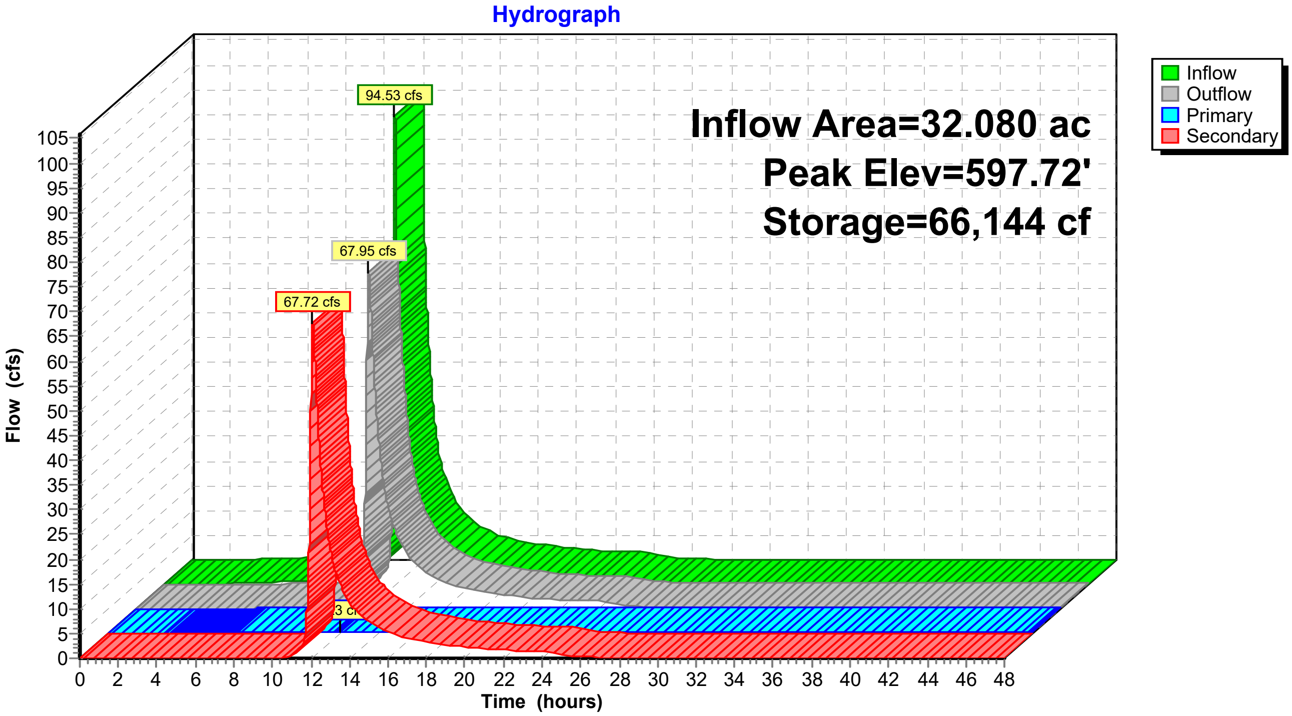
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	36,590	0	0
597.00	38,800	37,695	37,695
598.00	40,070	39,435	77,130

Device	Routing	Invert	Outlet Devices
#1	Primary	592.58'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#2	Secondary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Device 1	596.00'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=0.23 cfs @ 12.08 hrs HW=597.72' TW=592.45' (Dynamic Tailwater)
⮤**1=Underdrain** (Passes 0.23 cfs of 2.09 cfs potential flow)
  ⮤**3=Exfiltration through bioretention media**(Exfiltration Controls 0.23 cfs)

Secondary OutFlow Max=67.70 cfs @ 12.08 hrs HW=597.72' TW=592.45' (Dynamic Tailwater)
⮤**2=overflow weir** (Weir Controls 67.70 cfs @ 3.12 fps)

Pond 120P: bioretention 103



Summary for Pond 121p: dry pond 10

[80] Warning: Exceeded Pond DMH140 by 0.42' @ 25.11 hrs (0.63 cfs 0.189 af)

Inflow Area = 48.470 ac, 56.49% Impervious, Inflow Depth > 3.82" for 100-yr event
Inflow = 108.13 cfs @ 12.10 hrs, Volume= 15.410 af
Outflow = 29.85 cfs @ 13.06 hrs, Volume= 12.101 af, Atten= 72%, Lag= 57.3 min
Primary = 29.85 cfs @ 13.06 hrs, Volume= 12.101 af
Routed to Pond 111P : dry pond 20
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Pond 10d : depression

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 594.13' @ 13.06 hrs Surf.Area= 86,306 sf Storage= 252,620 cf
Flood Elev= 598.00' Surf.Area= 100,533 sf Storage= 613,798 cf

Plug-Flow detention time= 358.4 min calculated for 12.099 af (79% of inflow)
Center-of-Mass det. time= 180.7 min (1,139.1 - 958.5)

Volume	Invert	Avail.Storage	Storage Description
#1	591.00'	613,798 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

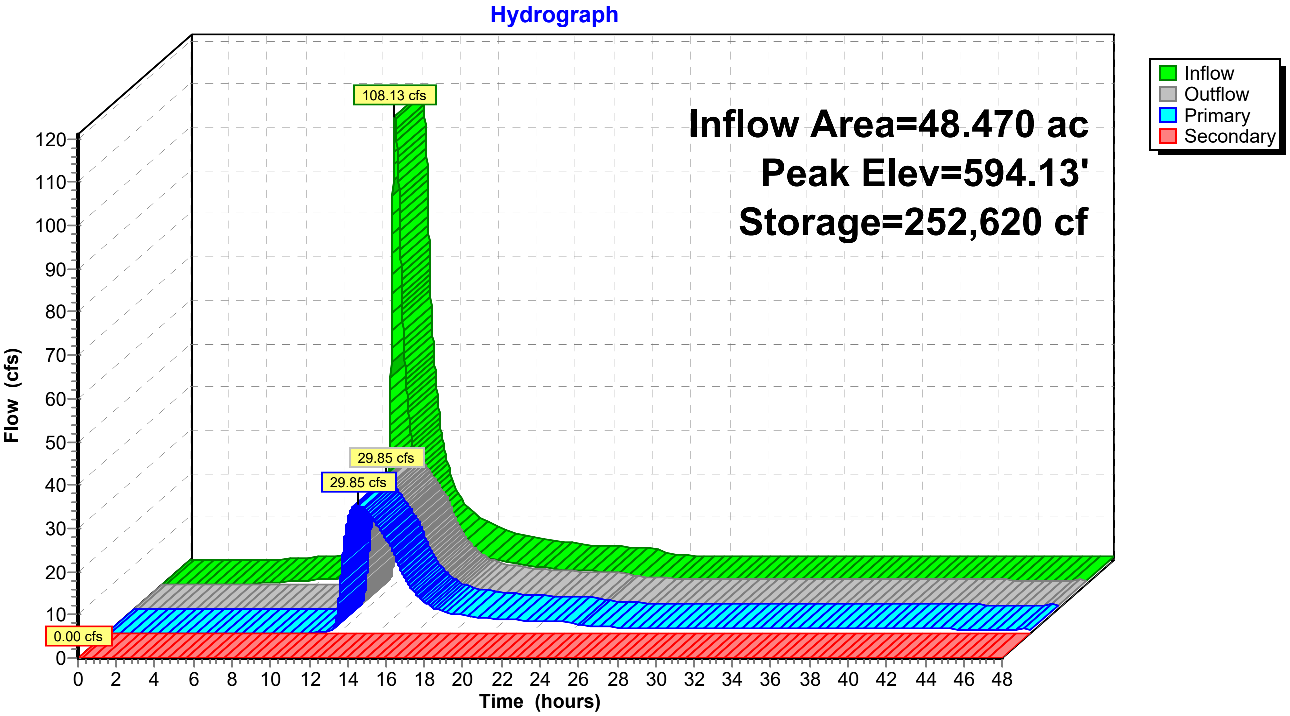
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
591.00	75,120	0	0
596.00	92,990	420,275	420,275
598.00	100,533	193,523	613,798

Device	Routing	Invert	Outlet Devices
#1	Primary	591.00'	**36.0" Round Culvert** L= 103.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 591.00' / 591.00' S= 0.0000 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf
#2	Secondary	596.00'	**162.0 deg x 10.0' long x 2.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=29.85 cfs @ 13.06 hrs HW=594.13' TW=592.25' (Dynamic Tailwater)
↰**1=Culvert** (Barrel Controls 29.85 cfs @ 5.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=591.00' TW=592.75' (Dynamic Tailwater)
↰**2=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 121p: dry pond 10



Summary for Pond 122f: forebay 100 bypass

Inflow Area = 30.720 ac, 75.42% Impervious, Inflow Depth = 4.20" for 100-yr event
Inflow = 203.44 cfs @ 11.97 hrs, Volume= 10.756 af
Outflow = 195.31 cfs @ 11.97 hrs, Volume= 10.756 af, Atten= 4%, Lag= 0.3 min
Primary = 66.42 cfs @ 11.98 hrs, Volume= 5.247 af
Routed to Pond 120P : bioretention 103
Secondary = 124.05 cfs @ 11.97 hrs, Volume= 4.886 af
Routed to Pond 1P : forebay 100 bypass
Tertiary = 5.87 cfs @ 12.01 hrs, Volume= 0.624 af
Routed to Pond DMH140 : DMH-140

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 596.50' Surf.Area= 6,360 sf Storage= 2,805 cf
Peak Elev= 597.91' @ 12.01 hrs Surf.Area= 10,586 sf Storage= 14,741 cf (11,936 cf above start)
Flood Elev= 598.00' Surf.Area= 10,860 sf Storage= 15,720 cf (12,915 cf above start)

Plug-Flow detention time= 12.1 min calculated for 10.690 af (99% of inflow)
Center-of-Mass det. time= 4.8 min (770.6 - 765.8)

Volume	Invert	Avail.Storage	Storage Description
#1	596.00'	15,720 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
596.00	4,860	0	0
598.00	10,860	15,720	15,720

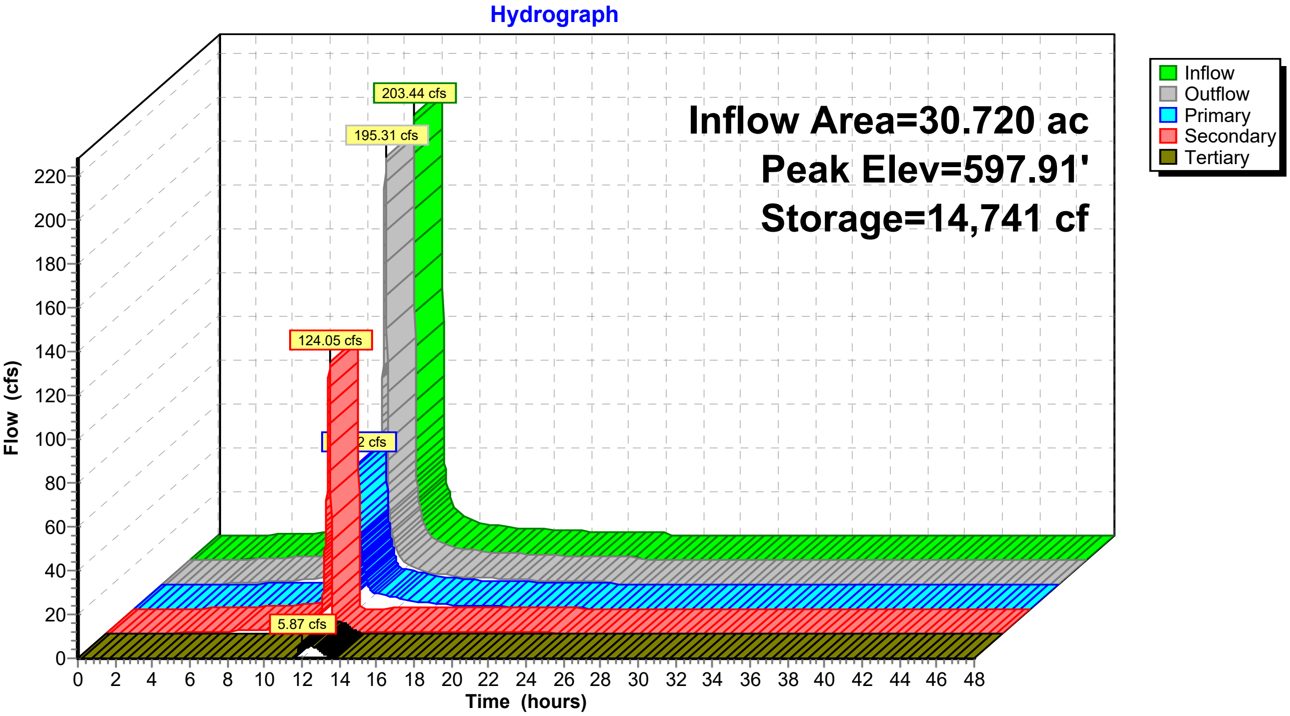
Device	Routing	Invert	Outlet Devices
#1	Primary	596.50'	**162.0 deg x 10.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#2	Secondary	596.50'	**162.0 deg x 50.0' long x 1.50' rise overflow weir** Cv= 2.47 (C= 3.09)
#3	Tertiary	595.00'	**12.0" Round Culvert to DMH-140** L= 35.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 595.00' / 594.30' S= 0.0200 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#4	Device 3	597.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=63.77 cfs @ 11.98 hrs HW=597.88' TW=597.52' (Dynamic Tailwater)
└─**1=overflow weir** (Weir Controls 63.77 cfs @ 2.46 fps)

Secondary OutFlow Max=106.39 cfs @ 11.97 hrs HW=597.84' TW=597.75' (Dynamic Tailwater)
└─**2=overflow weir** (Weir Controls 106.39 cfs @ 1.35 fps)

Tertiary OutFlow Max=5.87 cfs @ 12.01 hrs HW=597.91' TW=595.13' (Dynamic Tailwater)
└─**3=Culvert to DMH-140** (Inlet Controls 5.87 cfs @ 7.47 fps)
  └─**4=Grate** (Passes 5.87 cfs of 36.81 cfs potential flow)

Pond 122f: forebay 100 bypass



Summary for Pond 301f: forebay 400

```
Inflow Area =         3.840 ac, 67.97% Impervious, Inflow Depth =  4.09"   for 100-yr event
Inflow      =       25.11 cfs @  11.97 hrs, Volume=          1.309 af
Outflow     =       15.44 cfs @  12.00 hrs, Volume=          1.309 af, Atten= 39%, Lag= 1.7 min
Primary     =       15.44 cfs @  12.00 hrs, Volume=          1.309 af
   Routed to Pond 302b : bioretention 401
```

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Starting Elev= 605.00' Surf.Area= 7,090 sf Storage= 21,930 cf
Peak Elev= 606.32' @ 12.05 hrs Surf.Area= 8,330 sf Storage= 32,105 cf (10,175 cf above start)
Flood Elev= 606.50' Surf.Area= 8,500 sf Storage= 33,623 cf (11,693 cf above start)

Plug-Flow detention time= 213.4 min calculated for 0.806 af (62% of inflow)
Center-of-Mass det. time= 19.8 min (791.1 - 771.3)

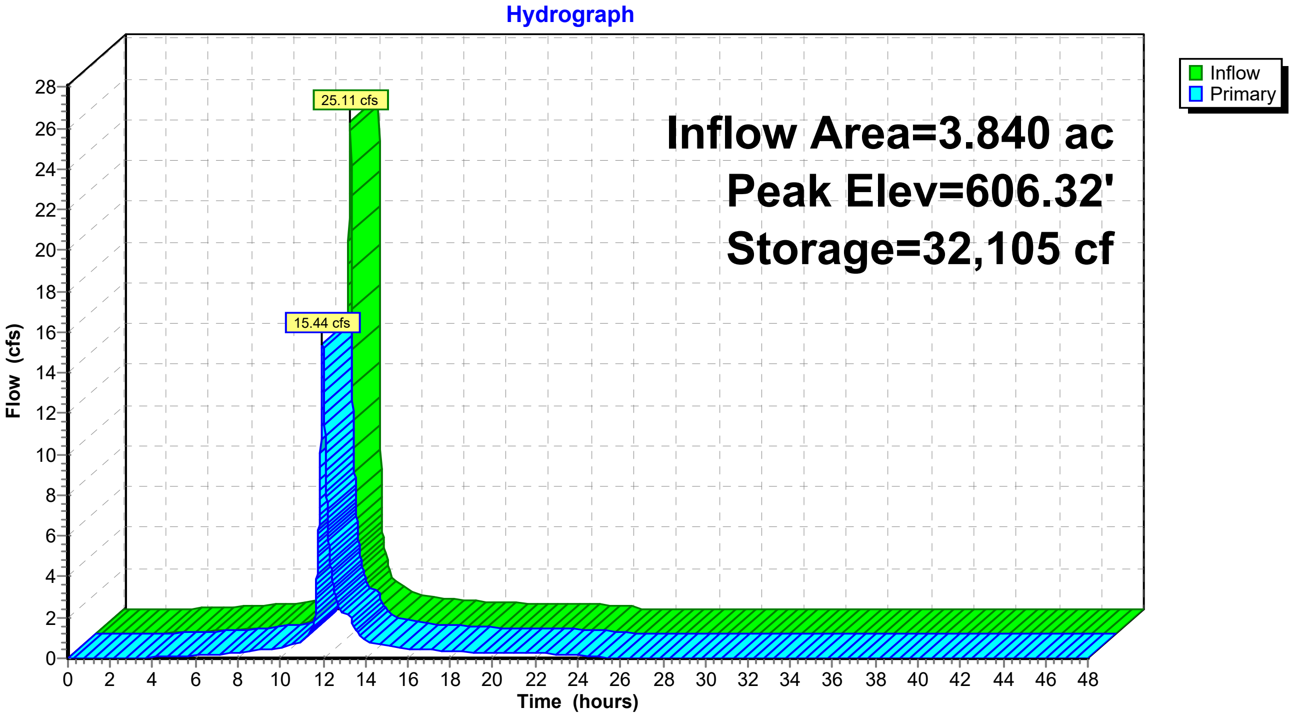
Volume	Invert	Avail.Storage	Storage Description
#1	601.00'	33,623 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
601.00	3,930	0	0
604.50	6,640	18,498	18,498
605.00	7,090	3,433	21,930
606.50	8,500	11,693	33,623

Device	Routing	Invert	Outlet Devices
#1	Primary	605.00'	**162.0 deg x 10.0' long x 1.50' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)

Primary OutFlow Max=0.00 cfs @ 12.00 hrs HW=606.22' TW=606.23' (Dynamic Tailwater)
└─**1=Sharp-Crested Vee/Trap Weir** (Controls 0.00 cfs)

Pond 301f: forebay 400



Summary for Pond 302b: bioretention 401

[80] Warning: Exceeded Pond 301f by 0.02' @ 11.96 hrs (10.79 cfs 0.095 af)

Inflow Area = 10.830 ac, 48.29% Impervious, Inflow Depth = 3.75" for 100-yr event
Inflow = 56.95 cfs @ 11.97 hrs, Volume= 3.384 af
Outflow = 39.29 cfs @ 12.04 hrs, Volume= 3.360 af, Atten= 31%, Lag= 4.2 min
Primary = 7.91 cfs @ 12.04 hrs, Volume= 2.530 af
Routed to Reach DP3 : DP1
Secondary = 31.38 cfs @ 12.04 hrs, Volume= 0.830 af
Routed to Reach DP3 : DP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 606.31' @ 12.04 hrs Surf.Area= 23,906 sf Storage= 39,383 cf
Flood Elev= 606.50' Surf.Area= 24,360 sf Storage= 44,085 cf

Plug-Flow detention time= 129.3 min calculated for 3.359 af (99% of inflow)
Center-of-Mass det. time= 124.9 min (917.0 - 792.1)

Volume	Invert	Avail.Storage	Storage Description
#1	604.50'	44,085 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

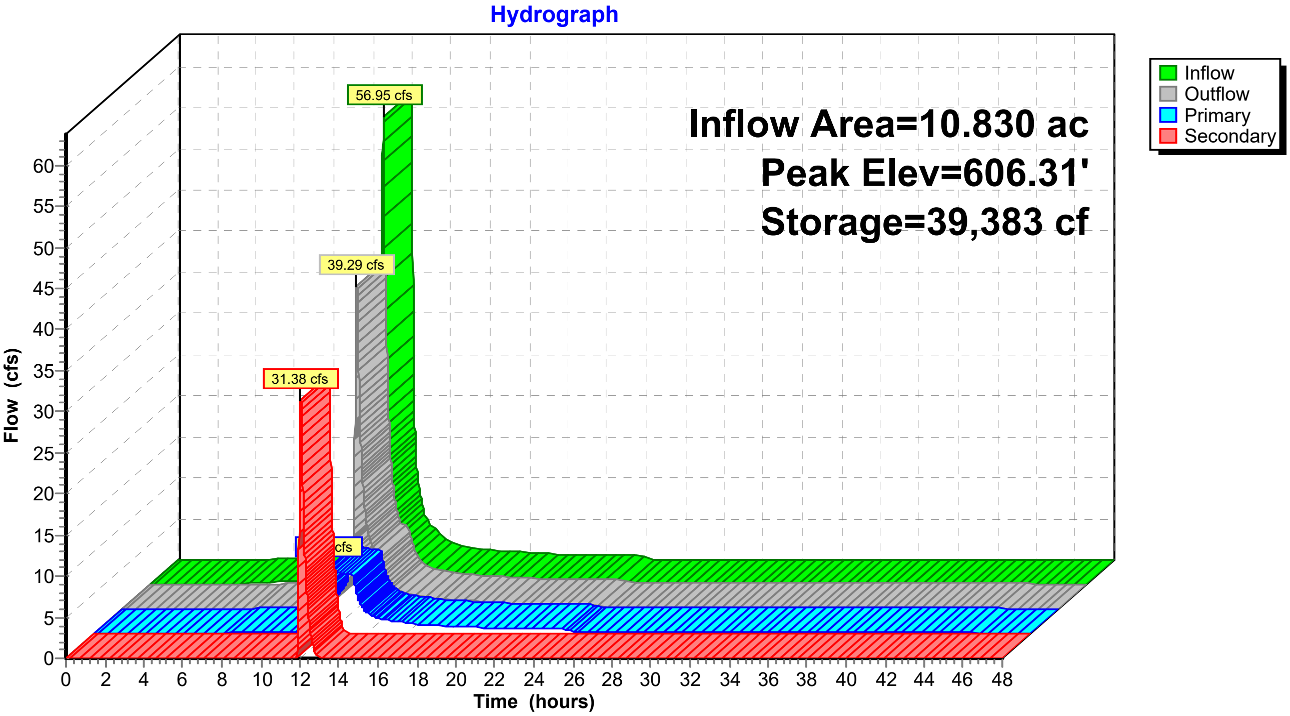
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
604.50	19,750	0	0
605.50	22,030	20,890	20,890
606.50	24,360	23,195	44,085

Device	Routing	Invert	Outlet Devices
#1	Primary	601.08'	**12.0" Round Culvert** L= 68.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 601.08' / 600.08' S= 0.0147 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.79 sf
#2	Device 1	605.00'	**30.0" x 48.0" Horiz. Grate** C= 0.600 Limited to weir flow at low heads
#3	Secondary	605.50'	**162.0 deg x 10.0' long x 1.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.47 (C= 3.09)
#4	Device 1	601.08'	**6.0" Vert. Underdrain** C= 0.600 Limited to weir flow at low heads
#5	Device 4	604.50'	**0.250 in/hr Exfiltration through bioretention media over Surface area** Phase-In= 0.10'

Primary OutFlow Max=7.91 cfs @ 12.04 hrs HW=606.30' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 7.91 cfs @ 10.07 fps)
  ├─**2=Grate** (Passes < 54.99 cfs potential flow)
  └─**4=Underdrain** (Passes < 2.11 cfs potential flow)
    └─**5=Exfiltration through bioretention media**(Passes < 0.14 cfs potential flow)

Secondary OutFlow Max=31.33 cfs @ 12.04 hrs HW=606.30' TW=0.00' (Dynamic Tailwater)
└─**3=Sharp-Crested Vee/Trap Weir** (Weir Controls 31.33 cfs @ 2.58 fps)

Pond 302b: bioretention 401



Summary for Pond DMH140: DMH-140

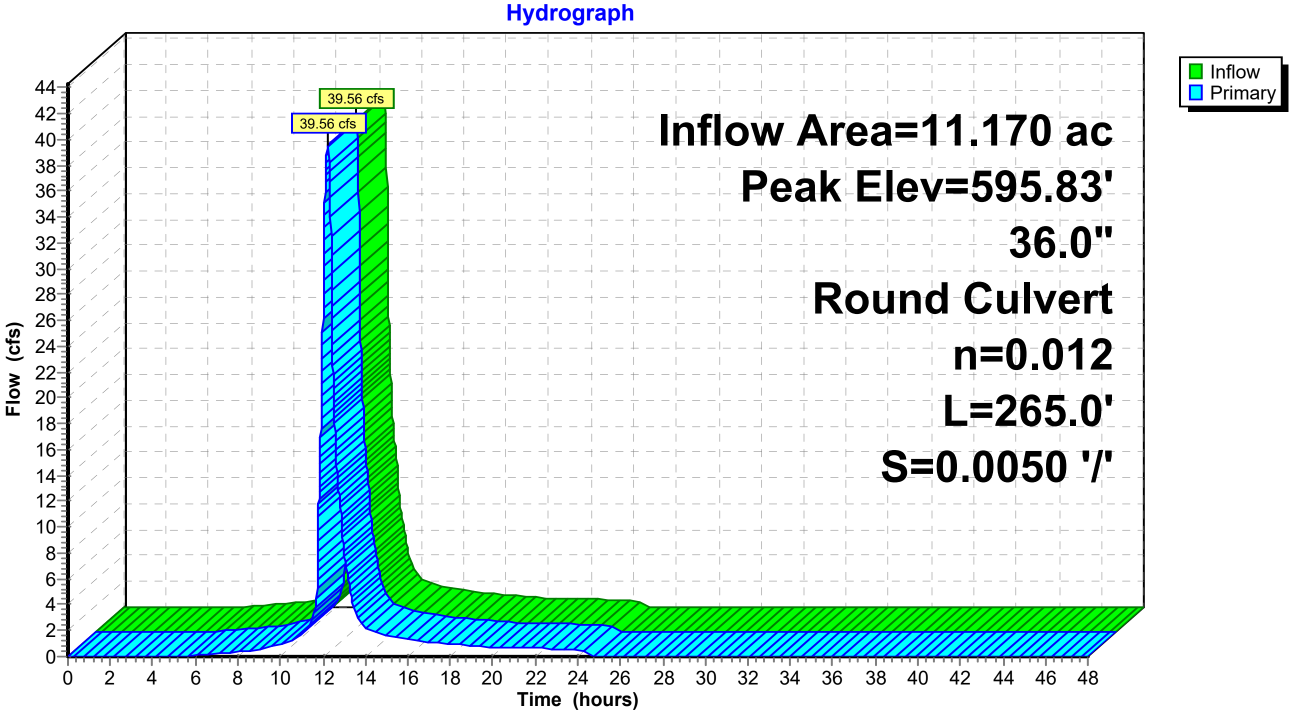
Inflow Area = 11.170 ac, 37.42% Impervious, Inflow Depth = 4.13" for 100-yr event
Inflow = 39.56 cfs @ 12.23 hrs, Volume= 3.845 af
Outflow = 39.56 cfs @ 12.23 hrs, Volume= 3.845 af, Atten= 0%, Lag= 0.0 min
Primary = 39.56 cfs @ 12.23 hrs, Volume= 3.845 af
Routed to Pond 121p : dry pond 10

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 595.83' @ 12.23 hrs
Flood Elev= 601.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	592.83'	**36.0" Round Culvert** L= 265.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 592.83' / 591.50' S= 0.0050 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 7.07 sf

Primary OutFlow Max=39.56 cfs @ 12.23 hrs HW=595.83' TW=593.08' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 39.56 cfs @ 6.95 fps)

Pond DMH140: DMH-140



Summary for Pond DMH142: DMH-142

Inflow Area = 11.170 ac, 37.42% Impervious, Inflow Depth = 3.46" for 100-yr event
Inflow = 34.41 cfs @ 12.25 hrs, Volume= 3.221 af
Outflow = 34.41 cfs @ 12.25 hrs, Volume= 3.221 af, Atten= 0%, Lag= 0.0 min
Primary = 34.41 cfs @ 12.25 hrs, Volume= 3.221 af
Routed to Pond DMH140 : DMH-140

Routing by Dyn-Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 598.28' @ 12.25 hrs
Flood Elev= 601.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	594.91'	**30.0" Round Culvert** L= 54.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 594.91' / 593.34' S= 0.0291 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 4.91 sf

Primary OutFlow Max=34.41 cfs @ 12.25 hrs HW=598.28' TW=595.83' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 34.41 cfs @ 7.01 fps)

Pond DMH142: DMH-142

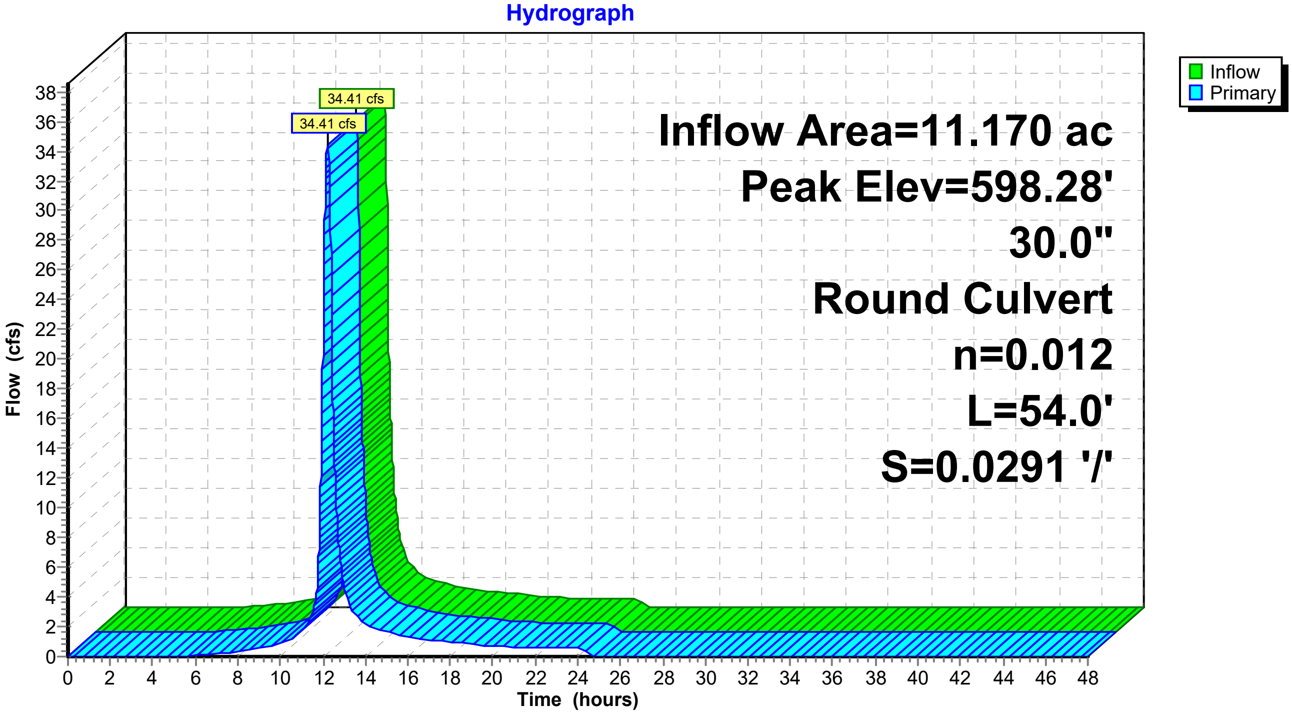


TABLE OF CONTENTS

Project Reports

1-yr Event

10-yr Event

100-yr Event

Appendix G: Certification Statements

Owner's/Operator's 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."

Name (please print) ______________________________

Title ______________________________ **Date** ______________

Address ______________________________

Phone ______________ **Email** ______________________

Signature ______________________________

Contractor's Certification

"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."

Contracting Firm Name ______________________________

Address ______________________________

Phone ______________ **Fax** ______________

Name (please print) ______________________________

Title ______________________ **Date** ______________

Signature ______________________________

SWPPP Responsibilities ______________________________

____

____

____

Trained Individual Name (please print) ______________________________

Title ______________________ **Date** ______________

Signature ______________________________

SWPPP Responsibilities ______________________________

____

____

Note: All Contractors involved with Stormwater related activities shall sign a Contractor's Certification.

Subcontractor's Certification

"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."

Subcontracting Firm Name ______________________________

Address ______________________________

Phone ______________ **Fax** ______________

Name (please print) ______________________________

Title ______________________ **Date** ____________

Signature ______________________________

SWPPP Responsibilities ______________________________

____

____

____

Trained Individual Name (please print) ______________________________

Title ______________________ **Date** ____________

Signature ______________________________

SWPPP Responsibilities ______________________________

____

____

Note: All subcontractors involved with Stormwater related activities shall sign a Subcontractor's Certification.

Appendix H: Example Inspection Form

EXAMPLE EROSION CONTROL REPORT

PROJECT NO: ____________ PROJECT NAME: ________________________ DATE: ___________

MUNICIPALITY: __________________________ LOCATION: ______________________________

CONTRACTOR: ____________________________ OWNER: __________________________________

DATE OF PREVIOUS INSPECTION: __________ INSPECTOR'S NAME: _____________________

DATE OF MOST RECENT STORM
0.5" OR GREATER: __________ DATE OF INSPECTION: ___________________

LAST RAIN EVENT: _____________________ DEPTH: _________________________________

WEATHER: ______________________________ TEMPERATURE: ___________°F___________

SPECIAL NOTES:

EROSION CONTROL CHECKLIST

ADDITIONAL ACTION REQUIRED BY PROJECT MANAGER OR PROJECT ENGINEER ☐ YES ☐ NO

PHOTOS OR SKETCHES ATTACHED ☐ ADDITIONAL REMARKS ATTACHED ☐

Inspector (print name)	**Inspection Date**
Qualified Professional (print name)	**Qualified Professional 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?
☐ ☐ ☐ Is there residue from oil and floating substances, visible oil film, or globules of grease?
☐ ☐ ☐ 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 and debris 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 properties?
☐ ☐ ☐ 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.

Runoff Control Practices

1. Excavation Dewatering

Yes No NA

☐ ☐ ☐ Upstream and downstream berms (sandbags, inflatable damns, 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.

2. Level 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 occuring.
☐ ☐ ☐ 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. Stabilized Construction Entrance

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 the site?
☐ ☐ ☐ Is adequate drainage provided to prevent ponding at entrance?

2. Silt Fence

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.

3. Storm Drain Inlet Protection (Use for Stone & Block; Filter Fabric; Curb; or, Excavated practices)

Yes	**No**	**NA**	
☐	☐	☐	Installed concrete blocks lengthwise so open ends face outward, not upward.
☐	☐	☐	Place wire screen between No. 3 crushed stone and concrete blocks.
☐	☐	☐	Drainage area is 1 acre 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.

Sediment accumulation is ____% of design capacity.

4. 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 accumulation is ____% of design capacity.

5. Temporary Sediment Basin

Yes	**No**	**NA**	
☐	☐	☐	Basin and outlet structure constructed per the approved plan.
☐	☐	☐	Basin side slopes are stablized with seed/mulch.
☐	☐	☐	Drainage structure is flushed and basin surface restored upon removal of sediment basin facility.

Sediment accumulation is ____% of design capacity.

Appendix I: Post-Construction Inspection & Maintenance

Post Construction Inspection and Maintenance Site Checklist

1. **Steep Slopes (any slope 3:1 or steeper)**
   (Frequency: Annual) **Yes No NA**
   a. Vegetation and ground cover adequate. ☐ ☐ ☐
      i. Minimum 80% ground cover. ☐ ☐ ☐
         Maintenance: Topsoil, rake and seed bare areas. Remove any dead or dying plants and decaying plant material. Replace dead and dying plants.
      ii. Excessively tall grass (greater than 6” in height) ☐ ☐ ☐
         Maintenance: Mow slopes 3:1 or flatter to have a grass height of 4” to 6”. Increase mowing frequency as necessary. Steep slopes planted with meadow mix as shown on the approved plans do not have to be mowed.
      iii. Unauthorized plants. ☐ ☐ ☐
         Maintenance: Remove any unauthorized plants, including roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.
   b. Slope erosion. ☐ ☐ ☐
      i. Small bare areas (min. 50 square feet). ☐ ☐ ☐
         Maintenance: Topsoil, rake and seed bare areas.
      ii. Ruts less than 12” wide. ☐ ☐ ☐
         Maintenance: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Backfill ruts and compact soil. Topsoil, rake and seed bare areas. Alternatively, hydroseeding can be used to seed the slope.
      iii. Ruts greater than 12” wide. ☐ ☐ ☐
         Maintenance: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Re-grade, backfill ruts and compact soil. Install erosion control mats on slopes 3:1 or steeper to protect the re-graded slope. Topsoil, rake and seed bare areas. Inspect on a weekly basis until 80% ground cover is achieved. Alternatively, hydroseeding can be used to seed the slope.
   c. Uneven settling ☐ ☐ ☐
      Maintenance: Visually inspect for uneven settling. Classify the settling based upon the categories below.
      i. Greater than 0” but less than 2” of settling. ☐ ☐ ☐
         Maintenance: No immediate action required. Re-inspect in 6 months.
      ii. Greater than 2” but less than 4” of settling. ☐ ☐ ☐
         Maintenance: Immediately repair. Re-grade and compact the soil. Topsoil, rake and seed the area. Re-inspect in 6 months.

	Yes	No	NA
iii. Greater than 4" of settling. *<u>Maintenance</u>: Immediately stabilize the area and consult a NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐

2. Swales (Frequency: Annual)	**Yes**	**No**	**NA**
a. Inflow Points	☐	☐	☐
i. Vegetation and ground cover adequate. *<u>Maintenance</u>: Reseed bare areas. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐
ii. Free from erosion/undercutting. *<u>Maintenance</u>: Immediately stabilize and repair any areas where erosion around has occurred. Rake and seed the area. Seed mixture shall meet the seed mixture requirements specified on the approved plans.*	☐	☐	☐
iii. Rip rap in good condition. *<u>Maintenance</u>: Replace stone, as necessary.*	☐	☐	☐
iv. No evidence of sediment buildup. *<u>Maintenance</u>: Remove and properly dispose of any accumulated sediment when the depth is 20% of swale design depth.*	☐	☐	☐
b. Check Dams	☐	☐	☐
i. No evidence of sediment buildup. *<u>Maintenance</u>: Remove accumulated sediment behind dams when sediment depth is one-third the dam height.*	☐	☐	☐
ii. Stone in good condition. *<u>Maintenance</u>: Replace stone, as necessary.*	☐	☐	☐
iii. No evidence of erosion *<u>Maintenance</u>: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed area.*	☐	☐	☐
c. Energy Dissipaters	☐	☐	☐
i. No evidence of sediment buildup. *<u>Maintenance</u>: Remove and properly dispose of any accumulated sediment when half of the void space is filled.*	☐	☐	☐
ii. Rip rap in good condition. *<u>Maintenance</u>: Replace stone, as necessary.*	☐	☐	☐
iii. No evidence of erosion. *<u>Maintenance</u>: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed.*	☐	☐	☐

3. Culverts **(Frequency: Annual)**	**Yes**	**No**	**NA**
a. Headwalls or End sections	☐	☐	☐
i. In good condition, no need for repairs.	☐	☐	☐
a. Cracks or displacement. *Maintenance: Repair any minor cracks. If minor displacement is observed, re-inspect in 6 months. Replace structure if major cracks or significant displacement is observed.*	☐	☐	☐
b. Minor spalling (<1”). *Maintenance: Repair any minor spalling.*	☐	☐	☐
c. Major spalling (rebars exposed). *Maintenance: Replace structure.*	☐	☐	☐
ii. Clear of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment.*	☐	☐	☐
iii. Clear of debris and trash. *Maintenance: Remove and properly dispose of any debris and trash.*	☐	☐	☐
b. Rip rap in good condition. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
c. Pipes free from damage, corrosion, and sediment. *Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.*	☐	☐	☐

Notes:

1. The site must be returned to the approved conditions when any repairs are made.
2. Unauthorized plants are any plants that are growing or have been installed that are not any of the plants shown on the approved plans.
3. All seed mixtures shall meet the seed mixture requirements specified on the approved plans.
4. Replace any dead or dying plants with plants specified in the planting schedule shown on the approved plans.

Comments:

____
____
____
____

Actions to be taken:

____
____
____
____

Post Construction Inspection and Maintenance Checklist
Bioretention

1. Embankment

(Frequency: Annual)	**Yes**	**No**	**NA**
a. Vegetation and ground cover adequate.	☐	☐	☐
i. Minimum 80% ground cover.	☐	☐	☐
Maintenance: Topsoil, rake and seed bare areas. Replace dead and dying plants.			
ii. Excessively tall grass (greater than 6″ in height)	☐	☐	☐
Maintenance: Mow grass to have a height of 4″ to 6″. Increase mowing frequency as necessary.			
iii. Unauthorized plants.	☐	☐	☐
Maintenance: Remove any unauthorized plants, including roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.			
b. Slope erosion.	☐	☐	☐
i. Small bare areas (min. 50 square feet).	☐	☐	☐
Maintenance: Topsoil, rake and seed bare areas.			
ii. Ruts less than 12″ wide.	☐	☐	☐
Maintenance: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Backfill ruts and compact soil. Topsoil, rake and seed bare areas. Alternatively, hydroseeding can be used to seed the slope.			
iii. Ruts greater than 12″ wide.	☐	☐	☐
Maintenance: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Re-grade, backfill ruts and compact soil. Install erosion control mats on slopes 3:1 or steeper to protect the re-graded slope. Topsoil, rake and seed bare areas. Inspect on a weekly basis until 80% ground cover is achieved. Alternatively, hydroseeding can be used to seed the slope.			
c. Uneven settling	☐	☐	☐
Maintenance: Install permanent benchmarks or other permanent reference point in each practice to be used with as-built elevations to measure uneven settling.			
i. Greater than 0″ but less than 2″ of settling.	☐	☐	☐
Maintenance: No immediate action required. Re-inspect in 6 months.			
ii. Greater than 2″ but less than 4″ of settling.	☐	☐	☐
Maintenance: Immediately repair. Re-grade and compact the soil. Topsoil, rake and seed the area. Re-inspect in 6 months.			

	Yes	No	NA
iii. Greater than 4" of settling. *<u>Maintenance</u>: Immediately stabilize the area and consult a NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐
d. Animal burrows. *<u>Maintenance</u>: Fill animal burrows with similar material to the existing material and compact. Rake and seed the area.*	☐	☐	☐
e. Cracking, bulging, or sliding of slope.	☐	☐	☐
i. Upstream face.	☐	☐	☐
ii. Downstream face.	☐	☐	☐
iii. At or beyond downstream toe.	☐	☐	☐
iv. At or beyond upstream toe.	☐	☐	☐
v. Emergency spillway. *<u>Maintenance</u>: Immediately stabilize the slope and consult an NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐
f. Seeps/leaks at downstream face. *<u>Maintenance</u>: Look for changes in the color of the vegetation, plant species and their density to help locate the leak source.*	☐	☐	☐
g. Rip rap slope protection failure. *<u>Maintenance</u>: Stabilize slope, re-grade and compact the soil. Replace stone as necessary.*	☐	☐	☐
i. Emergency spillway clear of any obstructions or debris. *<u>Maintenance</u>: Remove and properly dispose of any trash and debris. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐

2. Inflow Points
(Frequency: Annual)

	Yes	No	NA
a. Vegetation and ground cover adequate. *<u>Maintenance</u>: Reseed bare areas. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area by their removal.*	☐	☐	☐
b. Free from erosion/undercutting. *<u>Maintenance</u>: Immediately stabilize and repair any areas where erosion around has occurred. Rake and seed the area. Seed mixture shall meet the seed mixture requirements specified on the approved plans.*	☐	☐	☐
c. Rip rap in good condition. *<u>Maintenance</u>: Replace stone, as necessary.*	☐	☐	☐

	Yes	No	NA
d. Pipes free from damage, corrosion, and sediment. *Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.*	☐	☐	☐

3. Outlet Structure/Overflow Spillway (Frequency: Annual)

	Yes	No	NA
a. Outlet structure in good condition.	☐	☐	☐
i. In good condition, no need for repairs.	☐	☐	☐
a. Cracks or displacement *Maintenance: Repair any minor cracks or displacement. Replace structure if major cracks or displacement is observed.*	☐	☐	☐
b. Minor spalling (<1"). *Maintenance: Repair any minor spalling observed.*	☐	☐	☐
c. Major spalling (rebars exposed). *Maintenance: Replace structure.*	☐	☐	☐
d. Joint failures. *Maintenance: Replace structure.*	☐	☐	☐
e. Water tightness. *Maintenance: Reseal structure for water tightness if minor leaks are observed. Replace structure if significant leaks are observed.*	☐	☐	☐
ii. Clear of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of sump height.*	☐	☐	☐
iii. Clear of debris and trash. *Maintenance: Remove and properly dispose of any debris and trash.*	☐	☐	☐
iv. Pipes free from damage, corrosion, and sediment. *Maintenance: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.*	☐	☐	☐
b. Overflow spillway	☐	☐	☐
i. In good condition, no need for repairs. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
ii. Clear of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment when half of the void space is filled.*	☐	☐	☐
iii. Clear of debris and trash. *Maintenance: Remove and properly dispose of any debris and trash.*	☐	☐	☐

	Yes	No	NA
iv. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion occurred around or below the overflow spillway. Replace stone, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐
v. No evidence of erosion at downstream toe of drop structure or weir spillway. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed.*	☐	☐	☐

4. Check Dams/Energy Dissipaters/Swales (Frequency: Annual)

	Yes	No	NA
a. Check Dams	☐	☐	☐
i. No evidence of sediment buildup. *Maintenance: Remove accumulated sediment behind dams when sediment depth is one-third the dam height.*	☐	☐	☐
ii. Stone in good condition. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
iii. No evidence of erosion *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed area.*	☐	☐	☐
b. Energy Dissipaters	☐	☐	☐
i. No evidence of sediment buildup. *Maintenance: Remove and properly dispose of any accumulated sediment when half of the void space is filled.*	☐	☐	☐
ii. Rip rap in good condition. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
iii. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and reseed.*	☐	☐	☐
c. Swales	☐	☐	☐
i. No evidence of sediment buildup. *Maintenance: Remove and properly dispose of any accumulated sediment when the depth is 20% of swale design depth.*	☐	☐	☐
ii. No evidence of erosion. *Maintenance: Immediately stabilize. Backfill any ruts and compact the soil. Topsoil, rake and seed the area.*	☐	☐	☐

5. Sediment Forebay

(Frequency: Monthly)	**Yes**	**No**	**NA**
a. Free of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of the design capacity.*	☐	☐	☐
b. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Topsoil, rake and seed the area.*	☐	☐	☐
c. Overflow Spillway.	☐	☐	☐
i. In good working condition, no need for repairs. *Maintenance: Replace stone, as necessary.*	☐	☐	☐
ii. Clear of sediment. *Maintenance: Remove and properly dispose of any accumulated sediment when half of the void space is filled.*	☐	☐	☐
iii. Clear of trash and debris. *Maintenance: Remove and properly dispose of any debris and trash.*	☐	☐	☐
iv. No evidence of erosion. *Maintenance: Immediately stabilize and repair any areas where erosion occurred around or below the overflow spillway. Replace stone, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐
v. No evidence of erosion at downstream toe of drop structure or weir spillway. *Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐

6. Debris Cleanout

(Frequency: Monthly)	**Yes**	**No**	**NA**
a. Contributing areas clean of debris. *Maintenance: Remove and properly dispose of any trash and debris.*	☐	☐	☐
b. No dumping of yard wastes into practice. *Maintenance: Remove any yard wastes. Remind any maintenance personnel, landscapers, etc. to properly dispose of any yard wastes.*	☐	☐	☐
c. Clear of debris and litter. *Maintenance: Remove and properly dispose of any trash and debris.*	☐	☐	☐

7. Bioretention Basin Vegetation

(Frequency: Monthly)	**Yes**	**No**	**NA**
a. Plant height not less than design water depth of 3”. *Maintenance: Remove any plants that have heights less than 3”. Replace with plants specified on the approved plans that have a minimum height of 3”.*	☐	☐	☐
b. Plant composition according to approved plans. *Maintenance: Remove any dead or dying plants and decaying plant material. Replace dead and dying plants.*	☐	☐	☐
c. No placement of unapproved plants. *Maintenance: Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use herbicides.*	☐	☐	☐
d. Grass height not greater than 6”. *Maintenance: Mow grass. Increase frequency of mowing as necessary to keep grass heights less than 6”.*	☐	☐	☐
e. Sparse or bare vegetation in more than 10% of bioretention area. *Maintenance: Install replacement plants, as necessary. Topsoil, rake and seed the area.*	☐	☐	☐
f. Nuisance weeds or vegetation taking over more than 25% of the basin. *Maintenance: Remove any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the disturbed area*	☐	☐	☐
g. Mulch is in good condition and the appropriate thickness. *Maintenance: Replace decomposed mulch to the thickness shown on the approved plans.*	☐	☐	☐

8. Bioretention Basin Dewatering

(Frequency: Monthly)	**Yes**	**No**	**NA**
a. Dewaters between storms. *Maintenance: If filter bed is clogged or draining poorly, remove top few inches of discolored filter media. Rake the remaining material and replace the removed filter bed media.*	☐	☐	☐
b. No evidence of standing water 48 or more hours after a rainfall. *Maintenance: If standing water covers more than 15% of the planting bed 48 hours after a rainfall, remove top few inches of planting bed media. Rake the filter bed media to loosen the soil. Recheck after next rainfall event. If still not dewatering fully after 48 hours, remove and replace the entire filter bed media. If problem persists, contact a NYS licensed Professional Engineer.*	☐	☐	☐

	Yes	No	NA
c. Underdrain present and no evidence of standing water 48 or more hours after a rainfall. *<u>Maintenance</u>: Flush underdrain system to remove any trapped sediment. If no sediment is present, remove top few inches of planting bed media. Rake the filter bed media to loosen the soil. Recheck after next rainfall event. If still not dewatering fully after 48 hours, remove entire filter bed material and check the gravel drainage layer for clogging. Replace filter bed media and gravel drainage layer with new material. If problem persists, contact a NYS licensed Professional Engineer.*	☐	☐	☐

9. Bioretention Basin Filter Bed Integrity
(Frequency: Annual)

	Yes	No	NA
a. Filter bed has not been blocked or filled inappropriately. *<u>Maintenance</u>: Remove all blockages and inappropriate fill. Restore filter bed to elevation shown on the approved plans.*	☐	☐	☐
b. Filter bed flat and level. *<u>Maintenance</u>: Remove all blockages, inappropriate fill, or accumulated sediment if present. Check embankment for differential settlement. If differential settlement is noted, refer to Item 1.c for maintenance procedures. If no differential settlement is noted, rake and level the planting bed media so that it is flat and level.*	☐	☐	☐
c. Uneven ponding. *<u>Maintenance</u>: Remove all blockages, inappropriate fill, or accumulated sediment if present. Check embankment for differential settlement. If differential settlement is noted, refer to Item 1.c for maintenance procedures. If no differential settlement is noted, rake and level the planting bed media so that it is flat and level.*	☐	☐	☐

Notes:

1. The site must be returned to the approved conditions when any repairs are made.
2. Unauthorized plants are any plants that are growing or have been installed that are not any of the plants shown on the approved plans.
3. All seed mixtures shall meet the seed mixture requirements specified on the approved plans.
4. Replace any dead or dying plants with plants specified in the planting schedule shown on the approved plans.
5. Replaced stone shall meet the stone requirements specified on the approved plans.
6. Replaced filter bed media shall meet the filter bed media requirements specified on the approved plans.
7. Replaced gravel drainage layer shall meet the gravel drainage layer requirements specified on the approved plans.

Comments:

Actions to be taken:

Post Construction Inspection and Maintenance Checklist
Dry Detention Basin

1. Embankment
(Frequency: Annual) — **Yes No NA**

a. Vegetation and ground cover adequate. ☐ ☐ ☐
   - i. Minimum 80% ground cover. ☐ ☐ ☐
     Maintenance: Topsoil, rake and seed bare areas. Replace dead and dying plants.
   - ii. Excessively tall grass (greater than 6” in height) ☐ ☐ ☐
     Maintenance: Mow grass to have a height of 4” to 6”. Increase mowing frequency as necessary.
   - iii. Unauthorized plants. ☐ ☐ ☐
     Maintenance: Remove any unauthorized plants, including roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.

b. Slope erosion. ☐ ☐ ☐
   - i. Small bare areas (min. 50 square feet). ☐ ☐ ☐
     Maintenance: Topsoil, rake and seed bare areas.
   - ii. Ruts less than 12” wide. ☐ ☐ ☐
     Maintenance: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Backfill ruts and compact soil. Topsoil, rake and seed bare areas. Alternatively, hydroseeding can be used to seed the slope.
   - iii. Ruts greater than 12” wide. ☐ ☐ ☐
     Maintenance: Prior to making any repairs, identify the source of erosion and correct. Protect the slopes prior to any work occurring. Re-grade, backfill ruts and compact soil. Install erosion control mats on slopes 3:1 or steeper to protect the re-graded slope. Topsoil, rake and seed bare areas. Inspect on a weekly basis until 80% ground cover is achieved. Alternatively, hydroseeding can be used to seed the slope.

c. Uneven settling ☐ ☐ ☐
   Maintenance: Install permanent benchmarks or other permanent reference point in each practice to be used with as-built elevations to measure uneven settling.
   - i. Greater than 0” but less than 2” of settling. ☐ ☐ ☐
     Maintenance: No immediate action required. Re-inspect in 6 months.
   - ii. Greater than 2” but less than 4” of settling. ☐ ☐ ☐
     Maintenance: Immediately repair. Re-grade and compact the soil. Topsoil, rake and seed the area. Re-inspect in 6 months.

	Yes	No	NA
iii. Greater than 4″ of settling. *<u>Maintenance</u>: Immediately stabilize the area and consult a NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐
d. Animal burrows. *<u>Maintenance</u>: Fill animal burrows with similar material to the existing material and compact. Topsoil, rake and seed the area.*	☐	☐	☐
e. Cracking, bulging, or sliding of slope.	☐	☐	☐
i. Upstream face.	☐	☐	☐
ii. Downstream face.	☐	☐	☐
iii. At or beyond downstream toe.	☐	☐	☐
iv. At or beyond upstream toe.	☐	☐	☐
v. Emergency spillway. *<u>Maintenance</u>: Immediately stabilize the slope and consult an NYS Licensed Professional Engineer within 2 weeks before making any additional repairs.*	☐	☐	☐
f. Seeps/leaks at downstream face. *<u>Maintenance</u>: Look for changes in the color of the vegetation, plant species and their density to help locate the leak source.*	☐	☐	☐
g. Rip rap slope protection failure. *<u>Maintenance</u>: Stabilize slope, re-grade and compact the soil. Replace stone, as necessary.*	☐	☐	☐
i. Emergency spillway clear of any obstructions or debris. *<u>Maintenance</u>: Remove and properly dispose of any trash and debris. Remove any unauthorized plants, or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the area disturbed by their removal.*	☐	☐	☐

2. Inflow Points

(Frequency: Annual)

	Yes	No	NA
a. Vegetation and ground cover adequate. *<u>Maintenance</u>: Reseed bare areas. Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use any herbicides. Topsoil, rake and seed the area disturbed by their removal.*	☐	☐	☐
b. Free from erosion/undercutting. *<u>Maintenance</u>: Immediately stabilize and repair any areas where erosion around has occurred. Topsoil, rake and seed the area.*	☐	☐	☐
c. Rip rap in good condition. *<u>Maintenance</u>: Replace stone, as necessary.*	☐	☐	☐
d. Pipes free from damage, corrosion, and sediment. *<u>Maintenance</u>: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.*	☐	☐	☐

3. Outlet Structure/Overflow Spillway

(Frequency: Annual)	**Yes**	**No**	**NA**
a. Riser pipe	☐	☐	☐
i. In good condition, no need for repairs. *<u>Maintenance</u>: Repair any minor damages. Replace structure if significant damages are observed.*	☐	☐	☐
ii. Clear of sediment. *<u>Maintenance</u>: Remove and properly dispose of any accumulated sediment when at 50% of sump height.*	☐	☐	☐
iii. Clear of debris and trash. *<u>Maintenance</u>: Remove and properly dispose of any debris and trash.*	☐	☐	☐
b. Concrete outlet structure	☐	☐	☐
i. In good condition, no need for repairs.	☐	☐	☐
a. Cracks or displacement. *<u>Maintenance</u>: Repair any minor cracks. If minor displacement is observed, re-inspect in 6 months. Replace structure if major cracks or significant displacement is observed.*	☐	☐	☐
b. Minor spalling (<1"). *<u>Maintenance</u>: Repair any minor spalling.*	☐	☐	☐
c. Major spalling (rebars exposed). *<u>Maintenance</u>: Replace structure.*	☐	☐	☐
d. Joint failures. *<u>Maintenance</u>: Replace structure.*	☐	☐	☐
e. Water tightness. *<u>Maintenance</u>: Reseal structure for water tightness if minor leaks are observed. Replace structure if significant leaks are observed.*	☐	☐	☐
ii. Clear of sediment. *<u>Maintenance</u>: Remove and properly dispose of any accumulated sediment when at 50% of sump height.*	☐	☐	☐
iii. Clear of debris and trash. *<u>Maintenance</u>: Remove and properly dispose of any debris and trash.*	☐	☐	☐
iv. Pipes free from damage, corrosion, and sediment. *<u>Maintenance</u>: Immediately repair any damaged pipes. If pipes are severely damaged and cannot be repaired, replace the pipes. Remove and properly dispose of any sediment.*	☐	☐	☐
c. Low flow orifice is unobstructed. *<u>Maintenance</u>: Remove and properly dispose of any debris and trash.*	☐	☐	☐

	Yes	No	NA
d. Low flow trash rack.	☐	☐	☐
i. Clear of debris and trash.	☐	☐	☐
Maintenance: Remove and properly dispose of any debris and trash.			
ii. Clear of any corrosion.	☐	☐	☐
Maintenance: If significant corrosion is observed, replace trash rack.			
e. Weir trash rack.	☐	☐	☐
i. Clear of debris and trash.	☐	☐	☐
Maintenance: Remove and properly dispose of any debris and trash.			
ii. Clear of any corrosion.	☐	☐	☐
Maintenance: If significant corrosion is observed, replace trash rack.			
f. Control valve operational.	☐	☐	☐
Maintenance: Replace if not functioning or operational.			
g. Pond valve operational, chained and locked.	☐	☐	☐
Maintenance: Replace valve if not functioning or operational.			
h. Overflow spillway	☐	☐	☐
i. In good condition, no need for repairs.	☐	☐	☐
Maintenance: Replace any dislodged stone with the same stone type.			
ii. Clear of sediment.	☐	☐	☐
Maintenance: Remove and properly dispose of any accumulated sediment when half of the void space is filled.			
iii. Clear of debris and trash.	☐	☐	☐
Maintenance: Remove and properly dispose of any debris and trash.			
iv. No evidence of erosion.	☐	☐	☐
Maintenance: Immediately stabilize and repair any areas where erosion occurred around or below the overflow spillway. Replace stone, as necessary. Topsoil, rake and seed the area.			
v. No evidence of erosion at downstream toe of drop structure or weir spillway.	☐	☐	☐
Maintenance: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and seed the area.			

4. Sediment Forebay
(Frequency: Monthly)

	Yes	No	NA
a. Free of sediment.	☐	☐	☐
Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of the design capacity.			

Yes No NA

b. No evidence of erosion. ☐ ☐ ☐
<u>Maintenance</u>: Immediately stabilize and repair any areas where erosion has occurred. Topsoil, rake and seed the area.

c. Overflow Spillway. ☐ ☐ ☐

- i. In good working condition, no need for repairs. ☐ ☐ ☐
  <u>Maintenance</u>: Replace stone, as necessary.
- ii. Clear of sediment. ☐ ☐ ☐
  <u>Maintenance</u>: Remove and properly dispose of any accumulated sediment when half of the void space is filled.
- iii. Clear of trash and debris. ☐ ☐ ☐
  <u>Maintenance</u>: Remove and properly dispose of any debris and trash.
- iv. No evidence of erosion. ☐ ☐ ☐
  <u>Maintenance</u>: Immediately stabilize and repair any areas where erosion occurred around or below the overflow spillway. Replace stone, as necessary. Topsoil, rake and seed the area.
- v. No evidence of erosion at downstream toe of drop structure or weir spillway. ☐ ☐ ☐
  <u>Maintenance</u>: Immediately stabilize and repair any areas where erosion has occurred. Replace stone, as necessary. Topsoil, rake and seed the area.

5. Dry Pond Areas (Frequency: Monthly)

Yes No NA

a. Vegetation adequate. ☐ ☐ ☐
<u>Maintenance</u>: Topsoil, rake and seed the area.

b. Undesirable vegetative growth. ☐ ☐ ☐
<u>Maintenance</u>: Mow grass to have a height of 4" to 6". Remove any unauthorized plants or any nuisance weeds and vegetation, including their roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.

c. Undesirable woody vegetation. ☐ ☐ ☐
<u>Maintenance</u>: Remove any undesirable woody vegetation, including their roots. Do not use herbicides. Topsoil, rake and seed the area disturbed by their removal.

d. Low flow channels clear of obstructions. ☐ ☐ ☐
<u>Maintenance</u>: Remove and properly dispose of any debris and trash.

e. Standing water or wet spots. ☐ ☐ ☐
<u>Maintenance</u>: Re-grade areas to ensure positive drainage. Topsoil, rake and seed the area.

f. Sediment and trash accumulation. ☐ ☐ ☐
<u>Maintenance</u>: Remove and properly dispose of any accumulated sediment and trash.

6. Vegetation

(Frequency: Annual)

	Yes	**No**	**NA**
a. Vegetation health and growing. *Maintenance: Remove any dead or dying plants and decaying plant material. Replace dead and dying plants.*	☐	☐	☐
b. Evidence of invasive species. *Maintenance: Remove invasive species, including roots. Do not use herbicides. Install additional wetland plants as necessary.*	☐	☐	☐
c. Accumulated sediment reducing volume significantly. *Maintenance: Remove and properly dispose of any accumulated sediment when at 50% of the design capacity.*	☐	☐	☐

7. Miscellaneous

(Frequency: Monthly)

	Yes	**No**	**NA**
a. Encroachment on pond or easement area. *Maintenance: Remove any encroachments into the pond or easement area.*	☐	☐	☐
b. Maintenance access routes in good condition. *Maintenance: Repair any minor damage or erosion to the maintenance access routes. If significant damage or erosion is noted, stabilize, re-grade and re-establish the maintenance access routes in accordance with the plans.*	☐	☐	☐
c. Signs of hydrocarbon build-up. *Maintenance: Coordinate removal/cleanup of any oil, gas, or contaminants with the appropriate clean-up personnel.*	☐	☐	☐
d. Fence in good condition. *Maintenance: Replace any damaged sections of fence.*	☐	☐	☐
e. Safety signs are installed. *Maintenance: Replace any missing signs.*	☐	☐	☐

Notes:

1. The site must be returned to the approved conditions when any repairs are made.
2. Unauthorized plants are any plants that are growing or have been installed that are not any of the plants shown on the approved plans.
3. All seed mixtures shall meet the seed mixture requirements specified on the approved plans.
4. Replace any dead or dying plants with plants specified in the planting schedule shown on the approved plans.
5. Replaced stone shall meet the stone requirements specified on the approved plans.

Comments:

Actions to be taken:

Exhibit D

EXHIBIT D
Wetlands/Waters Impact Assessment
Project Fifi
Section 132.18, Block 1, Lot 2
Section 146.05, Block 1, Lot 9
Section 146.06, Block 1, Lots 1 & 2
Town of Niagara, Niagara County, New York

Existing Conditions

The Site totals approximately 216 acres, much of which is currently utilized for agriculture (corn). Those areas not utilized for agriculture are generally limited to the southwestern to east-central portions of the Site. These areas comprise herbaceous and scrub-shrub uplands and wetlands generally bisected by the former Niagara Drag Strip. This Wetlands Impact Assessment was prepared to analyze the impacts of construction of an approximately 650,000 square foot e-commerce warehouse and storage facility on the Site. The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Map does not map wetlands onsite (see attached). The nearest mapped features offsite include an emergent wetland near the northeastern corner of the Site and a riverine (stream) near the southern Site boundary. As shown on the New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetlands and Surface Waters Map, the site does not contain NYSDEC-mapped wetlands or streams (see attached). The nearest mapped wetland is located approximately 900 feet to the southwest of the site (TW-1). Cayuga Creek and a tributary to Cayuga Creek are mapped offsite to the east and southeast. These streams are classified by NYSDEC as Class C.

Langan wetland scientists conducted a delineation of wetlands and waters ("Wetland Delineation Report") on the property in November and December 2021, consistent with federal delineation methodology outlined under the U.S. Army Corps of Engineers ("USACE") Wetlands Delineation Manual and Northcentral and Northeast Regional Supplement. Delineated features onsite consist of 16 wetlands/wetland complexes, totaling approximately 45.559 acres. The majority of these wetlands are agricultural or associated with drainage improvements (ditches) that appear to have been historically constructed to manage agricultural runoff or relict features associated with the prior Niagara Drag Strip. The location and extent of each feature are identified on the Wetland Delineation Plan (Drawing WN101) included in the Wetland Delineation Report (attached). In addition, a description of the soils, vegetation, and hydrology for each wetland feature is included in the Wetland Delineation Report.

Wetlands Impacts

The Project will require limited impacts to wetlands/waters (approximately 2.75 acres) for the construction of parking areas, access roads, utilities, the Facility and stormwater basins. The Project has been designed to avoid wetlands/waters impacts to the greatest extent practicable while achieving the desired Project goals. The Site totals approximately 216 acres with approximately 45.559 acres of wetlands interspersed across the Site. The total limit of Project disturbance is approximately 115 acres, generally positioned in the central and northern portions of the Site. Of the 115 acres to be disturbed, the Project will impact only 2.75 acres of wetlands. Areas of wetlands to be impacted are limited to agriculture wetlands and ditches with low ecological value/function. Avoidance of additional wetland impacts was accomplished through an iterative site layout selection process and detailed design and grading of specific Project elements. As shown on the Site Plans, wetlands present in the southern portion of the site and along the eastern and western site boundary are avoided. In addition, the strategic placement of stormwater management facilities avoids wetland impacts and ultimately allows for a landscape that promotes un-fragmented open space across approximately 140 acres of the site (inclusive of the basins and wetlands to remain). In addition, the current stormwater runoff from the Site (untreated agricultural runoff) will be replaced with runoff managed pursuant to a SPDES permit. Furthermore, upon completion of construction, areas of wetlands and uplands to remain will be allowed to naturally succeed. These areas are expected to revert to a natural condition that will provide an ecological uplift to the site and region, providing habitat for local wildlife and enhancing the functions and value of the wetlands onsite. Naturalization of these areas will ultimately benefit the watershed as a whole.

As shown on the Site Plans, the Project will require a total of approximately 2.75 acres of impacts to wetlands to facilitate construction of the building and associated utilities, internal driveways, parking areas and truck court. As shown on Table 1, the 2.75 acres of wetlands impacts include all or portions of Wetlands 1, 2, 3, 4, 5 and 16. A characterization of each of the wetland impact areas is outlined below.

Table 1: Wetland Impacts.

Wetland Number	Wetland Type	Cowardin Classification	Size (Acres)	Impact Area (Acres)
1	Agricultural	PEM1Ef	1.141	0.119
2	Agricultural	PEM1Ef	2.525	1.239
	Emergent drainage ditch	PEME5d		0.600
	Common reed dominated	PEM5E		N/A
3	Agricultural, isolated	PEM1Ef	0.125	0.125
4	Agricultural, isolated	PEM1Ef	0.062	0.062
5	Agricultural	PEM1Ef	4.816	0.010
	Emergent drainage ditch	PEM1E		N/A
	Scrub/shrub with drainage feature	PSS1Ed		N/A
	Emergent Drainage Swale	PEM1Ed		N/A
	Scrub/shrub	PSS1E		N/A
16	Agricultural	PEM1Ef	4.062	0.597
	Scrub/shrub	PSS1E		N/A

Wetland 1

The Project will require impacts to approximately 0.119 acres of Wetland 1. Wetland 1 comprises an agricultural wetland located in the northeastern portion of the site, along Tuscarora Road. Wetland impacts are required to facilitate improvements to Tuscarora Road. The area of wetland impacts will occur immediately adjacent to the existing roadway, in an area that is disturbed due to ongoing farming (corn). Due to the size, location, fragmented nature, and character of the wetland, it has low ecological function/value and provides little benefit to the environment. As a result, impacts to this wetland are expected to be insignificant.

Wetland 2

The Project will require impacts to approximately 1.839 acres of Wetland 2. Wetland 2 generally consists of areas utilized for agriculture (corn), a drainage ditch, and a common reed (*Phragmites australis*) dominated wetland adjacent to the ditch. The tree-lined drainage ditch travels west to east across the northern portion of the Site; receiving runoff from the agricultural fields to the north.

The drainage ditch located within Wetland 2 appears to be a historically man-made feature constructed to manage runoff from surrounding upland areas. Based on apparently inadequate drainage/land management along the drainage ditch in recent years, wetlands have formed on either side of the drainage ditch as a result of depressions on the upslope side and breaks in the ditch on the downslope side. Breaks in the drainage ditch allow water to exit after significant rain or snow melt events, forming wetlands. As delineated, this feature is fragmented from other wetlands/waters onsite and aside from an intermittent/seasonal surface water connection to Wetland 16, remains hydrologically isolated from other features. This wetland is largely surrounded by disturbed, agricultural land effectively cutting it off ecologically from the wetland complex in the southern and southwestern portion of the Site. Based on its character, this wetland provides limited functionality and is of low ecological value.

As shown on the Site Plans, the Project will impact the eastern portion of Wetland 2 to facilitate construction of the building and internal access drive. Areas to be impacted include a portion of the drainage ditch and wetlands actively managed as part of ongoing agricultural operations (corn harvest). Based on the low functionality and ecological value of these areas, it is anticipated that the loss of a portion of this wetland would be insignificant to the site and surrounding area.

Wetlands 3 and 4

Wetlands 3 (0.125 acres) and 4 (0.062 acres) are isolated agricultural wetlands; lacking a surface water connection to other wetlands/waters. These wetlands are small, isolated depressions within a large agricultural field in the western portion of the Site. Due to ongoing farming activities, the soils and vegetation are frequently disturbed. Based on the current definition of “waters of the U.S.”, these features do not appear to be subject to USACE jurisdiction.

The Project includes construction of a parking area in the area of Wetland 3 and 4. The proposed parking area will require the filling of both wetlands, totaling 0.187 acres. Due to the size, isolated nature, and character of the wetlands, they have low ecological function/value and provide little benefit to the environment.

Wetland 5

The Project will require disturbance to approximately 0.010 acres of Wetland 5 to allow for the installation of an underground gas line and an underground stormwater conveyance pipe. The areas of disturbance consist of wetlands currently utilized for agriculture (corn). Following installation of these project elements, the ground surface will be restored to pre-existing grade. Based on the wetland character, small area and temporary nature of disturbance, permanent wetland impacts will be avoided.

Wetland 16

The Project will require impacts to approximately 0.597 acres of Wetland 16. Wetland 16 contains areas utilized for agriculture (corn), emergent and scrub/shrub communities. Wetland 16 drains south via a pipe beneath an earthen berm and the former Niagara Drag Strip, toward Wetland 11. During recent site observations, the pipe appeared to be wholly or partially collapsed/plugged. As a result of the deteriorated condition of the pipe, water backs up behind the pipe which appears to have exacerbated wetland conditions in recent years.

Similar to Wetland 2, this wetland is largely surrounded by agricultural disturbed land effectively cutting it off ecologically from the wetland complex in the southern and southwestern portions of the Site. Emergent and scrub-shrub portions of this wetland may provide opportunities for transient wildlife to rest or forage; however, it provides little ecological value to the region. Based on its character, this wetland provides limited functionality and is of low ecological value.

As shown on the Site Plans, the Project will impact the northeastern and northwestern "fingers" of Wetland 2 to facilitate construction of the truck court associated with the building. Areas of the wetland to be impacted largely consist of those currently utilized for agriculture (corn). Those portions of the wetland that contain emergent and scrub-shrub communities will remain. Based on the small area, low functionality and ecological value of the wetlands to be impacted, it is anticipated that the loss of a portion of this wetland would be insignificant to the surrounding area and/or the health of the wetlands to remain.

Mitigation

As required by the USACE under Section 404 of the Clean Water Act, compensatory mitigation for the 2.75 acres of wetland impacts is proposed to be completed through the purchase of an equal number of credits from the Ducks Unlimited (DU) In-Lieu Fee Program (ILF) – Buffalo-Eighteenmile service area.

Based on the limited area of wetlands impacts relative to the size of the Site and Project, the incorporated design elements, and the proposed mitigation measures, the Project is not expected to result in a significant impact to wetlands. A Joint Permit Application to the USACE and NYSDEC seeking authorization of the Project and associated wetland impacts will be submitted for review and approval, and coordination with NYSDEC and USACE has already begun.

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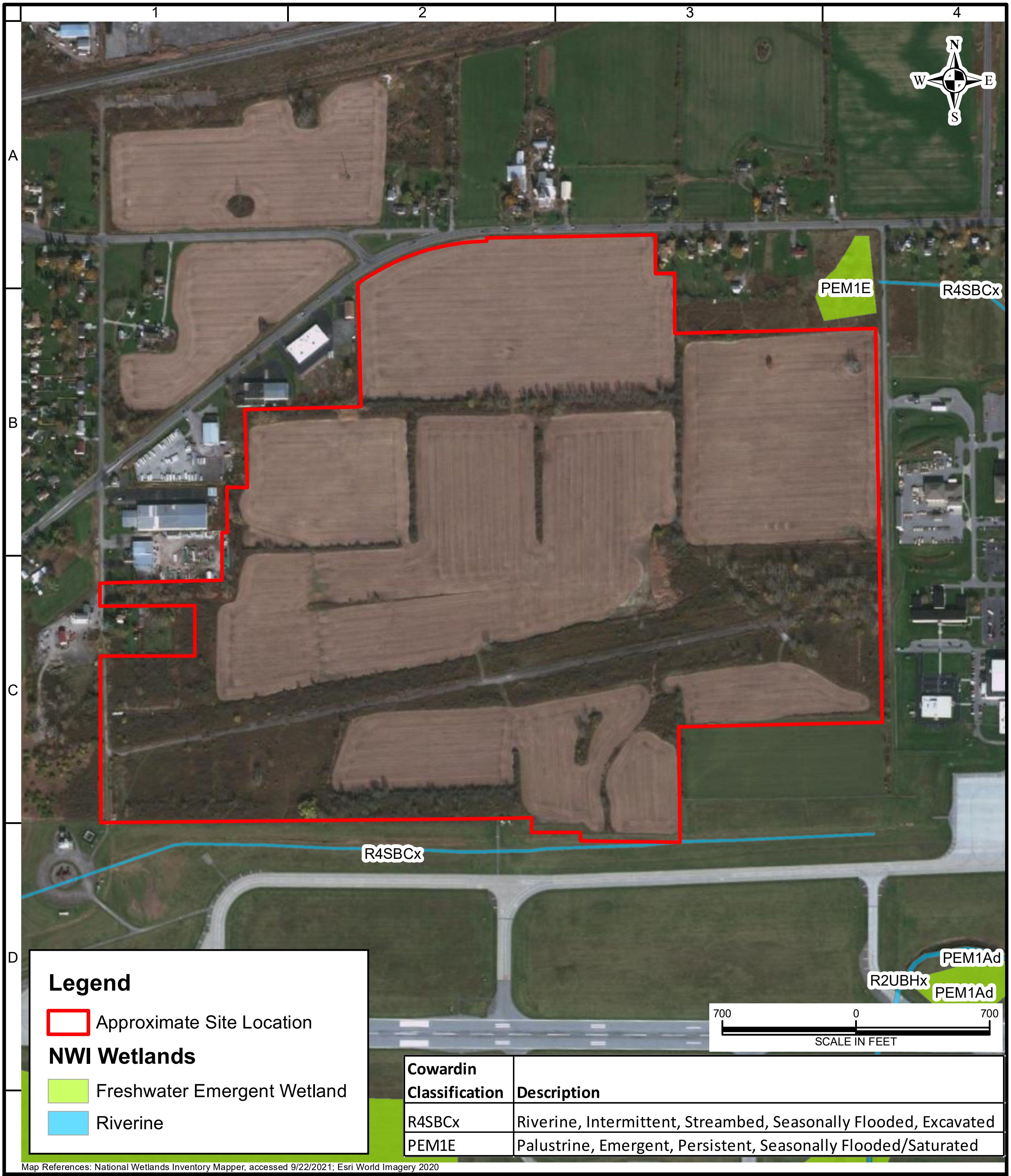

Legend

🟥 Approximate Site Location

NWI Wetlands

🟩 Freshwater Emergent Wetland

🟦 Riverine

Cowardin Classification	Description
R4SBCx	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated
PEM1E	Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated

Map References: National Wetlands Inventory Mapper, accessed 9/22/2021; Esri World Imagery 2020

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Langan International LLC
Collectively known as Langan

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project
PROJECT
FIFI
SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title
NWI
WETLANDS MAP

Project No.
190071801
Date
09/21/2021
Scale
1" = 700'
Drawn By
SEP

Figure
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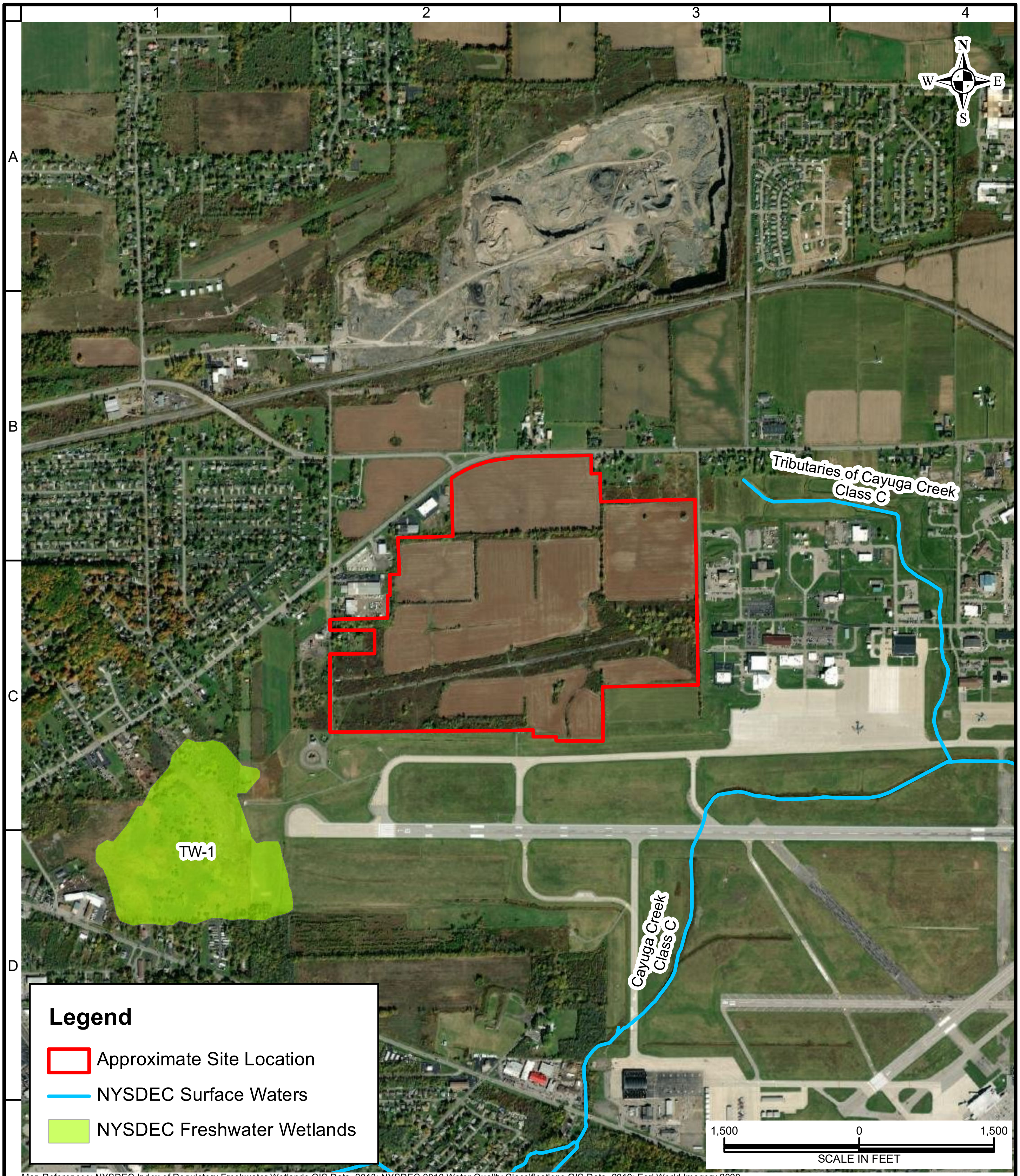

Map References: NYSDEC Index of Regulatory Freshwater Wetlands GIS Data, 2013; NYSDEC 2010 Water Quality Classifications GIS Data, 2019; Esri World Imagery 2020

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Project
PROJECT
FIFI
SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title
NYSDEC FRESHWATER WETLANDS AND SURFACE WATERS

Project No.
190071801
Date
09/21/2021
Scale
1" = 1,500'
Drawn By
SEP

Figure
D2

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure 6 - NYSDEC Wetlands Waters.mxd

WETLAND DELINEATION REPORT

Project Fifi
Section 132.18, Block 1, Lot 2
Section 146.05, Block 1, Lot 9
Section 146.06, Block 1, Lots 1 & 2
Town of Niagara, Niagara County, New York

Prepared For:

JB2 Partners, LLC
3322 Grant Valley Road NW
Atlanta, GA 30305

Prepared By:

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One North Broadway, Suite 910
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LANGAN

25 January 2022
190071801

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ATTACHMENTS

LIST OF DRAWINGS

1.0 SITE LOCATION AND DESCRIPTION

This Wetland Delineation Report was prepared for an approximate ±215-acre property located along Lockport Road in the Town of Niagara, Niagara County, New York (Figures 1 and 2) (Site). The Site is designated on municipal tax maps as parcel numbers 146.06-1-1, 146.06-1-2, 146.05-1-9 and 132.18-1-2 (Figure 3) and is generally bounded by Lockport Road to the north, Tuscarora Road to the east, Niagara Falls International Airport to the south and Haseley Drive to the west. The Site is currently undeveloped, consisting mostly of agricultural fields and herbaceous/scrub-shrub areas. The former Niagara Drag Strip is located in the southern portion of the Site (Figure 4). Photographs and a Photograph Location Map of the Site are provided in Appendix A. The approximate center point of the Site is 43.117055° N, -78.960718° W (WGS1984).

The United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Map does not map wetlands onsite (Figure 5). The nearest mapped features offsite include an emergent wetland near the northeastern corner of the Site and a riverine (stream) near the southern Site boundary. As shown on the New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetlands and Surface Waters Map, the site does not contain NYSDEC-mapped wetlands or streams (Figure 6). The nearest mapped wetland is located approximately 900 feet to the southwest of the site (TW-1). Cayuga Creek and a tributary to Cayuga Creek are mapped offsite to the east and southeast. These streams are classified by NYSDEC as Class C.

Based on a review of the Federal Emergency Management Agency (FEMA) Effective Flood Insurance Rate Map (FIRM), a Cayuga Creek West Tributary is mapped in the western portion of the site (Figure 7). The stream contains a mapped floodway, generally limited to the stream centerline and 100-year floodplain elevations that range from approximate elevation 600 (NAVD88) at the upstream end of the site to approximate elevation 590 (NAVD88) at the downstream end of the site. The floodplain associated with an offsite reach of the tributary generally parallels the southern site boundary.

The Natural Resources Conservation Service (NRCS) Soils Map for Niagara County, NY identifies four soil map units onsite: Cayuga and Cazenovia silt loams, 0 to 6 percent slopes (CcA and CcB), Lakemont silty clay loam, 0 to 3 percent slopes Lc) and Odessa silty clay loam, 0 to 3 percent slopes (OdA) (Figure 8). According to the Natural Resources Conservation Service (NRCS) "National List of Hydric Soils of the United States", the soil map units Lc and OdA are classified as hydric soils. OdA contains only hydric inclusions (5%).

2.0 WETLAND IDENTIFICATION AND DESCRIPTION

2.1 Methodology

The methodology used by Langan to evaluate wetlands and waters of the U.S. onsite is consistent with Federal delineation methodology, including the USACE guidelines as specifically referenced in the *1987 Corps of Engineers Wetlands Delineation Manual* and the *2012 Northcentral and Northeast Regional Supplement (Version 2.0)*. This methodology utilizes a three parameter approach to identifying and delineating wetlands and requires a field evaluation of the three parameters to determine if an area is a wetland. The dominance of hydrophytic vegetation, the presence of suitable wetland hydrology, and hydric soils are required for a positive determination. Observations for each of these parameters are discussed below and provided on the field data sheets included in Attachment A.

2.2 Field Observations

Langan wetland scientists conducted a delineation of wetlands and waters on the property in November and December 2021. Delineated features onsite consist of 16 wetlands/wetland complexes, totaling approximately 45.559 acres. The wetlands present onsite, as well as the wetland classifications and associated flag numbers are provided in Table 1 below. A description of the delineated wetlands is also provided below. The location and extent of each feature described below is identified on the Wetland Delineation Plan (Drawing WN101). In addition, a description of the soils, vegetation, and hydrology for each feature is included on the field data sheets provided in Attachment A and Site photographs and photograph location map showing the upland and wetlands conditions onsite are provided in Appendix A.

Table 1: Wetlands Summary.

Wetland Number	Wetland Type	Cowardin Classification	Size (Acres)	Associated Flag Numbers
1	Agricultural	PEM1Ef	1.141	H1 - H11
2	Agricultural	PEM1Ef	2.525	R16 – R32, V1 –V31, V1A – V1D, E1 – E8, EE1 – EE7
	Emergent drainage ditch	PEME5d		R1 – R14, R35-R36, V31 – V40, V1D – V1V, E8-E9, EE7 – EE8, EE1A – EE1L
	Common reed dominated	PEM5E		R13 – R16, R32 – R35
3	Agricultural, isolated	PEM1Ef	0.125	T1 – 10
4	Agricultural, isolated	PEM1Ef	0.062	S1 – S9

Table 1 Continued: Wetlands Summary.

Wetland Number	Wetland Type	Cowardin Classification	Size (Acres)	Flag Numbers
5	Agricultural	PEM1Ef	4.816	Y1 – Y11, Y18 – Y25, Y31 – Y36, U12 - U22, U24 – U31, U33 – U45, U51 – U69, D1 – D15, D18 – D31, Z7 – Z15, Z21 – Z29
	Emergent drainage ditch	PEM1E		Y11 – Y17
	Scrub/shrub with drainage feature	PSS1Ed		Y25 – Y30, U45 – U51, D15 – D18, Z15 – Z22
	Emergent drainage Swale	PEM1Ed		J1-J18
	Scrub/shrub	PSS1E		J18 – J24, Y36 – Y38, U1 – U12, U22 – U24, U31 – U33
6	Scrub/shrub drainage ditch	PSS1Ed	0.031	Q1 – Q13
7	Emergent drainage ditch	PEM1Ed	0.107	P1 – P18
8	Scrub/shrub	PSS1E	12.121	O1 – O23, O1A – O1N, XX11 – XX12, XX16– XX22
	Agricultural	PEM1Ef		XX12 – XX16
	Emergent drainage swale	PEM1Ed		XX1 – XX10
9	Scrub/shrub, isolated	PSS1E	0.034	ZZ1 - ZZ8
10	Scrub/shrub, isolated	PSS1E	0.016	K1 – K6
11	Agricultural	PEM1Ef	16.438	B1 – B17, BB1 – BB12, YY1 – YY11
	Scrub/shrub	PSS1E		B17 – B82, YY11 – YY14
	Upland area within agricultural field	N/A		UP1 – UP13
12	Scrub/shrub	PSS1E	2.043	C1 – C37
13	Scrub/shrub drainage ditch	PSS1Ed	0.623	A1 – A17, AA1 – AA6
	Scrub/shrub	PSS1E		AA6 – AA17
	Emergent	PEM1E		A17 – A20, AA17 – AA20
14	Scrub/shrub drainage ditch	PSS1Ed	0.104	N1 – N14
15	Agricultural	PEM1Ef	1.311	I5 – I10
	Emergent drainage ditch	PEM1Ed		I10 – 141, I1A – I1I, I1 – I5
16	Agricultural	PEM1Ef	4.062	W1 – W43
	Scrub/shrub	PSS1E		W43 – W56, G59 – G74

Surface Water Drainage Patterns onsite

- Wetland 1 drains offsite to the east via a culvert that travels beneath Tuscarora Road.
- Wetland 2 has two (2) drainage pathways. The western portion of the ditch appears to spill into the agricultural field to the south (near wetland flag nos. R14 and R34). It appears that a partially collapsed drain captures runoff in this area; however the presence of a pipe was not observed. The eastern portion of this wetland drains south-southeast toward Wetland 16.
- Wetlands 3 and 4 are isolated; lacking a surface water connection to other wetlands/waters.
- The eastern portion of Wetland 5 generally drains in a southerly direction toward a large berm associated with the historic drag strip. A pipe is present beneath the drag strip and conveys water toward Wetland 8; however, it appears that the pipe is partially collapsed/plugged. The western portion of Wetland 5 drains to the west, toward Haseley Drive. The wetland is hydrologically connected to Wetlands 6 and 7, which flow south.
- Wetland 6 and 7 are a series of drainage ditches that flow south and ultimately offsite.
- Wetland 8 drains south, offsite via a series of ditches/pipes, toward an unnamed tributary of Cayuga Creek.
- Wetlands 9 and 10 are isolated; lacking a surface water connection to other wetlands/waters.
- Wetland 11 drains offsite to the south toward an unnamed tributary of Cayuga Creek.
- Wetland 12 is piped beneath of paved surface toward Wetland 11.
- Wetlands 13, 14, and 15 drain south offsite via a drainage ditch running along Tuscarora Road.
- Wetland 16 drains south via a pipe beneath the former drag strip, toward Wetland 11. It appears that the pipe is partially collapsed/plugged.

Agricultural Wetlands

The agricultural wetlands, interspersed throughout the site, consist of corn crop (*Zea mays*). These wetlands, or portions thereof, exhibit disturbed soils and altered hydrology due to farming activities, such as tilling. The agricultural wetlands identified as Wetlands 3 and 4 are small isolated depressions within a large agricultural field in the western portion of the Site. Refer to Table 1 and the accompanying Wetland Delineation Plan for the location of these features. The general hydrologic conditions and soils observed within these wetlands is provided below:

Hydrology – The primary source of hydrology for these wetlands is surface water runoff from the adjacent upland areas. Indicators of wetland hydrology observed during Site observations include: standing water, soil saturation, water marks, sediment deposits, algal mat/crust, drainage patterns, micro-topographic relief, and inundation visible on aerial imagery.

Soils – Soil texture, color, and redoximorphic features were largely consistent throughout the wetland agricultural fields. Soils across the site are generally characteristic of loamy/clayey soils. Generally, the 'A' horizon is characterized with a Munsell Soil color ranging from 10YR 2/1 to 10YR 4/2 matrix with 10YR 4/4 to 10YR 6/8 concentrations, when present. Generally, the 'B' horizon is characterized with a Munsell Soil color ranging from 10YR 3/1 to 10YR 5/1 matrix with 10YR 4/4 to 10YR 6/8 concentrations, when present. Common indicators of hydric soils onsite include a depleted matrix, amongst others. See Attachment A – Field Data Sheets.

Scrub/Shrub Wetland Communities

Scrub/shrub wetlands, or portions thereof, are interspersed throughout the Site. The scrub/shrub vegetation composition throughout these wetlands are dominated by the same plant species, as described below. The scrub/shrub wetlands identified as Wetlands 9 and 10 are small isolated depressions in the landscape, surrounded by an agricultural field, in the south-central portion of the Site. Refer to Table 1 and the accompanying Wetland Delineation Plan for the location of these features. The general hydrologic conditions and soils observed within these wetlands is provided below.

Vegetation – The scrub/shrub communities onsite are generally dominated by the following species: European buckthorn (*Rhamnus cathartica*), gray dogwood (*Cornus racemose*) and silky dogwood (*Cornus racemose*). Non-dominant species generally include: red chockeberry (*Aronia arbutifolia*), black willow (*Salix nigra*), alder (*Alnus* species), red maple (*Acer rubra*), round-leaf goldenrod (*Solidago patula*), wand panic grass (*Panicum virgatum*), nodding burr-marigold (*Bidens cernua*), purple loosestrife (*Lythrum salicaria*), and soft rush (*Juncus effusus*). Throughout the wetlands are some scattered eastern cottonwood (*Populus deltoides*).

Hydrology – The primary source of hydrology for these wetlands is surface water runoff from the adjacent uplands. Indicators of wetland hydrology observed during Site observations include: standing water, soil saturation, water marks, sediment deposits, drainage patterns, micro-topographic relief, and inundation visible on aerial imagery.

Soils – Soil texture, color, and redoximorphic features were largely consistent throughout the wetland scrub/shrub wetlands. Soils across the site are generally characteristic of loamy/clayey soils. Generally, the ‘A’ horizon is characterized with a Munsell Soil color ranging from 10YR 2/1 to 10YR 3/2 matrix. Generally, the ‘B’ horizon is characterized with a Munsell Soil color ranging from 10YR 3/1 to 10YR 4/1 matrix with 10YR 4/6 to 10YR 5/6 concentrations, when present. Common indicators of hydric soils onsite include a depleted matrix, amongst others. See Attachment A – Field Data Sheets.

Emergent Wetland Communities

The emergent wetlands, or portions thereof, are interspersed throughout the Site. The majority of these features are drainage ditches and swales with similar dominant vegetative composition, as described below. However, a portion Wetland 2, in the northwestern portion of the site is common reed (*Phragmites australis*) dominated. Refer to Table 1 and the accompanying Wetland Delineation Plan for the location of these features. The general hydrologic conditions and soils observed within these wetlands is provided below.

Vegetation – The emergent communities onsite are generally dominated by round-leaf goldenrod, reed canary grass, nodding burr-marigold, purple loosestrife, and narrow-leaf cattail (*Typha angustifolia*). Notable non-dominant species include soft rush, silky dogwood, and panic grass.

Hydrology – The primary source of hydrology for these wetlands is surface water runoff from the adjacent upland areas. Indicators of wetland hydrology observed during Site observations include: standing water, soil saturation, water-stained leaves, water marks, sediment deposits, drainage patterns, and micro-topographic relief.

Soils – Soil texture, color, and redoximorphic features were largely consistent throughout the wetland agricultural fields. Soils across the site are generally characteristic of loamy/clayey soils. Generally, the ‘A’ horizon is characterized with a Munsell Soil color of 7.5YR 3/1. Generally, the ‘B’ horizon is characterized with a Munsell Soil color of 7.5YR 4/2 matrix with 7.6YR 4/4 concentrations. Common indicators of hydric soils onsite include a depleted matrix, amongst others. See Attachment A – Field Data Sheets.

3.0 USACE CLASSIFICATION

According to current U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) guidance, the current interpretation of waters of the U.S. is consistent with the pre-2015 regulatory regime. The term waters of the U.S. under the pre-2015 regulatory definition includes most tributary wetlands and waters, including wetlands adjacent to other waters; however, generally excludes swales and erosion gullies, man-made drainage ditches draining uplands, and wetlands that are not "adjacent" to other tributary wetlands or waters (e.g. isolated wetlands).

As discussed above in Section 2.2, Wetlands 1, 2, 4, 5, 6, 7, 8, 11, 12, 13, 14, 15 and 16 contain a surface water connection to offsite waterways to the east and south (Cayuga Creek and associated tributaries). This connection has been created either by means of a direct surface water connection, drainage pipe or overland flow as evidenced by drainage patterns. As such, these wetlands are expected to meet the parameters of jurisdictional wetlands/waters, as regulated by the USACE under Section 404 of the Clean Water Act.

It is important to note that the drainage ditch located within Wetland 2 appears to be a historically man-made feature constructed to manage runoff from surrounding upland areas. Based on apparently inadequate drainage/land management along the drainage ditch in recent years, wetlands have formed adjacent to portions of the ditch and in areas downslope where water naturally outlets after storm events. Based on the above, the man-made portions of the ditch that do not contain adjacent wetlands may be considered non-jurisdictional.

Wetlands 3, 4, 9, and 10 are not adjacent to other wetlands/waters and do not contain a surface water connection to any other wetlands/waters. As such, Wetlands 3, 4, 9, and 10 appear to be non-jurisdictional features that do not meet the definition of waters of the U.S.

An official determination on USACE-jurisdictional wetlands/waters should be obtained through review and approval by the USACE through issuance of a Jurisdictional Determination.

4.0 NYSDEC CLASSIFICATION

Pursuant to Section 24-0107 of the NYSDEC Freshwater Wetlands Act, "freshwater wetlands" means lands and waters of the state as shown on the NYSDEC Freshwater Wetlands Map which contain any or all of various types of wetlands listed at Section 24-0107(1)(a). As shown on the NYSDEC Freshwater Wetlands and Waters Map (Figure 6), there are no NYSDEC freshwater wetlands or waters mapped onsite. The nearest mapped wetland is identified as "TW-1", mapped approximately 960 feet southwest of the Site. The nearest mapped streams, the Cayuga Creek (Class C) southeast of the Site and a tributary to Cayuga Creek (Class C) to the northeast of the Site, are approximately 1,400 feet and 650 feet from the Site, respectively. As such, the wetlands present onsite are not expected to be subject to NYSDEC jurisdiction under the NYSDEC Freshwater Wetlands Act.

An official determination on the absence of NYSDEC-regulated wetlands/waters under Articles 15 and 24 should be obtained from the NYSDEC.

5.0 CONCLUSION

As documented in this report, a delineation of wetlands and waters was completed by Langan wetland scientists in accordance with federal wetland delineation methodologies in November and December 2021. As shown on the Wetland Delineation Plan (Drawing WN101) and discussed herein, the Site includes 16 wetlands/wetland complexes. With exception to Wetlands 3, 4, 9, 10 and portions of Wetland 2, all other wetlands delineated onsite are expected to be subject to USACE jurisdiction under Section 404 of the Clean Water Act. Due to the isolated, non-adjacent nature of Wetlands 3, 4, 9, and 10 and those portions of Wetland 2 that comprise a man-made drainage ditch, we expect that these wetlands are non-jurisdictional.

Based on the absence of NYSDEC mapped freshwater wetlands and waters, we do not expect the delineated wetlands/waters onsite will be subject to NYSDEC jurisdiction under the NYSDEC Freshwater Wetlands Program (Article 24) or Protection of Waters Program (Article 15).

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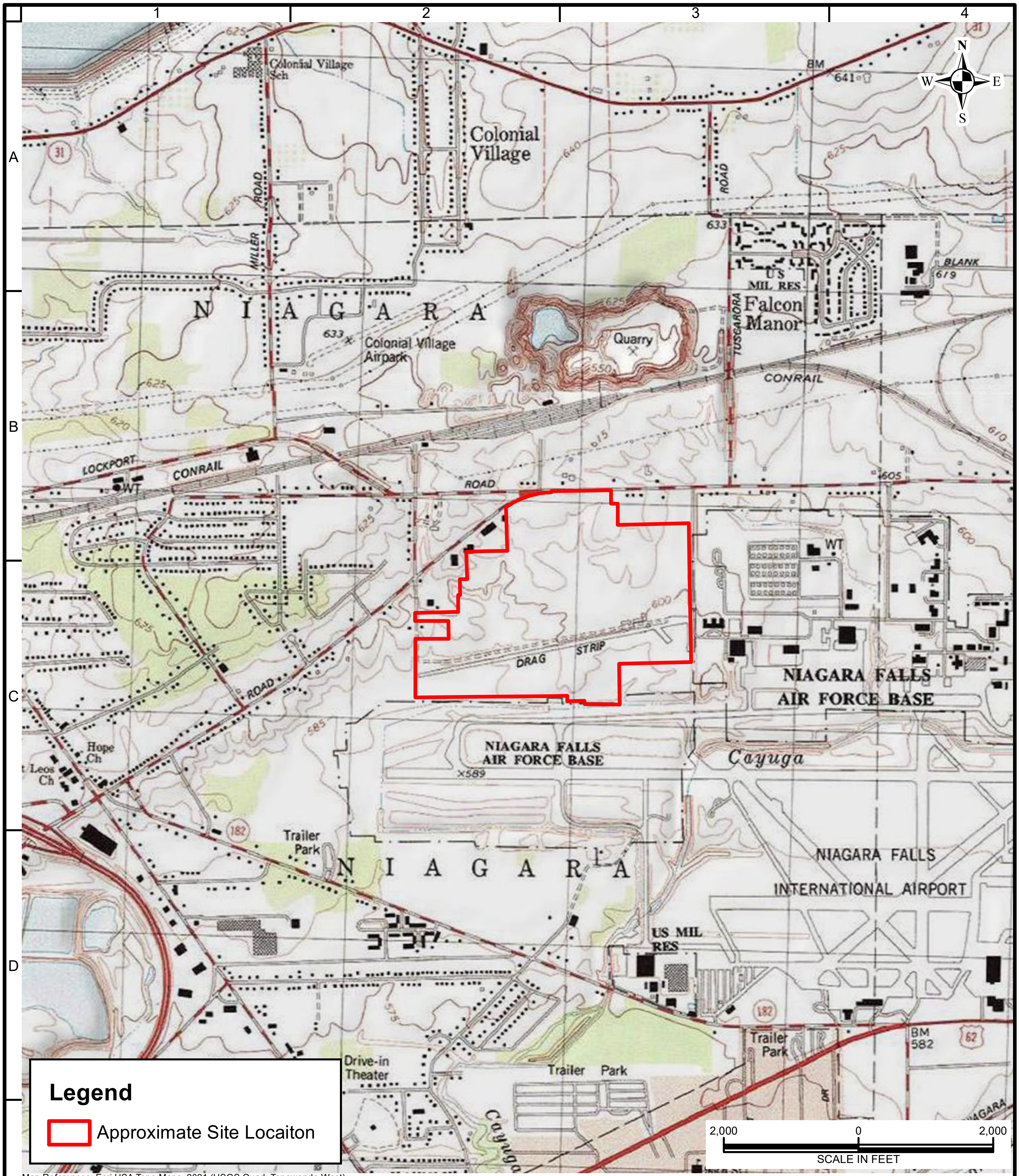
FIGURES



Map References: Esri USA Topo Maps, 2021 (USGS Quad: Tonawanda West)

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Project

PROJECT
FIFI

SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

USGS SITE
LOCATION MAP

Project No.
190071801

Date
09/21/2021

Scale
1" = 2,000'

Drawn By
SEP

Figure
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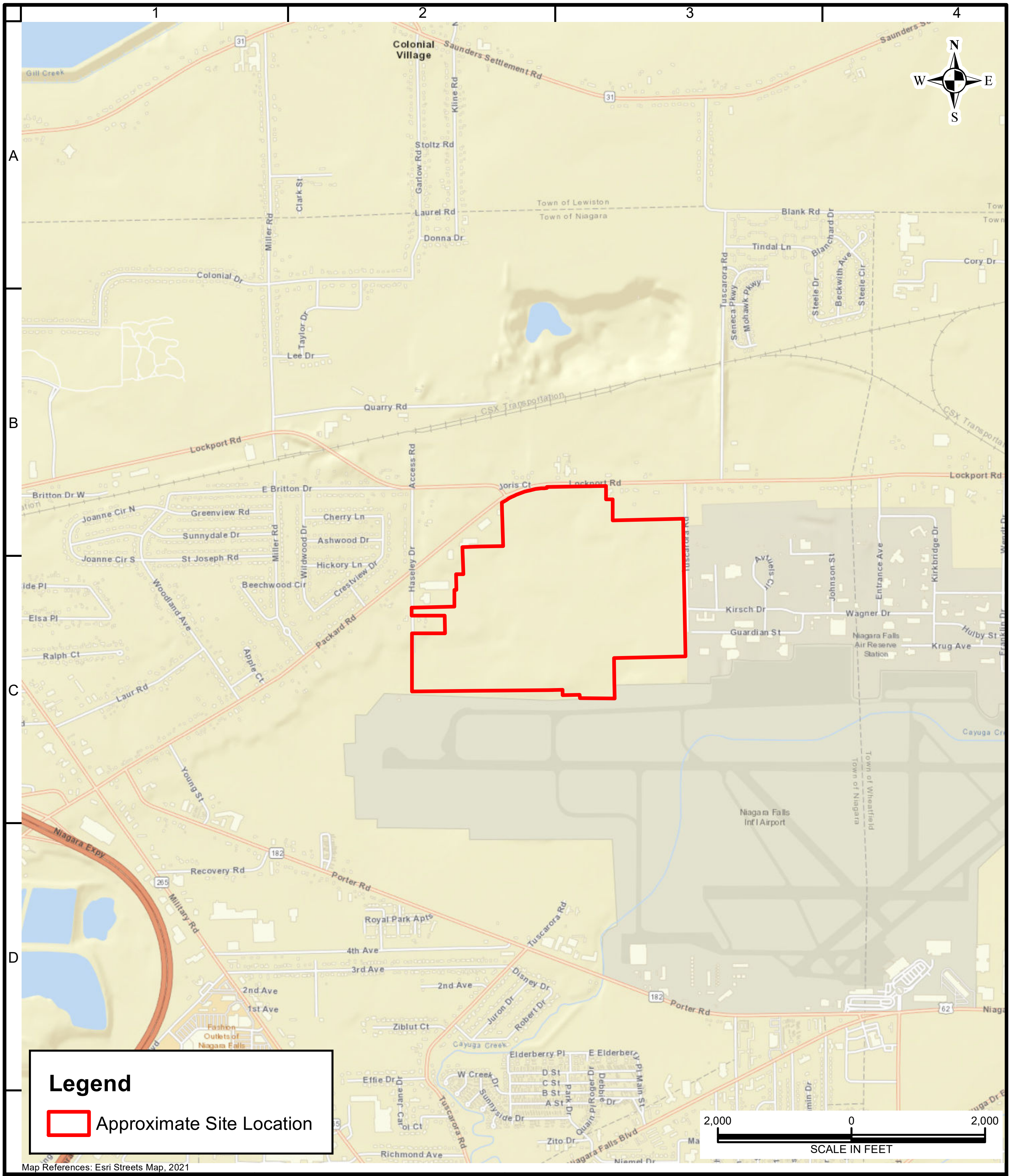

Legend

🟥 Approximate Site Location

Map References: Esri Streets Map, 2021

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146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

VICINITY MAP

Project No. 190071801
Date 09/21/2021
Scale 1" = 2,000'
Drawn By SEP

Figure 2

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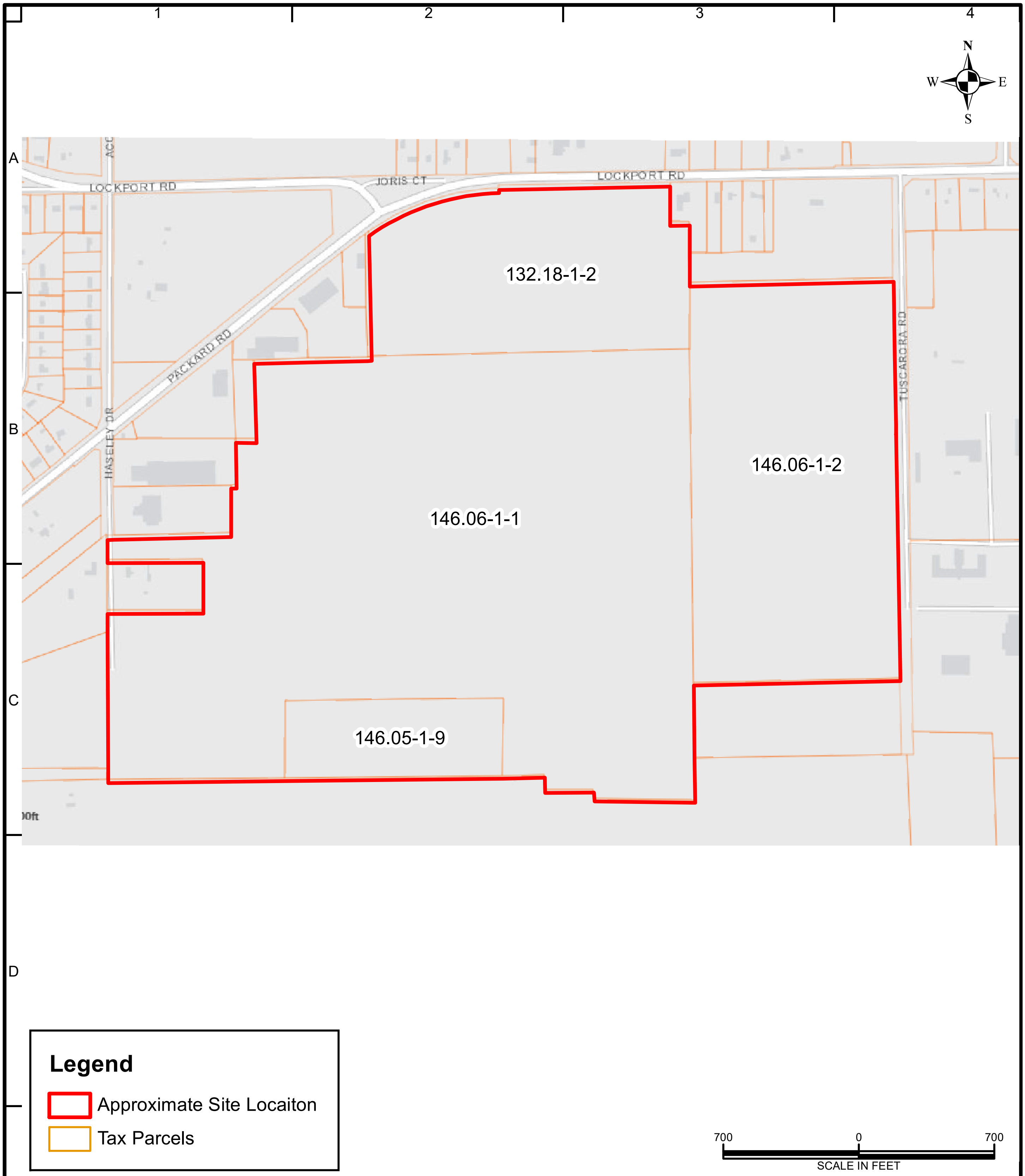

Map References: NYSDEC Environmental Resource Mapper, accessed 09/23/2021

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Langan International LLC
Collectively known as Langan

NJ CERTIFICATE OF AUTHORIZATION No. 24GA27996400

Project

PROJECT
FIFI

SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

TAX MAP

Project No. 190071801	Figure
Date 09/24/2021	3
Scale 1" = 700'	
Drawn By SEP	

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure 3 - Tax.mxd

Map References: Esri World Imagery 2020

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Project

PROJECT
FIFI

SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

SITE AERIAL PHOTOGRAPH

Project No.
190071801

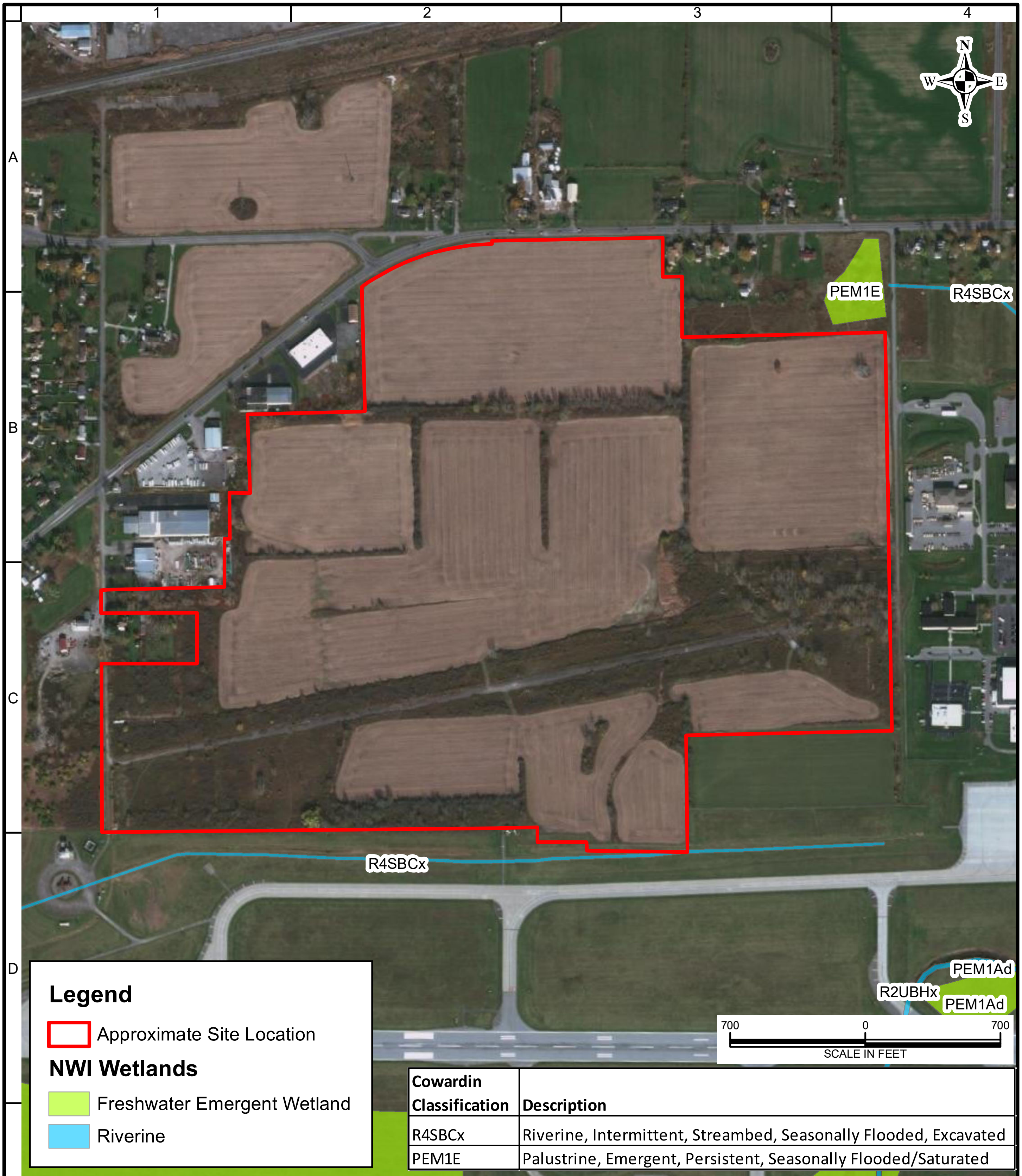
Date
09/21/2021

Scale
1" = 700'

Drawn By
SEP

Figure
4

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure 4 - Aerial Photograph.mxd



Legend

▭ Approximate Site Location

NWI Wetlands

🟩 Freshwater Emergent Wetland

🟦 Riverine

Cowardin Classification	Description
R4SBCx	Riverine, Intermittent, Streambed, Seasonally Flooded, Excavated
PEM1E	Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated

Map References: National Wetlands Inventory Mapper, accessed 9/22/2021; Esri World Imagery 2020

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Project

PROJECT
FIFI

SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

NWI WETLANDS MAP

Project No.
190071801

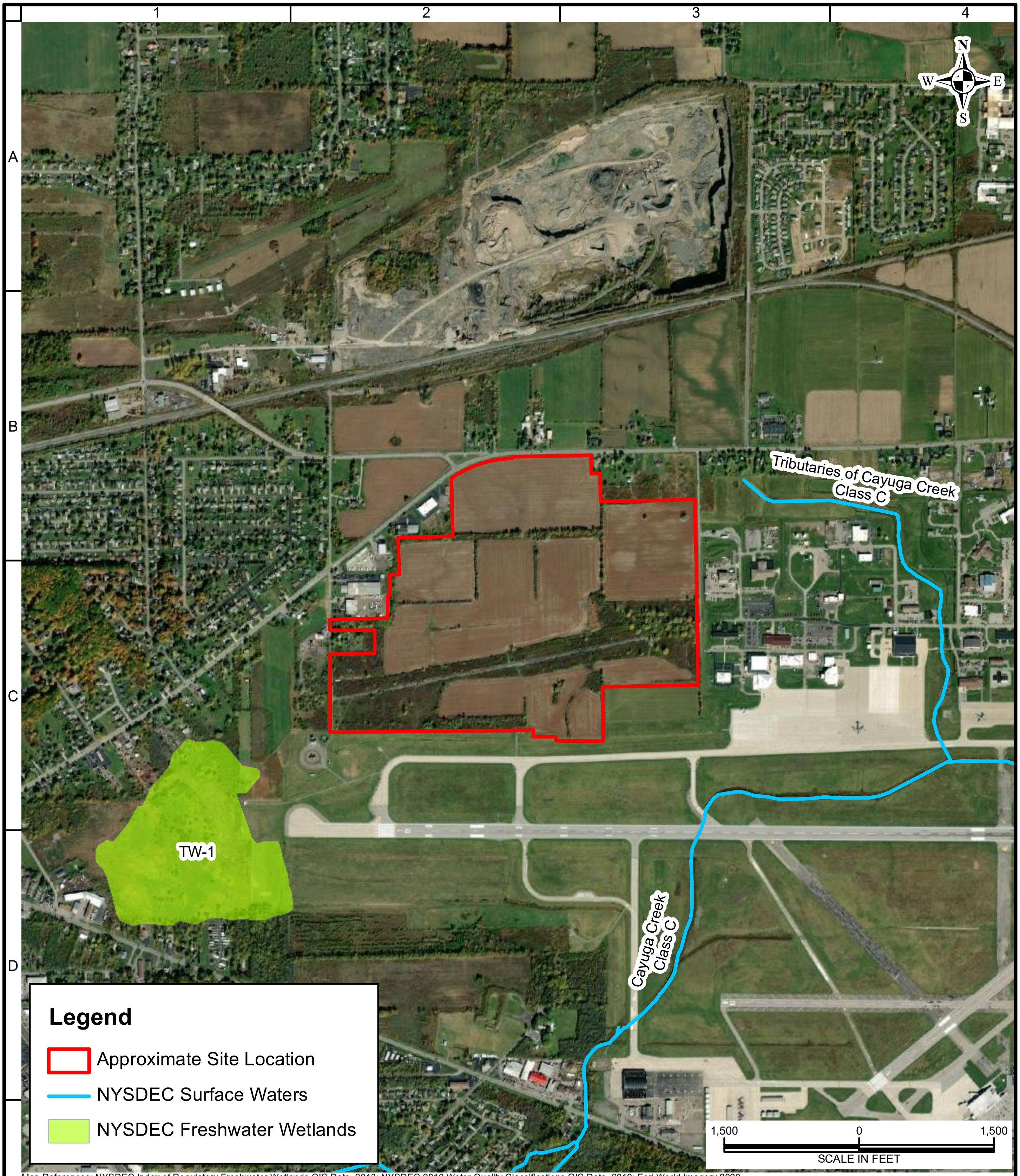
Date
09/21/2021

Scale
1" = 700'

Drawn By
SEP

Figure
5

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure 5 - NWI Wetlands.mxd



Map References: NYSDEC Index of Regulatory Freshwater Wetlands GIS Data, 2013; NYSDEC 2010 Water Quality Classifications GIS Data, 2019; Esri World Imagery 2020

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Project

PROJECT
FIFI

SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

NYSDEC
FRESHWATER
WETLANDS AND
SURFACE WATERS

Project No.
190071801

Date
09/21/2021

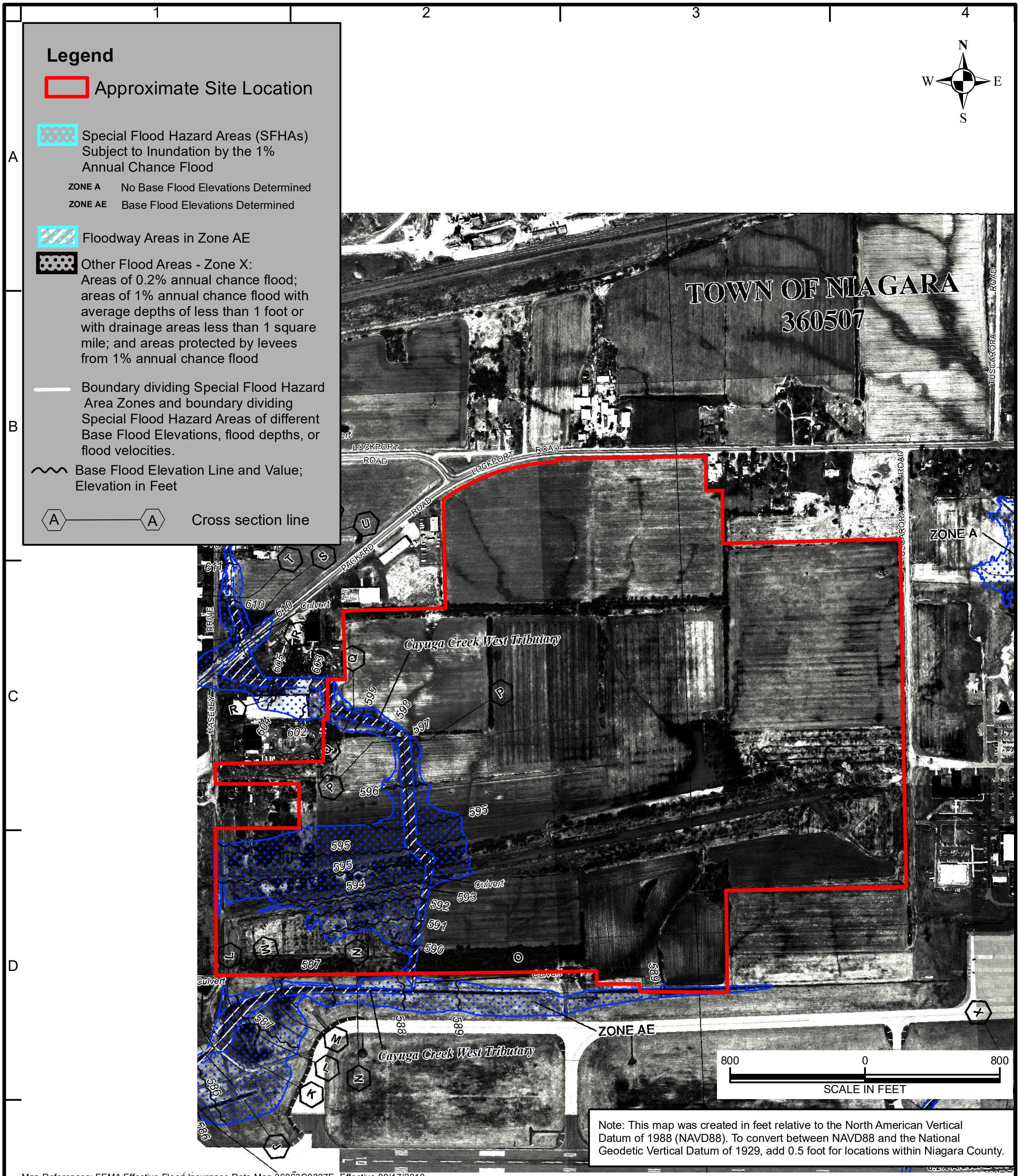
Scale
1" = 1,500'

Drawn By
SEP

Figure

6

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure 6 - NYSDEC Wetlands Waters.mxd



Legend

🟥 Approximate Site Location

▨ Special Flood Hazard Areas (SFHAs) Subject to Inundation by the 1% Annual Chance Flood

ZONE A	No Base Flood Elevations Determined
ZONE AE	Base Flood Elevations Determined

▨ Floodway Areas in Zone AE

▨ 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

— Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

〰 Base Flood Elevation Line and Value; Elevation in Feet

A——A Cross section line

Note: This map was created in feet relative to the North American Vertical Datum of 1988 (NAVD88). To convert between NAVD88 and the National Geodetic Vertical Datum of 1929, add 0.5 foot for locations within Niagara County.

Map References: FEMA Effective Flood Insurance Rate Map 36063C0327E, Effective 09/17/2010

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Project

PROJECT
FIFI

SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

FEMA EFFECTIVE FIRM MAP

Project No.
190071801

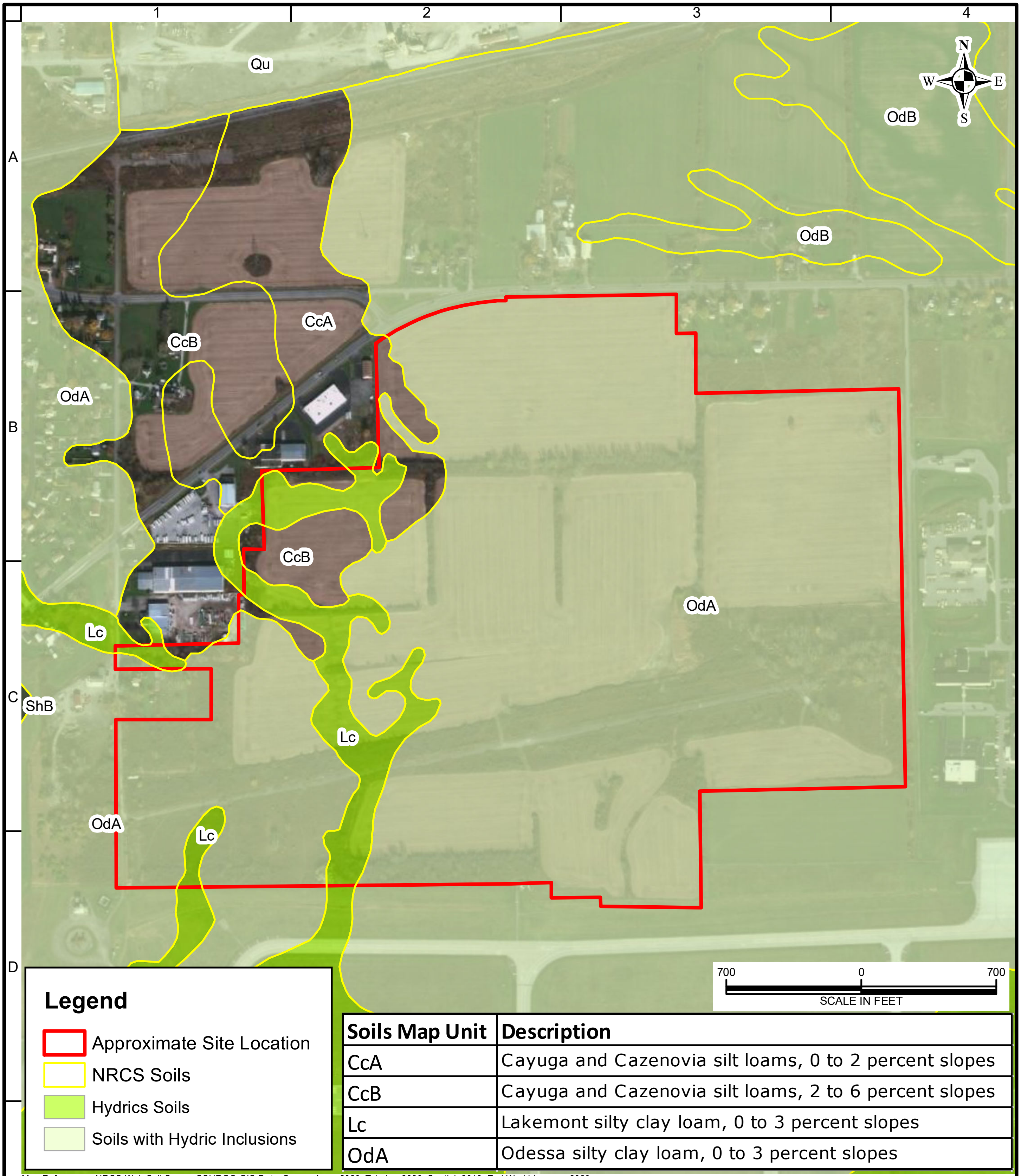
Date
09/21/2021

Scale
1" = 800'

Drawn By
SEP

Figure
7

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure 7 - FEMA Effectiv.mxd



Legend

🟥 Approximate Site Location

🟨 NRCS Soils

🟩 Hydrics Soils

▢ Soils with Hydric Inclusions

Soils Map Unit	**Description**
CcA	Cayuga and Cazenovia silt loams, 0 to 2 percent slopes
CcB	Cayuga and Cazenovia silt loams, 2 to 6 percent slopes
Lc	Lakemont silty clay loam, 0 to 3 percent slopes
OdA	Odessa silty clay loam, 0 to 3 percent slopes

Map References: NRCS Web Soil Survey SSURGO GIS Data, Survey Area: 2020, Tabular: 2020, Spatial: 2019; Esri World Imagery 2020

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Project
PROJECT
FIFI
SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title
NRCS SOILS
MAP

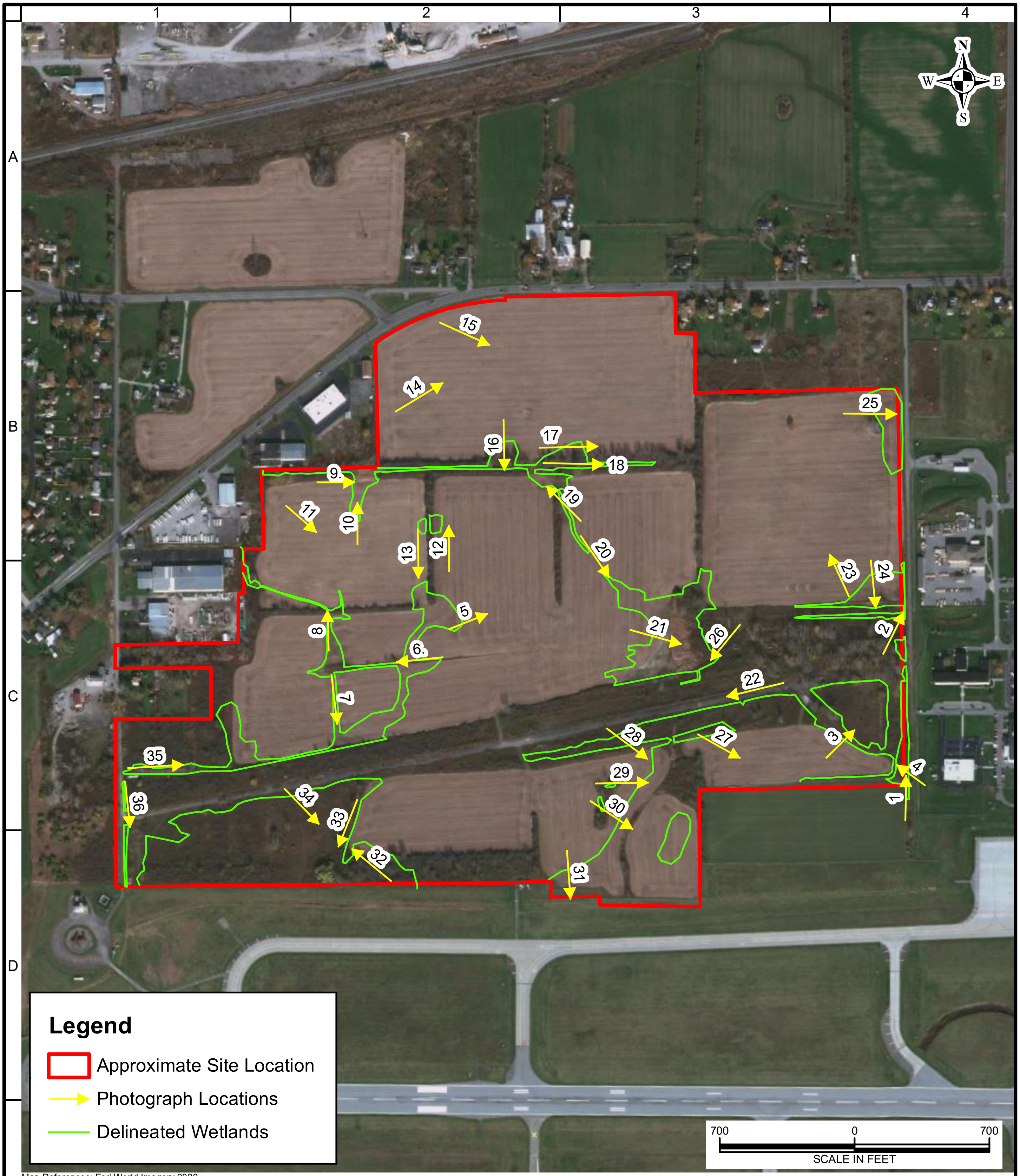
Project No.
190071801
Date
09/21/2021
Scale
1" = 700'
Drawn By
SEP

Figure
8

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure 8 - Soils.mxd

APPENDIX A

PHOTOGRAPH LOG AND
PHOTOGRAPH LOCATION MAP



Map References: Esri World Imagery 2020

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Project

PROJECT
FIFI

SECTION/BLOCK/LOT:
132.18/1/2, 146.05/1/9,
146.06/1/1 & 146.06/1/2

TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title

PHOTOGRAPH
LOCATION MAP

Project No.
190071801

Date
01/20/2022

Scale
1" = 700'

Drawn By
SEP

Figure

A

Path: \\langan.com\data\WPW\data8\190071801\Project Data\ArcGIS\MXD\Natural_Resource_Figures\Figure A - PhotoLocation.mxd

Photograph No. 1 – Photograph of the scrub/shrub and emergent wetland ditch in the southeastern portion of the Site (Wetland 13), facing north.

Photograph No. 2 – Representative photograph of the scrub/shrub wetlands associated with the drainage ditch at Wetland 14.

Photograph No. 3 – Photograph of the upland defunct paved access road in the southeastern portion of the site, looking toward the Wetland 12.

Photograph No. 4 – Photograph of an agricultural portion of Wetland 11 in the southeastern portion of the Site, facing northwest.

Photograph No. 5 – Photograph of the upland agricultural field in the central portion of the Site, in the vicinity of Wetland 5, facing northeast.

Photograph No. 6 –Photograph of the scrub/shrub wetland ditch within a portion of Wetland 5, in the western portion of the Site, taken facing west.

Photograph No. 7 – Photograph of the agricultural wetland within a portion of Wetland 5, facing south.

Photograph No. 8 – Photograph of the agricultural wetland within a portion of Wetland 5, facing north.

Photograph No. 9 – Photograph of the *Phragmites*-dominated portion of Wetland 2 in the western portion of the Site, facing east.

Photograph No. 10 – Photograph of the *Phragmites*-dominated portion of Wetland 2 in the western portion of the Site, facing north.

Photograph No. 11 – Representative photograph of the upland agricultural field in the western portion of the Site, taken facing southeast.

Photograph No. 12 – Photograph of the isolated agricultural Wetland 3, facing north.

Photograph No. 13 – Photograph of the isolated agricultural Wetland 4, facing south.

Photograph No. 14 – Photograph of the upland agricultural field in the northwestern portion of the Site, facing northeast.

Photograph No. 15 – Photograph of the upland agricultural field in the northern portion of the Site, taken facing southeast.

Photograph No. 16 – Photograph of an agricultural portion of Wetland 2, facing south.

Photograph No. 17 – Photograph of an agricultural portion of Wetland 2, facing east.

Photograph No. 18 – Photograph of the drainage ditch within Wetland 2, facing east.

Photograph No. 19 – Photograph of an agricultural portion of Wetland 2, facing northwest.

Photograph No. 20 – Photograph of an agricultural portion of Wetland 2, facing southeast.

Photograph No. 21 – Photograph of the agricultural/emergent portion of Wetland 16, facing southeast.

Photograph No. 22 – Photograph of the defunct drag strip traversing the southern portion of the site, taken facing southwest.

Photograph No. 23 – Photograph take along the boundary of Wetland 15 in the eastern portion of the Site, facing northwest.

Photograph No. 24 – Photograph of the agricultural portion of Wetland 15, facing south.

Photograph No. 25 – Photograph of Wetland 1, in the northeastern portion of the Site, facing east.

Photograph No. 26 – Photograph of the scrub/shrub wetland portion of Wetland 16, facing southwest.

Photograph No. 27 – Photograph of an agricultural portion of Wetland 11, facing southeast.

Photograph No. 28 – Photograph of the scrub/shrub wetland portion of Wetland 11, facing southeast.

Photograph No. 29 – Photograph of Wetland 10, facing east.

Photograph No. 30 – Photograph of Wetland 9, facing southeast.

Photograph No. 31 – Photograph of an agricultural portion of Wetland 11, facing south.

Photograph No. 32 – Photograph of a scrub/shrub portion of Wetland 8, facing northwest.

Photograph No. 33 – Photograph of an emergent and scrub/shrub portion of Wetland 8, facing southwest.

Photograph No. 34 – Photograph of an emergent and scrub/shrub portion of Wetland 8, facing southeast.

Photograph No. 35 – Photograph of an emergent and scrub/shrub portion of Wetland 5, facing east.

Photograph No. 36 – Photograph of Wetland 6 along Haseley Drive, facing south.

ATTACHMENT A

FIELD DATA SHEETS

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/16/2021

Applicant/Owner: ____ State: NY Sampling Point: DP1

Investigator(s): V. Schaller Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Terrene non-riparian basin Local relief (concave, convex, none): Concave Slope %: >2%

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.114721 Long: -78.95388 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PSS1B

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____
If yes, optional Wetland Site ID: Wetland 12 (C30)

Remarks: (Explain alternative procedures here or in a separate report.)
This wetland is a depression in the landscape within an area encircled by defunct paved and gravel access roads.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
____ High Water Table (A2)
X Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)

X Water-Stained Leaves (B9)
____ Aquatic Fauna (B13)
____ Marl Deposits (B15)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Thin Muck Surface (C7)
X Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

____ Surface Soil Cracks (B6)
____ Drainage Patterns (B10)
____ Moss Trim Lines (B16)
____ Dry-Season Water Table (C2)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Stunted or Stressed Plants (D1)
X Geomorphic Position (D2)
X Shallow Aquitard (D3)
____ Microtopographic Relief (D4)
X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 2
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Sphagnum hummocks and ponding present in the immediate area.

VEGETATION – Use scientific names of plants.

Sampling Point: DP1

Tree Stratum (Plot size: 20 x 20')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	
Sapling/Shrub Stratum (Plot size: 10 x 10')			
1. *Cornus racemosa*	43	Yes	FAC
2. *Cornus amomum*	20	Yes	FACW
3. *Salix nigra*	5	No	OBL
4. *Salix discolor*	10	No	FACW
5. *Alnus*	10	No	
6. *Aronia arbutifolia*	10	No	FACW
7. *Rhamnus cathartica*	10	No	FAC
	108	=Total Cover	
Herb Stratum (Plot size: 10 x 10')			
1. *Typha angustifolia*	10	Yes	OBL
2. *Solidago*	5	No	
3. *Dipsacus fullonum*	5	No	FACU
4. *Lythrum salicaria*	10	Yes	OBL
5. *Juncus effusus*	10	Yes	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	35	x 1 =	35
FACW species	40	x 2 =	80
FAC species	63	x 3 =	189
FACU species	5	x 4 =	20
UPL species	0	x 5 =	0
Column Totals:	143	(A)	324 (B)

Prevalence Index = B/A = 2.27

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Loamy/Clayey	
8-12	10YR 3/2	90	10YR 5/6	10	C	M	Loamy/Clayey	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_X_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
_X_ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 12

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/17/2021

Applicant/Owner: ______ State: NY Sampling Point: DP2

Investigator(s): V. Schaller Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Elevated access road Local relief (concave, convex, none): convex Slope %: 0

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.114686 Long: -78.953960 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ___ No X

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X
If yes, optional Wetland Site ID: N/A

Remarks: (Explain alternative procedures here or in a separate report.)
This area consists of a defunct access road with little to no soil present. However, a vegetative community has become established.

Boring taken in access road between Wetlands 11 and 12 at flags B11 and C30.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP2

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Cornus racemosa*	10	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10	=Total Cover	

Herb Stratum (Plot size: 10 x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Dipsacus fullonum*	20	Yes	FACU
2. *Artemisia vulgaris*	15	No	UPL
3. *Andropogon virginicus*	10	No	FACU
4. *Solidago*	10	No	
5. *Poa*	30	Yes	
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85	=Total Cover	

Woody Vine Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	30	x 4 =	120
UPL species	15	x 5 =	75
Column Totals:	55 (A)		225 (B)

Prevalence Index = B/A = 4.09

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100					Loamy/Clayey	Moss and decomposed material
								on top of pavement

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal - Pavement Present
Depth (inches): 3

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Although a moss and grass covered dark surface was present, it was underlain with a defunct paved access road.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/16/2021

Applicant/Owner: ____ State: NY Sampling Point: DP3

Investigator(s): V. Schaller Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Terrene non-riparian Local relief (concave, convex, none): relatively flat to sloping Slope %: >2%

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.11463 Long: -78.954067 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X

Hydric Soil Present? Yes X No ____

Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

If yes, optional Wetland Site ID: Wetland 11 (B11)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

____ Surface Water (A1)
____ High Water Table (A2)
X Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9)
____ Aquatic Fauna (B13)
____ Marl Deposits (B15)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Presence of Reduced Iron (C4)
X Recent Iron Reduction in Tilled Soils (C6)
____ Thin Muck Surface (C7)
____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

____ Surface Soil Cracks (B6)
____ Drainage Patterns (B10)
____ Moss Trim Lines (B16)
____ Dry-Season Water Table (C2)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Stunted or Stressed Plants (D1)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
X Microtopographic Relief (D4)
____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes X No ____ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding is present in the vicinity of the boring location at approximately flags B1 - B7 and BB1 - BB2. Approximately 1 to 3 inches of ponded water present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: DP3

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is an actively farm wet corn agricultural field. No other vegetation was present in this area and the corn had already been harvested. However, the corn stalk basesd were still visible.

SOIL

Sampling Point DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	80	10YR 6/8	20	C	M		Dense clay present throughout layers
8-18	10YR 5/1	80	10YR 6/8	20	C	M		Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☒ Depleted Below Dark Surface (A11)
- ☒ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ☐ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ☐ High Chroma Sands (S11) (**LRR K, L)**
- ☐ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ☐ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ☐ Polyvalue Below Surface (S8) (**LRR K, L**)
- ☐ Thin Dark Surface (S9) (**LRR K, L**)
- ☐ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ☐ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ☐ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ☐ Red Parent Material (F21)
- ☐ Very Shallow Dark Surface (F22)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 18

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/17/2021
Applicant/Owner: ______ State: NY Sampling Point: DP4
Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Agriculural field Local relief (concave, convex, none): Gently sloping Slope %: 0-5%
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.115873 Long: -78.962194 Datum: WGS1984
Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology X significantly disturbed? Are “Normal Circumstances” present? Yes ___ No X
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X
If yes, optional Wetland Site ID: N/A

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling.

Data point taken near wetland flag D17

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
? Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes X No ___ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soils were saturated due to a recent rain event.

VEGETATION – Use scientific names of plants.

Sampling Point: DP4

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn was harvested prior to site visit. Corn stalk bases still visible.

SOIL

Sampling Point DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100						Dense clay present throughout layers
5-8	10YR 3/3	90	10YR 5/6	5	C	M		Distinct redox concentrations
			10YR 3/2	5	C	M		Faint redox concentrations
8-18	10YR 3/6	85	10YR 5/6	5	C	M		Faint redox concentrations
			10YR 3/2	5	C	M		Faint redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 18

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Although the soil had a dark surface and some redoximorphic features were present beginning below 5 inches, the soil is disturbed agricultural soil with a 3 chroma matrix color with increasing value as depth increases without an increase in redoximporhpic features. Due to the disturbed nature of the soil and increase in matrix value it was determined that the soil is non-hydric.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/16/2021

Applicant/Owner: ___ State: NY Sampling Point: DP5

Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Terrene non-riparian ditch Local relief (concave, convex, none): concave Slope %: >2%

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.115806 Long: -78.962025 Datum: WGS1984

Soil Map Unit Name: Lc - Lakemont silty clay loam, 0 to 3 percent slopes NWI classification: PSS1Ed

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___
If yes, optional Wetland Site ID: Wetland 5 (D17)

Remarks: (Explain alternative procedures here or in a separate report.)
This drainage ditch provides drainage for adjacent agricultural fields.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 5
Saturation Present? Yes X No ___ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Portions of this ditch have 1 to 2 inches of standing water, and water table at the surface.

VEGETATION – Use scientific names of plants.

Sampling Point: DP5

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: N/A)			
1. *Cornus amomum*	60	Yes	FACW
2. *Cornus racemosa*	15	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	75	=Total Cover	

Herb Stratum (Plot size: 10 x 10')			
1. *Solidago patula*	20	Yes	OBL
2. *Panicum virgatum*	5	No	FAC
3. *Bidens cernua*	5	No	OBL
4. *Lythrum salicaria*	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	60	x 2 =	120
FAC species	20	x 3 =	60
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	110	(A)	210 (B)

Prevalence Index = B/A = 1.91

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 4/2	80	7.5YR 5/2	20	C	M		Dense clay present throughout layers
8-20	7.5YR 5/2	80	7.5YR 5/2	20	C	M		Faint redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
X Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/17/2021
Applicant/Owner: ___ State: NY Sampling Point: DP6
Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Agricultural field Local relief (concave, convex, none): Sloping Slope %: >2%
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.115487 Long: -78.964041 Datum: WGS1984
Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X
If yes, optional Wetland Site ID: N/A

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling.

Data point taken near Wetand 5, flag Y25.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soils were saturated due to a recent rain event.

VEGETATION – Use scientific names of plants.

Sampling Point: DP6

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80 =Total Cover		
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	80 (A)		400 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn was harvested prior to site visit. Corn stalk bases still visible.

SOIL

Sampling Point DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100						Dense clay present throughout layers
5-8	10YR 3/3	85	10YR 5/6	5	C	M		Distinct redox concentrations
			10YR 3/2	5	C	M		Faint redox concentrations
8-18	10YR 3/6	85	10YR 5/6	5	C	M		Faint redox concentrations
			10YR 3/2	5	C	M		Faint redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 18

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/16/2021
Applicant/Owner: State: NY Sampling Point: DP7
Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Terrene riparian Local relief (concave, convex, none): Concave Slope %: >2%
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.115539 Long: -78.964047 Datum: WGS1984
Soil Map Unit Name: Lc - Lakemont silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology significantly disturbed? Are “Normal Circumstances” present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes No X
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No

Is the Sampled Area within a Wetland? **Yes** X **No**
If yes, optional Wetland Site ID: Wetland 4 (Y25)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- X Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- X Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 3
Water Table Present?	Yes X	No	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP7

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is an active wet corn agricultural field. No other vegetation was present in this area at the time of site inspection. The corn had already been harvested. However, the corn stalk bases were still visible.

SOIL

Sampling Point DP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	90	10YR 4/4	10	C	M		Dense clay present throughout layers
6-20	10YR 3/1	90	10YR 4/4	10	C	M		Distinct redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 18

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/17/2021
Applicant/Owner: ______ State: NY Sampling Point: DP8
Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Agricultural field Local relief (concave, convex, none): Sloping Slope %: >2%
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.118316 Long: -78.963723 Datum: WGS1984
Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology X significantly disturbed? Are “Normal Circumstances” present? Yes ___ No X
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X
If yes, optional Wetland Site ID: N/A

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling.

Data point taken near Wetland 2, Flag R15.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes X No ___ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soils were saturated due to a recent rain event.

VEGETATION – Use scientific names of plants.

Sampling Point: DP8

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90	(A)	450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn was harvested prior to site visit. Corn stalk base still visible.

SOIL

Sampling Point DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100						Dense clay present throughout layers
5-8	10YR 3/3	90	10YR 5/6	10	C	M		Distinct redox concentrations
			10YR 3/2	10	C	M		Faint redox concentrations
8-18	10YR 3/6	90	10YR 5/6	10	C	M		Faint redox concentrations
			10YR 3/2	5	C	M		Faint redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 18

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/16/2021
Applicant/Owner: ___ State: NY Sampling Point: DP 9
Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Terrene non-riparian slope Local relief (concave, convex, none): Sloping Slope %: >2%
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.118327 Long: -78.963593 Datum: WGS1984
Soil Map Unit Name: Lc - Lakemont silty clay loam, 0 to 3 percent slopes NWI classification: PEM5E
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___
If yes, optional Wetland Site ID: Wetland 2 (R15)

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___
Water Table Present? Yes X No ___ Depth (inches): 5
Saturation Present? Yes X No ___ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
The high water table is likely due to perched conditions.

This wetland drains to an opening within the corn field. This may be a colapsed drain within the farm field allowing water to enter. It is unknown where the water discharges to.

Ponding present in the vicinity of the data point, 2 to 5 inches in depth.

VEGETATION – Use scientific names of plants.

Sampling Point: DP 9

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')			
1. *Phragmites australis*	90	Yes	FACW
2. *Juncus*	3	No	
3. *Erigeron strigosus*	2	No	FACU
4. *Lythrum salicaria*	5	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	90	x 2 =	180
FAC species	0	x 3 =	0
FACU species	2	x 4 =	8
UPL species	0	x 5 =	0
Column Totals:	97	(A)	193 (B)

Prevalence Index = B/A = 1.99

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 4/2	70	7.5YR 4/6	30	C	M		Dense clay present throughout layers
8-20	5YR 4/2	70	5YR 5/6	30	C	M		Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
? Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021
Applicant/Owner: ______ State: NY Sampling Point: DP10
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1196 Long: -78.9623 Datum: WGS1984
Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil ___ , or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X
If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
X Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes X No ___ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturated soils at surface due to a recent rain event; not indicative of A3 indicator.

VEGETATION – Use scientific names of plants.

Sampling Point: DP10

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Herb Stratum (Plot size:)			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	90	x 5 =	450	
Column Totals:	90	(A)	450	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2						Loamy/Clayey	plow layer
8-15	7.5YR 4/3	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021
Applicant/Owner: ____ State: NY Sampling Point: DP11
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.11463 Long: -78.954067 Datum: WGS1984
Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes X No ____
Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____
If yes, optional Wetland Site ID: Wetalnd 2 (E22)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 2
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes X No ____ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding present in the vicinity of the boring location at Flag E22. Approximately 1 to 3 inches of ponded water present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: DP11

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90	(A)	450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is actively farmed and recently harvested of corn.

SOIL

Sampling Point DP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	Plow Layer
7-13	10YR 4/1	85	10YR 4/6	15	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
_x_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** _X_ **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021

Applicant/Owner: ____ State: NY Sampling Point: DP12

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): ____ Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1190 Long: -78.9605 Datum: WGS1984

Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X

Hydric Soil Present? Yes ____ No ____

Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes X No ____ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturated soils at surface due to a recent rain event; not indicative of A3 indicator.

VEGETATION – Use scientific names of plants.

Sampling Point: DP12

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size:)			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	80 (A)		400 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-8	10YR 3/2						Loamy/Clayey	plow layer
8-15	7.5YR 4/3	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____

Depth (inches): ____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021

Applicant/Owner: ____ State: NY Sampling Point: DP13

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1200 Long: -78.9588 Datum: WGS1984

Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X

Hydric Soil Present? Yes ____ No X

Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturated soils at surface due to a recent rain event; not indicative of A3 indicator.

VEGETATION – Use scientific names of plants.

Sampling Point: DP13

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size:)			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80 =Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	80 (A)		400 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2						Loamy/Clayey	plow layer
8-15	7.5YR 4/3	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ____ State: NY Sampling Point: DP14

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1183 Long: -78.9598 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____
If yes, optional Wetland Site ID: Wetland 2 (V29)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9)
____ Aquatic Fauna (B13)
____ Marl Deposits (B15)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Thin Muck Surface (C7)
____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

____ Surface Soil Cracks (B6)
____ Drainage Patterns (B10)
____ Moss Trim Lines (B16)
____ Dry-Season Water Table (C2)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Stunted or Stressed Plants (D1)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ Microtopographic Relief (D4)
____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 2
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes X No ____ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding present in the vicinity of the boring location at Flag V29. Approximately 1 to 3 inches of ponded water present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: DP14

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	80 (A)		400 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is actively farmed and recently harvested of corn.

SOIL

Sampling Point DP14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	Plow Layer
7-13	10YR 4/1	85	10YR 4/6	15	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021
Applicant/Owner: ______ State: NY Sampling Point: DP15
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1182 Long: -78.9601 Datum: WGS1984
Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ___ No X	**within a Wetland?** **Yes** ___ **No** X
Wetland Hydrology Present?	Yes ___ No X	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation. As such, the soil is disturbed from farming activity, inlcuding tilling.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP15

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size:)			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90	(A)	450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2						Loamy/Clayey	plow layer
8-15	7.5YR 4/3	95	10YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ____ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021
Applicant/Owner: State: NY Sampling Point: DP16
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): relatively flat to sloping Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1194 Long: -78.9532 Datum: WGS1984
Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology significantly disturbed? Are “Normal Circumstances” present? Yes X No
Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes No X
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No

Is the Sampled Area within a Wetland? Yes X **No**
If yes, optional Wetland Site ID: Wetalnd 1 (H3)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
High Water Table (A2)
Saturation (A3)
Water Marks (B1)
Sediment Deposits (B2)
Drift Deposits (B3)
Algal Mat or Crust (B4)
Iron Deposits (B5)
Inundation Visible on Aerial Imagery (B7)
Sparsely Vegetated Concave Surface (B8)

Water-Stained Leaves (B9)
Aquatic Fauna (B13)
Marl Deposits (B15)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres on Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

Surface Soil Cracks (B6)
Drainage Patterns (B10)
Moss Trim Lines (B16)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Stunted or Stressed Plants (D1)
Geomorphic Position (D2)
Shallow Aquitard (D3)
Microtopographic Relief (D4)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No Depth (inches): 2
Water Table Present? Yes No X Depth (inches):
Saturation Present? Yes X No Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding present in the vicinity of the boring location at Flag H3. Approximately 1 to 3 inches of ponded water present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: DP16

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80 =Total Cover		

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	80	(A)	400 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is actively farmed and recently harvested of corn.

SOIL

Sampling Point DP16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2						Loamy/Clayey	Plow Layer
7-13	10YR 4/1	85	10YR 4/6	15	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021

Applicant/Owner: ______ State: NY Sampling Point: DP17

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloped Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1193 Long: -78.9539 Datum: WGS1984

Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X

Hydric Soil Present? Yes ___ No X

Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

Datapoint taken near Wetland H, flag H3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP17

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Herb Stratum (Plot size:)			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	90	x 5 =	450	
Column Totals:	90	(A)	450	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2						Loamy/Clayey	plow layer
10-15	7.5YR 4/3	95	10YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: State: NY Sampling Point: DP18

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1168 Long: -78.9535 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X

Hydric Soil Present? Yes X No ___

Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X **No** ___

If yes, optional Wetland Site ID: Wetland 15 (I8)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 2

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes X No ___ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding present in the vicinity of the boring location at Flag I6. Approximately 1 to 3 inches of ponded water present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: DP18

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90	(A)	450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is actively farmed and recently harvested of corn.

SOIL

Sampling Point DP18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2						Loamy/Clayey	Plow Layer
7-13	10YR 4/1	85	10YR 4/6	15	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021
Applicant/Owner: ______ State: NY Sampling Point: DP19
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1170 Long: -78.9538 Datum: WGS1984
Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X
If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

Data point taken near Wetland I, flag I7.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP19

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Herb Stratum (Plot size:)			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	80	x 5 =	400	
Column Totals:	80	(A)	400	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2						Loamy/Clayey	plow layer
10-15	7.5YR 4/3	95	10YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 11/18/2021

Applicant/Owner: ______ State: NY Sampling Point: DP20

Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Terrene non-riparian slope Local relief (concave, convex, none): Slope Slope %: >2%

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.116184 Long: -78.957550 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X

Hydric Soil Present? Yes X No ___

Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: Wetland 16 (W21)

Remarks: (Explain alternative procedures here or in a separate report.)
This area is actively farmed with corn crop. As such, the soil is diturbed from farming activity, inlcuding tilling. Problematic vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
X High Water Table (A2)
___ Saturation (A3)
X Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
X Algal Mat or Crust (B4)
___ Iron Deposits (B5)
X Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 3

Water Table Present? Yes X No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP20

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
___ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is an active wet corn agricultural field. No other vegetation was present in this area at the time of site inspection. The corn had already been harveted. However, the corn stalk bases were still visible.

SOIL

Sampling Point DP20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	90	10YR 4/4	10	C	M		Dense clay present throughout layers
6-20	7.5YR 4/2	60	7.5YR 4/6	30	C	M		Prominent redox concentrations
			7.5YR 2.5/1	10	C	M		Faint redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
_X_ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** _X_ **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021
Applicant/Owner: ____ State: NY Sampling Point: DP21
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1161 Long: -78.9581 Datum: WGS1984
Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes ____ No X
Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X
If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

Data point taken near Wetland 16.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)

____ Water-Stained Leaves (B9)
____ Aquatic Fauna (B13)
____ Marl Deposits (B15)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Thin Muck Surface (C7)
____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

____ Surface Soil Cracks (B6)
____ Drainage Patterns (B10)
____ Moss Trim Lines (B16)
____ Dry-Season Water Table (C2)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Stunted or Stressed Plants (D1)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ Microtopographic Relief (D4)
____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP21

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Herb Stratum (Plot size:)			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	80	x 5 =	400	
Column Totals:	80	(A)	400	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2						Loamy/Clayey	plow layer
8-13	7.5YR 4/3	95	10YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ____ State: NY Sampling Point: DP22

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1163 Long: -78.9566 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	If yes, optional Wetland Site ID: ____

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken in scrub-shrub upland near Wetland 16.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

____ Surface Water (A1)
____ High Water Table (A2)
____ Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)

____ Water-Stained Leaves (B9)
____ Aquatic Fauna (B13)
____ Marl Deposits (B15)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Thin Muck Surface (C7)
____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

____ Surface Soil Cracks (B6)
____ Drainage Patterns (B10)
____ Moss Trim Lines (B16)
____ Dry-Season Water Table (C2)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Stunted or Stressed Plants (D1)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ Microtopographic Relief (D4)
____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP22

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: 10 x 10')			
1. *Cornus racemosa*	40	Yes	FAC
2. *Rhamnus cathartica*	50	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	90	=Total Cover	
Herb Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90	(A)	270 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Successional vegetation established in former improved area.

SOIL

Sampling Point DP22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-11	7.5YR 4/3	100					Loamy/Clayey	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Data point does not meet the wetland hydrology and soils criteria.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021
Applicant/Owner: ____ State: NY Sampling Point: DP23
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Concave Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1127 Long: -78.9631 Datum: WGS 84
Soil Map Unit Name: OdA - Odessa silty clay loam, 0 to 3% slopes NWI classification: PEM1E
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____
If yes, optional Wetland Site ID: Wetland 5 (J15)

Remarks: (Explain alternative procedures here or in a separate report.)
Emergent wetland (swale).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
____ High Water Table (A2)
X Saturation (A3)
____ Water Marks (B1)
____ Sediment Deposits (B2)
____ Drift Deposits (B3)
____ Algal Mat or Crust (B4)
____ Iron Deposits (B5)
____ Inundation Visible on Aerial Imagery (B7)
____ Sparsely Vegetated Concave Surface (B8)
____ Water-Stained Leaves (B9)
____ Aquatic Fauna (B13)
____ Marl Deposits (B15)
____ Hydrogen Sulfide Odor (C1)
____ Oxidized Rhizospheres on Living Roots (C3)
____ Presence of Reduced Iron (C4)
____ Recent Iron Reduction in Tilled Soils (C6)
____ Thin Muck Surface (C7)
____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

____ Surface Soil Cracks (B6)
X Drainage Patterns (B10)
____ Moss Trim Lines (B16)
____ Dry-Season Water Table (C2)
____ Crayfish Burrows (C8)
____ Saturation Visible on Aerial Imagery (C9)
____ Stunted or Stressed Plants (D1)
____ Geomorphic Position (D2)
____ Shallow Aquitard (D3)
____ Microtopographic Relief (D4)
____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 5
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP23

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 x 10')			
1. *Cornus amomum*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
	15	=Total Cover	

Herb Stratum (Plot size: 10 x 10')			
1. *Phalaris arundinacea*	50	Yes	FACW
2. *Typha angustifolia*	20	Yes	OBL
3. *Lythrum salicaria*	20	Yes	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	40	x 1 =	40
FACW species	65	x 2 =	130
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		170 (B)

Prevalence Index = B/A = 1.62

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 3/1	100					Loamy/Clayey	
8-15	7.5YR 4/2	85	7.5YR 4/4	15	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ______ State: NY Sampling Point: DP24

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1143 Long: -78.9672 Datum: WGS 84

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X Hydric Soil Present? Yes ___ No X Wetland Hydrology Present? Yes ___ No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X If yes, optional Wetland Site ID: ______	

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken in scrub-shrub upland near Wetland 5, flag J15.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP24

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: N/A)			
1. *Cornus racemosa*	70	Yes	FAC
2. *Rhamnus cathartica*	20	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	90	=Total Cover	

Herb Stratum (Plot size: 10 x 10')			
1. *Solidago canadensis*	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	40	=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ________ (A)

Total Number of Dominant Species Across All Strata: ________ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ________ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	130	(A)	430 (B)

Prevalence Index = B/A = 3.31

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Successional vegetation established in former improved area.

SOIL

Sampling Point DP24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	100					Loamy/Clayey	
7-10	7.5YR 4/2	100					Loamy/Clayey	
10-15	7.5YR 4/4	85	7.5YR 4/6	15	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ____ State: NY Sampling Point: DP25

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1127 Long: -78.9631 Datum: WGS 84

Soil Map Unit Name: Lc - Lakemont silty clay loam, 0 to 3% slopes NWI classification: PSS1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___

Hydric Soil Present? Yes X No ___

Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: Wetland 8 (XX19)

Remarks: (Explain alternative procedures here or in a separate report.)
Forested/scrub-shrub wetland along southern site boundary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

X Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 1

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP25

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 x 10')			
1. *Cornus racemosa*	20	Yes	FAC
2. *Rhamnus cathartica*	25	Yes	FAC
3. *Cornus amomum*	35	Yes	FACW
4.			
5.			
6.			
7.			
	80	=Total Cover	

Herb Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	105 (A)		280 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
X 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Successional vegetation established in former improved area.

SOIL

Sampling Point DP25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	
6-12	7.5YR 4/2	85	7.5YR 4/6	15	C	M	Loamy/Clayey	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type:
Depth (inches):

Hydric Soil Present? **Yes** X **No**

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021
Applicant/Owner: ______ State: NY Sampling Point: DP26
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1128 Long: -78.9625 Datum: WGS 84
Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area**
Hydric Soil Present?	Yes ___ No X	**within a Wetland? Yes ___ No X**
Wetland Hydrology Present?	Yes ___ No X	If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken in wooded upland near Wetland 8, flag XX19.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP26

Tree Stratum (Plot size: 10 X 10)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 X 10)			
1. *Cornus racemosa*	40	Yes	FAC
2. *Rhamnus cathartica*	50	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	90	=Total Cover	

Herb Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	115	x 3 =	345
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	115 (A)		345 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Successional vegetation established in former improved area.

SOIL

Sampling Point DP26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	
6-12	7.5YR 4/3	90	10YR 4/6	10	C	M	Loamy/Clayey	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Data point does not meet the wetland hydrology and soils criteria.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ____ State: NY Sampling Point: DP27

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain, farmed wetland Local relief (concave, convex, none): relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1127 Long: -78.9591 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X

Hydric Soil Present? Yes X No ____

Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

If yes, optional Wetland Site ID: Wetland 11 (YY2)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): 2

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes X No ____ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Ponding present in the vicinity of the boring location at Flag YY2. Approximately 1 to 3 inches of ponded water present in this area.

VEGETATION – Use scientific names of plants.

Sampling Point: DP27

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	90	x 5 =	450	
Column Totals:	90	(A)	450	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is actively farmed and recently harvested of corn.

SOIL

Sampling Point DP27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	Plow Layer
7-13	10YR 4/1	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type:

Depth (inches):

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021
Applicant/Owner: ___ State: NY Sampling Point: DP28
Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1128 Long: -78.9593 Datum: WGS1984
Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___
Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ___	No X	**within a Wetland? Yes** ___ **No** X
Wetland Hydrology Present?	Yes ___	No X	If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

Data point taken near Wetland 11, flag Y3.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? Yes ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ____ State: NY Sampling Point: DP29

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1135 Long: -78.9588 Datum: WGS 84

Soil Map Unit Name: OdA - Odessa silty clay loam, 0 to 3% slopes NWI classification: PSS1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___
If yes, optional Wetland Site ID: Wetland 8 (XX19)

Remarks: (Explain alternative procedures here or in a separate report.)
Scrub-shrub wetland. Appears to have formed within a man-made depression.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- X Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP29

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Cornus amomum*	30	Yes	FACW
2. *Cornus racemosa*	20	Yes	FAC
3. *Populus deltoides*	20	Yes	FAC
4.			
5.			
6.			
7.			
	70	=Total Cover	

Herb Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		180 (B)

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	
6-12	10YR 4/1	85	10YR 4/6	15	C	M	Loamy/Clayey	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
? Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ________

Depth (inches): ________

Hydric Soil Present? **Yes** X **No** ____

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ___ State: NY Sampling Point: DP30

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): Relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1138 Long: -78.9587 Datum: WGS 84

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___
Hydric Soil Present? Yes ___ No X
Wetland Hydrology Present? Yes ___ No X

Is the Sampled Area within a Wetland? **Yes** ___ **No** X
If yes, optional Wetland Site ID: ___

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken in successional scrub-shrub upland between Wetlands 9 and 10.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)

___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes ___ No X Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP30

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 x 10')			
1. *Cornus racemosa*	40	Yes	FAC
2. *Rhamnus cathartica*	50	Yes	FAC
3.			
4.			
5.			
6.			
7.			
	90	=Total Cover	

Herb Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	90	(A)	270 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation
X 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)
Successional vegetation established in former improved area.

SOIL

Sampling Point DP30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/3	100					Loamy/Clayey	
7-12	7.5YR 4/3	90	10YR 4/6	10	C	M	Loamy/Clayey	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

Data point does not meet the wetland hydrology and soils criteria.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ______ State: NY Sampling Point: DP31

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): None Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1140 Long: -78.9586 Datum: WGS 84

Soil Map Unit Name: OdA - Odessa silty clay loam, 0 to 3% slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil X , or Hydrology ___ significantly disturbed? Are “Normal Circumstances” present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ___

Hydric Soil Present? Yes X No ___

Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___

If yes, optional Wetland Site ID: Wetland 10 (K2)

Remarks: (Explain alternative procedures here or in a separate report.)
Scrub-shrub wetland. Appears to have formed within a man-made depression.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
X Sparsely Vegetated Concave Surface (B8)
X Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP31

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Cornus amomum*	30	Yes	FACW
2. *Cornus racemosa*	20	Yes	FAC
3. *Populus deltoides*	20	Yes	FAC
4.			
5.			
6.			
7.			
	70	=Total Cover	

Herb Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	

Woody Vine Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	30	x 2 =	60
FAC species	40	x 3 =	120
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	70 (A)		180 (B)

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point DP31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	
6-12	10YR 4/1	85	10YR 4/6	15	C	M	Loamy/Clayey	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
X Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
X Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/3/2021

Applicant/Owner: ______ State: NY Sampling Point: DP32

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): relatively flat to sloping Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1137 Long: -78.9581 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X
Hydric Soil Present? Yes X No ___
Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? **Yes** X **No** ___
If yes, optional Wetland Site ID: Wetland 11 (YY8)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
X Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? Yes X No ___ Depth (inches): 6
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP32

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Sapling/Shrub Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		

Herb Stratum (Plot size: 10 x 10')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		

Woody Vine Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:		
OBL species	0	x 1 =	0	
FACW species	0	x 2 =	0	
FAC species	0	x 3 =	0	
FACU species	0	x 4 =	0	
UPL species	90	x 5 =	450	
Column Totals:	90	(A)	450	(B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is actively farmed and recently harvested of corn.

SOIL

Sampling Point DP32

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/1	100					Loamy/Clayey	Plow Layer
7-13	10YR 4/1	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
x Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ___
Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara/Niagara Sampling Date: 12/3/2021

Applicant/Owner: ______ State: NY Sampling Point: DP33

Investigator(s): RM Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain Local relief (concave, convex, none): ______ Slope %: 0-5

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.1140 Long: -78.9582 Datum: WGS1984

Soil Map Unit Name: OdA - Odessa silty clay loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation X , Soil ____ , or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X

Hydric Soil Present? Yes ____ No X

Wetland Hydrology Present? Yes ____ No X

Is the Sampled Area within a Wetland? **Yes** ____ **No** X

If yes, optional Wetland Site ID: ______

Remarks: (Explain alternative procedures here or in a separate report.)
Data point taken within an active farm field (corn); harvested at the time on observation.

Data point taken in upland between Wetland 10 and 11.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- ____ Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes ____ No X Depth (inches): ____

Saturation Present? Yes ____ No X Depth (inches): ____
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ____ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP33

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Herb Stratum (Plot size: ______)			
1. *Zea mays*	80	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	80	=Total Cover	

Woody Vine Stratum (Plot size: ______)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	80	x 5 =	400
Column Totals:	80	(A)	400 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn harvested at the time of observation. Corn stalk bases still visible.

SOIL

Sampling Point DP33

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2						Loamy/Clayey	plow layer
7-13	7.5YR 4/3	90	10YR 4/6	10	C	M	Loamy/Clayey	Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/01/2021

Applicant/Owner: ______ State: NY Sampling Point: DP34

Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Terrene non-riparian basin Local relief (concave, convex, none): Concave - isolated Slope %: >2%

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.117654 Long: -78.962911 Datum: WGS1984

Soil Map Unit Name: Lc - Lakemont silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation X , Soil X , or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___ , Soil ___ , or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ___ No X

Hydric Soil Present? Yes X No ___

Wetland Hydrology Present? Yes X No ___

Is the Sampled Area within a Wetland? Yes X **No** ___

If yes, optional Wetland Site ID: Wetland 3 (T10)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- X Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? Yes X No ___ Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? Yes X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP34

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	
Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation
2 - Dominance Test is >50%
3 - Prevalence Index is ≤3.0^{1}
4 - Morphological Adaptations^{1} (Provide supporting data in Remarks or on a separate sheet)
X Problematic Hydrophytic Vegetation^{1} (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is an active wet corn agricultural field. No other vegetation was present in this area at the time of site inspection. The corn had already been harvested. However, the corn stalk bases were still visible.

SOIL

Sampling Point DP34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	90	10YR 4/4	10	C	M		Dense clay present throughout layers
6-20	10YR 3/1	90	10YR 4/4	10	C	M		Distinct redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/01/2021

Applicant/Owner: ______ State: NY Sampling Point: DP35

Investigator(s): V. Schaller Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2

Landform (hillside, terrace, etc.): Plain, hedge row Local relief (concave, convex, none): Convex Slope %: >2%

Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.117650 Long: -78.963064 Datum: WGS1984

Soil Map Unit Name: Oda - Odessa silty clay loam, 0 to 3 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No X	**Is the Sampled Area**
Hydric Soil Present?	Yes ___ No X	**within a Wetland? Yes ___ No X**
Wetland Hydrology Present?	Yes ___ No X	If yes, optional Wetland Site ID: N/A

Remarks: (Explain alternative procedures here or in a separate report.)
Scrub/treeline between agricultural fields separating Wetlands S and T.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9)
___ Aquatic Fauna (B13)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres on Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___ Surface Soil Cracks (B6)
___ Drainage Patterns (B10)
___ Moss Trim Lines (B16)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Soils were saturated due to a recent rain and snow event.

VEGETATION – Use scientific names of plants.

Sampling Point: DP35

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	20	Yes	FAC
2. *Quercus rubra*	40	Yes	FACU
3.			
4.			
5.			
6.			
7.			
	60	=Total Cover	

Sapling/Shrub Stratum (Plot size: 10 x 10')			
1. *Cornus racemosa*	20	Yes	FAC
2. *Malus coronaria*	5	Yes	UPL
3.			
4.			
5.			
6.			
7.			
	25	=Total Cover	

Herb Stratum (Plot size: 10 x 10')			
1. *Artemisia vulgaris*	10	Yes	UPL
2. *Solidago*	10	Yes	
3. *Poa*	5	Yes	
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25	=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28.6% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	40	x 4 =	160
UPL species	15	x 5 =	75
Column Totals:	95	(A)	355 (B)

Prevalence Index = B/A = 3.74

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
Corn was harvested prior to site visit. Corn stalk bases still visible.

SOIL

Sampling Point DP35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/3	100						Dense clay present throughout layers
7-18	7.5YR 4/3	90	10YR 4/6	10	C	M		Prominent redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)
___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 18

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

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WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Niagara NY Site City/County: Niagara, Niagara County Sampling Date: 12/01/2021
Applicant/Owner: ____ State: NY Sampling Point: DP36
Investigator(s): C. Amundson Section, Township, Range: 132.18/1/2, 146.05/1/9, 146.06/1/1&2
Landform (hillside, terrace, etc.): Terrence non-riparian basin Local relief (concave, convex, none): Concave - isolated Slope %: >2%
Subregion (LRR or MLRA): LRR L, MLRA 101 Lat: 43.117697 Long: -78.963144 Datum: WGS1984
Soil Map Unit Name: Lc - Lakemont silty clay loam, 0 to 3 percent slopes NWI classification: PEM1Ef
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are Vegetation X , Soil X , or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes X No ____
Are Vegetation ____ , Soil ____ , or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No X
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____

Is the Sampled Area
within a Wetland? **Yes** X **No** ____
If yes, optional Wetland Site ID: Wetland 4 (S8)

Remarks: (Explain alternative procedures here or in a separate report.)
The area is actively farmed with corn crop. As such, the soil is disturbed from farming activity, inlcuding tilling. Vegetation is problematic.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ____ Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15)
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- X Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Stunted or Stressed Plants (D1)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X Microtopographic Relief (D4)
- ____ FAC-Neutral Test (D5)

Field Observations:
Surface Water Present? Yes ____ No ____ Depth (inches): ____
Water Table Present? Yes ____ No ____ Depth (inches): ____
Saturation Present? Yes ____ No x Depth (inches): 0
(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP36

Tree Stratum (Plot size: N/A)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Sapling/Shrub Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
		=Total Cover	

Herb Stratum (Plot size: 10 x 10')			
1. *Zea mays*	90	Yes	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90	=Total Cover	

Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
3.			
4.			
		=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90	(A)	450 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

X Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)
This area is an active wet corn agricultural field. No other vegetation was present in this area at the time of site inspection. The corn had already been harvested. However, the corn stalk bases were still visible.

SOIL

Sampling Point DP36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	90	10YR 4/4	10	C	M		Dense clay present throughout layers
6-20	10YR 3/1	90	10YR 4/4	10	C	M		Distinct redox concentrations

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Depleted Below Dark Surface (A11)
X Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7)

___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
___ High Chroma Sands (S11) (**LRR K, L)**
___ Loamy Mucky Mineral (F1) (**LRR K, L**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
X Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
___ Coast Prairie Redox (A16) (**LRR K, L, R**)
___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
___ Polyvalue Below Surface (S8) (**LRR K, L**)
___ Thin Dark Surface (S9) (**LRR K, L**)
___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
___ Red Parent Material (F21)
___ Very Shallow Dark Surface (F22)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Refusal

Depth (inches): 18

Hydric Soil Present? **Yes** X **No** ___

Remarks:
This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to include the NRCS Field Indicators of Hydric Soils, Version 7.0, 2015 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

ATTACHMENT B

THREATENED AND ENDANGERED SPECIES CORRESPONDENCE

MARCH 3, 1849

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
Phone: (607) 753-9334 Fax: (607) 753-9699
http://www.fws.gov/northeast/nyfo/es/section7.htm

In Reply Refer To:
Consultation Code: 05E1NY00-2022-SLI-0268
Event Code: 05E1NY00-2022-E-03271
Project Name: Niagara

January 04, 2022

Subject: Updated list of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq*.). This list can also be used to determine whether listed species may be present for projects without federal agency involvement. New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list.

Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the ESA, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list. If listed, proposed, or candidate species were identified as potentially occurring in the project area, coordination with our office is encouraged. Information on the steps involved with assessing potential impacts from projects can be found at: http://www.fws.gov/northeast/nyfo/es/section7.htm

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq*.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the Services wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the ESA. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

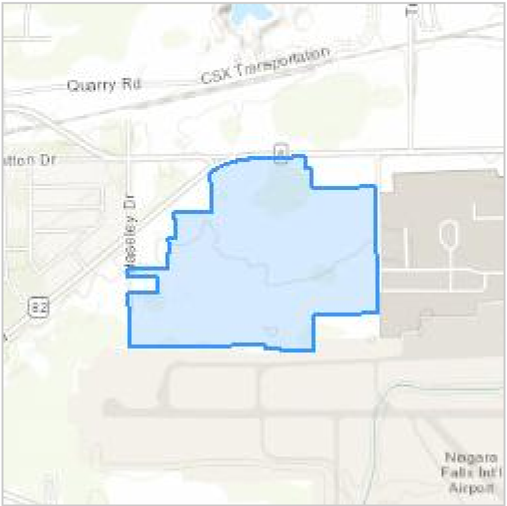
This species list is provided by:

New York Ecological Services Field Office
3817 Luker Road
Cortland, NY 13045-9385
(607) 753-9334

Project Summary

Consultation Code: 05E1NY00-2022-SLI-0268
Event Code: Some(05E1NY00-2022-E-03271)
Project Name: Niagara
Project Type: ** OTHER **
Project Description: due diligence
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.1166705,-78.9594529637188,14z



Counties: Niagara County, New York

Endangered Species Act Species

There is a total of 1 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife, New York Natural Heritage Program
625 Broadway, Fifth Floor, Albany, NY 12233-4757
P: (518) 402-8935 | F: (518) 402-8925
www.dec.ny.gov

November 3, 2021

Sarah Parks
Langan
300 Kimball Drive, 4th floor
Parsippany, NJ 07054-217

Re: 8995 Lockport Rd
County: Niagara   Town/City: Niagara

Dear Sarah Parks:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to the above project.

Enclosed is a report of rare or state-listed animals and plants, and significant natural communities that our database indicates occur in the vicinity of the project site.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our database. We cannot provide a definitive statement as to the presence or absence of all rare or state-listed species or significant natural communities. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

The presence of the plants and animals identified in the enclosed report may result in this project requiring additional review or permit conditions. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the NYS DEC Region 9 Office, Division of Environmental Permits, at dep.r9@dec.ny.gov.

Sincerely,

Heidi J Krahling

Heidi Krahling
Environmental Review Specialist
New York Natural Heritage Program

926

New York Natural Heritage Program — Report on State-listed Animals

The following state-listed animals have been documented in the vicinity of the project site.

The following list includes animals that are listed by NYS as Endangered, Threatened, or Special Concern; and/or that are federally listed.

For information about any permit considerations for your project, please contact the Permits staff at the NYSDEC Region 9 Office at dep.r9@dec.ny.gov, (716) 851-7165.

The following species has been documented within 1/4 mile of the project site.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Birds				
Short-eared Owl *Nonbreeding -- Wintering Areas*	*Asio flammeus*	Endangered		14570

This report only includes records from the NY Natural Heritage database.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the listed animals in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, and from NYSDEC at www.dec.ny.gov/animals/7494.html.

New York Natural Heritage Program

Report on Rare Animals, Rare Plants, and
Significant Natural Communities

The following rare plants, rare animals, and significant natural communities have been documented at the project site, or in its vicinity.

We recommend that potential impacts of the proposed project on these species or communities be addressed as part of any environmental assessment or review conducted as part of the planning, permitting and approval process, such as reviews conducted under SEQR. Field surveys of the project site may be necessary to determine the status of a species at the site, particularly for sites that are currently undeveloped and may still contain suitable habitat. Final requirements of the project to avoid, minimize, or mitigate potential impacts are determined by the lead permitting agency or the government body approving the project.

The following animal, while not listed by New York State as Endangered or Threatened, is rare in New York and is of conservation concern.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*HERITAGE CONSERVATION STATUS*
Crustaceans			
Devil Crawfish	*Lacunicambarus diogenes*	Unlisted	Imperiled in NYS

Documented within 50 yards south of the project site at the Niagara Falls Air Force Reserve Base. 2000-11-03: The crawfish were observed in a ditch with cattails, purple loosestrife, watercress, water plantain, curly dock, and duckweed. There is a mowed meadow on both sides of the ditch. 11179

This report only includes records from the NY Natural Heritage database. For most sites, comprehensive field surveys have not been conducted, and we cannot provide a definitive statement as to the presence or absence of all rare or state-listed species. Depending on the nature of the project and the conditions at the project site, further information from on-site surveys or other sources may be required to fully assess impacts on biological resources.

If any rare plants or animals are documented during site visits, we request that information on the observations be provided to the New York Natural Heritage Program so that we may update our database.

Information about many of the rare animals and plants in New York, including habitat, biology, identification, conservation, and management, are available online in Natural Heritage's Conservation Guides at www.guides.nynhp.org, from NatureServe Explorer at www.natureserve.org/explorer, and from USDA's Plants Database at http://plants.usda.gov/index.html (for plants).

ATTACHMENT C

QUALIFICATIONS OF PREPARERS

Robert March, PWS

Senior Project Scientist

Environmental Permitting, Wetland Delineation, Wetland Mitigation, Threatened and Endangered Species Surveys

18 years in the industry ~ 17 years with Langan

Mr. March has over 17 years of professional experience providing natural resources and environmental permitting services. Mr. March is a certified Professional Wetland Scientist and has performed hundreds of wetland site investigations and delineations and has prepared and coordinated numerous permit applications in New York and New Jersey in accordance with local, state and federal freshwater and tidal wetland/waters programs, coastal zone rules, and environmental assessments/impact statements. Additional experience includes wetland mitigation design and wetland mitigation monitoring and proficiency in ecological assessments, including wildlife assessments and vegetative inventories.

Selected Projects

- Warehouse Distribution Project – Clay, NY
- Project Olive – Grand Island, NY
- Geer Road Solar – Kingsbury, NY
- Project ROC1 – Gates, NY
- Project Redtail – East Fishkill, NY
- Cherrywood Development Site – New Hartford, NY
- Pratt Landing – New Rochelle, NY
- Cypress Creek Renewables – Pearl Solar, Batavia, NY
- Cypress Creek Renewables – Cardiff Solar, Cambria, NY
- Cypress Creek Renewables – Starpoint Solar, Pendleton, NY
- Valley Cottage Industrial – Valley Cottage, NY
- Airmont Plaza – Airmont, NY
- ORU – West Warwick Substation, Warwick, NY
- ORU – South Goshen Substation, Goshen, NY
- ORU – Little Tor Substation, Clarkstown, NY
- The Shops at Nanuet, Nanuet, NY
- Matrix Business Park, Newburgh, NY
- Montgomery Distribution Facility, Montgomery, NY
- Liberty Business Park, Liberty, NY
- 2505 Bruckner Boulevard – Bronx, NY
- 28-90 Review Ave – Queens, NY
- PANYNJ – JFK International Airport
- Red Hook Logistics – Brooklyn, NY
- New York City Police Academy, Queens, NY
- CBS High Island, Bronx, NY
- Ferry Point Waterfront Park, Bronx, NY
- Staten Island Traffic Improvements – Staten Island, NY
- SUNY Ulster Water Supply Extension, Marbletown, NY
- Ridge 29, Pound Ridge, NY
- Mitigation Project, Staten Island, NY

Education

B.S. Wildlife Management
State University of New York at Cobleskill

A.A.S., Fish and Wildlife Technology
State University of New York at Cobleskill

Professional Registration

Professional Wetland Scientist, NJ

Affiliations

Society of Wetland Scientists

VICTORIA SCHALLER

SENIOR STAFF SCIENTIST

WETLAND DELINEATION & LAND USE PERMITTING

Ms. Schaller has over eight years of experience performing land use consulting services, including conducting numerous wetland site investigations and delineations, completing extensive natural resource due diligence reviews, preparing federal and state wetland, coastal, and floodplain permit applications in New Jersey and New York. Ms. Schaller has also assisted in wetland and riparian zone mitigation monitoring studies in New Jersey. Ms. Schaller has also been involved in the coordination and preparation of environmental/threatened and endangered species assessments, habitat suitability determinations, and mitigation monitoring.

SELECTED PROJECTS

- Black Creek, Robbinsville, NJ
- Valtris Logan, Logan, NJ
- West Essex Logistics Center, Livingston, NJ
- Silver Line Drive, North Brunswick, NJ
- Proposed Senior Housing Development, Little Ferry, NY
- TCC Hercules, Sayreville, NJ
- Kmart Westmount Plaza Redevelopment, Parsippany-Troy Hills, NJ
- Rockefeller – Forest Lane, Carney’s Point, NJ
- ARBOK Kelly Logistics Park North, Carney’s Point, NJ
- Morris County Golf Club Maintenance Facility, Morris, NJ
- GAF Wayne Residential Development, Wayne, NJ
- 1219 Blue Mountain Road, Saugerties, NY
- 125 South New Road, Hicksville, NY
- Union County Government Complex, Elizabeth, NJ
- Stavola-Manchester, Manchester, NJ
- 2547 Maple Ave, Cortlandt NY
- Intercontinental Great Brands LLC, Hanover, NJ
- 1140 Courses Landing Road, Caney’s Point, NJ
- 331 North Virginia Avenue, Carney’s Point, NJ
- 1110 Oak Point Avenue, Bronx, NY
- Foodirect Warehouse, Bronx, NY
- 436 Bloomsbury Road Habitat Suitability Determination, Franklin, NJ
- Equinix – 600 Jefferson Avenue, Secaucus, NJ
- Former Wyeth Tract, West Windsor, NJ
- Medical Facility – 1150 South Avenue, Staten Island, NY
- Sitex – Paramus, Paramus, NJ
- Cramer Site, Pemberton, NJ
- Intersection Improvements – South Avenue at Edward Curry Avenue, Staten Island, NY
- Former Penick Corporation Facility Mitigation Site, Montville, NJ

EDUCATION

B.S. Environmental Studies and Minor Chemistry
State University of East Stroudsburg

M.S. Biology - Emphasis in Environmental Management
State University of East Stroudsburg

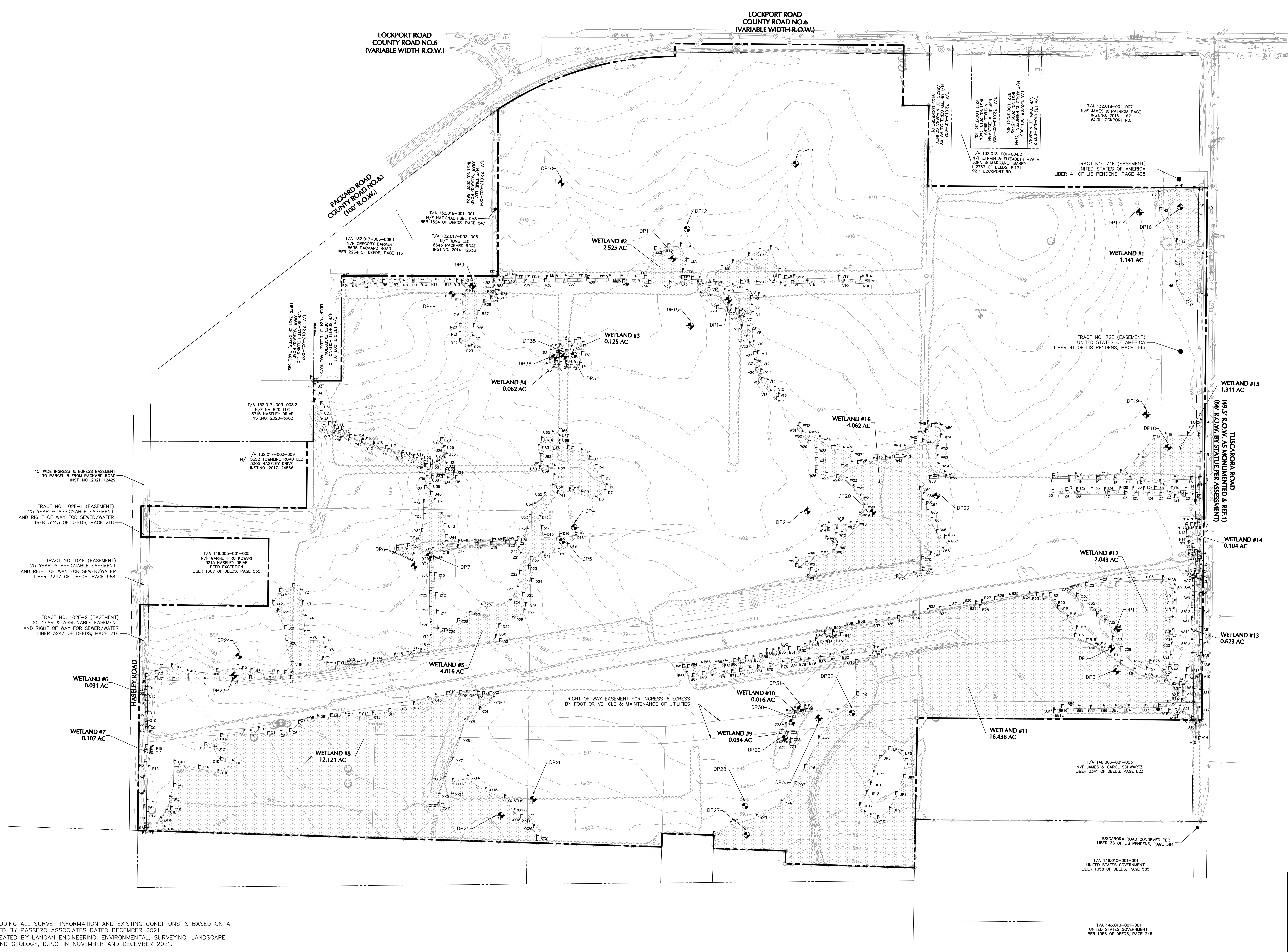
PROFESSIONAL REGISTRATION

Wetland Professional in Training (WPIT)

AFFILIATIONS

Society of Wetland Scientists

DRAWINGS



NOTES:

1) BASE PLAN INCLUDING ALL SURVEY INFORMATION AND EXISTING CONDITIONS IS BASED ON A SURVEY PREPARED BY PASSERO ASSOCIATES DATED DECEMBER 2021.
2) WETLANDS DELINEATED BY LANGAN ENGINEERING, ENVIRONMENTAL, SURVEYING, LANDSCAPE ARCHITECTURE AND GEOLOGY, D.P.C. IN NOVEMBER AND DECEMBER 2021.

150 0 50 100 150
SCALE IN FEET

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR OR GEOLOGIST, TO ALTER THIS ITEM IN ANY WAY.

WETLAND LEGEND

— - —	PROPERTY LINE
─┴─┴─	WETLAND BOUNDARY
⊕	FIELD DATA POINT

Date	Description	No.
	Revisions	

Signature Date

LANGAN
Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
One North Broadway, Suite 910
White Plains, NY 10601
T: 914.323.7400 F: 914.323.7401 www.langan.com

Project
PROJECT FIFI
TAX ID. 132.18-1-2, 146.05-1-9, 146.06-1-1, & 146.06-1-2
TOWN OF NIAGARA
NIAGARA COUNTY NEW YORK

Drawing Title
WETLAND DELINEATION PLAN

Project No.	190071801
Date	JANUARY 4, 2022
Drawn By	CZ
Checked By	RM

Figure
WN101
Sheet 1 of 1

Filename: C:\bms\langan-pw-01\d0141517\FG01-190071801-0203-WN101-0101.dwg Date: 1/25/2022 Time: 09:59 User: czolezi Style Table: Langan.stb Layout: WN101