SPECIAL USE PERMIT APPLICATION
AND ENVIRONMENTAL ASSESSMENT

CIRCULAR enerG FACILITY

0 State Route 96, Romulus, NY 14541

November 2017

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EXECUTIVE SUMMARY

INTRODUCTION

The Circular enerG Facility is a proposed renewable energy project (the "Project") proposed to be constructed on a site (the "Project Site") in the Town of Romulus, at the former Seneca Army Depot (the "Depot"), on part of tax map parcel number 8-1-03.5, bounded northerly by E. Kendaia Road, and westerly by Fayette Road. Circular enerG, LLC (the "Applicant") intends to develop approximately 48 acres of the former Depot into a sustainable waste-to-energy facility ("Facility"), where municipal solid waste would be combusted and converted to renewable energy. ***See* Appendix 0.A**., Site Plans.

The Circular enerG Facility will be a sustainable project, utilizing solid waste as a resource rather than just burying it, while minimizing the emission of greenhouse gases. The Project will be consistent with the concept of a Circular Economy, which is a regenerative system in which resource input and waste, emission, and energy leakage are minimized by closing and narrowing material and energy loops.

The Project will be fully compliant with applicable solid waste, air, and other environmental regulations administered by the New York State Department of Environmental Conservation ("NYSDEC") and federal agencies. The Applicant will be submitting necessary applications to NYSDEC and other agencies to permit the Facility.

The Town of Romulus has already determined that a waste-to-energy facility constitutes "Renewable Energy Production," per the Town's Zoning Ordinance, and is allowed by Special Use Permit. ***See* Appendix 17.B**. Thus, the Applicant has submitted a Special Use Permit Application, with the required Public Notification Form, and a Full Environmental Assessment Form ("FEAF"). The Applicant has also submitted a request to subdivide, per the Town of Romulus Subdivision Regulations, the Project Site from tax map parcel number 8-1-03.5. The Applicant will also seek a variance for the maximum building height, which will be applied for at a later date.

The following additional information, consisting of a narrative, exhibits and reports, is being provided to involved agencies to assist them in review of the Project pursuant to State Environmental Quality Review Act ("SEQRA"). This document supplements the information provided in Part 1 of the Full Environmental Assessment Form. The Part 1 FEAF immediately follows this Executive Summary. To assist in the SEQRA review, this Executive Summary follows the sections of Part 2 of the FEAF. Each section is reviewed and a brief summary of the Project's potential effect in each area is provided. Where appropriate, the summary provides references to the section of the FEAF that contains the supporting information and/or documentation. The summary is qualified in its entirety by reference to the supporting information and documents, including all materials constituting Appendices, and all materials incorporated by reference. This summary is not a complete summary of those materials, but is provided in order to facilitate review.

The Project

The Applicant will construct and operate a waste-to-energy facility at the Project Site, at the former Depot in the Town of Romulus, Seneca County. The Facility will combust municipal solid waste (MSW) and the combustible fraction of construction and demolition debris (C&D) to generate electrical power for sale in the New York market. Residual materials will be recycled, including ferrous and non-ferrous metals, which will be diverted from the waste stream, and/or recovered after combustion.

The New York State Solid Waste Management Plan and State Solid Waste Management Policy, set forth at Environmental Conservation Law ("ECL") §27-0106, prescribe a hierarchy ("Hierarchy") for solid waste management whereby landfilling is the last resort, and energy recovery prior to landfilling is preferred. This Project seeks to execute the policy set forth in the Hierarchy, by constructing and operating a state-of-the-art waste-to-energy facility. At present, waste management in Seneca County and all of NYSDEC Region 8 is inconsistent with this Hierarchy by depending on landfilling almost exclusively. The Facility will improve environmental quality and reduce the carbon footprint from waste generation by utilizing the more preferred option of waste-to-energy. As discussed in Section 6, this will result in a savings of about 168,485 tons per year of carbon dioxide equivalent compared to landfilling.

Waste-to-energy facilities provide a sustainable method of producing energy. The differences between the energy methods and their relative fossil fuel emissions is substantial; with waste-to-energy being the cleanest of all.

Air Emissions of Waste-To-Energy and Fossil Fuel Power Plants
(Pounds per Megawatt Hour)

Facility Type	Carbon Dioxide	Sulfur Dioxide	Nitrogen Oxides
Coal	2,249	13	6
Oil	1,672	12	4
Natural Gas	1,135	0.1	1.7
Waste-To-Energy	837	0.8	5.4

Source: "Comparison of Air Emissions from Waste-to-Energy Facilities to Fossil Fuel Power Plants." 2005, SWANA Applied Research Foundation, by Jeremy O'Brien.

http://www.mcilvainecompany.com/industryforecast/incinerators/overview/IWSA_2007_Directory2.pdf

The Project Site will consist of a main processing building and a number of outparcel buildings. The main processing building contains the majority of the components required for the waste-to-energy process. ***See*** **Appendix 0.B** for a detailed overview of the proposed Facility. MSW and C&D waste will be delivered to the main processing building by a combination of road transfer trailers and rail cars within sealed containers designed specifically for waste transport.

The Project is planned to be comprised of two phases. Construction of Phase 1 is estimated to begin in about December 2019. By about December 2021, when construction of Phase 1 is complete, the Facility can begin accepting, on average, 1,320 tons per day ("tpd") (1,200 metric

ton per day ("mtpd"), and producing less than 25 megawatts ("MW") of energy. During Phase 2, slated to be completed by December 2023, waste acceptance can increase, on average, to 2,640 tpd (2,400 mtpd) per day, and the Applicant may elect to increase electric generating capacity to 50 MW of energy.

The anticipated permits and approvals required for the Facility include the following:

Government Entity	**Anticipated Permit or Approval**	**Projected Application Date**
Romulus Planning Board	Special Use Permit	November 6, 2017
Romulus Planning Board	Subdivision	November 6, 2017
Romulus ZBA	Area Variance(s)	Fall 2017
Romulus Town Board	Host Community Agreement and/or PILOT Agreement	Fall 2017
Seneca County Sewer District #2	Connection to Sewer Plant	Fall 2017
Seneca County Water District #1	Water Supply	Fall 2017
Seneca County IDA	Host Community Agreement and/or PILOT Agreement	Fall 2017
Romulus Central School District	Host Community Agreement and/or PILOT Agreement	Fall 2017
NYSDEC	6 NYCRR Part 360 Solid Waste Management Facility Permit- Part 362-1 Combustion Facilities and Thermal Treatment Facilities	Fall 2017
NYSDEC	6 NYCRR Part 601 Water Withdrawal Permit	Fall 2018
NYSDEC	SPDES General Permit for Stormwater Discharges from Construction Activity	Fall 2018
NYSDEC	SPDES Multi Sector General Permit for Stormwater Discharges from Industrial	Fall 2018
NYSDEC/ USACE	Joint Application for Federal Wetland Disturbance	January 2018
NYSDEC	6 NYCRR 613 Control of the Bulk Storage of Petroleum	Winter 2018
NYSDEC	Article 19 Environmental Conservation Law – 6 NYCRR Parts 201-6 Title V Facility Permits, and 231 New Source Review for New and Modified Facilities	Winter 2018
NYSDEC	6 NYCRR Part 608, Water Quality Certification	Winter 2018
NYSDEC	Article 17 Environmental Conservation Law – 6 NYCRR Part 750 –SPDES Permit	Winter 2018
NYSDOH	Cooling Tower Registry	Fall 2018
USEPA	Title V Clean Air Act Permit	Fall 2018
USACE	404 Wetland Permit	January 2018

The Applicant also anticipates that if the electric capacity is proposed to be increased in Phase 2 to 25 MW or greater, permission will be required by the New York State Board on Electric Generation Siting and the Environment pursuant to Article 10 of the Public Service Law.

Seneca Army Depot

The Depot is a 10,587-acre military facility located in Seneca County, in the Town of Varick and Romulus. The former military facility was owned by the U.S. Government and operated by the Army between 1941 and approximately 2000, when the Depot military mission ceased. Depot's historic military mission included receipt, storage, distribution, maintenance, and demilitarization of conventional ammunition, explosives and special weapons.

The peak civilian employment at the Depot was reached in July 1943 when 2511 people from 60 different communities were employed there. On July 14, 1989, the United States Environmental Protection Agency ("USEPA") proposed the Depot for inclusion on the National Priorities List ("NPL"). The USEPA recommendation was approved and finalized on August 30, 1990, when the Depot was listed in Group 14 of the Federal Facilities portion of the NPL. Once the Depot was listed on the NPL, the Army, the USEPA, and NYSDEC identified 57 solid waste management units ("SWMUs") where historic data or information suggested, or evidence existed to support, that hazardous materials or hazardous wastes had been handled and may have been released and migrated into the environment. This list of SWMUs was subsequently expanded to include 72 sites. The Depot was a hazardous waste Generator and Treatment, Storage and Disposal Facility and thus, subject to regulation under the Resource Conservation and Recovery Act. Under this permit system, corrective action is required at all SWMUs, as needed.

In 1995, the Depot was designated for closure under the Department of Defense Base Realignment and Closure ("BRAC") process. With the Depot's inclusion on the BRAC list, the Army's emphasis expanded from expediting necessary investigations and remedial actions at prioritized sites to include the release of non-affected portions of the Depot to the surrounding community for their reuse for non-military purposes (i.e., industrial, municipal, and residential). The contamination at the Depot is currently being managed by the United State Army Corps of Engineers ("USACE"), and the Depot is listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites (State Superfund List), as a Class 2 Site, Site No. 850006. Through the BRAC process, the U.S. Army issued a Finding of Suitability to Transfer portions of the Depot to Seneca County Industrial Development Agency ("SCIDA"), which it did in 2005 and 2011. Seneca Depot, LLC, the current owner of the Project Site, then purchased roughly 1,000 acres of the Depot from the SCIDA on November 4, 2014. The Applicant intends to purchase or lease the Project Site, following subdivision from the 1,000-acre holdings of Seneca Depot, LLC.

SECTION 1 - LAND

Section 1 of Part 2 of the Full Environmental Assessment Form asks whether the Project may involve construction on, or physical alteration of, the land surface of the Project Site. Although the Project will involve construction and alteration of land, it will not result in a significant adverse impact on land.

Currently, the Project Site contains abandoned buildings, parking lots and areas of shrubs and dense vegetation. The Project Site is located on a glacial till plain in the eastern lake section of the Central Lowland Physiographic Province. This glacial till consists of a highly heterogeneous mixture of silts, clay, sand, and minor gravel. The glacial till is underlain by bedrock from the Devonian age Hamilton Group. While four separate formations comprise this group, the Project Site is dominated by Moscow Shale. Moscow Shale is gray, calcareous shale that is friable and less calcareous in the upper third grading to more calcareous and fossiliferous in the lower two-thirds of its approximate 140-foot (43 m) thickness. Joint openings are prevalent throughout the entire formation.

Bedrock is relatively shallow within the Project Site. The Project Site is generally flat (0%-5% slope). To accommodate the tipping floor with sufficient waste storage for efficient operations, the Facility design requires a substantial change in elevation which can be accomplished either below or above ground, or a combination of both. Due to the shallow bedrock, subgrade Facility components may be cost-prohibitive. In addition to the shallow bedrock, groundwater is also shallow in the target location. Groundwater is believed to be between 2.0 feet (0.6 m) and 5.0 feet (1.5 m) below ground surface. Special construction and design approaches must be utilized to protect underground structures. All construction will be performed pursuant to the standards and requirements of the Town, including hours of operation.

The Project is utilizing land that is deed restricted, and only suitable for commercial or industrial uses. In fact, the Project Site is within an area where paint had allegedly been disposed of, and near the area of two former deactivation furnaces. These areas required excavation of contaminated soil, and require continued groundwater monitoring. These areas cannot be used for residential purposes. The Project will not interfere with the on-going groundwater monitoring. The Project seeks to turn these contaminated lands into a beneficial use for the community.

To alleviate impacts to the land from the Project, the Project will implement an Integrated Pest Management Plan ("IPM"), which will significantly reduce herbicide and pesticide in runoff. While the Project Site is not located within an agricultural area, the Applicant is sensitive to the fact the surrounding areas are agricultural in nature, and the Project's proximity to Seneca Lake. An IPM Plan is defined by the Food and Agriculture Organization of the United Nations as follows:

> Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest

control mechanisms.

Through the use of this methodology, herbicide and pesticide contaminants in post-construction stormwater discharges will be minimized.

Therefore, the Project will not result in any significant adverse impacts on land.

SECTION 2 – GEOLOGICAL FEATURES

Section 2 of Part 2 of the Full Environmental Assessment Form asks whether the Project may result in the modification or destruction of, or inhibit access to, any unique or unusual land forms on the site (e.g., cliffs, dunes, minerals, fossils, caves). The Project will not, and thus will not result in a significant adverse impact on geological features.

The New York State Environmental Resource Mapper was utilized to determine that there are no Unique Land or Geologic Features on the Project Site. The Project Site is located within the former Depot, and has been substantially disturbed since the 1940's. ***See*** **Appendix 2.A**, USGS Map.

Therefore, no unique or unusual land forms were found on or adjacent to the Project Site that would be impacted by the Project.

SECTION 3 – SURFACE WATER

Section 3 of Part 2 of the Full Environmental Assessment Form asks whether the Project may affect one or more wetlands or other surface waterbodies (e.g., streams, rivers, ponds or lakes). Impacts of the Project on wetlands or other surface water bodies will not be significant adverse impacts.

Wetlands

Daigler Engineering, PC ("DE") performed a wetland delineation within the Project Site area on July 10-11, 19-20, and 26, 2017. The wetland delineation was conducted in accordance with the January 1987 *Corps of Engineers Wetland Delineation Manual*, and the January 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2). The results of this wetland delineation are presented in a report entitled *Wetland Delineation Report: Green Energy Facility*, dated August 2017. ***See*** **Appendix 3.A**. The wetland delineation report identified 25 wetland areas totaling 7 acres.

The wetland delineation report was submitted to NYSDEC and USACE for review with a request for a wetland boundary confirmation, and a field visit. USACE conducted the wetland boundary confirmation, and field visit with DE on October 24, 2017. The USACE field visit resulted in the removal of one wetland area from the delineated wetland areas, and a revision to the boundary of two wetland areas. One wetland area was slightly increased in size, while the other was significantly decreased, so the updated total wetland area is approximately 5.51 acres. The USACE determined that five wetlands were connected to waters of the United States, totaling

approximately 1.21 acres. Four other wetland areas were suspected to be connected to waters of the United States. ***See*** **Appendix 3.B**., for Revised Wetland Delineation Map.

The USACE requested the August 2017 Wetland Delineation Report be revised to include the site topography, and a detailed description of the nearest conveyance for each wetland to complete their jurisdictional determination. DE will revise the August 2017 Wetland Delineation Report as requested, and seek a preliminary jurisdictional determination for the jurisdictional wetlands, and an approved jurisdictional determination for the isolated non-jurisdictional wetlands.

The design of the Facility will minimize impacts to the preliminary jurisdictional wetlands, but it will not be feasible to avoid all impacts. Out of the 5.51 acres of presumed wetlands, the Project will only disturb 0.63 acres. Regardless, these wetlands are highly disturbed and contain invasive species, so mitigation efforts can be accomplished easily. Any permanent disturbances to preliminary jurisdictional wetlands, if in excess of 0.1 acres, will be mitigated at an off-site location using an area ratio greater than 1:1. The Applicant will seek a federal 404 Permit as necessary for construction.

Stormwater Pollution Prevention Plan

The Applicant has prepared a Stormwater Pollution Prevention Plan ("SWPPP") pursuant to NYSDEC regulations. ***See*** **Appendix 3.C**. The Applicant will obtain coverage under the SPDES General Permit for Stormwater Discharges from Construction Activity, NYS GP-0-15-002.

The Project's SWPPP complies with NYSDEC regulations, and provides a design ensuring that both construction and post-construction operations will not result in increased erosion. The SWPPP provides for the construction and post-construction practices necessary to address the stormwater runoff condition from the Project Site. Stormwater runoff will flow, by gravity, to on-site catch basins, swales and ditches routed to stormwater management facilities. The stormwater management facilities will be designed to provide initial stormwater treatment. Stormwater runoff that does not exceed the design storm event will be reserved on-site for treatment in the raw water treatment system and be used as make-up process water. This method of stormwater management is beneficial to meet stormwater permit requirements and to reduce the raw water withdrawal from Seneca Lake.

The Project will not result in an increase in the peak rate of runoff from the Project Site, and it will maintain existing flow paths throughout the Project Site. The implementation of the construction erosion control portion of the SWPPP will provide for on-site control of sediment and silt runoff, and will protect waters from silt accumulation. The Applicant also will implement an IPM Plan, which will significantly reduce the runoff of stormwater containing pesticides and herbicides.

Water Supply Demand

Attached as **Appendix 3.D.** Engineering Report, prepared by Costich Engineering, D.P.C.,

which details water supply demand. The freshwater requirements include high purity boiler feed water, makeup water for boilers and cooling, water for fire protection and potable water for domestic use. The Facility will have a raw water demand of approximately 445,000 gallons per day (gpd) (1,685m^3/d), which will be withdrawn from Seneca Lake, about 3.75 miles (6.0 km) west of the Project Site, from an existing water intake formerly utilized by the Depot. Required improvements include relining an abandoned 8-inch (20 cm) pipe, and installing a new pump in the existing wet well. Raw water will be tested during the final design stage to identify the specific treatment processes and equipment that will be required.

However, a municipal water supply is available from the Village of Waterloo Water Department and can be used for domestic water flow and to feed the fire hydrants on site. A dedicated fire service will serve the site for emergency use only. This service is for emergency, fire protection use only and will not be metered by the municipality. Hydrant flow tests at the Project Site indicate a significant pressure drop between the static and residual flow. Therefore, the fire hydrants will be separated from the process/fire protection water that will be used to pressurize the building sprinkler system.

Domestic water, for use in the Facility lavatories, laboratories and kitchens, will also be obtained from the Village of Waterloo municipal water supply. Domestic wastewater will discharge to the nearby 10 inch (25 cm) and 12 inch (30 cm) diameter clay tile sanitary sewer. This sanitary sewer flows to Seneca County Wastewater Treatment Plant #4, located on West Romulus Road, approximately 1,000 feet (0.3 km) east of Fayette Road.

Wastewater Discharges

The Project Engineering Report also details wastewater discharges, and is attached as **Appendix 3.D.** The Applicant proposes that leachate generated from the MSW will be discharged to Wastewater Treatment Plant #4, operated by Seneca County Water and Sewer Department. Preliminary discussions with the Department indicate that they likely would be willing to work with the Applicant to upgrade Wastewater Treatment Plant #4 to allow raw leachate as influent. Such an improvement would be a major benefit to the community, and is the preferred approach to wastewater management.

However, as an alternative, the Applicant could treat all leachate emanating from the Facility. A new SPDES Individual Wastewater Permit would be required. A perennial stream is not available on-site, so it is anticipated that the NYSDEC State Pollutant Discharge Elimination System ("SPDES") Permit would be required for a discharge to the nearby Reeder Creek. The leachate treatment system would consist of a 1,374,000 gallon equalization tank with leak detection and secondary containment, two 315,000 gallon anaerobic digesters and a 456,000 gallon sludge tank. In addition to these processes, a bio-membrane and nitrification-denitrification sequencing batch reactor and a nano-filtration treatment system would be added to the Facility. Sludge formed as a byproduct from the treatment plant would be directed to the municipal waste combustor as needed for the waste combustion process. Methane generation could occur as part of the anaerobic digestion process. The methane would be routed to the waste combustor to be used as fuel. Operations would be enclosed so noise and odor levels from the system would be controlled. The leachate treatment system would be located outside of wetland impacts. The

connection of a leachate forcemain from the waste pit or effluent discharge pipe may require temporary construction work in the wetlands, but any disruption would be very minor and would be mitigated.

Therefore, the Project will not have any significant adverse impacts on surface waters.

SECTION 4 – GROUNDWATER

Section 4 of Part 2 of the Full Environmental Assessment Form asks whether the Project may result in new or additional use of groundwater, or may have the potential to introduce contaminants to groundwater or an aquifer. The Project will not utilize groundwater, and will not result in any significant adverse impact on groundwater.

The Project Site is encumbered by two environmental easements granted to NYSDEC by the predecessor in title: Instrument Number 2008-00000893, Liber 767/318, dated January 31, 2008, recorded on March 4, 2008, and Instrument Number 2011-00006718, Liber 835/119, dated February 14, 2011, recorded on June 10, 2011. . These easements restricts groundwater use on the Project Site, by forbidding groundwater use without the prior written approval of the USEPA and U.S. Department of the Army. This restriction was imposed due to the contamination from former operations at the Depot. The Project does not call for the use of groundwater.

However, the Project will protect groundwater from further degradation. As discussed above, the Project will implement an IPM Plan, thus minimizing the potential effects of pesticide and herbicide applications upon groundwater resources. Further, any below grade storage of MSW will be accomplished inside a leak-proof concrete structure with secondary containment and leak detection if required by NYSDEC.

The Project calls for the impoundment of liquids, but will take measures to ensure that further degradation does not result. The impoundments will store leachate, boiler feed water, fire suppression water, stormwater, fuel, and chemical. The water for the boiler feed and fire suppression supply will be drawn from Seneca Lake. The approximate size and dimensions of the proposed tanks and impoundments are as follows:

Leachate Tank	Two 52 ft x 23 ft x 10 ft, 90,000 gallon tanks
Boiler Feed Water	200,000 gallons, 43ft (l) x 40ft (w) x 16ft (d)
Fire Suppression	200,000 gallons, 43ft (l) x 40ft (w) x 16ft (d)
Stormwater Management	Four Stormwater Management ponds totaling 2.9 million gallons, dimensions vary
Fuel Storage	4,000 gallons, 24ft (l) x 5.3ft (w) x 5.3ft (h)

The leachate tank will concrete tanks with secondary containment with leak detection. The boiler feed water and fire suppression impoundment structures will be reinforced concrete tanks. The stormwater management structures will be stabilized earthen impoundments.

On-site storage of petroleum will be necessary to provide fuel for on-site equipment. This equipment is predominately for the use of the container loading/unloading area. A 4,000 gallon

(15 m^3) double-walled, above-ground steel tank will be installed on-site with a secondary containment of at least 110% of the volume of the tank. Within the main processing plant, chemicals like slaked lime, activated carbon, and urea will be stored, and used in the flue gas cleaning system. Regular deliveries will be made to minimize the volume of on-site storage that is required.

SECTION 5 – FLOODING

Section 5 of Part 2 of the Full Environmental Assessment Form asks whether the Project may result in development on lands subject to flooding. The Project will not impact lands subject to flooding, and thus will not result in significant adverse flooding impacts.

The Project Site does not contain a recognized 100-year floodplain or 500-year floodplain as identified upon the most recent FEMA FIRM mapping. ***See* Appendix 5.A.** The entire area has been assigned a FEMA flood zone designation of Zone C. Zone C areas are defined as being outside the area of a 500-year flood and therefore have minimal to no risk of flooding.

Therefore, the Project will not result in development of lands that are subject to flooding.

SECTION 6 – AIR

Section 6 of Part 2 of the Full Environmental Assessment Form inquires with respect to a state regulated air emission source from the Project. While there will be state regulated air emissions, the Project will not result in significant adverse impacts on air quality, and will not degrade air quality in the vicinity of the Project Site.

6.1 Process Description and Sources of Air Emissions (Part 1 EAF Question D.2.f)

The Facility will include one or more sources of air emissions at the Project Site, including air emissions from fuel combustion and waste combustion. Mobile air emission sources during Facility operations will include waste unloading and handling equipment. Stationary emissions sources during Project construction will include generators, heaters, and construction equipment. Stationary sources during project operations will include the waste combustion system and process cooling water cooling towers.

The Facility is designed to receive, store, prepare for combustion, and combust 2,640 tpd of MSW, with process outputs including steam that is then used for electric power generation, and bottom ash and baghouse fly ash that is processed for use in concrete mix, aggregates, and fillers and from which metals are recovered and recycled. The Facility operation and process, and related air emission sources, are presented in **Appendix 6.A** and described as follows:

A. Waste Delivery and Material Handling

Waste deliveries are anticipated to be made by intermodal container trucks, transfer trailers, rear loaders, and front loaders (see Section 13 for a discussion of transportation impacts). The waste unloading platform will have 16 dumping platforms, and the truck will back up to the

designated platform to unload the waste into the underlying waste bunker. The waste bunker will have the capacity to store more than 5 days of waste deliveries. During this period, the waste is mixed and anticipated to decompose. Moisture will drain by gravity to a leachate collection pit. At the base of the waste bunker, a grid for leachate drainage will direct leachate toward a leachate collection tank (see Section 3 for a discussion of the leachate management system). Two semi-automatic cranes will be installed above the waste bunker for waste mixing, waste sorting and loading waste into the furnace feed hoppers.

Potential air emissions from the MSW delivery and handling processes include diesel exhaust from waste transfer vehicles entering and exiting the facility. Waste unloading, mixing, combustion, ash handling, waste unloading platform and the waste pit will not be open to air, so any gases produced will be managed by the Facility processes through the combustion air supply system for the furnace.

B. Waste Combustion

The waste combustion technology to be utilized at the Facility will be a moving grate furnace. From the hopper chute, the waste will be fed into the furnace using a moving grate feeding system to ensure that waste is fed into the furnace for combustion at a consistent rate. The moving grates will be designed to dry the waste as it is fed into the furnace, break up large pieces of waste, allow air flow through the grates, and ensure waste will be continuously transferred to the furnace.

A natural gas ignition burner will be provided to start the combustion process in the furnace and a natural gas auxiliary burner is used to raise and maintain a consistent temperature during operations. Heat from the combustion process flue gases will be transferred in the boiler to the boiler water to create steam used to drive electric power generating turbines. Flue gas emissions will be managed through the air pollution control system (discussed below) and bottom ash will be managed through the slag and ash management process (discussed below).

The combustion air supply system will be divided into two systems. The primary air supply system will provide air to the moving grates and furnace for combustion and to preheat the combustion air according to the heat value of incoming waste. This system will pull air from the waste bunker. The secondary air supply system will supply air to the furnace chamber via secondary air nozzles for combustion of gas and regulating furnace temperature and oxygen concentration. Secondary air will be pulled from the furnace area and at the slag extractor to diffuse odorous air and vapor.

The steam generation process will occur at a boiler that works in conjunction with the waste combustion furnace. The boiler will be a single drum, natural circulation water tube boiler. Steam output from the boiler will be at 400°C. Steam will then either sold to neighboring industrial businesses or routed to a steam turbine generator. After routing through the steam turbine generator, the steam will be cooled at an air-cooled cooling tower. The condensate water collected at the cooling tower will then be returned as process water.

C. Air Pollution Control System

The air pollution control system utilizes redundant and backup systems that result in a flue gas that will meet or exceed NYSDEC and USEPA emission standards. A schematic of the system is provided below, followed by a detailed description of the individual processes.

SCHEMATIC DIAGRAM OF THE AIR POLLUTION CONTROL SYSTEM

1. *Carbon Monoxide Control*

Carbon monoxide ("CO") present in the flue gas will result from incomplete combustion in the furnace. The key to achieve complete combustion of CO is control of the flow of secondary air in the furnace to provide sufficient oxygen to maximize the oxidation process, while avoiding a significant reduction in the local gas temperature.

2. *NOx Control*

Nitrogen oxides (NOx) will form from the combustion of nitrogen containing wastes at high temperatures and the fixation from nitrogen in air at very high temperatures. Moving grate furnaces restrain NOx production by combusting the waste at a relatively low temperature and staging air injection to optimize air supply. In addition, Selective Non-catalytic Reduction (SNCR) with the use of urea as a reductant will be used in the flue gas emission control train. Reaction of NOx with the urea forms nitrogen gas and water vapor, resulting in a NOx removal efficiency of up to 50%.

Under typical conditions, the SNCR process is expected to be sufficient to control NOx, but when necessary a secondary control process, selective catalytic reduction (SCR), utilizing ammonia, will be installed and on reserve. The SCR process will be utilized downstream of the bag filter. Removal of particulates decreases fouling of the catalyst; however, the gas may require reheating to bring the flue gas back to optimum temperatures. The ammonia will be injected into the flue gas duct work, then the mixture passes through a catalyst. SCR used in conjunction with SNCR will provide up to 90% removal of NOx.

3. *Acid Gas Control*

Flue gas produced during the waste combustion process will require treatment to remove acid gases such as hydrogen chloride (HCl) and sulfur dioxide (SO2), which result from the combustion of chlorine and sulfur containing materials. Two deacidification methods will be used at the Facility: dry and semi-dry methods. The semi-dry method uses a lime slurry and dry reaction tower in conjunction with a rotary atomizer to atomize the lime slurry absorbent to provide a high removal efficiency with no water discharge. This method is the most frequently used acid gas control technology utilized in the United States. The semi-dry flue gas deacidification process will be the primary method for control for HCl and SO2, providing around 95% removal efficiency.

Treatment of the flue gas using the semi-dry method will entail injection of the lime slurry via rotary atomizers in an adsorber vessel. The water within the slurry will evaporate, cooling the flue gas, while the lime reacts with the acid gases, forming calcium salt particulates which can be removed by the subsequent particulate removal process (i.e., fabric filters).

The dry method uses dry powdered lime, but provides a relatively low removal efficiency of around 80%. The dry method will be installed and on standby for use during periods when target levels of HCl and SO2 are not achieved using the semi-dry system alone and if the semi-dry system is down for maintenance.

4. *Dioxin, Furan, and Heavy Metal Removal*

Dioxins and furans (CDD/CDF) can form as products of incomplete combustion in the presence of chlorine compounds. Heavy metals can be present in low concentrations in the waste feedstock. In addition to utilizing good combustion practices to minimize the potential for formation of CDD/CDF (see CO Control discussion above), dioxins and furans (CDD/CDF), as well as heavy metals (especially, mercury), will be removed from the flue gas using an activated carbon injection system. Fine particles of activated carbon will be evenly mixed with the flue gas within the ductwork downstream of the semi-dry reaction tower. Sufficient contact time will be provided to achieve high adsorption and cleaning efficiency. Once the pollutants are adsorbed onto the activated carbon, the particulates can be removed by a subsequent treatment process (i.e., fabric filters).

5. *Particulate Control*

Particulate control will be achieved with fabric filters sewn into cylindrical tubes or bags. The flue gas will pass through the bag filters from outside to inside. Particulates, calcium salts, unreacted lime, and activated carbon particles will be collected on the surface of the filter, mainly through inertial compaction. This will form a dust cake layer. The dust cake layer will provide additional removal of pollutants as the flue gas passes through the unreacted lime and activated carbon found within the layer. The cleaned gas will be emitted out the bag filter via top plenums above a supporting plate for the filter media.

The cleaning of the bag filters will be carried out by pulse jet air. The differential pressure across the bag filter will be monitored and automatically controls the pulse jet cleaning system.

D. Slag and Ash Management

1. *Bottom Ash*

Through the process of MSW combustion approximately 25% by weight of the incoming waste will be reduced to ash which will be collected at the bottom of the furnace. This ash can be combined with slag pulled from the bottom of the boilers. The bottom ash and boiler slag will be processed for recovery of metals. After the metals are removed, the residual ash/slag will be prepared and sold for use in concrete mix, aggregates, and fillers.

The proposed bottom ash/boiler slag handling process will be housed in an enclosed building and includes initial screening with overhead magnets to pull out large (>1.25 inches) ferrous materials, including items such as non-perishable food cans, utensils, and grates. A second screen will further divide the material into less than 0.4-inch and 0.4-inch to 1.25-inch size classes. Both size classes will be processed by a magnetic drum separator for additional ferrous metals recovery, and an eddy current separator for non-ferrous metals (primarily aluminum) recovery. The ash in the smallest size class (< 0.4 inches) can be sold as a replacement material for concrete sand for use in cement blocks, sidewalks, or other concrete products. The remaining ash in the two larger sized classes will be crushed with an impact crusher, and reprocessed if needed, to achieve the sand-like particle size distribution necessary to be used in the production of concrete (i.e., 100% < 0.4 inches (10 mm)).

2. *Fly Ash*

Fly ash will be collected in the bag filters used in the air pollution control system. Generally, fly ash will be produced at a rate of approximately 5% of the incoming waste, by weight. After initial screening, fly ash can be mixed with the smallest size class (< 0.4 inches (10 mm)) of bottom ash and sold as a replacement material for concrete sand.

E. Dust Control

Dust controls measures will be implemented at the commencement of construction in accordance with the NYSDEC *Standards and Specifications for Erosion and Sediment Control* referenced as **Appendix 6.C**. A water truck has will be utilized on-site during construction, providing dust control on haul roads and actively worked areas. Street sweeping will occur as necessary to clean the roadways of any dust that has accumulated on adjacent streets so that it does not pose an impact to traffic safety. Both temporary and permanent stabilization will be utilized to control dust and applied in accordance with the NYSDEC General Permit requirements, including vegetative cover, straw mulching, and stone stabilization.

Additionally, dust generated during waste management and ash processing operations will be exhausted through the furnace supply air system and captured in the particulate control system.

6.2 Permitting Requirements (Part 1 FEAF Questions D.2.g and D.2.g(i))

The Project will require a federal Title V and Prevention of Significant Deterioration (PSD) air permit to operate because emissions of nitrogen oxides (NOx), and potentially sulfur dioxide (SO2) hydrogen chloride (HCl) exceed the triggering standards for major sources. However, because the Facility will meet or exceed the applicable emission standards, the Facility will not have a significant adverse impact on air quality.

A. Emission Estimates

While past experience with proprietary air pollution control equipment can be considered, AP-42, *Compilation of Air Pollutant Emission Factors*, is USEPA's primary compilation of emission factor information used to estimate Facility air emissions. AP-42 is organized by industry. In Chapter 2 of the 5th Edition, Section 2.1 is dedicated to Refuse Combustion. Emission factors (in pounds of pollutant emitted per US short ton of refuse combusted) are presented by combustor type and primary treatment technologies utilized. Based on the description in AP-42, the Facility utilizes a typical mass burn waterwall type combustor design with a waste acceptance rate of 2,640 US short tons/day and an assumed 365 days per year of waste acceptance. Under these conditions, the emissions estimates in US short tons per year ("TPY") are presented in the table below:

Table 6-1
Facility Emission Estimates

Pollutant	AP-42 Flue Gas Emission Rates[1] (TPY)	Adjusted AP-42 Flue Gas Emission Rates[2] (TPY)	Measured Flue Gas Emission Rates[3] (TPY)
CDD/CDF	3.18E-05	7.96E-06[4]	≤4.0E-07
NOx	1,715	858 (172)[5]	240
CO	223	223	13
CO_2	949,146	949,146	Not Measured
Particulate Matter	29.87	29.87	16
Mercury	1.06	2.65E-01[4]	Not Detected[8]
Cadmium	2.04E-03	5.10E-04[4]	Not Detected[8]
Arsenic	1.31E-02	3.26E-03[4]	0.014[7]
Chromium	1.45E-02	3.61E-03[4]	
Nickel	2.49E-02	6.22E-03[4]	
Lead	1.26E-01	3.14E-02[4]	
SO_2	267	53[6]	Not Detected[8]
HCl	102	20[6]	Not Detected[8]
Fluorides			Not Detected[8]

[1] Calculated using controlled emission factors which account for treatment with semi-dry adsoprtion and bag filters only.
[2] Calculated using emission reduction efficiencies presented in Section 6.1.C for all additional air pollution control measures.

[3] Converted from actual air emission measurements provided by an operating facility utilizing similar air pollution control equipment to that proposed for the Facility.
[4] Removal efficiency of 75% assumed for activated carbon injection system based on AP-42.
[5] SCNR 50% removal alone (SNCR+SCR 90% removal in combination).
[6]Additional 80% removal when dry method is used in combination with the semi-dry method.
[7]Sum of Sb, As, Pb, Cr, Co, Cu, Mn, Ni, and their compounds.
[8]Detection limit unknown.

In addition, the estimated emissions of Hazardous Air Pollutants ("HAPs") are 20.64 tons per year. HAPs at this Facility are dominated by HCl. All the metals and CDD/CDF are also HAPS. Controls for each of these compounds are included in the Facility design as discussed in Section 6.1.C.

AP-42 also provides conversion factors to convert the published emission factors into concentrations to facilitate the comparison of expected emissions to performance standards. The following Table provides the results of these conversions.

Table 6-2
Estimate of Emission Concentrations from the Facility

Pollutant	Unit[1]	AP-42 Flue Gas Concentration[2]	Adjusted AP-42 Flue Gas Concentration[3]	Measured Flue Gas Concentraion[4]
CDD/CDF	ng/Sm^3	8.2	2.05[5]	≤ 0.11
NOx	ppm	231	116 (23.1)[6]	34.69
CO	ppm	49.26	49.26	3.10
CO_2	ppm	134,000	134,000	Not Measured
Particulate Matter	mg/Sm^3	7.69	7.69	4.33
Mercury	µg/Sm^3	273	68.25[5]	Not Detected[9]
Cadmium	µg/Sm^3	3.36	0.84[5]	Not Detected[9]
Arsenic	µg/Sm^3	0.525	0.13[5]	3.7[8]
Chromium	µg/Sm^3	3.72	0.93[5]	
Nickel	µg/Sm^3	6.40	1.6[5]	
Lead	µg/Sm^3	32.4	8.1[5]	
SO_2	ppm	25.77	5.15[7]	Not Detected[9]
HCl	ppm	17.15	4.29[7]	Not Detected[9]

[1] Sm^3 = Standard cubic meters and ppm = parts per million by volume, both corrected to 7% oxygen.
[2]Calculated using controlled emission factors which account for treatment with semi-dry adsoprtion and bag filters only.
[3]Calculated using emission reduction efficiencies presented in Section 6.1.C for all additional air pollution control measures.
[4]Converted from actual air emission measurements provided by an operating facility utilizing similar air pollution control equipment to that proposed for Facility.
[5]Removal efficiency of 75% assumed for activated carbon injection system based on AP-42.
[6]SCNR 50% removal alone (SNCR+SCR 90% removal in combination).
[7]Additional 80% removal when dry method is used in combination with the semi-dry method.
[8]Sum of Sb, As, Pb, Cr, Co, Cu, Mn, Ni, and their compounds.
[9]Detection limit unknown.

B. New Source Performance Standards

The primary standards applicable to the Facility are the federal New Source Performance Standards (NSPSs). Similar to AP-42, the NSPSs are organized by industry. 40 CFR Part 60, Subpart Eb, *Standards of Performance for Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994*, will govern the base emissions limits. In 40 CFR §60.50b(a), a large municipal waste combustor is defined as a "municipal waste combustor unit with a combustion capacity greater than 250 tons per day of municipal solid waste." The standards contained within this regulation are summarized in the table below. In addition, several of the pollutants listed in Table 6-3 have stricter standards imposed by the State of New York as listed in 6 NYCRR §219-2.2. Where they exist, the stricter State standards have been noted.

Table 6-3
NSPS Standards Applicable to the Facility

Pollutant	Unit	Base Emission Standard (State Standard)
Particulate Matter	mg/Sm^3 (grains Sm^3)	20 (0.010)
Opacity	%, 6-minute average	10
Cadmium	µg/Sm^3	10
Lead	µg/Sm^3	140
Mercury	µg/Sm^3 -or- % of the potential, whichever is less stringent	50 (28) -or- 15
SO_2	ppm (Note 2) -or- % of the potential, whichever is less stringent	30 -or- 20
HCl	ppm -or- % of the potential, whichever is less stringent	25 -or- 5
CDD/CDF	ng/Sm^3	13 (2)
NOx, 1st year of operation	ppm	180
NOx, After 1st year	ppm	150
CO	ppm	100
Visible Emissions of Combustor Ash	% of observation period (9 minutes per 3-hour period per EPA Reference Method 22)	5

Notes: 1. Sm3 = Standard cubic meters corrected to 7% oxygen.
2. ppm = parts per million by volume and corrected to 7% oxygen.

A comparison of the estimate of emission concentrations in Table 6-2 with the base emission standards presented here demonstrates that the Facility will meet the emission standards for all compounds specified in the federal NSPS regulations. Estimated mercury concentrations are over the absolute standard of 28 and 50 µg/Sm^3, respectively, but under the 15% of the potential emissions (calculated using AP-42 as 104 µg/Sm^3).

C. New Source Review Standards

While NSPS considers the source alone, New Source Review (NSR) regulations considers the environment in which the Facility will be located. Under the NSR regulations, the Facility will be classified as a major stationary source because it is listed as one of the 28 major source types in 6 NYCRR §201-2.1(b)(21)(iii)(h), Municipal Incinerators Capable of Charging More Than 50 [US Short] Tons of Refuse Per Day. Additionally, the Facility would be considered a major source if the potential to emit (PTE) is greater than 100 tons (US short)/year for any of the following pollutants:

Table 6-4
Major Facility Thresholds for Attainment and Unclassified Areas

Contaminant	Major Facility Threshold (TPY)[1]	Maximum Estimated Emissions from Table 6-1[1] (TPY)[2]
Carbon monoxide	100	223
Nitrogen oxides	100	1,715[6]
Sulfur dioxide	100	267[6]
Particulate matter	100	29.87
Particulate matter: PM-10 emissions[3]	100	29.87
Particulate matter: PM-2.5 emissions[3]	100	29.87
Lead (elemental)	100	0.126
Fluorides	100	Not Detected
Sulfuric acid mist	100	Neg.[7]
Hydrogen sulfide (H2S)	100	Neg.[7]
Total reduced sulfur (including H2S)	100	Neg.[7]
Reduced sulfur compounds (including H2S)	100	Neg.[7]

Municipal waste combustor organics (measured as total tetra through octa-chlorinated dibenzo-p-dioxins and dibenzofurans)	100	3.18E-05
Municipal waste combustor metals (measured as particulate matter)	100	29.87
Municipal waste combustor acid gases (measured as sulfur dioxide and hydrogen chloride)	100	369[5]
Greenhouse gases	100 and 100,000[4]	951,563[8]
Any other regulated NSR contaminant	100	Neg.

[1] Unless as otherwise noted.
[2] TPY = US short ton per year.
[3] Both filterable and condensible fractions are to be included (see definitions of PM-10 and PM-2.5 in Part 200 of this Title).
[4] Measured as CO2 equivalents.
[5] SO2 of 267 tpy plus HCl of 102 tpy.
[6] Base AP-42 estimate that does not account mission reduction efficiencies presented in Section 6.1.C for all additional air pollution control measures.
[7] H2s, total reduced sulfur and reduced sulfur compounds will be negligible as combustion (typically via a flare) is the primary pollution control for these compounds.
[8] Calculated.

A comparison of the major source thresholds to the emissions estimates provided in Table 6-1 above indicate that the Facility will be a major source due to its NOx and gross greenhouse gas emissions (*but see* net greenhouse gas emission assessment below), and may also be considered major source for acid gases, sulfur dioxide, and carbon monoxide depending on the emission control estimate.

Under NSR regulations, if a facility, as here, is major source, it will be subject to either non-attainment NSR for non-attainment pollutants or Prevention of Significant Deterioration ("PSD") for attainment or unclassified pollutants. Here, the proposed Facility will be located in a region that is classified as attainment for all criteria pollutants, so PSD regulations under 6 NYCRR Part 231 apply.

The next step in the permitting process is to then compare the Facility's PTE emission with the following significant project thresholds.

Table 6-5
Significant Project Thresholds and Significant Net Emission Increase Thresholds for Attainment and Unclassified Areas

Contaminant	Significant Project Threshold[1]/ Significant Net Emission Increase Threshold
Carbon monoxide	100 TPY
Nitrogen oxides	40 TPY
Sulfur dioxide	40 TPY
Particulate matter	25 TPY
Particulate matter: PM-10 emissions[2]	15 TPY
Particulate matter: PM-2.5 emissions[2]	10 TPY
Lead (elemental)	0.6 TPY
Fluorides	3 TPY
Sulfuric acid mist	7 TPY
Hydrogen sulfide (H2S)	10 TPY
Total reduced sulfur (including H2S)	10 TPY
Reduced sulfur compounds (including H2S)	10 TPY
Municipal waste combustor organics (measured as total tetra through octa-chlorinated dibenzo-p-dioxin and dibenzofurans)	3.2 × 10-6 megagrams per year (3.5 × 10-6 TPY)
Municipal waste combustor metals (measured as particulate matter)	14 megagrams per year (15 TPY)
Municipal waste combustor acid gases (measured as sulfur dioxide and hydrogen chloride)	36 megagrams per year (40 TPY)
Greenhouse gases	Any increase and 75,000 TPY[3]
Any other regulated NSR contaminant	Any increase

[1] Project emission potential threshold. TPY = US short ton per year.
[2] Both filterable and condensible fractions are to be included (see definitions of PM-10 and PM-2.5 in Part 200 of this Title).
[3] Measured as CO2 equivalents.

Due to the location of the Facility in an Ozone Transport Region, the following thresholds for ozone precursors also apply:

Table 6-6
Significant Project Thresholds for the
Ozone Transport Region

Area/Contaminant Classification	Significant Project Threshold (TPY)[1]
Marginal, Moderate, or Ozone Transport Region	
VOC	40
NO_x	40

[1] Project emission potential threshold.

The Project thus has the potential to exceed seven of the significant project thresholds, which are identified by the shading in Table 6-5. As a result, the Facility will be required to submit a permit application that includes both Title V and PSD elements which may result in stricter or additional standards than the NSPS standards listed in Section 5-16.1.2. Elements of the permit application will include:

- An Air Emissions Inventory detailing emissions related information and a comparison with applicable limitations including calculations, process descriptions, flow diagrams, a description of air pollution control equipment, and emission points.
- An Air Monitoring and Compliance Plan that identifies the methods used for monitoring compliance with all applicable standards, test methods used for measuring compliance, record keeping, and reporting requirements.
- An Existing Air Quality Analysis to include site-specific air quality monitoring for those parameters that exceed the significant project thresholds under PSD (i.e., Tables 6-5 and 6-6) for a period of one year typically, but in no cases less than four months.
- A Best Available Control Technology (BACT) Review that demonstrates the adequacy of the proposed air pollution control equipment for every pollutant that exceeds their significant project threshold in Tables 6-5 and 6-6. Based on this information, the BACT may differ from the air emission controls proposed and changes to the air pollution control equipment may be mandatory.
- Dispersion modeling, performed according to the NYSDEC's Air Program Policy DAR-10, to provide supporting evidence that the Facility will not exceed the significant impact levels in the ambient air concentrations listed in the regulation (6 NYCRR §231-12.7) above the background concentrations determined during the existing air quality analysis. Should dispersion modeling not provide support that the Facility can remain below the significant impact levels as proposed, emission limitations stricter than the NSPS emissions standards presented in Table 6-3 will be imposed.

- An Impact Analysis with regards to the possible impairment to visibility and air quality projected for the area as a result of not only the Project itself, but also any other associated growth in commercial, residential, or industrial facilities anticipated due to the Project must be prepared. If it is determined that impairment is possible from the Project as proposed, stricter emission control limitations may be required.

In conclusion, the Facility will require Title V and PSD air emission permits because it will be considered a major facility and a significant project under NSR. Nonetheless, the Facility complies with the base emission performance standards under NSPS, and, if the Title V/PSD air permit application assessment concludes that the Facility will not meet air emission control requirements to achieve BACT, that emissions from the Facility will exceed significant impact levels as proposed, or, with other anticipated projects, it will impair visibility and air quality in the area of the Facility, the Applicant will implement additional emission controls to meet applicable standards. Therefore, the Project as currently designed, or as the Applicant would modify it during the NYSDEC air permitting approval process to ensure it complies with applicable standards, will not result in any significant adverse impacts on air quality, and will not degrade air quality in the vicinity of the Project Site.

6.3 Greenhouse Gas Emission Impact-Comparative Assessment (EAF Part 1 Question D.2.g(ii))

An assessment of the greenhouse gas ("GHG") emissions from the Project was performed to: (1) determine the gross and net annual GHG emissions from the Project; and (2) assess the GHG emissions of the Project as compared to landfilling—the alternative disposal method for mixed MSW available in New York State (*see* http://www.dec.ny.gov/chemical/23682.html).

A. Gross GHG Emissions

As presented in Section D.2.g of the EAF, the gross (i.e. stack) GHG emissions from the Project are 949,000 tons per year of CO2 and 8.6 tons per year of N2O, for total GHG emissions equivalent to 951,563 tons per year of CO2 ("CO2e").[1] The gross CO2 emissions are a measure of CO2 emitted from the combustion of MSW and ancillary fuel sources, while the N2O emissions are derived from waste combustion with the balance from fixation from the atmosphere. However, as discussed further below, the gross GHG emissions do not reflect the environmental benefits of the waste-to-energy Project, since it does not account for the biogenic biomass present in the MSW, the avoided GHG emissions from the utility sector associated with electricity production, or the avoided emissions from the recovery and recycling of metals.

B. Net GHG Emissions and Comparative Assessment to Landfilling Mixed MSW

[1] The Intergovernmental Panel on Climate Change (IPCC) has established CO2 as the reference gas for measurement of heat-trapping potential (also known as global warming potential or GWP). Comparative GHG emissions are expressed in tons of CO2 equivalents (CO2e). By definition, the GWP of CO2 is one. The GWP of N2O is 298. *See* U.S. EPA Documentation for GHG Emission and Energy Factors Used in WARM (February 2016)(the "WARM Documentation"), *available* at: https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emission-and-energy-factors-used-waste-reduction-model.

As presented below, an assessment of the net GHG emissions from the Project and a comparative assessment of landfilling mixed MSW conclude that the Project activities overall *reduce* GHG emissions and have a significantly beneficial GHG emission impact as compared to landfilling the same material.

As recommended in the NYSDEC Policy for Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements (July 15, 2009),[2] the net GHG emission assessment and comparative assessment to landfilling utilizes the latest version of U.S. EPA's Excel version of the Waste Reduction Model (WARM) (Version 14, March 2016) (the "WARM GHG Calculator")[3] and U.S. EPA Documentation for GHG Emission and Energy Factors Used in WARM (February 2016)(the "WARM Documentation")[4] to perform this GHG emission assessment.

The net GHG emissions and comparison to landfilling assessments utilized the default assumptions of the WARM GHG Calculator to determine the GHG emissions from the Project. The relevant assumptions are as follows:

- 963,600 U.S. tons of MSW are processed annually (2,640 tpd x 365 days) by the Project or the landfill.
- For the purposes of the WARM GHG Calculator, the Project was assumed to be a waste-to-energy mass burn facility that generates electricity as a byproduct of the combustion process and recovered and recycled ferrous metals from the bottom ash of the combustor.
- The WARM GHG Calculator composition for "mixed MSW" was assumed for the composition of the MSW feedstock.
- An average distance of 254 miles (the distance from New York City to the Project Site) was assumed as a conservative measure of the distance from the source of generation of MSW to the disposal facilities.
- The comparative landfill facility was conservatively assumed to have landfill gas recovery with recovery of the methane for energy.
- The comparative landfill was assumed to have "typical" landfill gas collection efficiency and a national average "MSW decay rate."
- The generated electricity would offset electrical generation in the State of New York.

As presented in the WARM Documentation, the net GHG emissions from waste-to-energy facilities consist of: (1) emissions from the transportation of waste to the facility; (2) emissions of non-biogenic CO2; and (3) emissions of N2O, minus (a) avoided emissions from the electric utility sector for the electricity product; and (b) avoided GHG emissions due to the recovery and recycling of ferrous metals at the combustor as compared with the use of a mix of recycled and virgin materials.[5] CO2 emissions from the combustion of biomass such as paper products, yard

[2] *Available at* http://www.dec.ny.gov/docs/administration_pdf/eisghgpolicy.pdf.
[3] *Available at*: https://www.epa.gov/warm/versions-waste-reduction-model-warm#WARM%20Tool%20V14.
[4] *Available at:* https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emission-and-energy-factors-used-waste-reduction-model.
[5] WARM Documentation at 5-1.

trimmings, and food discards are not counted toward the GHG emissions because they are biogenic, naturally cycling back to the atmosphere as CO2 as they degrade.[6]

The net GHG emissions from landfilling operations with landfill gas recovery for energy including the following components: (1) emissions from the transportation of waste to the facility; and (2) methane emissions from decomposition of biogenic carbon compounds, minus (a) biogenic carbon stored in the landfill; and (b) CO2 emission avoided from the electric utility sector for the electricity product.[7] As with the Project, CO2 emissions from biogenic sources are not counted toward net GHG emissions.[8] Methane is counted as a net GHG emission because, even if it is derived from biogenic sources, degradation would not result in methane emissions if not for deposition in the landfill.[9]

The Analysis Inputs and Summary Report generated from the WARM GHG Calculator are presented in **Appendix 6.B** and summarized in the table below:

Waste Disposal Method	**Net GHG Emissions (TPY CO2e)[10]**
Project Waste-to-Energy	-31,759
Landfilling	136,726
Net Benefit WTE to Landfill	-168,485

As shown, disposal of mixed MSW by way of the Project would result in a net a GHG emission reduction equal to 31,759 tons per year of CO2e. This net GHG benefit results because the gross GHG emissions are offset by GHG emissions reductions from avoidance of the combustion of fossil fuels from electricity generation, the accounting for biogenic MSW sources converted to CO2, and GHG offsets from metals recovery and recycling as compared with metals produced from a mix of recycled and virgin materials.

As compared with landfilling, the Project would result in a GHG reduction of about 68,485 tons per year of CO2e, primarily due to the methane emissions and the lack of metals recovery associated with landfilling.

In conclusion, the GHG emission impact of the Project is favorable, especially as compared with the alternative method for disposal of mixed MSW, namely, landfilling. Therefore, the Project will not result in a significant adverse impact on GHG emissions.

6.4 Methane Emissions

Potential for methane generation exists in the enclosed waste storage and mixing bunker. Precautions are taken to keep conditions in the waste aerobic through mixing and by combusting the waste at a similar rate as waste is delivered to avoid prolonged storage. Additionally, the

[6] WARM Documentation at 1-15 and 5-1.
[7] WARM Documentation at 6-2.
[8] WARM Documentation at 6-1.
[9] WARM Documentation at 6-1.
[10] A negative value represents a GHG emission reduction.

enclosed waste bunker is kept at a negative pressure with air directed to the furnace to ensure the combustion of any methane generated in the bunker.

6.5 Release of Air Pollutants from Open Air Operations

The Project may result in the release of air pollutants from open-air operations. Open air processes include diesel exhaust from waste transfer vehicles entering and exiting the facility. Operations within the waste unloading platform and the waste pit are not open to air, so any gases produced will be managed by the facility processes. Waste unloading, mixing, combustion and ash handling are not open-air processes.

SECTION 7 – PLANTS AND ANIMALS

Section 7 of Part 2 of the Full Environmental Assessment Form asks whether the Project may result in a loss of flora or fauna. Any loss would be *de minimis*, and the Project will not result in significant adverse impacts to flora and fauna.

The Project Site is within a highly disturbed area, being within the former Depot. The Depot was constructed in the 1940's and was active until the 2000's. The area remained disturbed after the 1990's due the on-going remediation of the Depot. The Depot is characterized by advanced successional scrub-shrub habitat with wooded pockets that fragment numerous small, successional stage of field habitats. The character of the open lands is fragmented, and successional field vegetation is growing out of old graveled roadways, parking lots, equipment and material storage areas. In addition, along the old railroad, roadways, and storage areas are simple non-vegetated gravel areas. This gravel substrate is impenetrable to borrowing/tunneling mammals, and has resulted in the natural succession of vegetation that is sparsely distributed.

Common vegetative species in the successional scrub-shrub/woods include black locust, scattered scotch pine, green ash, eastern cottonwood treats, and buckthorn, autumn olive, grey dogwood, and hawthorn shrub thickets. Other vegetation includes common species such as Canada goldenrod, Queen Ann's lace, teasel, timothy, knapweed, and other grasses and forbs.

The Applicant reviewed federal and New York State databases for plant and animal resources. The NYSDEC *Environmental Resource Mapper* notes that the Project Site may contain rare plants or animals, but does not specify any. Further the US Fish and Wildlife Service Information, Planning and Conservation ("IPaC") *Trust Resource Report* noted that the Northern Long-eared Bat (*myotis septentrionalis*) could be present within the Project Site. ***See* Appendix 7.A**. The Report also listed various migratory birds that could be affected by the Project. The IPaC Report noted that there were no critical habitats, wildlife refuges, or fish hatcheries at the Project Site.

The Applicant hired two expert consultants to investigate these issues. On July 8 and 9, 2017, Bat Conservation and Management, Inc. ("BCM") investigated 100 acres within the Depot, only 48 of which comprise the Project Site. ***See* Appendix 7.B**. BCM preformed an acoustic bat survey to determine the presence or probable absence of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened Northern long-eared bat within the Project Site,

following protocols outlined the 2017 U.S. Fish and Wildlife Service ("USFWS") *Range-wide Indiana Bat Summer Survey Guidelines*, which requires that the investigation take place between May 15 to August 15. No Indiana bat or Northern long-eared bat calls were detected during the survey and based on these results, so the absence of these two species within the Project Site can be presumed.

The Applicant also hired Environmental Resources to perform an ecological assessment of the Project Site in September 2017. ***See* Appendix 7.C**. The New York Natural Heritage Program ("NYNHP") indicated that the Short-eared Owl (*Asio flammeus*) is a New York State endangered species suspected to possibly inhabit in the Project Site. Environmental Resources concluded that the lack of dense herbaceous vegetation which serves as cover for small mammals and loose organic soils necessary for tunneling/borrowing mammals, is not conducive in accommodating an abundance of small mammals (meadow voles, field mice, etc.) that serve as prey for the Short-eared Owl. While the NYNHP response indicates Short-eared Owl has been documented at and within 0.5 miles of the Project Site, it is evident that there is more appropriate habitat for this species in the surrounding rural areas of Seneca County.

Based on the small areas of the open fields that are each fragmented by surrounding successional shrubs and woodlots, the impenetrable unnatural gravel substrate underlying the study area, and the vast rural acreages of more appropriate Short-eared Owl habitat surrounding the former Depot Project Site, Environmental Resources concluded that it is unlikely that the Project Site provides optimum habitat for the species. Therefore, the Project Site will not jeopardize or adversely affect Short-eared Owl individuals or populations.

Another wildlife consideration is the leucistic white-tailed deer herd on-site. The white deer have become a symbol of the Depot, and have been confined to the Depot for several decades, but are not legally protected. The Project will not interfere with the white deer population. The noteworthy efforts of Earl Martin, Deer Haven Park LLC, and Seneca White Deer, Inc. to restore the white deer habitat and food sources will boost the populations. Those efforts will continue on the Depot, but not within the area of the Project Site. The Applicant fully supports all white deer conservation efforts, and intends to contribute to those efforts. Furthermore, Bald Eagles and Osprey have been sited historically around the Depot, but have no documented habitats on the Project Site. The Project will not impact these species.

Therefore, the Project will not significantly impact plants and animals.

SECTION 8 - AGRICULTURAL RESOURCES

Section 8 of Part 2 of the Full Environmental Assessment Form asks whether the Project may impact agricultural resources. It will not, so the Project will not result in significant adverse impact on agricultural resources.

The Project is not located with an Agricultural District. ***See* Appendix 8.A.** The Depot has occupied the land since the 1940's, and there is documented contamination throughout the Depot. The Project Site does not occupy any potential agricultural land. In fact, the Project Site is encumbered by two environmental easements granted to NYSDEC by the predecessor in title,

which forbids groundwater use without the prior written approval of the USEPA and U.S. Department of the Army. This restriction was imposed due to the contamination from the Depot's operations. *See* Instrument Number 2008-00000893, Liber 767/318, and Instrument 2011-00006718, Liber 835/119.

Therefore, the Project will not impact any agricultural resources.

SECTION 9 – AESTHETIC RESOURCES

Section 9 of Part 2 of the Full Environmental Assessment Form asks whether the land uses of the Project are obviously different from, or are in sharp contrast to, current land use patterns between the Project and a scenic or aesthetic resource. They are not, and the Project will not result in significant adverse impact on aesthetic resources.

Seneca County in 2008 had 127,972 acres in farms, and in 2007 had 513 farms. Many of these farms contain facilities that include sheds, buildings, bunker and trench silos, and bins for grain storage. Silos are typically 10 to 90 feet in diameter and 30 to 275 feet in height. The County and surrounding community is accustomed to this high structures and should not be impacted by the Project's structures. Additionally, a cell phone tower exists about 1350 feet away from the Project Site, and is about 195 feet tall, which is taller than the height of the proposed building.

The Facility building will be about 180 feet tall, with a steam stack of about 260 feet. These heights will require a variance from the height limits in the Town Zoning Ordinance (discussed below). However, the Facility will not be inconsistent with other structures in the area. It will be aesthetically pleasing and will be properly maintained. ***See* Appendix 9.A.,** bird's eye view simulation of similar facility**, Appendix 9.B,** building elevations.

Therefore, the Project will not result in significant adverse impact on aesthetic resources.

SECTION 10 – HISTORIC AND ARCHEOLOGICAL RESOURCES

Section 10 of Part 2 of the Full Environmental Assessment Form asks whether the Project may occur in or adjacent to a historic or archeological resource. While there are nearby historic and archeological resources, the Project will not have a significant adverse impact on these resources.

Costich Engineering D.P.C., on behalf of the Applicant, requested a consultation from the New York State Historic Preservation Office ("SHPO") in order to determine whether historic places or archeological sites existed on the Project Site. Per letter dated September 21, 2017, SHPO found that the Project Site will have no adverse impact on any historic resources on the Project Site. ***See* Appendix 10.A.** It stated: "Our office continues to note that the Depot Historic District is eligible for listing on the National Register of Historic Places. Based upon further research our office has determined that that the boundaries of the historic district have been modified and that building 310: Lunch Room and Building S-311: Popping plant are not contributing to the historic district and are outside the district boundaries. As such, we have no concerns with potential impacts to these properties."

As for archeological sites, while there are two present within the Depot (Archeological Sites A09906.000229 and A09906.00230) that have been deemed eligible for the National Register of Historic Places, they are not located within the Project Site. In fact, SHPO indicated that no archeological sites were identified within the Project Site, and that it has no concerns regarding potential impacts to archaeological resources. ***See* Appendix 10.B.**

Therefore, the Project will not result in a significant adverse impacts to any Historic or Archeological Resources.

SECTION 11 – OPEN SPACE AND RECREATION

Section 11 of Part 2 of the Full Environmental Assessment Form asks whether the Project may result in a loss of recreational opportunities or a reduction of an open space resource as designated in any adopted municipal open space plan. The Project will not, so it will not have any significant adverse impact on open space and recreation.

The Project Site is not within an open space resource as designated in any adopted municipal open space plan. The Project will not result in an impairment of natural functions, or "ecosystem services," provided by an undeveloped area. The Project Site is within a highly developed area, and is restricted to public access. No current or future recreation uses are being lost due to the Project.

Thus, the Project will not result in a significant adverse impact on open space and recreation.

SECTION 12 – CRITICAL ENVIRONMENTAL AREAS

Section 12 of Part 2 of the Full Environmental Assessment Form asks whether the Project may be located within or adjacent to a critical environmental area ("CEA"). The Project will not be in a CEA, and will not result in a significant adverse impact on critical environmental areas.

The NYSDEC designates a Critical Environmental Area based on the exceptional or unique character of the area with respect to one or more of the following:

- a benefit or threat to human health;
- a natural setting (e.g., fish and wildlife habitat, forest and vegetation, open space and areas of important aesthetic or scenic quality);
- agricultural, social, cultural, historic, archaeological, recreational, or educational values; or
- an inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change.

There are no Critical Environmental Areas designated pursuant to 6 NYCRR Part 617 in Seneca County. ***See* Appendix 12.A**, CEAs listed by County. Thus, the Project will not result in a significant adverse impact on CEAs.

SECTION 13 – TRANSPORTATION

Section 13 of Part 2 of the Full Environmental Assessment Form makes inquiry into impacts from the Project that may result from a change to existing transportation systems. While the Project will utilize existing transportation systems, it will not result in a significant adverse impact on transportation.

A comprehensive Traffic Impact Study ("TIS") was prepared in October 2017 by SRF Associates. ***See*** **Appendix 13.A.** The purpose of the TIS was to identify and evaluate the potential traffic impacts from the Project. The TIS concludes that the existing transportation network can adequately accommodate the projected traffic volumes and resulting impacts to study area intersections. SRF made the following conclusions:

1. Based upon information provided by the Facility operator, employees are expected to work three shifts: 6 AM-2 PM, 2 PM-10 PM, and 10 PM-6 AM. Given that these shift times occur outside of the commuter peaks on the adjacent roadways (7-8 AM and 4-5 PM), employee traffic is not anticipated during the peak hours studied. However, truck and other heavy vehicle traffic is anticipated to enter and exit the Project Site during the peak hours.
2. The proposed development is expected to generate approximately 57 (23) total truck trips during the AM (PM) peak hours, respectively.
3. All intersections operate at LOS "B" or better on all approaches during both peak hours under existing, background, and full build conditions.
4. There are no significant changes in levels of service as a result of the proposed Project and no mitigation is warranted or recommended at any of the study area intersections.

The TIS was performed under the assumption that all municipal waste will reach the Facility via waste hauling trucks, approximately 176 per day. As mentioned above and detailed further below, the Applicant intends to utilize the existing rail infrastructure at the Depot to transport waste via rail, so the projected vehicular traffic figures are likely higher than they will actually be.

Assuming Phase 2 is completed and the Facility operates at full design capacity in 2024, the Facility may employ approximately 85 people. The work shifts (6 AM-2 PM, 2 PM-10 PM, and 10 PM-6 AM) occur outside the commuter peaks on the adjacent roadways, so no employee traffic is anticipated during the peak hours studied. The Project (trucks only and at full build out) is estimated to generate approximately: 176 waste hauling vehicles/day; 2 slaked line trucks/day; 1 activated carbon truck/day; 1 urea truck/day; 1 lubricating truck/day; 3 scrap ferrous metal trucks/day; 2 non-ferrous trucks/day; and 52 ash or concrete sand trucks/day. These estimated trips were then compared against the commuter peak hours of 7:00-8:00 AM and 4:00-5:00 PM.

Table 1 below details the result of that comparison.

TABLE I

PROJECTED TRIP GENERATION

DESCRIPTION	AM PEAK		PM PEAK	
	ENTER	EXIT	ENTER	EXIT
Employees	0	0	0	0
Trucks/Other Vehicles	36	21	9	14
Total Site Generated Trips	***36***	***21***	***9***	***14***

Based on these Project trip generation numbers, SRF undertook a capacity analysis whereby the effectiveness of a section of roadway and/or intersection was measured based on the number of vehicles during a specific time period. 2017 base and 2024 background operating conditions during the peak study periods were evaluated to determine a basis for comparison with the projected future conditions. The future traffic conditions generated by the Project were analyzed to assess the operations of the intersections in the study area time period. Table II below details the results:

TABLE II: CAPACITY ANALYSIS RESULTS

INTERSECTION	2017 EXISTING CONDITIONS		2024 BACKGROUND CONDITIONS		2024 FULL DEVELOPMENT CONDITIONS	
	AM	PM	AM	PM	AM	PM
Route 96/Cayuga Street						
Westbound – Cayuga Street	B(10.1)	A(9.8)	B(10.2)	A(9.8)	B(11.3)	B(10.3)
Southbound left – Route 96	A(7.4)	A(7.6)	A(7.5)	A(7.6)	A(7.5)	A(7.6)
Route 414/Cayuga Street						
Eastbound – Cayuga Street	A(9.9)	B(10.0)	A(9.9)	B(10.1)	B(10.7)	B(10.6)
Northbound left – Route 414	A(7.6)	A(7.5)	A(7.6)	A(7.5)	A(8.0)	A(7.8)
Route 96/E. Patrol Road						
Eastbound – E Patrol Road	B(10.3)	A(0.0)	B(10.4)	A(0.0)	B(12.7)	B(11.5)
Northbound left – Route 96	A(7.5)	A(0.0)	A(7.6)	A(0.0)	A(8.5)	A(8.6)
Route 96/Bromka Road						
Westbound – Bromka Road	A(8.9)	A(9.1)	A(8.9)	A(9.2)	A(9.0)	A(9.2)
Southbound left – Route 96	A(7.4)	A(7.4)	A(7.4)	A(7.4)	A(7.4)	A(7.4)

NOTES:
B(10.6) = Level Of Service (delay in seconds per vehicle)
N/A = Approach does not exist/was not analyzed during this condition.
F(*) = Delays greater than two minutes per vehicle

All intersections are projected to operate at LOS "B" or better on all approaches during both peak hours under existing, background, and full build conditions. There are no significant changes in levels of service as a result of the Project, and no mitigation is warranted or recommended at any of the study area intersections

As detailed above, after Phase 2 of the Project has been completed, and assuming the Project would not receive waste by rail, it is estimated that approximately 176 waste-hauling vehicles will deliver to the Facility per day. This traffic would be limited to state highways, either coming from the south on Routes 96 or 414, from the north, via the New York State Thruway, on Routes 96, 96A or 414, or from the east and west on Route 5 (U.S. 20). These roads are adequate to handle this modest level of truck traffic.

However, the Applicant prefers to utilize the existing rail lines on the Depot, and hopes to minimize the waste-hauling trucks from the roadways. Even with rail, some waste-hauling trucks will be necessary, but the impacts of those would be *de minimis*. *See* Sections 6, 15.

The Depot is already equipped with an existing rail facility, previously operated by the Army, and currently used by Anderson Rail Group. The existing rail is connected to the Finger Lakes Railway ("FGLK") shortline. The FGLK line runs east and west, across New York State in between Syracuse and Rochester. It has an interchange station in Geneva. The waste would be transported via rail in 20-foot (6 m) long top loading, rear dumping sealed containers, holding 20 tons of waste per container. After Phase 2 is complete, rail-haul operations would include deliveries of 30 flat railcars carrying 120 sealed containers Monday through Saturday each week. The rail facility is estimated to be capable of delivering up to 2,000 tpd.

The FGLK locomotive will stage the railcars with loaded containers on the unloading track, and then use the runaround track to maneuver to the storage track to recover the railcars with the empty containers before leaving the Project Site. The Facility will be equipped with a reach stacker that will unload each container from the railcar and place it on the truck for transfer to the enclosed waste unloading platform. Once the container is emptied, the truck will return to the loading/unloading pad, where the reach stacker will place the empty container back on the railcar. Once all the containers have been emptied, the railcar mover will transfer the railcars from the unloading track to the storage track.

To accommodate for the daily rail deliveries, new track and improvements to existing track will likely be required. Additional infrastructure would include the construction of the loading/unloading platform, access roadways and drainage features. Track improvements would include a new loading/unloading track, a new storage track and a runaround track that connects to the existing track at the Project Site. These improvements would be a benefit to the community, and would hopefully allow more development of the Depot.

Therefore, based on the above, the Project will not result in a significant adverse impact on transportation.

SECTION 14 – ENERGY

Section 14 of Part 2 of the Full Environmental Assessment Form asks whether the Project may cause an increase in any form of energy. The Project will generate electricity, and will not result in any adverse impact to energy resources, but rather have a positive impact.

Underground utilities, including water, electric, sanitary, gas, and telecommunications are

available throughout the property. The Seneca Ordnance Substation is located at the intersection of East Kendaia Road and East Patrol Road, approximately 1,700 feet (518 m) east of Facility. The substation distributes electricity to the Depot through a 34.5/4.8 kV, 5 MVA transformer and four 4.8 kV circuits via overhead and underground wires. This electrical substation will be the main connection between the Facility and the New York State Electric & Gas Corp. ("NYSEG") grid. Based on a previous interconnect study in the area, it is anticipated that the facility will require the following upgrade, at a minimum, to the utility-owned infrastructure: Rebuild existing 34.5kV transmission line to 115kV standards from the substation to Border City/MacDougall. This upgrade will benefit the community and the Depot.

Further, an 8" (20 cm) natural gas service line is located approximately 1,500 ft. (457 m) east of the proposed main processing building. Natural gas is serviced by NYSEG in the Romulus area. The Project will use approximately 7,334 scf/day (1,928 Nm^3/day or 73.36 therms/day) of natural gas. The existing gas utilizes are expected to meet the demand of the Project.

Energy Production

In addition to consuming a small amount of energy, the Facility will produce a large amount of energy. There will be either one or two condensing steam turbine generators with a total capacity of about 25 MW each (50 MW total). The second generator, if installed, would not be active until Phase 2 of the Project. Power output from the generators is 10.5kV. Power from the generators would be transmitted to the upgraded electrical substation using two 115kV/10.5kV step-up transformers.

The Project will generate the energy by steam. Steam generation is the process to recover heat from the waste combustion process before routing to a steam turbine for power generation. The process water circulating through the system as steam and condensate is treated to prolong the design life of the system components. The steam generation process occurs at a boiler that works in conjunction with the waste combustion furnace. The boiler is a single drum, natural circulation water tube boiler. Steam output from the boiler is at 400°C. Steam will then either sold to neighboring industrial businesses or routed to the steam turbine generator. After routing through the steam turbine generator, the steam will be cooled at an air-cooled cooling tower. The condensate water collected at the cooling tower will then returned as process water. A water pump house will be located adjacent to the cooling tower and process water collection tanks.

The New York Independent System Operator ("NYISO") manages the power grid for all of New York State. All energy sales and purchases are scheduled through the NYISO, using a locational based marginal pricing ("LBMP") methodology which considers not only the cheapest option to produce electricity, but also where electricity is produced relative to where the electricity will be used and the losses and constraints on the transmission system between the generator and the user. NYISO predicts the amount of energy needed to meet demand, and then mandates what generators will operate, and when and for how long they will operate, as well as determine the price they will be paid. Under this operational scheme, pricing varies based on location and demand every five minutes. For the purposes of determining LBMP, the NYISO groups generators into Zones by location. The Project would fall into the Central Zone, or Zone C. A computer algorithm managed by NYISO continuously calculates which generators can supply the electricity

demand at the lowest cost while meeting the system's transmission constraints regarding energy losses and congestion. The Project will aid in the electrical demand for this Zone.

Therefore, the Project will not have a significant adverse impact on energy. Instead, it will have a positive impact by generating renewable energy.

SECTION 15 – NOISE, ODOR, AND LIGHT

Section 15 of Part 2 of the Full Environmental Assessment Form asks whether the Project may result in an increase in noise, odors or outdoor lighting. There will not be any significant adverse environmental impacts with respect to noise, odors or outdoor lighting.

Noise

The Project will produce noise that will exceed existing ambient noise levels during construction and operation. However, any increased noise will not result in a significant adverse environmental impact. The Project will comply with the Town of Romulus Noise Ordinance.

Temporarily elevated noise levels will be generated by relatively short-term construction activities at the Project Site. Construction activities will generate noise for an approximately two-year period until Phase 1 of construction is complete. Once Phase 1 is functional, operations (at 50% potential capacity) and construction of Phase 2 will generate noise for another two-year period. Following completion of Phase 2, only operations will generate noise. Short duration sound level increases from construction activities will be temporary until construction moves away from the property boundary, screening is provided via building walls, or construction is complete.

Most of the operational noise sources will be located indoors (e.g., transformers, generators, etc.) where the walls of the building provide noise attenuation. Outdoor sources of noise that will contribute to existing ambient sound levels include an air emissions stack, cooling towers, the rail loading/unloading area, and waste truck queuing along the access road. The air emissions stack will be 260 feet tall, operating continuously 24 hours per day. The noise source for the stack includes a fan or blower to push emissions through the stack to the atmosphere. The fans/blowers will be enclosed inside the combustion operations building contributing little, if any noise to ambient conditions.

Cooling towers will operate continuously, 24 hours per day and generate noise from the fans, motors, and water noise. The stack and cooling towers will be shielded on one side by the combustion operations building, and on the other sides by noise barriers as required.

Truck queuing along the access road may occur before the weigh station/security and before entering the enclosed waste unloading platform. Truck noise will be minimized as the engines will be at idle. State solid waste regulations require that mufflers be fitted to all internal combustion-powered equipment used at the Facility. On-site vehicles will be subject to speed limitations and will be equipped with mufflers which will further attenuate sound levels. The maintenance of the on-site vehicle fleet, including appropriate mufflers, will attenuate sound levels.

Deliveries are expected to occur during daytime hours, excluding Sundays. Unloading of waste from trucks will occur inside the enclosed waste unloading platform with sealed doors, emitting little, if any noise through the walls of the building. Intermittent rail deliveries are expected to occur once per day, during daytime hours, excluding Sundays. Noise will be generated from the unloading of containers from the railcars to trucks. The trucks will then travel to the enclosed waste unloading platform inside the building to be unloaded.

Off-site traffic including waste haulers, delivery trucks, and other construction related vehicles will generate noise while travelling to and from the Facility; however, state motor vehicle law dictates noise restrictions pertaining to off-site traffic. Section 375 of the New York Vehicle and Traffic Law states, "every motor vehicle, operated or driven upon the highways of the state, shall at all times be equipped with an adequate muffler and exhaust system in constant operation and properly maintained to prevent any excessive or unusual noise."

Odor

The Facility will be designed to avoid the emanation of odors, however, odors may originate from the enclosed waste unloading platform, waste bunker, and the leachate collection system. These areas are inside the main operations building and will be maintained under negative pressure. The collected air in these areas will be used in the combustion process to mitigate the potential for odors outside of the enclosed areas. Flue gas will be treated with urea and lime, as well as activated carbon at the bag filter and released through the stack. No offensive odors are expected to result following treatment once released to the atmosphere. Since waste deliveries have the potential to produce an undesired odor, as such, waste is required to be covered during transportation via rail or truck. All waste delivered by rail will be enclosed in sealed containers that will only be opened indoors.

Light

The Project will be dark sky compliant, and have no off-site light spill. Given the secluded nature of the Project Site, the Project is not expected to cause any light impacts.

Based on the above, the Project will not result in a significant adverse impact on noise, odor or light.

SECTION 16 – HUMAN HEALTH

Section 16 of Part 2 of the Full Environmental Assessment Form asks whether the Project may have an impact on human health from exposure to new or existing sources of contaminants. There will be no significant adverse impact on human health.

The Project Site is +/- 3200 feet away from the nearest school (Romulus Central School), and +/- 1400 feet away from the nearest residence. The Project will not disturb the community by its operations. The nearby community is accustomed to industrial activities at the Project Site due to the U.S. Army's former operations at the Depot, which began in the 1940's. There were two

deactivated furnaces in the area of the Project Site as part of the Army's operations at the Depot, operating from the 1940's until 1989. These facilities were used for the demilitarization of various small arms munitions. The process of deactivation of munitions involved heating the munitions within a rotating steel kiln, which caused the munitions to detonate. The byproducts produced during this detonation were then swept out of the kiln through the stack. Therefore, a similar type of use has historically occurred near the Project Site.

The Project Site is not currently being remediated, but remediation did occur throughout the Depot due to the contamination from the U.S. Army's Operations. The Project Site will not disturb any portions of the Depot that have been remediated. The Project will not utilize groundwater and therefore will not disturb the groundwater use restriction in place at the Project Site.

The Project has adequate control measures in place to ensure that future generation, treatment and/or disposal of hazardous wastes will be protective of the environment and human health. The Facility operations are designed to avoid the generation of hazardous waste. A waste control plan will be prepared to inspect incoming waste and turn away or separate wastes that are expected to produce hazardous waste. While the Facility will not accept hazardous wastes, testing will occur at key points in the Facility to detect any potential hazardous waste that is unintentionally accepted. Depending on the characteristics of the waste, a hazardous waste disposal facility will be contacted to accept any hazardous waste that is found.

The State Solid Waste Management Plan and State Solid Waste Management Policy, set forth at ECL §27-0106, which prescribes the following Hierarchy for solid waste management:

(a) first, to reduce the amount of solid waste generated;
(b) second, to reuse material for the purpose for which it was originally intended or to recycle material that cannot be reused;
(c) third, to recover, in an environmentally acceptable manner, energy from solid waste that cannot be economically and technically reused or recycled; and
(d) fourth, to dispose of solid waste that is not being reused, recycled or from which energy is not being recovered, by land burial or other methods approved by the department.

The Facility will be fully compliant by recovering energy in an environmentally acceptable manner, and recycling residuals. At present, waste management in the Seneca County and all of NYSDEC Region 8 is generally inconsistent with the Hierarchy by depending on the least preferred alternative, landfilling solid waste from throughout the State and surrounding areas. Major landfills include Seneca Meadows in Seneca County, the Ontario County Landfill, and High Acres Landfill in Monroe County. The Facility will improve environmental quality and reduce the carbon footprint from waste generation by utilizing the more preferred option of waste-to-energy. As discussed in Section 6 above, this will result in a savings of 168,485 tpy of CO2e compared to landfilling.

Through the process of MSW combustion, the weight of the incoming waste is reduced by 75% to ash which is collected at the bottom of the furnaces. This ash can be combined with slag

pulled from the bottom of the boilers. Bottom ash and boiler slag will be processed for recovery of metals. Afterward, the residual ash/slag will be prepared and sold for use in concrete mix, aggregates, and fillers. The proposed bottom ash/boiler slag handling process would include initial screening with overhead magnets to pull out large (> 1.25 inches or 32 mm) ferrous materials, including items such as non-perishable food cans, utensils, and grates. The ash in the smallest size class (< 0.4 inches (10 mm)) will be sold as a replacement material for concrete sand for use in cement blocks, sidewalks, or other concrete products. The remaining ash in the two larger sized classes will be crushed with an impact crusher, and reprocessed if needed, to achieve the sand-like particle size distribution necessary to be used in the production of concrete (i.e., 100% < 0.4 inches (10 mm)). Fly ash will collected in the bag filters used in the air pollution control system. Fly ash will be mixed with the smallest size class (< 0.4 inches (10 mm)) of bottom ash and sold as a replacement material for concrete sand. Further, ferrous metals and aluminum typically comprise about 6% and 5% of the bottom ash by weight, respectively. The separation process can achieve a minimum of 80% efficiency.

Overall, the Project is project to recover approximately 11,560 tons of scrap ferrous metals, 8,750 tons of non-ferrous metals, and 267,880 tons of replacement material for concrete and sand.

Thus, the Project will not result in a significant adverse impact on human health.

SECTION 17 – CONSISTENCY WITH COMMUNITY PLANS

Section 17 of Part 2 of the Full Environmental Assessment Form asks whether the Project is not consistent with the adopted land use plans. The Project is consistent with the community plans, and will not result in any significant adverse impacts in this regard.

Zoning

The Property is zoned Industrial/Warehouse ("I/W"). ***See* Appendix 17.A**, Zoning Map**.** The Town Zoning Ordinance, Local Law No. 1 of the year 2015 ("Zoning Ordinance") details that

> The purpose; of the Industrial/Warehouse (I/W) District is to delineate areas best suited for Industrial, Office Development, Warehouse and Distribution uses because of location, existing services (i.e., rail), topography, existing facilities, previous use of the property and the relationship to other land uses. It is also the intent of the district to require that such uses be planned in a manner as to minimize degradation of groundwater and surface water quality, and wetlands, minimize disturbance of natural vegetation and harmonize with nearby residential areas

Renewable Energy is permitted by Special Permit within the I/W District. On March 16, 2017, the Town of Romulus Zoning Officer issued a zoning interpretation, notice of which was published in the *Ovid Gazette* on May 10, 2017. ***See* Appendix 17.B**. It states that a waste-to-energy facility which, through combustion of solid waste, would use the resulting heat from the combustion process to generate steam to power a turbine to produce electric power, is an allowed use at the former Depot. The interpretation goes on the state that a waste-to-energy facility would be classified under Article IV, Section 1 as a "Renewable Energy Production (Solar, Wind,

Biomass, Geothermal, etc.) – Utility scale." A waste-to-energy facility "would not be prohibited under Article IV, Section 4(a) of the Romulus Zoning Law as a 'noxious or injurious' use, provided it substantially complies with applicable environmental regulations." A second interpretation, dated August 28, 2017, confirmed that a waste-to-energy facility was an allowed use within the I/W Zoning District as well as the Warehouse, Industrial, Transportation, Energy Zoning District. Notice of that second interpretation was published in the *Ovid Gazette* on September 13, 2017. ***See* Appendix 17.B.**

As noted above, a height variance will be required, since the maximum height allowed in the I/W District is 35 feet, or 50 feet with approval of the Planning Board. The Facility building will be 180 feet tall, with an approximately 260-foot steam stack. However, the Zoning Ordinance allows such variances, and there are a number of structures in the area with similar heights.

Town of Romulus Comprehensive Plan

The Project is also consistent with the Town of Romulus Comprehensive Plan, which states

> During the past 50 plus years the Town of Romulus has been heavily dependent upon, and constrained by, government sector type facilities and employment. Subsequently, the economic health of the Township has encountered some big setbacks with the closing of all three of the large government employers – Sampson Naval Base (and its successors), the Willard Psychiatric Center, and the Depot – and these areas have remained off the tax rolls. The most recent closure, that of the Depot, will when completed, be highly detrimental, and it is coming just as the country is beginning to pull out of a downturn….This plan envisions the movement of the Town from a dependency on an economy which is government driven to one which is a more privately based. A limited economic impact of government agencies will remain, but it is thought that the Town will be strengthened by maintaining its strong agricultural base while diversifying through the attraction of other business activity primarily into the designated areas in the Depot.

Consistent with the Comprehensive Plan, the Project seeks to bring private industry to the decaying Depot. The Project will increase the tax base for the Town, and stimulate the economy by providing approximately 85 jobs. In addition, the Project will provide energy so other businesses can be located at the Depot. Further, the Applicant intends to offer a Host Community Plan to the local community to provide financial benefits.

Seneca County Plans

Ever since the Depot closed, the affected Towns and Seneca County have been trying to promote reuse of the property. The Seneca County Board of Supervisors established the Depot Local Redevelopment Authority in 1995, whose primary responsibility was to plan for redevelopment of the Depot. The Seneca County Industrial Development Agency ("SCIDA") has succeeded the Local Redevelopment Authority in that mission. SCIDA is currently marketing the

portion of the Depot that includes the Project Site. It seeks various uses, one of which is "Alternative Energy." *See* **Appendix 17.C**, SCIDA Available Sites Printout. This Project is in alignment with SCIDA's goals.

The Seneca County Comprehensive Plan was last updated in the late 1970s. The Seneca County Department of Planning and Community Development has been in the process of updating this Plan, which is comprised of six (6) chapters: (1) Seneca County Comprehensive Plan Introduction; (2) Seneca County Comprehensive Plan Overview; (3) Seneca County Housing Plan; (4) Agriculture and Farmland Protection Plan; (5) Seneca County Environmental Conservation Plan; and (6) Seneca County Economic Development Plan.

It is important to note that only Chapters 3 and 4 have been adopted at this time. The draft Seneca County Environmental Conservation Plan and draft Seneca County Economic Development Plan have not been adopted by Seneca County at this time. Nevertheless, the Project is consistent with these Plans.

The Seneca County Draft Environmental Conservation Plan (June 2014) details the importance of waste management." ***See* Appendix 17.E**. A "zero waste" management model makes landfilling the last resort, and encourages waste diversion and energy recovery: "Waste material is weighed and sorted, separated into its various constituent parts, inspected for consistency, re-sorted, and reprocessed, or baled for specialist reprocessing and re-manufacture or energy recovery. The goal is to transform everything into something of value, and not landfill anything unnecessarily." ***See* Appendix 17.E**. This model is in line with the New York State Waste Hierarchy set forth at ECL § 27-0106. While Seneca County does not have a County Solid Waste Management Plan, the Conservation Plan states that "[t]he best practices are intended to contribute to higher waste diversion/recycling levels in communities and thus reduce the amount of household and municipal waste going to landfills." The Project will achieve these goals.

The Seneca County Draft Economic Development Plan (June 2014) details the declining workforce and county-wide poverty. ***See* Appendix 17.F**. "Total personal income in Seneca County was slightly lower (1.5%) than the per capita figure of $36,245 for the nonmetro (rural) areas of New York State. It was also lower than the figures for the Rochester metro area (18.5% lower), Syracuse metro area (14.5%), and Ithaca metro area (8.8%)."

The Draft Economic Development Plan also details the utility service problems with the Depot, which the Project seeks to correct. "The lack of sufficient electric capacity and distribution at the Depot inhibits its growth as a job and business center, and Seneca County is committed to supporting necessary upgrades. Renewable energy may offer at least a partial solution to the Depot's energy problems. Seneca County is committed to supporting the development and use of green energy sources. The Seneca County IDA helps promote green energy Projects at the Depot." Thus, the Plan calls for renewable energy projects like the Facility.

The Economic goals of the County include: "Goal 3. Seek and support local and nonlocal businesses that strengthen and diversify the economic base, expand and enhance the tax base, improve wage and salary levels, and utilize the resident workforce, without diminishing the quality of natural, historical, or cultural resources in the County." This includes Strategy 3B to

Support and coordinate efforts to provide adequate infrastructure and targeted County investment in areas best suited for future and unmet employment opportunities; specifically:

- Route 318/414 corridor.
- Route 5 & 20 corridor/Seneca Army Depot.

Further, Strategy 3H is to "Enable alternative and renewable energy production, including, but not limited to, solar, hydro, biogas, and wind resources."

The Project will satisfy these economic goals as it will expand and enhance the tax base by providing about 85 jobs with varying salary levels. The Project will improve the infrastructure at the Depot. It will also provide renewable energy production that could be used for future businesses located on the Depot.

Based on the above, the Project is in alignment with the community plans and will be a catalyst for increase economic growth within the Town of Romulus and Seneca County. It will not result in any significant adverse impacts with regard to community plans.

SECTION 18 – CONSISTENCY WITH COMMUNITY CHARACTER

Section 18 of Part 2 of the Full Environmental Assessment Form asks whether the Project is inconsistent with the existing community character. The Project is consistent with, and will not result in an adverse impact to, community character.

The U.S. Army's military mission at the Depot included receipt, storage, distribution, maintenance, and demilitarization of conventional ammunition, explosives and special weapons from 1940 until 2000. The nearby community is accustomed to industrial activities at the Project Site due to these operations. No public resources are being diminished as the Project Site is currently not accessible to the public.

The type of use proposed by the Project has historically occurred on the Depot, although the Project will be a much cleaner operation. There were two deactivated furnaces as part of the Army's operations at the Depot, operating from the 1940's until 1989. These facilities were used for the demilitarization of various small arms munitions. The process of deactivation of munitions involved heating the munitions within a rotating steel kiln, which caused the munitions to detonate. The byproducts produced during this detonation were then swept out of the kiln through the stack. Therefore, the character of the property is not being altered by the Project.

The Project is not anticipated to have any adverse impacts with respect to Environmental Justice ("EJ") communities.[11] An EJ community includes "a minority or low-income community that may bear a disproportionate share of the negative environmental consequences resulting from

[11] Phase 1 of the Project will not meet the threshold under 6 NYCRR §487.2, so a full EJ is not required at this time. If, during Phase 2, a generating capacity of 25 MW or more will be reached, a full EJ analysis will be completed.

industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies." 6 NYCRR §487.3(l).

In accordance with the impact study area requirements of 6 NYCRR §487.4(a), the geographical area within one-half mile of the Project Site was investigated for the presence of EJ areas. Section 487.4 details how to determine the presence of an EJ area by comparing the most recent and reliable census block group data against set thresholds to determine if a minor or low-income community, or both, exist in the study area. The information in Table 3-1 provides a comparison of data from the U.S. Census Bureau's 2011-2015 American Community Survey 5-Year Estimates to the applicable Environmental Justice thresholds.

COMPARISON OF ENVIRONMENTAL JUSTICE THRESHOLDS FOR IMMEDIATE AND ADJACENT COMMUNITIES IN CENSUS TRACT 9508[3]

	% Minorities	% Low-Income
THRESHOLD	33.8[1]	23.59[2]
Block Group 1	7.7	6.7
Block Group 2	51.0	9.3
Block Group 3	1.6	8.9
Block Group 4	0.2	8.4
Block Group 5	34.8	11.6

[1] Threshold for a rural area.

[2] Below the federal poverty level.

[3] Data for the U.S. Census Bureau's 2011-2015 America Community Survey 5-Year Estimates.

It appears at this time that the Project falls within two EJ areas. The Project will fairly treat and meaningfully involve all people regardless of race, color, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. 6 NYCRR §487.6 requires that cumulative impacts of air be analyzed. As discussed fully in Section 6 of the Executive Summary, no significant adverse air impacts will occur from the Project to any community, including EJ communities. The physical conditions of the Project will not have any significant and adverse disproportionate environmental impacts any community. It will be operated and constructed in accordance will all statutes and regulations. The Facility will receive various permits from the NYSDEC, many of which include opportunities for public comment and involvement, as will the permitting through the Town.

Therefore, the Project will not have any significant adverse impacts on community character.

Instructions for Completing Part 1

Part 1 is to be completed by the applicant or project sponsor. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification.

Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information; indicate whether missing information does not exist, or is not reasonably available to the sponsor; and, when possible, generally describe work or studies which would be necessary to update or fully develop that information.

Applicants/sponsors must complete all items in Sections A & B. In Sections C, D & E, most items contain an initial question that must be answered either "Yes" or "No". If the answer to the initial question is "Yes", complete the sub-questions that follow. If the answer to the initial question is "No", proceed to the next question. Section F allows the project sponsor to identify and attach any additional information. Section G requires the name and signature of the project sponsor to verify that the information contained in Part 1 is accurate and complete.

A. Project and Sponsor Information.

Name of Action or Project: Circular enerG Facility		
Project Location (describe, and attach a general location map): Town of Romulus, Seneca County, State of New York		
Brief Description of Proposed Action (include purpose or need): The Circular enerG Facility is a proposed renewable energy Project (the "Project") in the Town of Romulus, located on the former Depot, part of tax map parcel no. 8-1-03.5, bounded northerly by E. Kendaia Road, and westerly by Fayette Road (the "Project Site"). Circular enerG, LLC (the "Applicant") intends to develop approximately 39.4 acres of the former Depot into a sustainable waste-to-energy Facility ("Facility"), where municipal solid waste is combusted and converted to energy.		
Name of Applicant/Sponsor: Circular enerG, LLC	Telephone: 585-546-8430 E-Mail: Aknauf@nyenvlaw.com	
Address: 400 Andrews Street, Suite 360		
City/PO: Rochester	State: NY	Zip Code: 14604
Project Contact (if not same as sponsor; give name and title/role):	Telephone: E-Mail:	
Address:		
City/PO:	State:	Zip Code:
Property Owner (if not same as sponsor): Seneca Depot, LLC	Telephone: 585-546-4866 E-Mail: mpalumbo@flaummgt.com	
Address: 400 Andrews Street, Suite 500		
City/PO: Rochester	State: NY	Zip Code: 14604

B. Government Approvals

B. Government Approvals, Funding, or Sponsorship. ("Funding" includes grants, loans, tax relief, and any other forms of financial assistance.)

Government Entity	If Yes: Identify Agency and Approval(s) Required	Application Date (Actual or projected)
a. City Council, Town Board, or Village Board of Trustees ☑Yes☐No	PILOT and/or Host Community Agreement	Winter 2018
b. City, Town or Village Planning Board or Commission ☑Yes☐No	Romulus Planning Board - Special Permit, Subdivision	Fall 2017
c. City Council, Town or Village Zoning Board of Appeals ☑Yes☐No	Town of Romulus Zoning Board of Appeals - Area Variance(s)	Winter 2018
d. Other local agencies ☑Yes☐No	Romulus Central School District - PILOT and/or Host Community Agreement	Winter 2018
e. County agencies ☑Yes☐No	Seneca Co. Water Dist. No. 1, Sewer Dist. No. 2, IDA, Highway Dept - water, sewer, PILOT, work	Winter 2018
f. Regional agencies ☐Yes☑No		
g. State agencies ☑Yes☐No	See Executive Summary	Fall 2017
h. Federal agencies ☑Yes☐No	See Executive Summary	Fall 2017

i. Coastal Resources.

i. Is the project site within a Coastal Area, or the waterfront area of a Designated Inland Waterway? ☐Yes☑No

ii. Is the project site located in a community with an approved Local Waterfront Revitalization Program? ☐Yes☑No

iii. Is the project site within a Coastal Erosion Hazard Area? ☐Yes☑No

C. Planning and Zoning

C.1. Planning and zoning actions.

Will administrative or legislative adoption, or amendment of a plan, local law, ordinance, rule or regulation be the only approval(s) which must be granted to enable the proposed action to proceed? ☐Yes☑No

- **If Yes,** complete sections C, F and G.
- **If No,** proceed to question C.2 and complete all remaining sections and questions in Part I

C.2. Adopted land use plans.

a. Do any municipally- adopted (city, town, village or county) comprehensive land use plan(s) include the site where the proposed action would be located? ☑Yes☐No

If Yes, does the comprehensive plan include specific recommendations for the site where the proposed action would be located? ☑Yes☐No

b. Is the site of the proposed action within any local or regional special planning district (for example: Greenway Brownfield Opportunity Area (BOA); designated State or Federal heritage area; watershed management plan; or other?) ☑Yes☐No

If Yes, identify the plan(s):

Remediaton Sites 850006

c. Is the proposed action located wholly or partially within an area listed in an adopted municipal open space plan, or an adopted municipal farmland protection plan? ☐Yes☑No

If Yes, identify the plan(s):

C.3. Zoning

a. Is the site of the proposed action located in a municipality with an adopted zoning law or ordinance. ☑ Yes ☐ No
If Yes, what is the zoning classification(s) including any applicable overlay district?
I/W - Industrial/Warehouse

b. Is the use permitted or allowed by a special or conditional use permit? ☑ Yes ☐ No

c. Is a zoning change requested as part of the proposed action? ☐ Yes ☑ No
If Yes,
i. What is the proposed new zoning for the site? _____

C.4. Existing community services.

a. In what school district is the project site located? Romulus Central School District

b. What police or other public protection forces serve the project site?
Seneca County Sheriff Department

c. Which fire protection and emergency medical services serve the project site?
Town of Romulus Fire Department

d. What parks serve the project site?
Sampson State Park

D. Project Details

D.1. Proposed and Potential Development

a. What is the general nature of the proposed action (e.g., residential, industrial, commercial, recreational; if mixed, include all components)? Energy Development- Industrial

b. a. Total acreage of the site of the proposed action? 48.3 acres
b. Total acreage to be physically disturbed? +/- 46.8 acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 48.3 acres

c. Is the proposed action an expansion of an existing project or use? ☐ Yes ☑ No
i. If Yes, what is the approximate percentage of the proposed expansion and identify the units (e.g., acres, miles, housing units, square feet)? % _____ Units: _____

d. Is the proposed action a subdivision, or does it include a subdivision? ☑ Yes ☐ No
If Yes,
i. Purpose or type of subdivision? (e.g., residential, industrial, commercial; if mixed, specify types)
Industrial
ii. Is a cluster/conservation layout proposed? ☐ Yes ☑ No
iii. Number of lots proposed? _____
iv. Minimum and maximum proposed lot sizes? Minimum _____ Maximum _____

e. Will proposed action be constructed in multiple phases? ☑ Yes ☐ No
i. If No, anticipated period of construction: _____ months
ii. If Yes:
- Total number of phases anticipated 2
- Anticipated commencement date of phase 1 (including demolition) _____ month 2019 year
- Anticipated completion date of final phase _____ month 2023 year
- Generally describe connections or relationships among phases, including any contingencies where progress of one phase may determine timing or duration of future phases:

See Executive Summary. Construction is anticipated to begin in December 2019 and be completed in December 2021. The Facility will operate at 50% of the design/permit capacity. Phase 2 will begin in 2021 and end in 2023, increasing the Facility to 100% of the design/permitted capacity.

f. Does the project include new residential uses? ☐Yes ☑No
If Yes, show numbers of units proposed.

	One Family	Two Family	Three Family	Multiple Family (four or more)
Initial Phase				
At completion of all phases				

g. Does the proposed action include new non-residential construction (including expansions)? ☑Yes ☐No
If Yes,
i. Total number of structures 10
ii. Dimensions (in feet) of largest proposed structure: +/- 263' height; +/-600' width; and +/-450' length
iii. Approximate extent of building space to be heated or cooled: +/-300,000 square feet

h. Does the proposed action include construction or other activities that will result in the impoundment of any liquids, such as creation of a water supply, reservoir, pond, lake, waste lagoon or other storage? ☑Yes ☐No
If Yes,
i. Purpose of the impoundment: Leachate management, boiler feed water treatment and storage, fire suppression treatment and storage, etc
ii. If a water impoundment, the principal source of the water: ☐ Ground water ☐ Surface water streams ☑Other specify:
Water impoundment for boiler feed water and fire suppression water is taken from Seneca Lake
iii. If other than water, identify the type of impounded/contained liquids and their source.
Liquid Storage associated with leachate management; fuel storage for operation of onsite equipment used for rail activities
iv. Approximate size of the proposed impoundment. Volume: See Exec Sum million gallons; surface area: See Exec Sum acres
v. Dimensions of the proposed dam or impounding structure: See E.S. height; See E.S. length
vi. Construction method/materials for the proposed dam or impounding structure (e.g., earth fill, rock, wood, concrete):
See Executive Summary Section 4

D.2. Project Operations

a. Does the proposed action include any excavation, mining, or dredging, during construction, operations, or both? ☐Yes ☑No
(Not including general site preparation, grading or installation of utilities or foundations where all excavated materials will remain onsite)
If Yes:
i. What is the purpose of the excavation or dredging?
ii. How much material (including rock, earth, sediments, etc.) is proposed to be removed from the site?
- Volume (specify tons or cubic yards):
- Over what duration of time?

iii. Describe nature and characteristics of materials to be excavated or dredged, and plans to use, manage or dispose of them.

iv. Will there be onsite dewatering or processing of excavated materials? ☐Yes ☐No
If yes, describe.

v. What is the total area to be dredged or excavated? acres
vi. What is the maximum area to be worked at any one time? acres
vii. What would be the maximum depth of excavation or dredging? feet
viii. Will the excavation require blasting? ☐Yes ☐No
ix. Summarize site reclamation goals and plan:

b. Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody, shoreline, beach or adjacent area? ☑Yes ☐No
If Yes:
i. Identify the wetland or waterbody which would be affected (by name, water index number, wetland map number or geographic description): See Executive Summary Section 3.

ii. Describe how the proposed action would affect that waterbody or wetland, e.g. excavation, fill, placement of structures, or alteration of channels, banks and shorelines. Indicate extent of activities, alterations and additions in square feet or acres:

The project proposes fill within a federal jurisdictional wetland. It is anticipated that approximately 0.63 acres of jurisdictional wetlands will be impacted. Any permanent disturbances to jurisdictional wetlands, if in excess of 0.1 acres, will be mitigated at an off-site location using an area ratio greater than 1:1.

iii. Will proposed action cause or result in disturbance to bottom sediments? ☐ Yes ☑ No

If Yes, describe: _____

iv. Will proposed action cause or result in the destruction or removal of aquatic vegetation? ☐ Yes ☑ No

If Yes:

- acres of aquatic vegetation proposed to be removed: _____
- expected acreage of aquatic vegetation remaining after project completion: _____
- purpose of proposed removal (e.g. beach clearing, invasive species control, boat access): _____
- proposed method of plant removal: _____
- if chemical/herbicide treatment will be used, specify product(s): _____

v. Describe any proposed reclamation/mitigation following disturbance:

Any permanent disturbances to preliminary jurisdictional wetlands, if in excess of 0.1 acres, will be mitigated at an off-site location using 1:1 ratio

c. Will the proposed action use, or create a new demand for water? ☑ Yes ☐ No

If Yes:

i. Total anticipated water usage/demand per day: 5,500 gallons/day

ii. Will the proposed action obtain water from an existing public water supply? ☑ Yes ☐ No

If Yes:

- Name of district or service area: Seneca County Water District #1
- Does the existing public water supply have capacity to serve the proposal? ☑ Yes ☐ No
- Is the project site in the existing district? ☐ Yes ☑ No
- Is expansion of the district needed? ☐ Yes ☑ No
- Do existing lines serve the project site? ☑ Yes ☐ No

iii. Will line extension within an existing district be necessary to supply the project? ☑ Yes ☐ No

If Yes:

- Describe extensions or capacity expansions proposed to serve this project:
  Reactivation and extension of the abandoned 8" diameter Seneca Lake water intake water main.
- Source(s) of supply for the district: Seneca Lake

iv. Is a new water supply district or service area proposed to be formed to serve the project site? ☐ Yes ☑ No

If, Yes:

- Applicant/sponsor for new district: _____
- Date application submitted or anticipated: _____
- Proposed source(s) of supply for new district: _____

v. If a public water supply will not be used, describe plans to provide water supply for the project: _____

vi. If water supply will be from wells (public or private), maximum pumping capacity: _____ gallons/minute.

d. Will the proposed action generate liquid wastes? ☑ Yes ☐ No

If Yes:

i. Total anticipated liquid waste generation per day: 132,300 gallons/day

ii. Nature of liquid wastes to be generated (e.g., sanitary wastewater, industrial; if combination, describe all components and approximate volumes or proportions of each):

126,800 gpd pf leachate from the waste pit and 5,500 gpd of domestic sewer from sinks and restrooms

iii. Will the proposed action use any existing public wastewater treatment facilities? ☑ Yes ☐ No

If Yes:

- Name of wastewater treatment plant to be used: Five Points Correctional WWTP
- Name of district: Seneca County Sewer District #2
- Does the existing wastewater treatment plant have capacity to serve the project? ☑ Yes ☐ No
- Is the project site in the existing district? ☑ Yes ☐ No
- Is expansion of the district needed? ☑ Yes ☐ No

- Do existing sewer lines serve the project site? ☑Yes☐No
- Will line extension within an existing district be necessary to serve the project? ☑Yes☐No

  If Yes:
  - Describe extensions or capacity expansions proposed to serve this project: _____

The Five Points Correctional WWTP is anticipated to be upgraded to adequately treat the leachate generated from the proposed facility.

iv. Will a new wastewater (sewage) treatment district be formed to serve the project site? ☐Yes☑No

If Yes:
- Applicant/sponsor for new district: _____
- Date application submitted or anticipated: _____
- What is the receiving water for the wastewater discharge? _____

v. If public facilities will not be used, describe plans to provide wastewater treatment for the project, including specifying proposed receiving water (name and classification if surface discharge, or describe subsurface disposal plans):

Public facilities will be used for wastewater treatment.

vi. Describe any plans or designs to capture, recycle or reuse liquid waste: _____

The Facility does not have plans to recycle or reuse liquid waste.

e. Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction? ☑Yes☐No

If Yes:

i. How much impervious surface will the project create in relation to total size of project parcel?

_____ Square feet or 21.6 acres (impervious surface)

_____ Square feet or 48.3 acres (parcel size)

ii. Describe types of new point sources. Storm pipes from detention ponds

iii Where will the stormwater runoff be directed (i.e. on-site stormwater management facility/structures, adjacent properties, groundwater, on-site surface water or off-site surface waters)?

On-Site stormwater management facilities

- If to surface waters, identify receiving water bodies or wetlands: _____
- Will stormwater runoff flow to adjacent properties? ☐Yes☑No

iv. Does proposed plan minimize impervious surfaces, use pervious materials or collect and re-use stormwater? ☑Yes☐No

f. Does the proposed action include, or will it use on-site, one or more sources of air emissions, including fuel combustion, waste incineration, or other processes or operations? ☑Yes☐No

If Yes, identify:

i. Mobile sources during project operations (e.g., heavy equipment, fleet or delivery vehicles)

Waste unloading equipment

ii. Stationary sources during construction (e.g., power generation, structural heating, batch plant, crushers)

Construction equipment

iii. Stationary sources during operations (e.g., process emissions, large boilers, electric generation)

Waste combustion, Cooling Tower

g. Will any air emission sources named in D.2.f (above), require a NY State Air Registration, Air Facility Permit, or Federal Clean Air Act Title IV or Title V Permit? ☑Yes☐No

If Yes:

i. Is the project site located in an Air quality non-attainment area? (Area routinely or periodically fails to meet ambient air quality standards for all or some parts of the year) ☐Yes☑No

ii. In addition to emissions as calculated in the application, the project will generate:
- 949,000 Tons/year (short tons) of Carbon Dioxide (CO_2)
- 8.6 Tons/year (short tons) of Nitrous Oxide (N_2O)
- 0.0 Tons/year (short tons) of Perfluorocarbons (PFCs)
- 0.0 Tons/year (short tons) of Sulfur Hexafluoride (SF_6)
- 0.0 Tons/year (short tons) of Carbon Dioxide equivalent of Hydroflourocarbons (HFCs)
- 20.64 Tons/year (short tons) of Hazardous Air Pollutants (HAPs)

h. Will the proposed action generate or emit methane (including, but not limited to, sewage treatment plants, landfills, composting facilities)? ☑Yes ☐No

If Yes:

i. Estimate methane generation in tons/year (metric): De minimis methane emissions from waste bunker. See Executive Summary Section 6.

ii. Describe any methane capture, control or elimination measures included in project design (e.g., combustion to generate heat or electricity, flaring): See Executive Summary Section 6.

i. Will the proposed action result in the release of air pollutants from open-air operations or processes, such as quarry or landfill operations? ☑Yes ☐No

If Yes: Describe operations and nature of emissions (e.g., diesel exhaust, rock particulates/dust):

See Executive Summary Section 6.

j. Will the proposed action result in a substantial increase in traffic above present levels or generate substantial new demand for transportation facilities or services? ☐Yes ☑No

If Yes:

i. When is the peak traffic expected (Check all that apply): ☐ Morning ☐ Evening ☐Weekend ☐ Randomly between hours of _____ to _____.

ii. For commercial activities only, projected number of semi-trailer truck trips/day: _____

iii. Parking spaces: Existing _____ Proposed _____ Net increase/decrease _____

iv. Does the proposed action include any shared use parking? ☐Yes ☐No

v. If the proposed action includes any modification of existing roads, creation of new roads or change in existing access, describe:

vi. Are public/private transportation service(s) or facilities available within ½ mile of the proposed site? ☐Yes ☐No

vii Will the proposed action include access to public transportation or accommodations for use of hybrid, electric or other alternative fueled vehicles? ☐Yes ☐No

viii. Will the proposed action include plans for pedestrian or bicycle accommodations for connections to existing pedestrian or bicycle routes? ☐Yes ☐No

k. Will the proposed action (for commercial or industrial projects only) generate new or additional demand for energy? ☑Yes ☐No

If Yes:

i. Estimate annual electricity demand during operation of the proposed action:

The waste-to-energy facility is designed for the production of up to 438,000,000 kWh annually.

ii. Anticipated sources/suppliers of electricity for the project (e.g., on-site combustion, on-site renewable, via grid/local utility, or other):

Sources of electricity: Local utility (NYSEG) and on-site combustion of MSW

iii. Will the proposed action require a new, or an upgrade to, an existing substation? ☑Yes ☐No

l. Hours of operation. Answer all items which apply.

i. During Construction:

- Monday - Friday: 7:00 a.m. - 9:00 p.m.
- Saturday: 7:00 a.m. - 9:00 p.m.
- Sunday: 7:00 a.m. - 9:00 p.m.
- Holidays: 7:00 a.m. - 9:00 p.m.

ii. During Operations:

- Monday - Friday: 24 hrs/day
- Saturday: 24 hrs/day
- Sunday: 24 hrs/day
- Holidays: 24 hrs/day

m. Will the proposed action produce noise that will exceed existing ambient noise levels during construction, operation, or both? ☑ Yes ☐ No

If yes:

i. Provide details including sources, time of day and duration:

See Executive Summary Section 15.

ii. Will proposed action remove existing natural barriers that could act as a noise barrier or screen? ☐ Yes ☑ No

Describe: See Executive Summary Section 15.

n. Will the proposed action have outdoor lighting? ☑ Yes ☐ No

If yes:

i. Describe source(s), location(s), height of fixture(s), direction/aim, and proximity to nearest occupied structures:

Full cut off, down lit, dark sky compliant, no off site light spill

ii. Will proposed action remove existing natural barriers that could act as a light barrier or screen? ☐ Yes ☑ No

Describe:

o. Does the proposed action have the potential to produce odors for more than one hour per day? ☑ Yes ☐ No

If Yes, describe possible sources, potential frequency and duration of odor emissions, and proximity to nearest occupied structures:

See Executive Summary Section 15.

p. Will the proposed action include any bulk storage of petroleum (combined capacity of over 1,100 gallons) or chemical products 185 gallons in above ground storage or any amount in underground storage? ☑ Yes ☐ No

If Yes:

i. Product(s) to be stored Diesel Fuel, Slaked Lime, Activated Carbon, and Urea

ii. Volume(s) 4000 gallon per unit time 156,000 g/y (e.g., month, year)

iii. Generally describe proposed storage facilities:

Diesel Fuel; 4,000 gallon double-walled, above ground steel tank with secondary containment of 110% of the total volume. See Section 4 of Exec. Sum.

q. Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation? ☑ Yes ☐ No

If Yes:

i. Describe proposed treatment(s):

Lawn and landscaping maintenance, by certified and licensed applicators

ii. Will the proposed action use Integrated Pest Management Practices? ☑ Yes ☐ No

r. Will the proposed action (commercial or industrial projects only) involve or require the management or disposal of solid waste (excluding hazardous materials)? ☑ Yes ☐ No

If Yes:

i. Describe any solid waste(s) to be generated during construction or operation of the facility:

- Construction: ~25 tons per month (unit of time)
- Operation : 96,360 tons per year of mun. solid wa (unit of time)

ii. Describe any proposals for on-site minimization, recycling or reuse of materials to avoid disposal as solid waste:

- Construction: Waste generated is primarily construction and demolition debris. Debris will be recycled as much as practicable with disposal at an approved NYSDEC landfill.
- Operation: The project is a solid waste management facility. Any waste accepted on-site will be managed using waste combustion. By-products of waste combustion will be recycled to the maximum extent practicable.

iii. Proposed disposal methods/facilities for solid waste generated on-site:

- Construction: Waste generated is primarily construction and demolition debris. Debris will be recycled as much as practicable with disposal at an approved NYSDEC landfill.
- Operation: Any waste accepted onsite will be managed using waste combustion. By-products of waste combustion will be recycled as much as practicable with any material that cannot be recycled transported to an off-site NYSDEC-approved landfill for disposal.

s. Does the proposed action include construction or modification of a solid waste management facility? ☑ Yes ☐ No

If Yes:

i. Type of management or handling of waste proposed for the site (e.g., recycling or transfer station, composting, landfill, or other disposal activities): Solid waste management facility to use waste as fuel to produce energy.

ii. Anticipated rate of disposal/processing:

- _____ Tons/month, if transfer or other non-combustion/thermal treatment, or
- 110 Tons/hour, if combustion or thermal treatment

iii. If landfill, anticipated site life: N/A years

t. Will proposed action at the site involve the commercial generation, treatment, storage, or disposal of hazardous waste? ☐ Yes ☑ No

If Yes:

i. Name(s) of all hazardous wastes or constituents to be generated, handled or managed at facility: _____

ii. Generally describe processes or activities involving hazardous wastes or constituents: _____

iii. Specify amount to be handled or generated _____ tons/month

iv. Describe any proposals for on-site minimization, recycling or reuse of hazardous constituents: _____

v. Will any hazardous wastes be disposed at an existing offsite hazardous waste facility? ☐ Yes ☐ No

If Yes: provide name and location of facility: _____

If No: describe proposed management of any hazardous wastes which will not be sent to a hazardous waste facility: _____

E. Site and Setting of Proposed Action

E.1. Land uses on and surrounding the project site

a. Existing land uses.

i. Check all uses that occur on, adjoining and near the project site.

☐ Urban ☑ Industrial ☐ Commercial ☐ Residential (suburban) ☐ Rural (non-farm)
☐ Forest ☐ Agriculture ☐ Aquatic ☐ Other (specify): _____

ii. If mix of uses, generally describe: _____

b. Land uses and covertypes on the project site.

Land use or Covertype	Current Acreage	Acreage After Project Completion	Change (Acres +/-)
• Roads, buildings, and other paved or impervious surfaces	3.74	21.6	+17.86
• Forested	0	0	0
• Meadows, grasslands or brushlands (non-agricultural, including abandoned agricultural)	37.68	18.68	-19.0
• Agricultural (includes active orchards, field, greenhouse etc.)	0	0	0
• Surface water features (lakes, ponds, streams, rivers, etc.)	0	2.4	+2.4
• Wetlands (freshwater or tidal)	1.37	.74	-0 63
• Non-vegetated (bare rock, earth or fill)	5 51	4.88	-0.63
• Other Describe: _____			

c. Is the project site presently used by members of the community for public recreation? ☐Yes ☑No

i. If Yes: explain: _____

d. Are there any facilities serving children, the elderly, people with disabilities (e.g., schools, hospitals, licensed day care centers, or group homes) within 1500 feet of the project site? ☐Yes ☑No

If Yes,

i. Identify Facilities:

_____

e. Does the project site contain an existing dam? ☐Yes ☑No

If Yes:

i. Dimensions of the dam and impoundment:

- Dam height: _____ feet
- Dam length: _____ feet
- Surface area: _____ acres
- Volume impounded: _____ gallons OR acre-feet

ii. Dam's existing hazard classification: _____

iii. Provide date and summarize results of last inspection:

_____

f. Has the project site ever been used as a municipal, commercial or industrial solid waste management facility, or does the project site adjoin property which is now, or was at one time, used as a solid waste management facility? ☑Yes ☐No

If Yes:

i. Has the facility been formally closed? ☑Yes ☐ No

- If yes, cite sources/documentation: See Executive Summary re: Former Seneca Army Depot

ii. Describe the location of the project site relative to the boundaries of the solid waste management facility:

Solid waste management units were located throughout the Former Seneca Army Depot, including a furnace in the vicinity of the project site.

iii. Describe any development constraints due to the prior solid waste activities:

An Environmental Easement restricts groundwater use.

g. Have hazardous wastes been generated, treated and/or disposed of at the site, or does the project site adjoin property which is now or was at one time used to commercially treat, store and/or dispose of hazardous waste? ☑Yes ☐No

If Yes:

i. Describe waste(s) handled and waste management activities, including approximate time when activities occurred:

At the Seneca Army Depot the Army's historic military mission included receipt, storage, distribution, maintenance, and demilitarization of conventional ammunition, explosives and special weapons.

h. Potential contamination history. Has there been a reported spill at the proposed project site, or have any remedial actions been conducted at or adjacent to the proposed site? ☑Yes ☐ No

If Yes:

i. Is any portion of the site listed on the NYSDEC Spills Incidents database or Environmental Site Remediation database? Check all that apply: ☑Yes ☐No

☑ Yes – Spills Incidents database — Provide DEC ID number(s): 850006

☑ Yes – Environmental Site Remediation database — Provide DEC ID number(s): 850006

☐ Neither database

ii. If site has been subject of RCRA corrective activities, describe control measures:

The Project Site is within the Seneca Army Depot which had 72 solid waste management units, which have been remediated under RCRA, none are within the Project Site boundaries.

iii. Is the project within 2000 feet of any site in the NYSDEC Environmental Site Remediation database? ☑Yes ☐No

If yes, provide DEC ID number(s): 850006

iv. If yes to (i), (ii) or (iii) above, describe current status of site(s):

Groundwater monitoring on the Seneca Army Depot is still on-going but not within the Project Site boundaries. The remediation has been completed at the Project Site, but the Applicant must adhere to an environmental easement which restricts future uses and groundwater use.

v. Is the project site subject to an institutional control limiting property uses? ☑ Yes ☐ No

- If yes, DEC site ID number: 850006
- Describe the type of institutional control (e.g., deed restriction or easement): Environmental Easement
- Describe any use limitations: Restricts groundwater use and limits to commercial or industrial uses only
- Describe any engineering controls: _____
- Will the project affect the institutional or engineering controls in place? ☐ Yes ☑ No
- Explain: _____

The Project does not include the use of groundwater, and is an industrial-type project

E.2. Natural Resources On or Near Project Site

a. What is the average depth to bedrock on the project site? 5 ft+- feet

b. Are there bedrock outcroppings on the project site? ☐ Yes ☑ No
If Yes, what proportion of the site is comprised of bedrock outcroppings? _____ %

c. Predominant soil type(s) present on project site:

Angola silt loam	25 %
Darien silt loam	72 %
Ilion silty clay loam	3 %

d. What is the average depth to the water table on the project site? Average: 5ft+- feet

e. Drainage status of project site soils:
- ☐ Well Drained: ____ % of site
- ☑ Moderately Well Drained: 50 % of site
- ☑ Poorly Drained 50 % of site

f. Approximate proportion of proposed action site with slopes:
- ☑ 0-10%: 100 % of site
- ☐ 10-15%: ____ % of site
- ☐ 15% or greater: ____ % of site

g. Are there any unique geologic features on the project site? ☐ Yes ☑ No
If Yes, describe: _____

h. Surface water features.

i Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)? ☑ Yes ☐ No

ii Do any wetlands or other waterbodies adjoin the project site? ☑ Yes ☐ No

If Yes to either *i* or *ii*, continue. If No, skip to E.2.i.

iii Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency? ☑ Yes ☐ No

iv For each identified regulated wetland and waterbody on the project site, provide the following information:

- Streams: Name _____ Classification _____
- Lakes or Ponds: Name _____ Classification _____
- Wetlands: Name Federal Waters Approximate Size See Exec. Summ. Sec. 3
- Wetland No. (if regulated by DEC) _____

v Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies? ☐ Yes ☑ No

If yes, name of impaired water body/bodies and basis for listing as impaired: _____

i. Is the project site in a designated Floodway? ☐ Yes ☑ No

j. Is the project site in the 100 year Floodplain? ☐ Yes ☑ No

k. Is the project site in the 500 year Floodplain? ☐ Yes ☑ No

l. Is the project site located over, or immediately adjoining, a primary, principal or sole source aquifer? ☐ Yes ☑ No
If Yes:

i Name of aquifer: _____

m. Identify the predominant wildlife species that occupy or use the project site:
White tailed deer | Gray squirrel
Song birds

n. Does the project site contain a designated significant natural community? ☐Yes ☑No
If Yes:
i. Describe the habitat/community (composition, function, and basis for designation): _____
ii. Source(s) of description or evaluation: _____
iii. Extent of community/habitat:
- Currently: _____ acres
- Following completion of project as proposed: _____ acres
- Gain or loss (indicate + or -): _____ acres

o. Does project site contain any species of plant or animal that is listed by the federal government or NYS as endangered or threatened, or does it contain any areas identified as habitat for an endangered or threatened species? ☑Yes ☐No

p. Does the project site contain any species of plant or animal that is listed by NYS as rare, or as a species of special concern? ☐Yes ☑No

q. Is the project site or adjoining area currently used for hunting, trapping, fishing or shell fishing? ☐Yes ☑No
If yes, give a brief description of how the proposed action may affect that use: _____

E.3. Designated Public Resources On or Near Project Site

a. Is the project site, or any portion of it, located in a designated agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐Yes ☑No
If Yes, provide county plus district name/number: _____

b. Are agricultural lands consisting of highly productive soils present? ☐Yes ☑No
i. If Yes: acreage(s) on project site? _____
ii. Source(s) of soil rating(s): _____

c. Does the project site contain all or part of, or is it substantially contiguous to, a registered National Natural Landmark? ☐Yes ☑No
If Yes:
i. Nature of the natural landmark: ☐ Biological Community ☐ Geological Feature
ii. Provide brief description of landmark, including values behind designation and approximate size/extent: _____

d. Is the project site located in or does it adjoin a state listed Critical Environmental Area? ☐Yes ☑No
If Yes:
i. CEA name: _____
ii. Basis for designation: _____
iii. Designating agency and date: _____

e. Does the project site contain, or is it substantially contiguous to, a building, archaeological site, or district which is listed on, or has been nominated by the NYS Board of Historic Preservation for inclusion on, the State or National Register of Historic Places? ☑ Yes ☐ No

If Yes:

i Nature of historic/archaeological resource: ☐ Archaeological Site ☑ Historic Building or District

ii Name: Adjacent to Seneca Army Depot Historical District, which will not be impacted by the Project. See Executive Summary Section 10

iii Brief description of attributes on which listing is based:

Army's former operations at the Depot. See Executive Summary Section 10

f. Is the project site, or any portion of it, located in or adjacent to an area designated as sensitive for archaeological sites on the NY State Historic Preservation Office (SHPO) archaeological site inventory? ☑ Yes ☐ No

g. Have additional archaeological or historic site(s) or resources been identified on the project site? ☐ Yes ☑ No

If Yes:

i. Describe possible resource(s): _____

ii. Basis for identification: _____

h. Is the project site within fives miles of any officially designated and publicly accessible federal, state, or local scenic or aesthetic resource? ☐ Yes ☑ No

If Yes:

i Identify resource: _____

ii Nature of, or basis for, designation (e.g., established highway overlook, state or local park, state historic trail or scenic byway, etc.): _____

iii Distance between project and resource: _____ miles.

i. Is the project site located within a designated river corridor under the Wild, Scenic and Recreational Rivers Program 6 NYCRR 666? ☐ Yes ☑ No

If Yes:

i Identify the name of the river and its designation: _____

ii Is the activity consistent with development restrictions contained in 6NYCRR Part 666? ☐ Yes ☑ No

F. Additional Information

Attach any additional information which may be needed to clarify your project.

If you have identified any adverse impacts which could be associated with your proposal, please describe those impacts plus any measures which you propose to avoid or minimize them.

G. Verification

I certify that the information provided is true to the best of my knowledge.

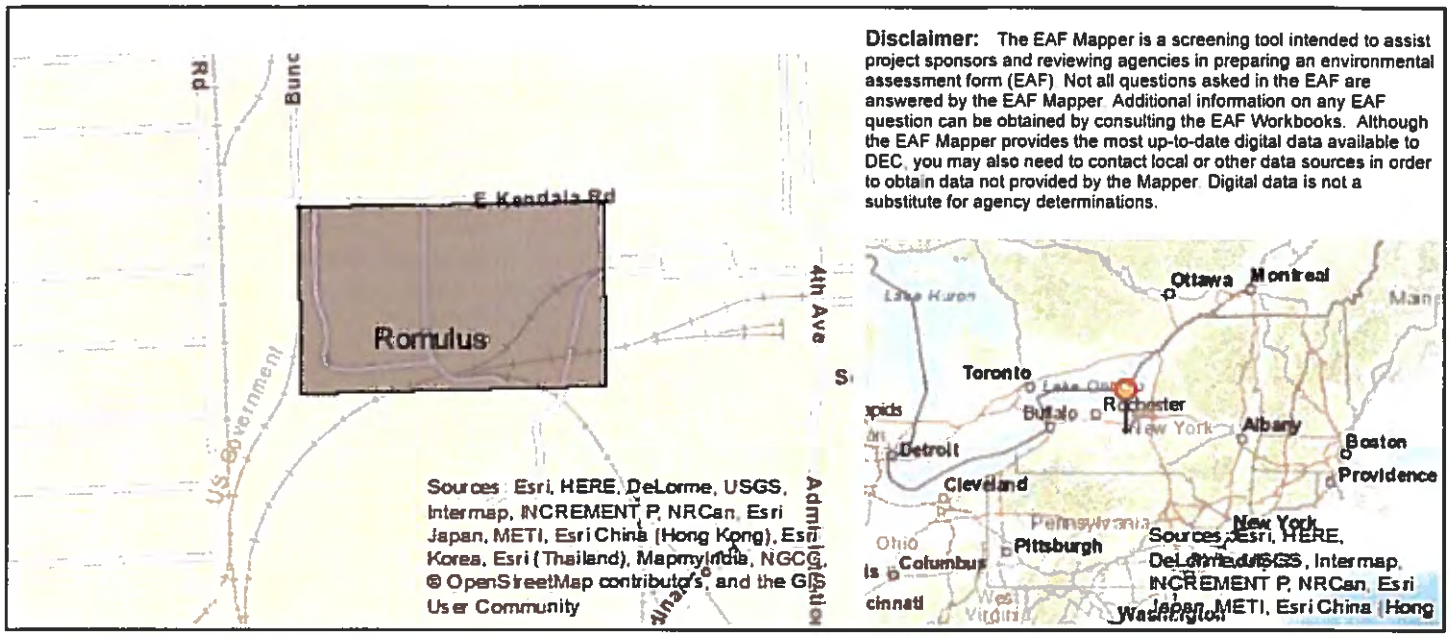
Applicant/Sponsor Name Circular enerG, LLC Date November 6, 2017

Signature _____ Title Secretary

PRINT FORM

EAF Mapper Summary Report

Wednesday, November 01, 2017 1:16 PM



Disclaimer: The EAF Mapper is a screening tool intended to assist project sponsors and reviewing agencies in preparing an environmental assessment form (EAF). Not all questions asked in the EAF are answered by the EAF Mapper. Additional information on any EAF question can be obtained by consulting the EAF Workbooks. Although the EAF Mapper provides the most up-to-date digital data available to DEC, you may also need to contact local or other data sources in order to obtain data not provided by the Mapper. Digital data is not a substitute for agency determinations.

B.i.i [Coastal or Waterfront Area]	No
B.i.ii [Local Waterfront Revitalization Area]	No
C.2.b. [Special Planning District]	Yes - Digital mapping data are not available for all Special Planning Districts. Refer to EAF Workbook.
C.2.b. [Special Planning District - Name]	Remediaton Sites:850006
E.1.h [DEC Spills or Remediation Site - Potential Contamination History]	Yes - Digital mapping data for Spills Incidents are not available for this location. Refer to EAF Workbook.
E.1.h.i [DEC Spills or Remediation Site - Listed]	Yes
E.1.h.i [DEC Spills or Remediation Site - Environmental Site Remediation Database]	Yes
E.1.h.i [DEC Spills or Remediation Site - DEC ID Number]	850006
E.1.h.iii [Within 2,000' of DEC Remediation Site]	Yes
E.1.h.iii [Within 2,000' of DEC Remediation Site - DEC ID]	850006
E.2.g [Unique Geologic Features]	No
E.2.h.i [Surface Water Features]	Yes
E.2.h.ii [Surface Water Features]	Yes
E.2.h.iii [Surface Water Features]	Yes - Digital mapping information on local and federal wetlands and waterbodies is known to be incomplete. Refer to EAF Workbook.
E.2.h.iv [Surface Water Features - Wetlands Name]	Federal Waters
E.2.h.v [Impaired Water Bodies]	No
E.2.i. [Floodway]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.

E.2.j. [100 Year Floodplain]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.2.k. [500 Year Floodplain]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.2.l. [Aquifers]	No
E.2.n. [Natural Communities]	No
E.2.o. [Endangered or Threatened Species]	Yes
E.2.p. [Rare Plants or Animals]	No
E.3.a. [Agricultural District]	No
E.3.c. [National Natural Landmark]	No
E.3.d [Critical Environmental Area]	No
E.3.e. [National Register of Historic Places]	Digital mapping data are not available or are incomplete. Refer to EAF Workbook.
E.3.f. [Archeological Sites]	Yes
E.3.i. [Designated River Corridor]	No

Town of Romulus

P.O. Box 177

1435 Prospect St.

Willard, NY 14588

607-869-9326

www.romulustown.com

TOWN OF ROMULUS

APPLICATION FOR SPECIAL USE PERMIT

Date of consultation with Zoning Officer 8/2017

Zoning District I/W

Applicant should read the Romulus Town Zoning Code section applicable to this application prior to completing this form. Additional requirements for a special use permit may be included in the applicable zoning section of the code. See sections VIII and IX. Any of these requirements must be included with this form. Incomplete applications cannot be considered by the Planning Board. The code is available on the town's web site.

Applicant Information: If more than one please provide information on additional sheet

Name Circular enerG, LLC

Mailing Address 400 Andrews Street, Suite 360, Rochester, NY 14604

If post office box or other please provide, physical address as well.

Phone Number _____ Cell Number [redacted]

Fax Number 585-546-4324 Email aknauf@nyenvlaw.com

Property Owner's Information (if different than Applicant Information): LIST ALL. If more than one please provide information on additional sheet.

Name Seneca Depot, LLC

Address 400 Andrews Street, Suite 500, Rochester, NY 14604

Phone Number 585-546-4866 Cell Number [redacted]

Fax Number 585-325-6058 Email mpalumbo@flaummgt.com

ADDRESS OF SITE FOR SPECIAL USE PERMIT (if different than Applicant Address) If more than one street address applies, list all.

Address E. Kendaia Road (part of tax # 8-1-03.5)

Property Tax Map ID number (List all) 08-1-03.5 (part)

Has this property been a subject of past Town Board, Planning Board or Zoning Board of Appeals applications and/ or approvals? Yes If yes, please describe

The Applicant has not sought any prior approvals, but the Town recently re-zoned the Project Site and about 900 more acres to Industrial/Warehouse to attract more industrial uses like the Project.

General Purpose and Description of Special Use Permit Request
Circular enerG, LLC (the "Applicant") intends to develop approximately 39 4 acres of the former Seneca Army Depot into a sustainable waste-to-energy facility ("Facility"), whereby municipal solid waste is incinerated and converted to energy.

Full Description and Business Plan See Executive Summary

SITE PLAN MUST BE ATTACHED TO THIS APPLICATION IN ORDER TO BE CONSIDERED. If not attached please provide explanation. Application may not be considered without a site plan.

Names, addresses, and qualifications of the preparers of any drawings submitted.

Costich Engineering, D.P.C. (Professional Engineering, Land Surveying and Landscape Architecture)
217 Lake Avenue, Rochester, NY 14608

Site plan, any maps, drawings must have Date, north point, written and graphic scale.

SITE PLAN MUST INCLUDE If any of these items are not provided please explain why. Mark each item yes for included, no for not included or NA if not applicable.

Boundaries of the area, drawn to scale and including distances and areas. Yesx_ No_ NA_

Location, ownership and use of all adjacent lands. Yesx_ No_ NA_

Location, name and existing width of all adjacent public or private roads. Yesx_ No_ NA_

Location, width and purpose of all existing and proposed easements, setbacks, reservations and areas dedicated to public use within or adjoining the property. Yesx_ No_ NA_

Complete outline of existing and proposed deed restrictions or covenants applying to the property. Yesx_No_ NA_

Existing hydrologic features, together with grading and drainage plan, showing existing and proposed contours at intervals of not less than ten (10) feet. Yesx_ No_ NA_

Location, proposed use, height and exterior dimensions of all existing and proposed buildings and structures on the property. Yesx_ No_ NA_

Location, design, construction materials of all parking and truck loading areas with ingress and egress drives thereto. Yes_x No_ NA_

Provision for pedestrian access, including public and private sidewalks. Yes_x No_ NA_

Location of outdoors storage areas. Yes_x No_ NA_

Location, design and construction materials of all existing or proposed site improvements, including drains, culverts, retaining walls, stone walls and fences. Yesx_ No_ NA_

Description of the method of securing potable water and the location, design and construction materials of such facilities. Yesx_ No_ NA_

Description of the method of sewage disposal and the location, design, and construction materials of such facilities. Yes __ xNo_ NA_

Location of fire lanes and other emergency zones including the location of fire hydrants. Yesx_ No_ NA_

Location, design and construction materials of all energy distribution facilities including electrical, gas, and solar energy. Yesx_ No_ NA_

Location, size, design and construction materials of all proposed signs. Yes_x No_ NA_

Location and proposed development of all buffer areas including indication of existing and proposed vegetative covers. Yesx_ No_ NA_

Location and design of outdoor lighting facilities. Yesx_ No_ NA_

Designation of the amount of gross floor area and gross leasable area proposed for retail sales and services, office and other similar commercial or light-industrial activities. Yesx_ No_ NA_

Number and distribution, by type, of all proposed dwelling units. Yesx_ No_ NA_

General landscaping plan and planting schedule. Yesx_ No_ NA_

An Environmental Assessment For (EAF) with Part 1 completed by the applicant, pursuant to SEQRA regulations. Yesx_ No_ NA_

Identification of all federal, state or county approvals, permits or licenses required for execution of the project. Yesx_ No_ NA_

Information concerning other elements that the Planning Board deems integral to the proposed use and necessary for the Planning Board to adequately review and evaluate the proposed use. Yesx No_ NA_

I have read the applicable zoning section of the Town of Romulus Zoning Regulations. Yesx_ No_

Any additional documentation required by the applicable zoning section is included. YesxNo_ NA_

Please see Addendum A to this application.

I/ We, the undersigned, agree the Information herein and attached is true I/We, the undersigned, do hereby permit officials and/or consultants of the Town of Romulus to enter the property described herein to complete a thorough review of this application.

Circular EnerG, LLC

_____ Date 11/3/17

Signature of Applicant

Seneca Depot, LLC

Michael Palumbo Date 11/2/17

Signature of Property Owner

Below is for Office Use Only

Filing Fee_____ Date Reviewed by County PB_____

Date Received_____ Comments _____

Public Hearing Date_____

Approved/Denied _____ Comments _____

Permit# _____

Planning Board Chairman _____ _____

Print Name Signature

Date of Approval/Denial _____

ADDENDUM A to Application for Special Use Permit

The Planning Board, in its discretion, may require the applicant to submit additional maps and materials in conjunction with the Special Permit application and site plan. Such maps or materials may include the following:

1. Vicinity map - this map at a scale of not less than 1" = 2,000' shall show the relationship off the proposed to existing community facilities that may affect or serve it such as roads, shopping areas, school and employment centers. It shall show all properties, subdivisions, roads and easements within three hundred feet(300') of the proposal.
2. Topographic map - this shall be drawn at a scale of not less than 1" = 100' and shall show existing topography at contour levels of not more than ten (10) feet. This map shall also show the location of pertinent natural features that may influence the design of the proposed use, such as lakes, ponds, streams, wetlands, rock outcrops, wooded areas and areas subject to flooding. If the Planning Board finds that a topographic map at the above mentioned scale provides insufficient detail to adequately review and evaluate the potential impact of the proposed use, the Planning Board may require the submission of a topographic map at a scale which it deems adequate to perform such review and evaluation.
3. Development Plan - this map of the site of the proposed Special Use shall be drawn at a scale of not less than 1" = 100' and shall show the location of all buildings and structures; all automobile parking and all parking for commercial vehicles while loading and unloading; the location and width of all driveways, exits and entrances; the location of all existing or proposed site improvements including drains, culverts, retaining walls and fences; a narrative description of and indication on the site plan of the location of sewage disposal facilities and water facilities; the location and size of all existing and proposed signs; the location of proposed buffer areas and the design of lighting and other facilities.
4. Elevations and/or Section - if deemed necessary by the Planning Board, the site plan shall be accompanied by elevations and/or sections at the same or greater scale as is required for the site plan. Such drawing shall be of sufficient details to clearly delineate the bulk, height and style of all buildings and other permanent structures included in the proposal.
5. Engineering plans - if deemed necessary by the Planning Board, the site plan shall be accompanied by engineering plans including road improvements, drainage system and public or private utility systems and other such supporting data.

TOWN OF ROMULUS

Tom Bouchard, Chairman
William Karlsen, Vice-Chairman
Kate Sinicropi, Secretary
Cindy Meckley, Member
Sue Ellen Balluff, Member
Al Nivison, Member
Mary Joslyn, Member

PLANNING BOARD
1435 Prospect Street
P.O. Box 177
Willard, New York 14588
PHONE: 607-869-9326
FAX: 607-869-5763
Email: Romulus@rochester.rr.com

PUBLIC HEARING NOTIFICATION FORM FOR SPECIAL USE PERMIT

STATE OF NEW YORK
COUNTY OF SENECA

I, Michael Palumbo, being duly sworn, testify as follows:

1. The statement made in this Affidavit are based upon my personal knowledge and I am competent to testify.
2. I own the property located at The former Seneca Army Depot (tax map no. 8-1-03.5) (herein the Premises) where I am seeking a Variance/Special Use Permit.
3. Attached hereto as Exhibit "A" is a list of neighbors who own and/or reside at Properties that are within 1000 feet of the Premises boundaries.
4. Exhibit "A" was obtained from: Costich Engineering, Land Surveying & Landscape Architecture D.P.C.
5. I attempted to contact each neighbor listed in Exhibit "A" to make them aware of the variance/special use request, which I described as a Special Use Permit Application and gave them a copy of the application.
6. I further attempted to inform each neighbor of a public information hearing. Which is scheduled to be held at the Romulus Town Hall at 7:00 pm On the date of December 4, 2017.
7. I was not able to contact the following neighbor (s):

   _____
   _____
   _____

8. I used the following means to attempt to contact each neighbor: First-class mail, sent on November 6, 2017

Michael Palumbo
PROPERTY OWNER
As agent for Seneca Depot LLC

Sworn to before me this 6th
Day of November, 2017

Ellen C Smith
NOTARY PUBLIC

ELLEN C SMITH
NOTARY PUBLIC, STATE OF NEW YORK
MONROE COUNTY
LIC. # 01SM4601008
COMM. EXP. 3/30/18

SENECA DEPOT, LLC

WASTE TO ENERGY FACILITY

LIST OF ADJOINERS WITHIN 1000' OF T.A.#8-1-3.5

CE#C3320

10/23/2017

TAX #	OWNER NAME	MAILING ADDRESS		
02-1-01	SENECA COUNTY IDA	1 DIPRONIO DR	WATERLOO, NY	13165
03-1-85.2	TIME WARNER CABLE NE LLC	7820 CRESCENT EXECUTIVE DR	CHARLOTTE, NC	28217
03-1-85.121	KEITH SCHRADER	5710 RTE 96	ROMULUS, NY	14541
03-1-85.122	RICHARD J GOODLIFF	5733 CHERRY HILL RD	ROMULUS, NY	14541
08-1-03.2	SENECA CTY SEWER DIST #2	1 DIPRONIO DR	WATERLOO, NY	13165
08-1-03.3	SENECA COUNTY	1 DIPRONIO DR	WATERLOO, NY	13165
08-1-03.4	TOWN OF ROMULUS	PO BOX 177	WILLARD, NY	14588

CIRCULAR enerG FACILITY
SITE DEVELOPMENT PLANS

TOWN OF ROMULUS
COUNTY OF SENECA
STATE OF NEW YORK

INDEX OF DRAWINGS

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GA002	GENERAL NOTES AND LEGEND SHEET (SHEET 2 OF 15)
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CA110	SITE AND PAVEMENT MARKING PLAN (SHEET 4 OF 15)
CA120	ON-SITE UTILITY PLAN (SHEET 5 OF 15)
CA130	GRADING AND EROSION CONTROL PLAN (SHEET 6 OF 15)
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EA150	LIGHTING PLAN (SHEET 8 OF 15)
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CA500	DETAIL SHEET (SHEET 13 OF 15)
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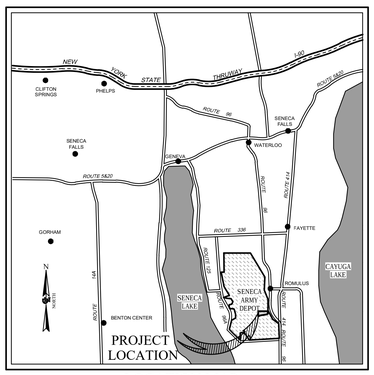
CA502	DETAIL SHEET (SHEET 15 OF 15)



LOCATION MAP
NOT TO SCALE

PROJECT TEAM

CIVIL ENGINEER	DEVELOPER	ENVIRONMENTAL ENGINEER	ATTORNEY
MIKE RITCHIE, P.E. COSTICH ENGINEERING 217 LAKE AVENUE ROCHESTER, NEW YORK 14608 PHONE: (585) 458-3020 EXT. 123 FAX: (585) 458-2731	CIRCULAR ENERG LLC 400 ANDREWS STREET ROCHESTER, NEW YORK 14604	JIM DAIGLER, P.E. DAIGLER ENGINEERING 2620 GRAND ISLAND BOULEVARD GRAND ISLAND, NEW YORK 14072 PHONE: (716) 773-6872 FAX: (716) 773-6873	ALAN J. KNAUF, ESQ. KNAUF SHAW, LLC 1400 CROSSROADS BUILDING 2 STATE STREET ROCHESTER, NEW YORK 14614 PHONE: (585) 546-8430

PREPARED FOR:
CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

STATE OF NEW YORK
MICHAEL R. COSTICH
NO. 065957
Licensed Professional Engineer

COSTICH ENGINEERING
- CIVIL ENGINEERING
- LAND SURVEYING
- LANDSCAPE ARCHITECTURE

217 LAKE AVENUE
ROCHESTER, NY 14608
(585) 458-3020

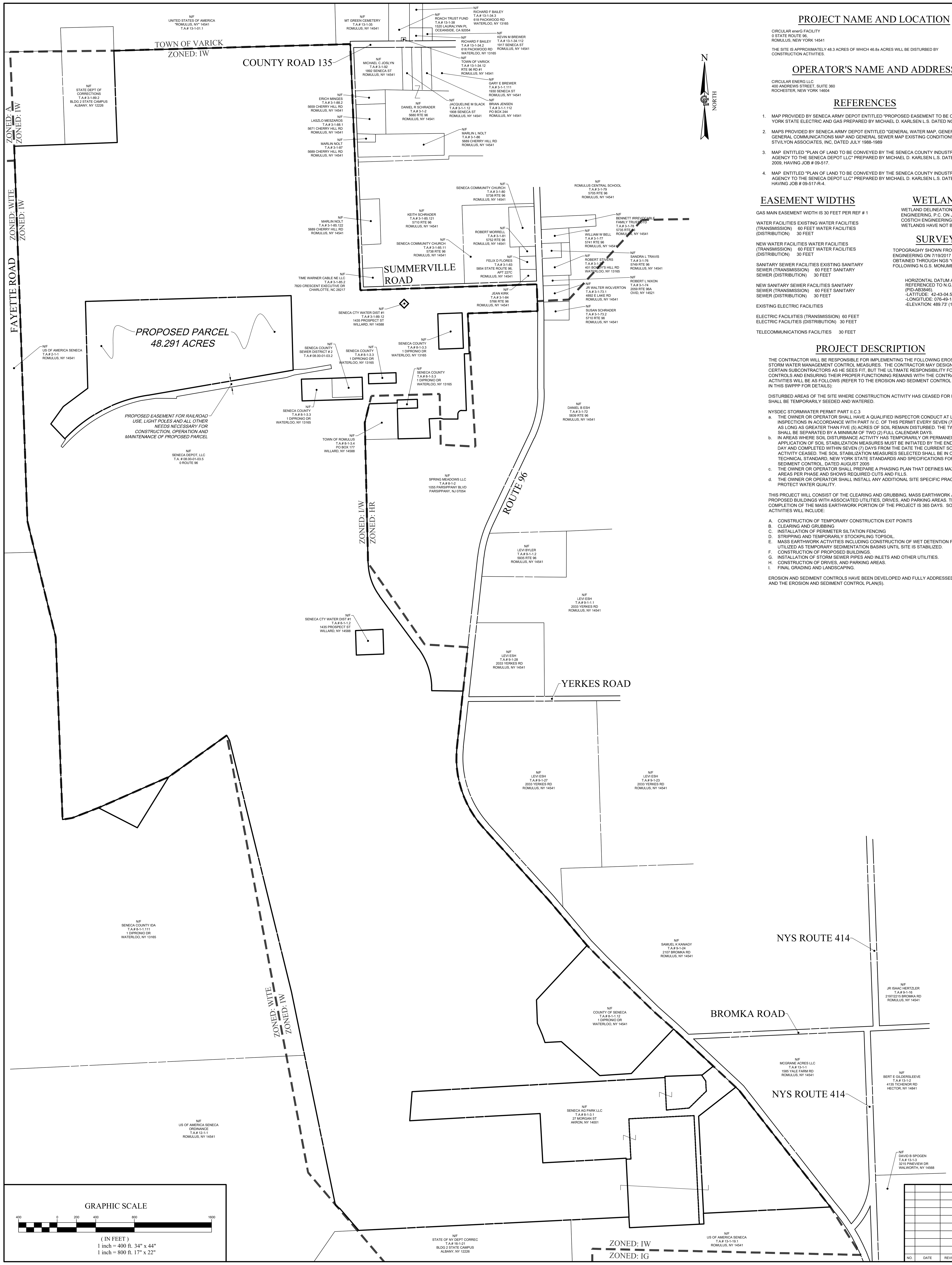
CIRCULAR enerG FACILITY
SITE DEVELOPMENT PLANS
TOWN OF ROMULUS
COUNTY OF SENECA
STATE OF NEW YORK

APPROVAL PLANS

DATE: NOVEMBER 01, 2017

PROJECT NO. C3320

SHEET NO. GA001
SHEET 1 OF 15



PROJECT NAME AND LOCATION

CIRCULAR enerG FACILITY
0 STATE ROUTE 96,
ROMULUS, NEW YORK 14541

THE SITE IS APPROXIMATELY 48.3 ACRES OF WHICH 46.8± ACRES WILL BE DISTURBED BY CONSTRUCTION ACTIVITIES.

OPERATOR'S NAME AND ADDRESS

CIRCULAR ENERG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

REFERENCES

1. MAP PROVIDED BY SENECA ARMY DEPOT ENTITLED "PROPOSED EASEMENT TO BE CONVEYED TO NEW YORK STATE ELECTRIC AND GAS PREPARED BY MICHAEL D. KARLSEN L.S. DATED NOVEMBER 7, 2000
2. MAPS PROVIDED BY SENECA ARMY DEPOT ENTITLED "GENERAL WATER MAP, GENERAL ELECTRIC MAP, GENERAL COMMUNICATIONS MAP AND GENERAL SEWER MAP EXISTING CONDITIONS" PREPARED BY STV/LYON ASSOCIATES, INC, DATED JULY 1988-1989
3. MAP ENTITLED "PLAN OF LAND TO BE CONVEYED BY THE SENECA COUNTY INDUSTRIAL DEVELOPMENT AGENCY TO THE SENECA DEPOT LLC" PREPARED BY MICHAEL D. KARLSEN L.S. DATED SEPTEMBER 15, 2009, HAVING JOB # 09-517.
4. MAP ENTITLED "PLAN OF LAND TO BE CONVEYED BY THE SENECA COUNTY INDUSTRIAL DEVELOPMENT AGENCY TO THE SENECA DEPOT LLC" PREPARED BY MICHAEL D. KARLSEN L.S. DATED OCTOBER 23, 2014, HAVING JOB # 09-517-R-4.

EASEMENT WIDTHS

GAS MAIN EASEMENT WIDTH IS 30 FEET PER REF # 1

WATER FACILITIES EXISTING WATER FACILITIES
(TRANSMISSION) 60 FEET WATER FACILITIES
(DISTRIBUTION) 30 FEET

NEW WATER FACILITIES WATER FACILITIES
(TRANSMISSION) 60 FEET WATER FACILITIES
(DISTRIBUTION) 30 FEET

SANITARY SEWER FACILITIES EXISTING SANITARY
SEWER (TRANSMISSION) 60 FEET SANITARY
SEWER (DISTRIBUTION) 30 FEET

NEW SANITARY SEWER FACILITIES SANITARY
SEWER (TRANSMISSION) 60 FEET SANITARY
SEWER (DISTRIBUTION) 30 FEET

EXISTING ELECTRIC FACILITIES

ELECTRIC FACILIITIES (TRANSMISSION) 60 FEET
ELECTRIC FACILITIES (DISTRIBUTION) 30 FEET

TELECOMMUNICATIONS FACILITIES 30 FEET

WETLAND NOTES

WETLAND DELINEATION PERFORMED BY DAIGLER ENGINEERING, P.C. ON JULY 12, 2017 AND LOCATED BY COSTICH ENGINEERING D.P.C. ON JULY 17, 2017. ALL WETLANDS HAVE NOT BEEN VERIFIED AS OF 8/11/2017.

SURVEY NOTES

TOPOGRAGHY SHOWN FROM A FIELD SURVEY BY COSTICH ENGINEERING ON 7/19/2017 HORIZONTAL AND VERTICAL DATA OBTAINED THROUGH NGS "OPUS" REFERENCED TO THE FOLLOWING N.G.S. MONUMENTS

HORIZONTAL DATUM AS SHOWN HERON IS REFERENCED TO N.G.S. MONUMENT ROMULUS (PID-AB3846).
-LATITUDE: 42-43-04.56203 (N)
-LONGITUDE: 076-49-15.14452 (W) } NAD 83 (CORS)
-ELEVATION: 489.73' (149.269 METERS) (NAVD 88)

PROJECT DESCRIPTION

THE CONTRACTOR WILL BE RESPONSIBLE FOR IMPLEMENTING THE FOLLOWING EROSION CONTROL AND STORM WATER MANAGEMENT CONTROL MEASURES. THE CONTRACTOR MAY DESIGNATE THESE TASKS TO CERTAIN SUBCONTRACTORS AS HE SEES FIT, BUT THE ULTIMATE RESPONSIBILITY FOR IMPLEMENTING THESE CONTROLS AND ENSURING THEIR PROPER FUNCTIONING REMAINS WITH THE CONTRACTOR. THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS (REFER TO THE EROSION AND SEDIMENT CONTROL PLAN SHEET CONTAINED IN THIS SWPPP FOR DETAILS):

DISTURBED AREAS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 7 DAYS SHALL BE TEMPORARILY SEEDED AND WATERED.

NYSDEC STORMWATER PERMIT PART II.C.3
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 AUGUST 2005
c. THE OWNER OR OPERATOR SHALL PREPARE A PHASING PLAN THAT DEFINES MAXIMUM DISTURBED AREAS 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.

THIS PROJECT WILL CONSIST OF THE CLEARING AND GRUBBING, MASS EARTHWORK AND CONSTRUCTING PROPOSED BUILDINGS WITH ASSOCIATED UTILITIES, DRIVES, AND PARKING AREAS. THE ESTIMATED TIME FOR COMPLETION OF THE MASS EARTHWORK PORTION OF THE PROJECT IS 365 DAYS. SOIL DISTURBING ACTIVITIES WILL INCLUDE:

A. CONSTRUCTION OF TEMPORARY CONSTRUCTION EXIT POINTS
B. CLEARING AND GRUBBING
C. INSTALLATION OF PERIMETER SILTATION FENCING
D. STRIPPING AND TEMPORARILY STOCKPILING TOPSOIL.
E. MASS EARTHWORK ACTIVITIES INCLUDING CONSTRUCTION OF WET DETENTION PONDS. PONDS SHALL BE UTILIZED AS TEMPORARY SEDIMENTATION BASINS UNTIL SITE IS STABILIZED.
F. CONSTRUCTION OF PROPOSED BUILDINGS.
G. INSTALLATION OF STORM SEWER PIPES AND INLETS AND OTHER UTILITIES.
H. CONSTRUCTION OF DRIVES, AND PARKING AREAS.
I. FINAL GRADING AND LANDSCAPING.

EROSION AND SEDIMENT CONTROLS HAVE BEEN DEVELOPED AND FULLY ADDRESSED IN THIS WRITTEN PLAN AND THE EROSION AND SEDIMENT CONTROL PLAN(S).

GENERAL NOTES

1. THE DEVELOPER'S AND CONTRACTOR'S ATTENTION IS DIRECTED TO ALL APPLICABLE LAWS REGARDING LIABILITY INCURRED THROUGH DISTURBANCE AND DESTRUCTION OF GEODETIC SURVEY MONUMENTS.
2. THE CONTRACTOR SHALL LOCATE, MARK, SAFEGUARD AND PRESERVE ALL SURVEY CONTROL MONUMENTS AND R.O.W. MONUMENTS IN THE AREA OF CONSTRUCTION. ANY AND ALL CONTROL POINTS, SURVEY AND R.O.W. MONUMENTS THAT ARE DISTURBED SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO PRESERVE THE INTEGRITY OF EXISTING UTILITIES TO REMAIN AND SHALL PROVIDE UNINTERUPTED SERVICE TO ALL USERS OF THE EXISTING UTILITIES. EXISTING UTILITIES (TO REMAIN) ENCOUNTERED IN TRENCH OR PAVEMENT EXCAVATIONS SHALL BE SUPPORTED AS ORDERED BY THE OWNER'S REPRESENTATIVE OR AS DIRECTED BY THE UTILITY COMPANY. EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS HAVE BEEN PLOTTED FROM FIELD SURVEYS AND RECORD MAPS AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF OR CLOSELY PARALLEL TO, OR UNDER THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. NO EXTENSIONS OF CONTRACT TIME AND NO ONETARY DAMAGE CLAIMS SHALL BE ALLOWED AS A RESULT OF REVISED DESIGN LOCATIONS OR TIME ALLOWED TO DO SAME WHICH RESULT FROM EXISTING UTILITIES BEING FOUND IN DIFFERENT LOCATIONS THAN SHOWN ON THESE DRAWINGS. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES.
4. THE CONTRACTOR SHALL PROVIDE "AS-BUILT" DRAWINGS INDICATING ALL DEVIATIONS FROM APPROVED PLANS. A RECORD SITE PLAN SHALL BE PROVIDED TO THE TOWN ENGINEERING DEPARTMENT. DIAGRAMS (SWING TIE) SHALL BE INDICATED FOR WATER CURB BOXES, VALVES AND LATERAL CLEANOUTS. THE RECORD SITE PLAN WILL ALSO INCLUDE ALL IMPROVEMENTS SUCH AS MANHOLES, HYDRANTS, GUTTERS, CURBS AND ANY OTHER PROMINENT FEATURE. ALL STRUCTURES WILL BE SHOWN WITH TIES TO THE PROPERTY LINES ON ALL SIDES.
5. ALL IMPROVEMENTS SHALL BE DONE IN ACCORDANCE WITH THE MOST RECENT STANDARDS AND SPECIFICATIONS OF THE TOWN OF SENECA FALLS AND ANY OTHER GOVERNING AGENCY HAVING JURISDICTION.
6. FIRE LANES SHALL BE POSTED ON THE BUILDING AND COORDINATED WITH THE TOWN FIRE MARSHALL.

EROSION AND SEDIMENT CONTROLS

STABILIZATION PRACTICES (PERMANENT)
PERMANENT STABILIZATION PRACTICES FOR THIS SITE INCLUDE:
A. PERMANENT SEEDING AND PLANTING OF ALL UNPAVED AREAS USING THE HYDROMULCHING GRASS SEEDING TECHNIQUE.

STABILIZATION PRACTICES (TEMPORARY)
TEMPORARY STABILIZATION PRACTICES FOR THIS SITE INCLUDE:
A. TEMPORARY SEEDING AND PLANTING OF ALL UNPAVED AREAS USING THE HYDROMULCHING GRASS SEEDING TECHNIQUE.
B. MULCHING EXPOSED AREAS.
C. SOIL ROUGHENING.
D. FREQUENT WATERING TO MINIMIZE WIND EROSION DURING CONSTRUCTION.

STRUCTURAL PRACTICES (PERMANENT)
PERMANENT STRUCTURAL PRACTICES FOR THIS SITE INCLUDE:
A. STORM SEWER, GUTTER AND PAVEMENT.
B. DETENTION PONDS.

STRUCTURAL PRACTICES (TEMPORARY)
STRUCTURAL PRACTICES FOR THIS SITE INCLUDE:
A. INLET PROTECTION
C. PERIMETER PROTECTION USING SILTATION FENCING
D. STABILIZED CONSTRUCTION EXIT POINTS
E. SEDIMENTATION BASINS

SEQUENCE OF MAJOR ACTIVITIES
THE CONTRACTOR WILL BE RESPONSIBLE FOR IMPLEMENTING THE FOLLOWING EROSION CONTROL AND STORM WATER MANAGEMENT CONTROL MEASURES. THE CONTRACTOR MAY DESIGNATE THESE TASKS TO CERTAIN SUBCONTRACTORS AS HE SEES FIT, BUT THE ULTIMATE RESPONSIBILITY FOR IMPLEMENTING THESE CONTROLS AND ENSURING THEIR PROPER FUNCTIONING REMAINS WITH THE CONTRACTOR. THE ORDER OF ACTIVITIES WILL BE AS FOLLOWS (REFER TO THE EROSION AND SEDIMENT CONTROL PLAN SHEET CONTAINED IN THIS SWPPP FOR DETAILS):
A. INSTALL PERIMETER SILT FENCES IN THE LOCATIONS SHOWN.
B. UTILIZE EXISTING PAVEMENT FOR VEHICLE WASH OFF, PROVIDE INLET PROTECTION TO ALL INLETS RECEIVING SEDIMENT LADIN RUNOFF.
C. CLEAR AND GRUB, CONSTRUCT DETENTION PONDS.
D. DISTURBED AREAS OF THE SITE WHERE CONSTRUCTION ACTIVITY HAS CEASED FOR MORE THAN 7 DAYS SHALL BE TEMPORARILY SEEDED AND WATERED.
E. PERFORM EARTHWORK OPERATIONS FOR BUILDING PADS AND INSTALL FOUNDATIONS. THE DETENTION FACILITY SHALL BE CONSTRUCTED AND UTILIZED AS A TEMPORARY SEDIMENT BASIN UNTIL STABILIZATION IS ACHIEVED.
F. INSTALL UNDERGROUND UTILITIES INCLUDING STORM SEWERS WITH INLET PROTECTION AND END SECTION STABILIZATION.
G. FINALIZE PAVEMENT SUBGRADE PREPARATION.
H. INSTALL BASE MATERIAL AS REQUIRED FOR PAVEMENT.
I. CARRY OUT FINAL GRADING AND SEEDING AND PLANTING

NYSDEC STORMWATER PERMIT PART II.C.3
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 AUGUST 2005
c. THE OWNER OR OPERATOR SHALL PREPARE A PHASING PLAN THAT DEFINES MAXIMUM DISTURBED AREAS 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.

NOTE:
REFERENCE THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP) DOCUMENT PREPARED BY COSTICH ENGINEERING FOR ADDITIONAL REQUIREMENTS FOR EROSION AND SEDIMENT CONTROL PRACTICES.

LEGEND

	EXISTING	PROPOSED
SIZE & TYPE OF TREE	DECIDUOUS / CONIFEROUS	SEE DRAWING LA100 - LA101
UTILITY POLE AND POLE NUMBER	RG&E 38 RTC 507	
GAS LINE	G	
GAS VALVE	GV	
GUY WIRE		
UNDERGROUND SIGNAL CABLE	S	
TRAFFIC HANDHOLE		
UNDERGROUND TELEPHONE	T	
UNDERGROUND ELECTRIC	E	
UNDERGROUND CABLE TELEVISION, PHONE AND INTERNET	U.C.T.V.	
EASEMENT		
STORM MANHOLE	D	D
STORM SEWER,C.B. & END SECTION	15" R.C.P.	12" STM.
SANITARY SEWER	8" SAN. SEWER	8" P.V.C.
SANITARY MANHOLE	S	S
HYDRANT W/VALVE		
WATER VALVE	WV	WV
WATERMAIN	W	W 8" D.I.P.
HEADWALL		
SIGN AND TYPE	STOP	STOP
LIGHT POST		SEE DRAWING EA100
CONCRETE CURB		
CONCRETE GUTTER		
EDGE OF PAVEMENT		
FENCE AND TYPE	WOOD GUIDE RAIL	
RIGHT-OF-WAY LINE & PROPERTY LINE		
BUILDING		
R.O.W. MONUMENT		
CONTOURS	307	312
LIMIT OF DISTURBANCE		LD

STORM SEWER NOTES

1. STORM SEWER PIPE MATERIAL SHALL BE POLYETHYLENE HIGH DENSITY (H.D.P.E.) SMOOTH INTERIOR.

SANITARY SEWER NOTES

1. FLOOR DRAINS, IF CONSTRUCTED, SHALL BE CONNECTED TO THE SANITARY SEWER. FLOOR DRAINS DO NOT INCLUDE FOUNDATION/FOOTER DRAIN. NOTE: ALL DISCHARGES TO THE SANITARY SEWER SHALL COMPLY WITH THE EFFLUENT LIMITS OF THE LOCAL AND/OR MONROE COUNTY SEWER USE LAW.
2. DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE PIPE. THE TESTS SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. IF THE DEFLECTION TEST IS TO BE RUN USING A RIGID BALL OR MANDREL, IT SHALL HAVE A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. THE TEST SHALL BE PREFORMED WITHOUT MECHANICAL PULLING DEVICES.
3. SANITARY SEWERS AND APPURTENANCES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TOWN OF SENECA FALLS.
4. EARTHWORK SHALL BE DONE PRIOR TO INSTALLATION OF ANY SANITARY SEWER MAINS AND APPURTENANCES.
5. MAXIMUM ALLOWABLE INFILTRATION OR EXFILTRATION SHALL NOT EXCEED 100 GALLONS PER INCH PER MILE OF PIPE PER DAY FOR THE SANITARY SEWER. IF AN AIR TEST IS USED, THE TEST, AS A MINIMUM, SHALL CONFORM TO THE PROCEDURE DESCRIBED IN THE ASTM-C-828-86, ENTITKED "STANDARD PRACTICE FOR LOW PRESSURED AIR TEST OF VITRIFIED CLAY PIPE LINES. SANITARY MANHOLES SHALL BE VISUALLY INSPECTED AND TESTED FOR LEAKAGE BY EXFILTRATION OR VACUUM. VACUUM TESTING OF MANHOLES SHALL COMPLY WITH THE METHOD OUTLINED IN THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION TECHNICAL INFORMATION PAMPHLET (TIP) NO. 15 (REVISED).
6. SANITARY SEWER MAINS ARE TO BE POLYVINYL CHLORIDE (P.V.C.), SDR-35. SANITARY LATERALS SHALL BE P.V.C., SDR-21.

ADA HANDICAP ACCESSIBILITY NOTES

GENERAL NOTES:

1. SPECIAL ATTENTION SHALL BE GIVEN TO COMPLIANCE WITH THE FAIR HOUSING ACCESSIBILITY GUIDELINES AND THE BUILDING CODE OF NEW YORK STATE (BCNYS), THE FAIR HOUSING OR AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES, AND APPLICABLE LOCAL LAWS AND REGULATIONS, LATEST EDITIONS.LATEST EDITIONS.
2. IT IS ESSENTIAL THAT CONTRACTORS ARE AWARE OF THE SITE ACCESSIBILITY REQUIREMENTS. COSTICH ENGINEERING HAS DEVELOPED THESE NOTES AND DETAILS TO ASSURE THAT CONTRACTORS ARE AWARE OF THE REQUIREMENTS AT THE POINT IN TIME WHEN THEY ARE BIDDING THE PROJECT. IN ADDITION, COSTICH ENGINEERING HAS MADE A POINT IN THESE NOTES AND DETAILS, AS WELL AS IN OUR DRAWINGS, TO PROVIDE SLOPES / GRADES AND DIMENSIONS THAT COMPLY WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS AND APPLICABLE LOCAL LAWS AND REGULATIONS, LATEST EDITIONS. IF THESE SLOPES / GRADES AND DIMENSIONS ARE NOT ACHIEVABLE, THE CONTRACTOR IS REQUIRED TO CONTACT THE OWNER IMMEDIATELY AND BEFORE MOVING FORWARD WITH THE WORK.
3. THE CONTRACTOR SHALL NOTIFY COSTICH ENGINEERING IMMEDIATELY OF ANY CONFLICT BETWEEN THESE NOTES AND DETAILS AND OTHER PROJECT DRAWINGS, WHETHER BY COSTICH ENGINEERING OR OTHERS. THE CONTRACTOR SHALL NOT PROCEED WITH THE WORK FOR WHICH THE ALLEGED CONFLICT HAS BEEN DISCOVERED UNTIL SUCH ALLEGED CONFLICT HAS BEEN RESOLVED. NO CLAIM SHALL BE MADE BY THE CONTRACTOR FOR DELAY DAMAGES AS A RESULT OF RESOLUTION OF ANY SUCH CONFLICT(S).
4. THESE ACCESSIBILITY NOTES AND DETAILS ARE INTENDED TO DEPICT SLOPE AND DIMENSIONAL REQUIREMENTS ONLY. REFER TO SIDEWALK, CURBING, AND PAVEMENT DETAILS FOR ADDITIONAL INFORMATION.

ACCESSIBLE ROUTE NOTES:

1. AT LEAST ONE ACCESSIBLE ROUTE SHALL BE PROVIDED WITHIN THE SITE FROM ACCESSIBLE PARKING SPACES AND ACCESSIBLE PASSENGER LOADING ZONES; PUBLIC STREETS OR SIDEWALKS; AND PUBLIC TRANSPORTATION STOPS TO THE ACCESSIBLE BUILDING OR FACILITY THEY SERVE.
2. AT LEAST ONE ACCESSIBLE ROUTE SHALL CONNECT ACCESSIBLE BUILDINGS, ACCESSIBLE FACILITIES, ACCESSIBLE ELEMENTS, AND ACCESSIBLE SPACES THAT ARE ON THE SAME SITE.
3. WALKING SURFACES SHALL HAVE A MAXIMUM RUNNING SLOPE OF 5.0% AND A MAXIMUM CROSS SLOPE OF 2.0%.
4. ANY WALKING SURFACE WITH A RUNNING SLOPE GREATER THAN 5.0% IS A RAMP AND SHALL COMPLY WITH THE GUIDELINES FOR RAMPS OR CURB RAMPS.
5. TRANSITIONS BETWEEN RAMPS, WALKS, LANDINGS, GUTTERS OR STREETS SHALL BE FLUSHAND FREE OF ABRUPT VERTICAL CHANGES (1/4 INCH MAXIMUM VERTICAL CHANGE IN LEVEL).
6. FLOOR SURFACES SHALL BE STABLE, FIRM AND SLIP RESISTANT.
7. THE MINIMUM CLEAR WIDTH SHALL BE THIRTY-TWO (32) INCHES FOR A ROUTE SEGMENT LENGTH LESS THAN TWENTY-FOUR (24) INCHES. CONSECUTIVE SEGMENTS OF THIRTY-TWO (32) INCHES IN WIDTH MUST BE SEPARATED BY A ROUTE SEGMENT FORTY-EIGHT (48) INCHES MINIMUM IN LENGTH AND THIRTY-SIX (36) INCHES MINIMUM IN WIDTH.
8. THE MINIMUM CLEAR WIDTH SHALL BE THIRTY-SIX (36) INCHES FOR A ROUTE SEGMENT LENGTH GREATER THAN TWENTY-FOUR (24) INCHES.
9. WHERE AN ACCESSIBLE ROUTE MAKES A 180 DEGREE TURN AROUND AN OBJECT THAT IS LESS THAN FORTY-EIGHT (48) INCHES IN WIDTH, CLEAR WIDTH SHALL BE FORTY-TWO (42) INCHES MINIMUM APPROACHING THE TURN, FORTY-EIGHT (48) INCHES MINIMUM DURING THE TURN, AND FORTY-TWO (42) INCHES MINIMUM LEAVING THE TURN. THE CLEAR WIDTH APPROACHING AND LEAVING THE TURN MAY BE THIRTY-SIX (36) INCHES MINIMUM WHEN THE CLEAR WIDTH AT THE TURN IS SIXTY (60) INCHES MINIMUM.
10. AN ACCESSIBLE ROUTE WITH A CLEAR WIDTH LESS THAN SIXTY (60) INCHES SHALLPROVIDE PASSING SPACES AT INTERVALS OF TWO HUNDRED (200) FEET MAXIMUM. PASSING SPACES SHALL BE EITHER A SIXTY (60) INCH MINIMUM BY SIXTY (60) INCH MINIMUM SPACE; OR AN INTERSECTION OF TWO (2) WALKING SURFACES THAT PROVIDE A COMPLIANT T-SHAPED TURNING SPACE, PROVIDED THE BASE AND ARMS OF THE T-SHAPED SPACE EXTEND FORTY-EIGHT (48) INCHES MINIMUM BEYOND THE INTERSECTION.
11. DOORS, DOORWAYS AND GATES THAT ARE PART OF AN ACCESSIBLE ROUTE SHALL COMPLY WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS
12. DIRECTIONAL SIGNAGE INDICATING THE ROUTE TO THE NEAREST ACCESSIBLE BUILDING ENTRANCE SHALL BE PROVIDED AT INACCESSIBLE BUILDING ENTRANCES.
14. WHERE POSSIBLE, DRAINAGE INLETS SHALL NOT BE LOCATED ON AN ACCESSIBLE ROUTE IN THE EVENT THAT A DRAINAGE INLET MUST BE LOCATED ON AN ACCESSIBLE ROUTE, THE GRATE SHALL COMPLY WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS.

RAMP NOTES:

1. ANY PART OF AN ACCESSIBLE ROUTE WITH A RUNNING SLOPE GREATER THAN 5% SHALL BE CONSIDERED A RAMP.
2. THE MAXIMUM RUNNING SLOPE FOR A RAMP SHALL BE 8.33% AND THE MAXIMUM CROSS SLOPE SHALL BE 2.0%.
3. THE CLEAR WIDTH OF A RAMP RUN SHALL BE THIRTY-SIX (36) INCHES MINIMUM. WHERE HANDRAILS ARE PROVIDED ON THE RAMP RUN, THE CLEAR WIDTH SHALL BE MEASURED BETWEEN THE HANDRAILS.
4. THE RISE FOR ANY RAMP RUN SHALL BE THIRTY (30) INCHES MAXIMUM.
5. LANDINGS SHALL BE PROVIDED AT THE TOP AND BOTTOM OF RAMPS. LANDINGS SHALL HAVE A SLOPE NOT STEEPER THAN 2.0% IN ANY DIRECTION. THE LANDING CLEAR WIDTH SHALL BE AT LEAST AS WIDE AS THE WIDEST RAMP RUN LEADING TO THE LANDING. THE LANDING CLEAR LENGTH SHALL BE SIXTY (60) INCHES LONG MINIMUM. RAMPS THAT CHANGE DIRECTION BETWEEN RUNS AT LANDINGS SHALL HAVE A CLEAR LANDING OF SIXTY (60) INCHES BY SIXTY (60) INCHES MINIMUM.
6. RAMP RUNS WITH A RISE GREATER THAN SIX (6) INCHES OR A HORIZONTAL PROJECTION GREATER THAN SEVENTY-TWO (72) INCHES SHALL HAVE HANDRAILS ON BOTH SIDES COMPLYING WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS.
7. FLOOR SURFACES OF RAMPS AND LANDINGS SHALL BE STABLE, FIRM AND SLIP RESISTANT.
8. EDGE PROTECTION COMPLYING WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS SHALL BE PROVIDED ON EACH SIDE OF RAMP RUNS AND ON EACH SIDE OF RAMP LANDINGS.
9. WHERE DOORWAYS ARE LOCATED ADJACENT TO A RAMP LANDING, MANEUVERING CLEARANCES COMPLYING WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS SHALL BE PERMITTED TO OVERLAP THE REQUIRED LANDING AREA. WHERE DOORS THAT ARE SUBJECT TO LOCKING ARE ADJACENT TO A RAMP LANDING, LANDINGS SHALL BE SIZED TO PROVIDE A COMPLIANT TURNING SPACE. CURB RAMP NOTES:

CURB RAMP NOTES:

1. THE MAXIMUM RUNNING SLOPE OF A CURB RAMP SHALL BE 8.33% AND THE MAXIMUM CROSS SLOPE SHALL BE 2.0%.
2. COUNTER SLOPES OF ADJOINING GUTTERS AND ROAD SURFACES IMMEDIATELY ADJACENT TO THE CURB RAMP SHALL NOT BE STEEPER THAN 5%. THE ADJACENT SURFACES AT TRANSITIONS AT CURB RAMPS TO WALKS, GUTTERS AND STREETS SHALL BE AT THE SAME LEVEL.

CURB RAMP NOTES (CONT.):

3. THE CLEAR WIDTH OF A CURB RAMP SHALL BE SIXTY (60) INCHES MINIMUM, EXCLUSIVE OF FLARED SIDES, IF PROVIDED.
4. LANDINGS SHALL BE PROVIDED AT THE TOP OF CURB RAMPS. THE CLEAR LENGTH OF THE LANDING SHALL BE THIRTY-SIX (36) INCHES MINIMUM. THE CLEAR WIDTH OF THE LANDING SHALL BE AT LEAST AS WIDE AS THE CURB RAMP, EXCLUDING FLARED SIDES, LEADING TO THE LANDING. LANDINGS SHALL HAVE A SLOPE NOT STEEPER THAN 2% IN ANY DIRECTION.
5. IF A CURB RAMP IS LOCATED WHERE PEDESTRIANS MUST WALK ACROSS THE RAMP, OR WHERE IT IS NOT PROTECTED BY HANDRAILS OR GUARDRAILS, IT SHALL HAVE FLARED SIDES.
6. WHERE PROVIDED, CURB RAMP FLARES SHALL NOT EXCEED 10%. IF THE CLEAR LENGTH OF THE LANDING IS LESS THAN FORTY-EIGHT (48) INCHES THAN THE SLOPE OF THE FLARED SIDES SHALL NOT EXCEED 8.33%.
7. CURB RAMPS AND THE FLARED SIDES OF CURB RAMPS SHALL BE LOCATED SO THAT THEY DO NOT PROJECT INTO VEHICULAR TRAFFIC LANES, PARKING SPACES OR PARKING ACCESS AISLES. CURBS AT MARKED CROSSINGS SHALL BE WHOLLY CONTAINED WITHIN THE MARKINGS, EXCLUDING ANY FLARED SIDES.
8. CURB RAMPS SHALL BE LOCATED OR PROTECTED TO PREVENT THEIR OBSTRUCTION BY PARKED VEHICLES.
9. CURB RAMPS SHALL HAVE A TWENTY-FOUR (24) INCH DEEP DETECTABLE WARNING COMPLYING WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS, EXTENDING THE FULL WIDTH OF THE RAMP. REFER TO DETECTABLE WARNING DETAILS AND NOTES FOR PLACEMENT, ORIENTATION AND NOTES.
10. FLOOR SURFACES OF CURB RAMPS SHALL BE DEEP GROOVED, ½ INCH WIDE BY ¼ INCH DEEP, ONE (1) INCH CENTERS TRANSVERSE TO THE RAMP.
11. WHERE PROVIDED, STOP LINES SHALL BE LOCATED IN ADVANCE OF CURB RAMP.
12. WHERE PROVIDED, PEDESTRIAN ACTIVATED SIGNALS SHALL BE LOCATED ADJACENT TO THE SIDEWALK AND NOT ON THE SIDEWALK.
13. WHERE PROVIDED, DRAINAGE INLETS SHALL BE LOCATED UPSTREAM OF CURB RAMPS AND NOT IN THE RAMP AREA.
14. CURB RAMP TYPE AND LOCATION ARE PER PLAN.

PARKING SPACE NOTES:

1. ACCESSIBLE PARKING SPACES SHALL BE LOCATED ON THE SHORTEST ACCESSIBLE ROUTES OF TRAVEL FROM ADJACENT PARKING TO AN ACCESSIBLE BUILDING ENTRANCE.
2. ACCESSIBLE PARKING SPACES AND ACCESS AISLES SHALL BE AT LEAST NINETY-SIX (96) INCHES WIDE. WHERE PARKING SPACES AND ACCESS AISLES ARE MARKED WITH LINES, THE WIDTH MEASUREMENTS SHALL BE MADE FROM CENTERLINE OF THE MARKINGS. WHERE PARKING SPACES OR ACCESS AISLES ARE NOT ADJACENT TO ANOTHER PARKING SPACE OR ACCESS AISLES, MEASUREMENTS SHALL BE PERMITTED TO INCLUDE THE FULL WIDTH OF THE LINE DEFINING THE PARKING SPACE OR ACCESS AISLE.
3. PARKING ACCESS AISLES SHALL BE PART OF AN ACCESSIBLE ROUTE TO THE BUILDING OR FACILITY ENTRANCE AND SHALL COMPLY WITH PROVISIONS FOR ACCESSIBLE ROUTES. MARKED CROSSINGS SHALL BE PROVIDED WHERE THE ACCESSIBLE ROUTE MUST CROSS VEHICULAR TRAFFIC LANES. WHERE POSSIBLE, IT IS PREFERABLE THAT THE ACCESSIBLE ROUTE NOT PASS BEHIND PARKED VEHICLES.
4. TWO (2) ACCESSIBLE PARKING SPACES MAY SHARE A COMMON ACCESS AISLE.
5. ACCESS AISLES SHALL EXTEND THE FULL LENGTH OF THE PARKING SPACE THEY SERVE.
6. ACCESS AISLES SHALL BE MARKED SO AS TO DISCOURAGE PARKING IN THEM.
7. ACCESS AISLES SHALL NOT OVERLAP THE VEHICULAR WAY. ACCESS AISLES SHALL BE PERMITTED TO BE PLACED ON EITHER SIDE OF THE PARKING SPACE EXCEPT FOR ANGLED VAN PARKING SPACES WHICH SHALL HAVE ACCESS AISLES LOCATED ON THE PASSENGER SIDE OF THE PARKING SPACES.
8. FLOOR SURFACES OF PARKING SPACES AND ACCESS AISLES SERVING THEM SHALL BE STABLE, FIRM AND SLIP RESISTANT. ACCESS AISLES SHALL BE AT THE SAME LEVEL AS THE PARKING SPACES THEY SERVE. CHANGES IN LEVEL ARE NOT PERMITTED.
9. PARKING SPACES AND ACCESS AISLES SHALL BE LEVEL WITH SURFACE SLOPES NOT EXCEEDING 2.0% IN ALL DIRECTIONS.
10. PARKED VEHICLE OVERHANGS SHALL NOT REDUCE THE REQUIRED CLEAR WIDTH OF AN ACCESSIBLE ROUTE.
11. PARKING SPACES FOR VANS AND ACCESS AISLES AND VEHICULAR ROUTES SERVING THEM SHALL PROVIDE A VERTICAL CLEARANCE OF NINETY-EIGHT (98) INCHES MINIMUM. SIGNS SHALL BE PROVIDED AT ENTRANCES TO PARKING FACILITIES INFORMING DRIVERS OF CLEARANCES AND THE LOCATION OF VAN ACCESSIBLE PARKING SPACES.
12. EACH ACCESSIBLE PARKING SPACE SHALL BE PROVIDED WITH SIGNAGE DISPLAYING THE INTERNATIONAL SYMBOL OF ACCESSIBILITY. EACH ACCESS AISLE SHALL BE PROVIDED WITH SIGNAGE READING "NO PARKING ANYTIME". SIGNS SHALL BE INSTALLED AT A CLEAR HEIGHT OF BETWEEN SIXTY (60) INCHES AND EIGHTY-FOUR (84) INCHES ABOVE GRADE AND SHALL NOT INTERFERE WITH AN ACCESSIBLE ROUTE FROM AN ACCESS AISLE. SIGNS LOCATED WHERE THEY MAY BE HIT BY VEHICLES BEING PARKED SHALL BE INSTALLED WITH BOLLARD PROTECTION.
13. ACCESSIBLE PARKING SPACE, ACCESS AISLE STRIPING, AND INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL BE PAINTED BLUE.

PASSENGER LOADING ZONE NOTES:

1. PASSENGER LOADING ZONES SHALL PROVIDE VEHICULAR PULL-UP SPACE NINETY-SIX (96) INCHES WIDE MINIMUM AND TWENTY (20) FEET LONG MINIMUM.
2. PASSENGER LOADING ZONES SHALL PROVIDE A CLEARLY MARKED ACCESS AISLE THAT IS SIXTY (60) INCHES WIDE MINIMUM AND EXTENDS THE FULL LENGTH OF THE VEHICLE PULL-UP SPACE THEY SERVE.
3. ACCESS AISLE SHALL ADJOIN AN ACCESSIBLE ROUTE AND NOT OVERLAP THE VEHICULAR WAY.
4. VEHICLE PULL-UP SPACES AND ACCESS AISLES SERVING THEM SHALL BE LEVEL WITH SURFACE SLOPES NO EXCEEDING 2.0% IN ALL DIRECTIONS. ACCESS AISLES SHALL BE AT THE SAME LEVEL AS THE VEHICLE PULL-UP SPACE THEY SERVE. CHANGES IN LEVEL ARE NOT PERMITTED.
5. FLOOR SURFACES OF VEHICLE PULL-UP SPACES AND ACCESS AISLES SERVING THEM SHALL BE STABLE, FIRM AND SLIP RESISTANT.
6. VEHICLE PULL-UP SPACES, ACCESS AISLES SERVING THEM AND A VEHICULAR ROUTE FROM AN ENTRANCE TO THE PASSENGER LOADING ZONE, AND FROM THE PASSENGER LOADING ZONE TO A VEHICULAR EXIT SERVING THEM, SHALL PROVIDE A VERTICAL CLEARANCE OF ONE HUNDRED FOURTEEN (114) INCHES MINIMUM.

ACCESSIBLE ENTRANCE NOTES:

1. ACCESSIBLE ENTRANCES SHALL BE PROVIDED AS REQUIRED BY STATE & FEDERAL ACCESSIBILITY REQUIREMENTS.
2. ENTRANCE DOORS, DOORWAYS AND GATES SHALL COMPLY WITH STATE & FEDERAL ACCESSIBILITY REQUIREMENTS AND SHALL BE ON AN ACCESSIBLE ROUTE.

NO.	DATE	REVISION	BY	CHKD.	APVLS.

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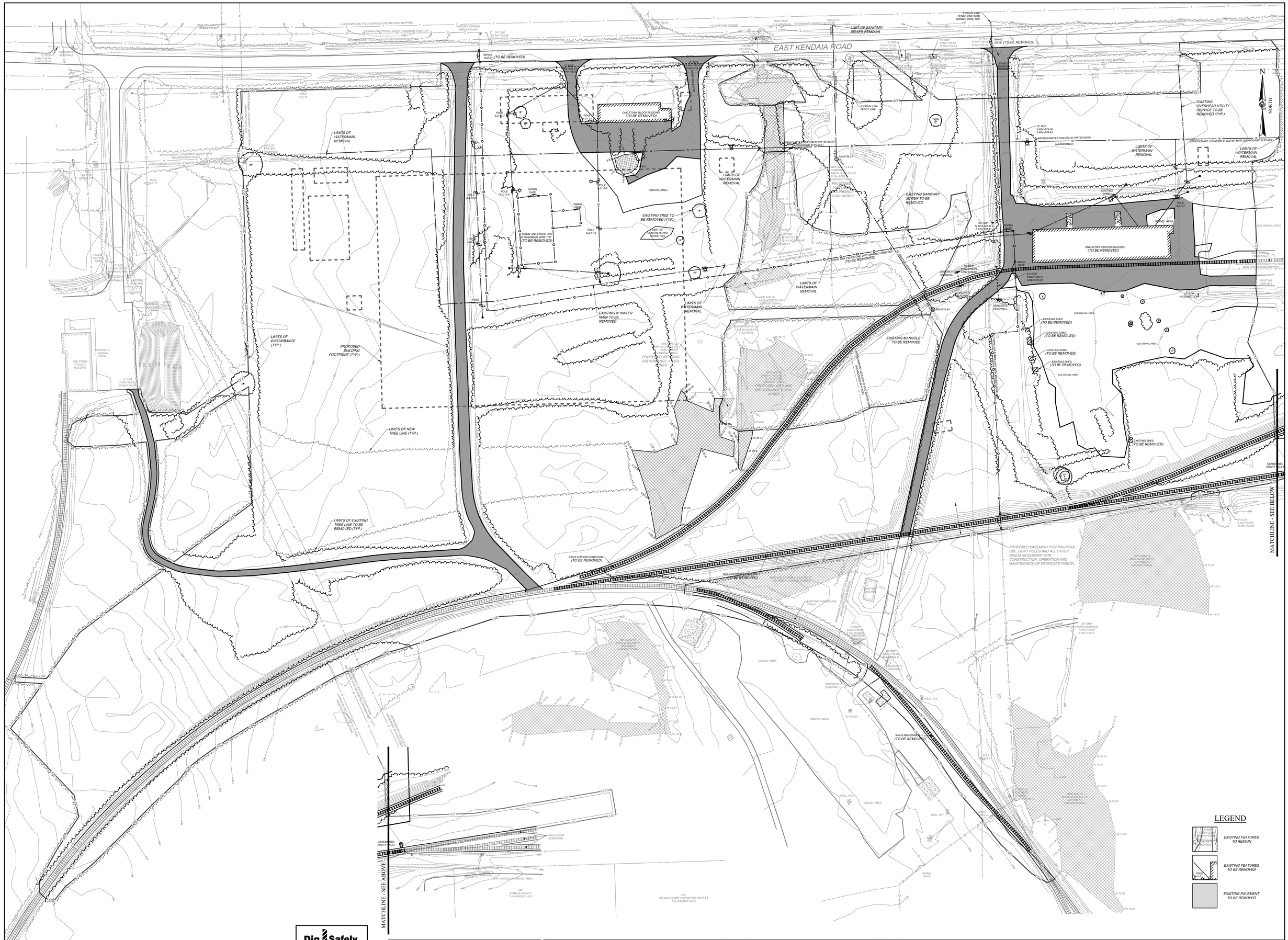
STATE OF NEW YORK · MARK R. COSTICH · NO. 065971 · Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPO/BASE: ---
DATE: 11/01/2017
SCALE: 1" = 400'

Costich Engineering
• Civil Engineering
• Land Surveying
• Landscape Architecture
217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY
TITLE OF DRAWING: SCHEMATIC TOTAL HOLDINGS & GENERAL NOTES
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK
CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604
DWG. # C3320
GA002



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GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft. 34" x 44"
1 inch = 120 ft. 17" x 22"

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STATE OF NEW YORK · MARK R. COSTICH · 065937 · Licensed Professional Engineer

PROJECT ENGINEER	M.O.R.
DRAWN BY	C.J.M.
BOUNDARY	---
TOPO/BASE	D.T.H.
DATE	11/01/2017
SCALE	1"=60'

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- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

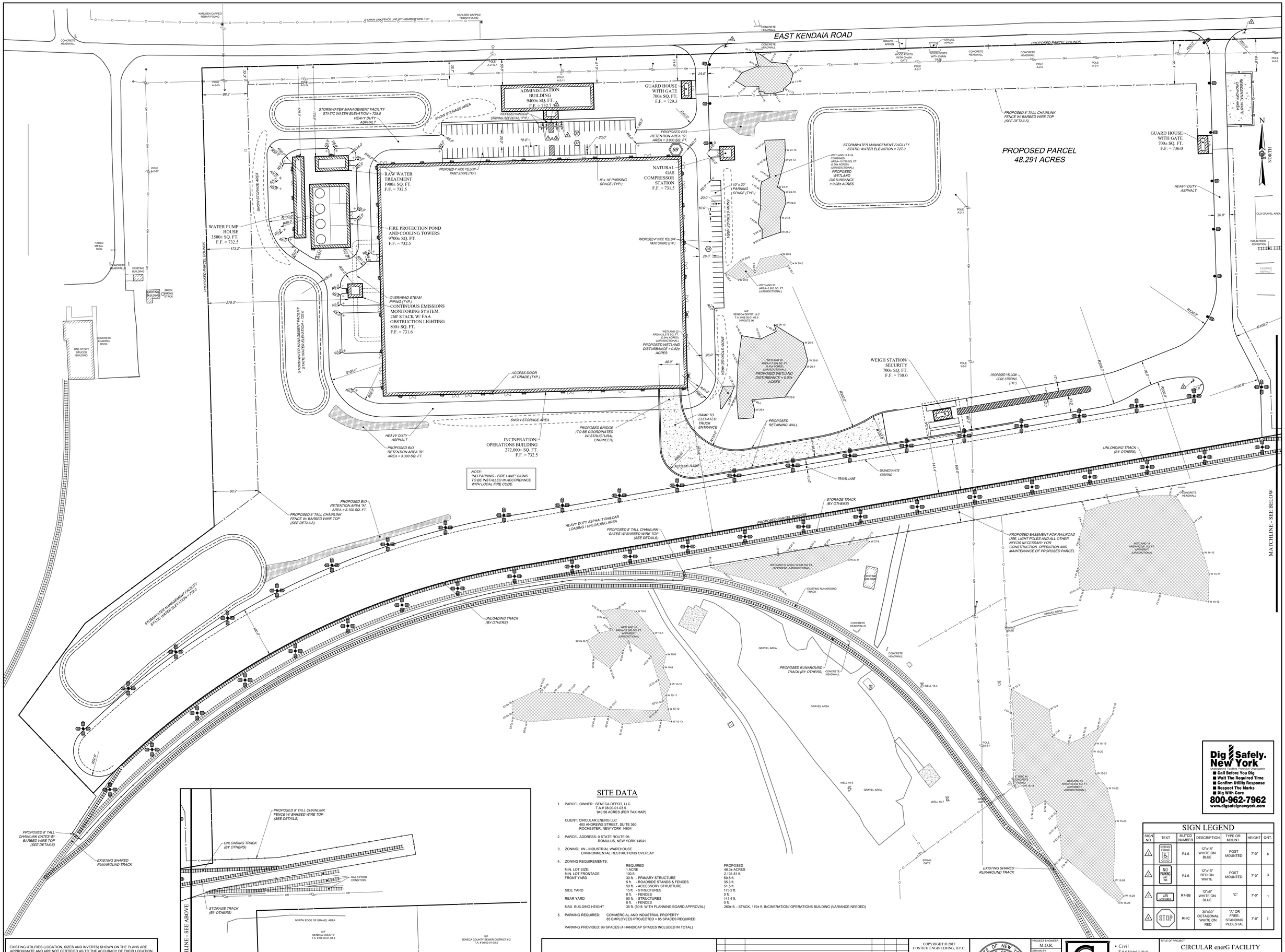
TITLE OF PROJECT: CIRCULAR enerG FACILITY

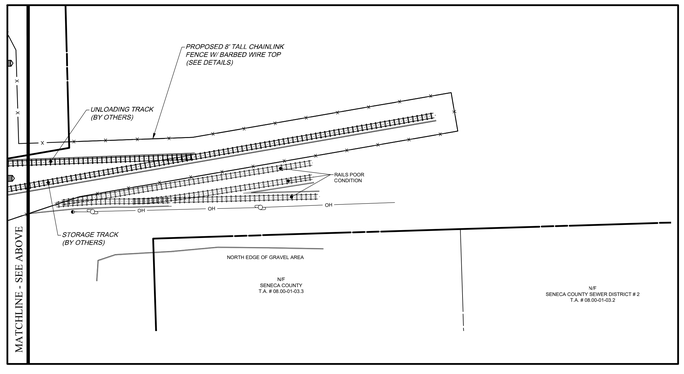
TITLE OF DRAWING: EXISTING FEATURES / DEMOLITION PLAN

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG # C3320
CA100
SHEET 1 OF 15





PROPOSED 8' TALL CHAINLINK GATES W/ BARBED WIRE TOP (SEE DETAILS)

EXISTING SHARED RUNAROUND TRACK

EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF, OR CLOSELY PARALLEL TO, OR UNDER, THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES. THE CONTRACTOR SHALL ALSO NOTIFY UNDERGROUND UTILITY LOCATION SERVICE AT LEAST 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

SITE DATA

1. PARCEL OWNER: SENECA DEPOT, LLC
   T.A # 08.00-01-03.5
   940.56 ACRES (PER TAX MAP)

   CLIENT: CIRCULAR ENERG LLC
   400 ANDREWS STREET, SUITE 360
   ROCHESTER, NEW YORK 14604

2. PARCEL ADDRESS: 0 STATE ROUTE 96,
   ROMULUS, NEW YORK 14541

3. ZONING: IW - INDUSTRIAL WAREHOUSE
   ENVIRONMENTAL RESTRICTIONS OVERLAY

4. ZONING REQUIREMENTS:

	REQUIRED	PROPOSED
MIN. LOT SIZE:	1 ACRE	48.3± ACRES
MIN. LOT FRONTAGE	100 ft.	2,131.51 ft.
FRONT YARD	30 ft. - PRIMARY STRUCTURE	50.8 ft.
	5 ft. - ROADSIDE STANDS & FENCES	35.3 ft.
	50 ft. - ACCESSORY STRUCTURE	51.5 ft.
SIDE YARD	15 ft. - STRUCTURES	173.2 ft.
	0 ft. - FENCES	0 ft.
REAR YARD	50 ft. - STRUCTURES	141.4 ft.
	0 ft. - FENCES	0 ft.
MAX. BUILDING HEIGHT	35 ft. (50 ft. WITH PLANNING BOARD APPROVAL)	260± ft. - STACK, 179± ft. INCINERATION/ OPERATIONS BUILDING (VARIANCE NEEDED)

5. PARKING REQUIRED: COMMERCIAL AND INDUSTRIAL PROPERTY
   85 EMPLOYEES PROJECTED = 85 SPACES REQUIRED

   PARKING PROVIDED: 99 SPACES (4 HANDICAP SPACES INCLUDED IN TOTAL)

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SIGN LEGEND

SIGN NO.	TEXT	MUTCD NUMBER	DESCRIPTION	TYPE OR MOUNT	HEIGHT	QNT.
1	RESERVED PARKING	P-4-6	12"x18" WHITE ON BLUE	POST MOUNTED	7'-0"	6
2	NO PARKING DO NOT TOW	P-4-6	12"x18" RED ON WHITE	POST MOUNTED	7'-0"	3
3	VAN ACCESSIBLE	R7-8B	12"x6" WHITE ON BLUE	"C"	7'-0"	1
4	STOP	R-I-IC	30"x30" OCTAGONAL WHITE ON RED	"A" OR FREE-STANDING PEDESTAL	7'-0"	3

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft. 34" x 44"
1 inch = 120 ft. 17" x 22"

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STATE OF NEW YORK · MARK R. COSTICH · 065971 · Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPOGRAPHY: D.T.H.
DATE: 11/01/2017
SCALE: 1"=60'

Costich Engineering
- Civil Engineering
- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

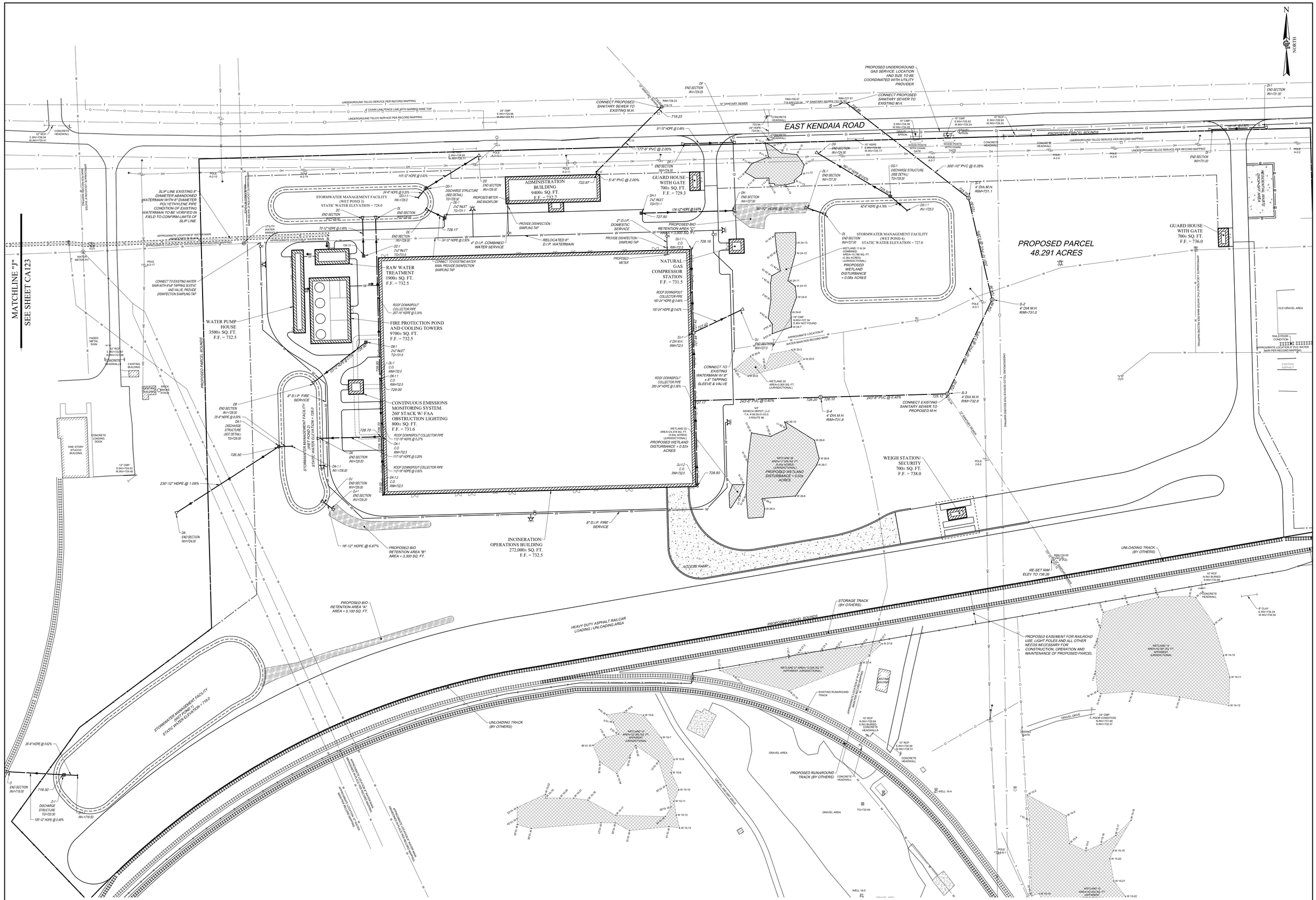
TITLE OF PROJECT: CIRCULAR enerG FACILITY

TITLE OF DRAWING: SITE AND PAVEMENT MARKING PLAN

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS,
COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG.# C3320
CA110
SHEET 4 OF 15



REFERENCES:

1. PER A SET OF PLANS ENTITLED "REPLACE WATERLINE" PREPARED BY RIST FROST STEPHENS ENGINEERING ARCHITECTURE, HAVING FILE NUMBER 7527-4051 STAMPED "RECORD DRAWING OF WORK AS-BUILT" DATED SEPTEMBER 2, 1985.
2. PER A SET OF PLANS ENTITLED "SENECA ARMY DEPOT MASTER PLAN BASIC INFORMATION MAPS" PREPARED BY STV / LYON ASSOCIATES, INC. HAVING PROJECT NUMBER 4468-01-62 DATED MARCH 1988.
3. PER A FIELD SURVEY PERFORMED BY COSTICH ENGINEERING, D.P.C. PERFORMED IN AUGUST 2017.
4. APPROXIMATE LOCATION OF EXISTING FEATURES OUTSIDE OF PROJECT AREA SHOWN HEREON PER REFERENCES 1 AND 2, TAXMAPS, AND AERIAL IMAGERY.

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GRAPHIC SCALE

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STATE OF NEW YORK
MARK R. COSTICH
065971
Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPO/BASE: D.T.H.
DATE: 11/01/2017
SCALE: 1"=60'

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- Land Surveying
- Landscape Architecture

217 Lake Avenue
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(585) 458-3020

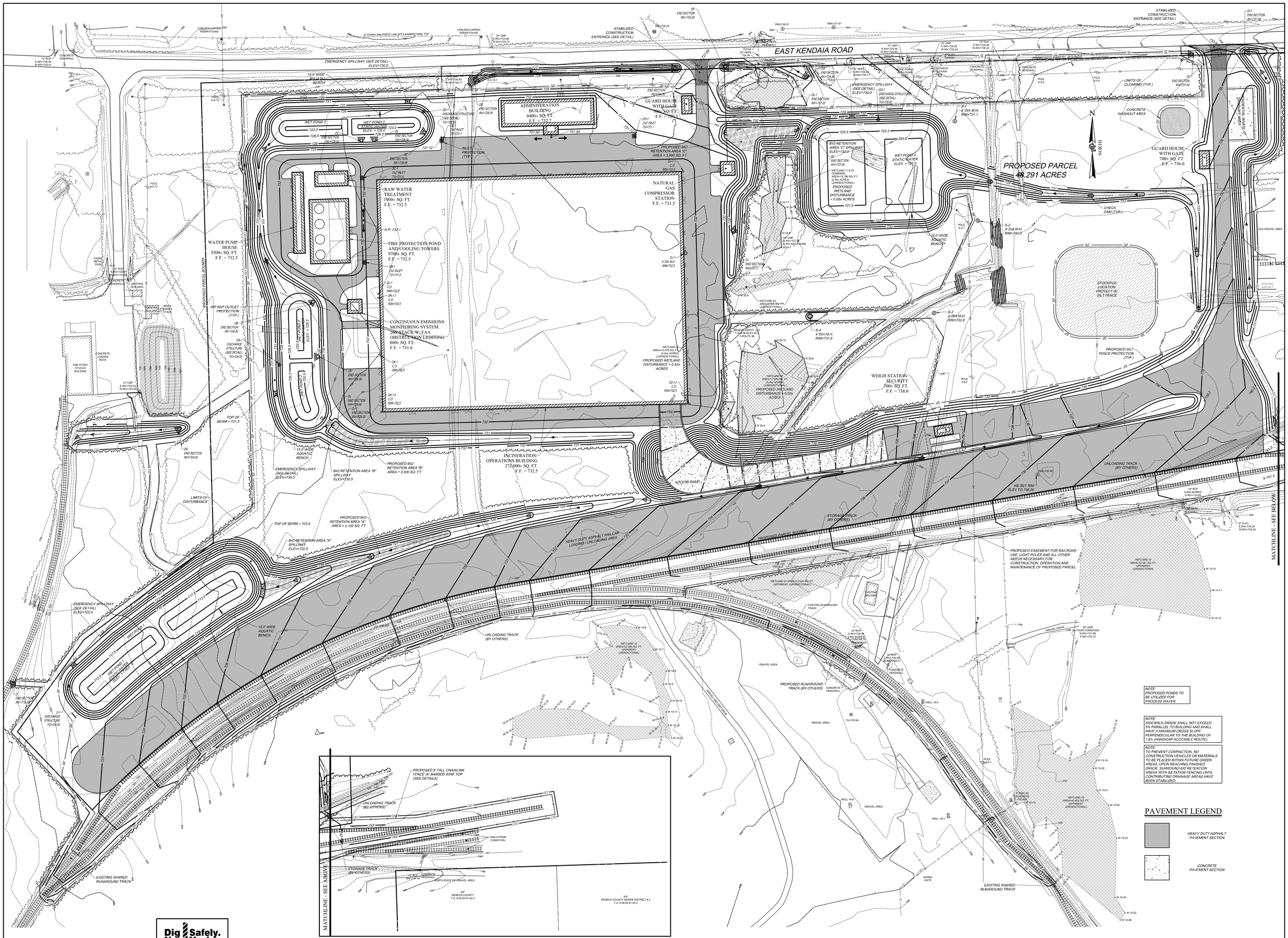
CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

TITLE OF PROJECT: CIRCULAR enerG FACILITY

TITLE OF DRAWING: UTILITY PLAN

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS,
COUNTY OF SENECA, STATE OF NEW YORK

DWG # CA120
SHEET 5 OF 15



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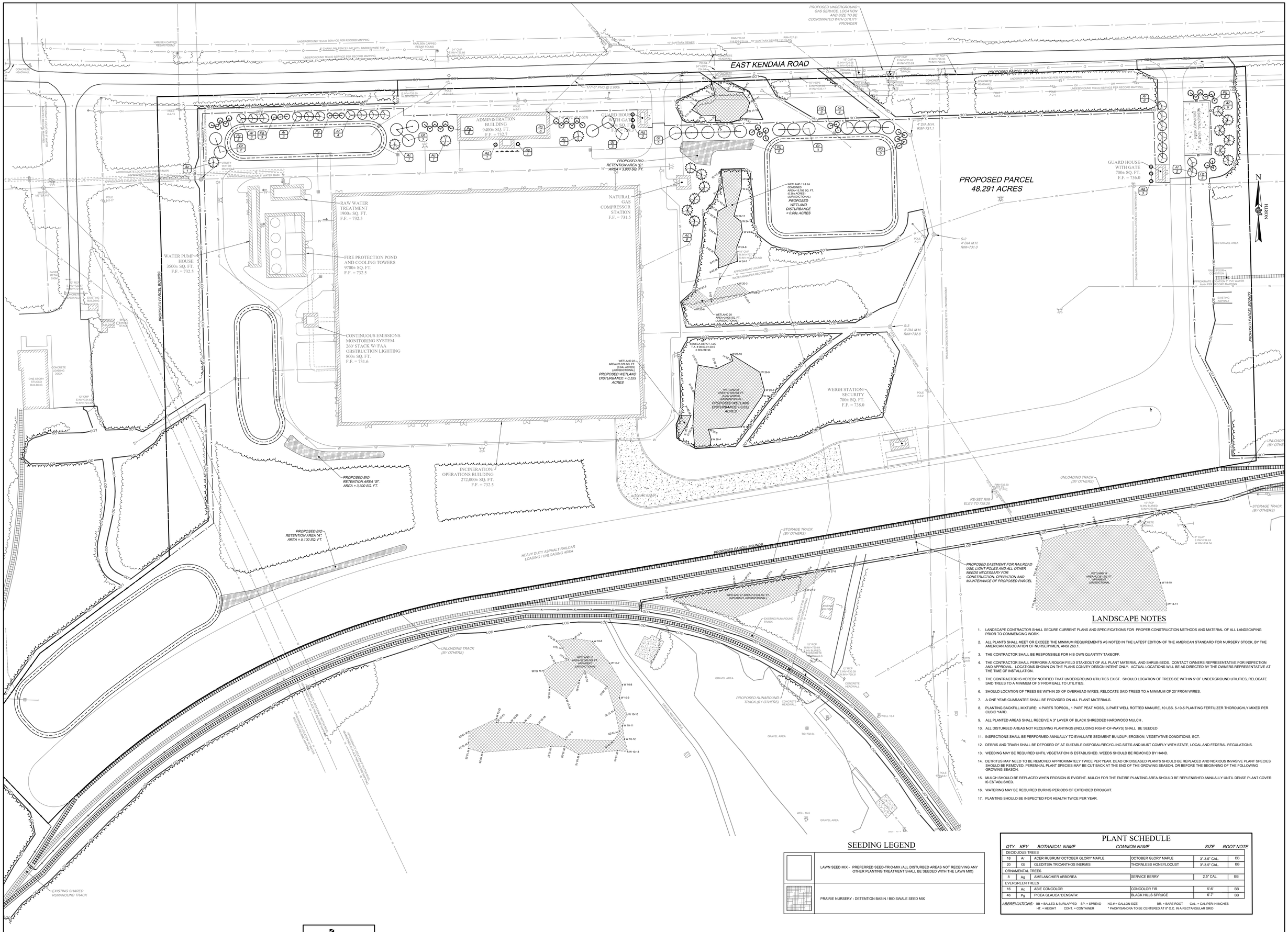
STATE OF NEW YORK · MARK R. COSTICH · No. 065971 · Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPOBASE: D.T.H.
DATE: 11/01/2017
SCALE: 1"=60'

Costich Engineering
- Civil Engineering
- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585)458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY
TITLE OF DRAWING: GRADING & EROSION CONTROL PLAN
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK.
CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604
DWG # 3320
CA130
SHEET 6 OF 15



LANDSCAPE NOTES

1. LANDSCAPE CONTRACTOR SHALL SECURE CURRENT PLANS AND SPECIFICATIONS FOR PROPER CONSTRUCTION METHODS AND MATERIAL OF ALL LANDSCAPING PRIOR TO COMMENCING WORK.
2. ALL PLANTS SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS AS NOTED IN THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, BY THE AMERICAN ASSOCIATION OF NURSERYMEN, ANSI Z60.1.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN QUANTITY TAKEOFF.
4. THE CONTRACTOR SHALL PERFORM A ROUGH FIELD STAKEOUT OF ALL PLANT MATERIAL AND SHRUB-BEDS. CONTACT OWNERS REPRESENTATIVE FOR INSPECTION AND APPROVAL. LOCATIONS SHOWN ON THE PLANS CONVEY DESIGN INTENT ONLY. ACTUAL LOCATIONS WILL BE AS DIRECTED BY THE OWNERS REPRESENTATIVE AT THE TIME OF INSTALLATION.
5. THE CONTRACTOR IS HEREBY NOTIFIED THAT UNDERGROUND UTILITIES EXIST. SHOULD LOCATION OF TREES BE WITHIN 5' OF UNDERGROUND UTILITIES, RELOCATE SAID TREES TO A MINIMUM OF 5' FROM BALL TO UTILITIES.
6. SHOULD LOCATION OF TREES BE WITHIN 20' OF OVERHEAD WIRES, RELOCATE SAID TREES TO A MINIMUM OF 20' FROM WIRES.
7. A ONE YEAR GUARANTEE SHALL BE PROVIDED ON ALL PLANT MATERIALS.
8. PLANTING BACKFILL MIXTURE: 4 PARTS TOPSOIL, 1 PART PEAT MOSS, ½ PART WELL ROTTED MANURE, 10 LBS. 5-10-5 PLANTING FERTILIZER THOROUGHLY MIXED PER CUBIC YARD.
9. ALL PLANTED AREAS SHALL RECEIVE A 3" LAYER OF BLACK SHREDDED HARDWOOD MULCH .
10. ALL DISTURBED AREAS NOT RECEIVING PLANTINGS (INCLUDING RIGHT-OF-WAYS) SHALL BE SEEDED
11. INSPECTIONS SHALL BE PERFORMED ANNUALLY TO EVALUATE SEDIMENT BUILDUP, EROSION, VEGETATIVE CONDITIONS, ECT.
12. DEBRIS AND TRASH SHALL BE DEPOSED OF AT SUITABLE DISPOSAL/RECYCLING SITES AND MUST COMPLY WITH STATE, LOCAL AND FEDERAL REGULATIONS.
13. WEEDING MAY BE REQUIRED UNTIL VEGETATION IS ESTABLISHED. WEEDS SHOULD BE REMOVED BY HAND.
14. DETRITUS MAY NEED TO BE REMOVED APPROXIMATELY TWICE PER YEAR. DEAD OR DISEASED PLANTS SHOULD BE REPLACED AND NOXIOUS INVASIVE PLANT SPECIES SHOULD BE REMOVED. PERENNIAL PLANT SPECIES MAY BE CUT BACK AT THE END OF THE GROWING SEASON, OR BEFORE THE BEGINNING OF THE FOLLOWING GROWING SEASON.
15. MULCH SHOULD BE REPLACED WHEN EROSION IS EVIDENT. MULCH FOR THE ENTIRE PLANTING AREA SHOULD BE REPLENISHED ANNUALLY UNTIL DENSE PLANT COVER IS ESTABLISHED.
16. WATERING MAY BE REQUIRED DURING PERIODS OF EXTENDED DROUGHT.
17. PLANTING SHOULD BE INSPECTED FOR HEALTH TWICE PER YEAR.

SEEDING LEGEND

	LAWN SEED MIX - PREFERRED SEED-TRIO-MIX (ALL DISTURBED AREAS NOT RECEIVING ANY OTHER PLANTING TREATMENT SHALL BE SEEDED WITH THE LAWN MIX)
	PRAIRIE NURSERY - DETENTION BASIN / BIO SWALE SEED MIX

PLANT SCHEDULE

QTY.	KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT NOTE
DECIDUOUS TREES					
18	Ar	ACER RUBRUM 'OCTOBER GLORY' MAPLE	OCTOBER GLORY MAPLE	3"-3.5" CAL.	BB
20	Gt	GLEDITSIA TRICANTHOS INERMIS	THORNLESS HONEYLOCUST	3"-3.5" CAL.	BB
ORNAMENTAL TREES					
8	Ag	AMELANCHIER ARBOREA	SERVICE BERRY	2.5" CAL.	BB
EVERGREEN TREES					
16	Ac	ABIE CONCOLOR	CONCOLOR FIR	5'-6'	BB
46	Pg	PICEA GLAUCA 'DENSATA'	BLACK HILLS SPRUCE	6'-7'	BB

ABBREVIATIONS: BB = BALLED & BURLAPPED SP. = SPREAD NO.# = GALLON SIZE BR. = BARE ROOT CAL. = CALIPER IN INCHES
HT. = HEIGHT CONT. = CONTAINER * PACHYSANDRA TO BE CENTERED AT 8" O.C. IN A RECTANGULAR GRID

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■ Wait The Required Time
■ Confirm Utility Response
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www.digsafelynewyork.com

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GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft. 34" x 44"
1 inch = 120 ft. 17" x 22"

NO.	DATE	REVISION	BY	CHKD.	APVLS.

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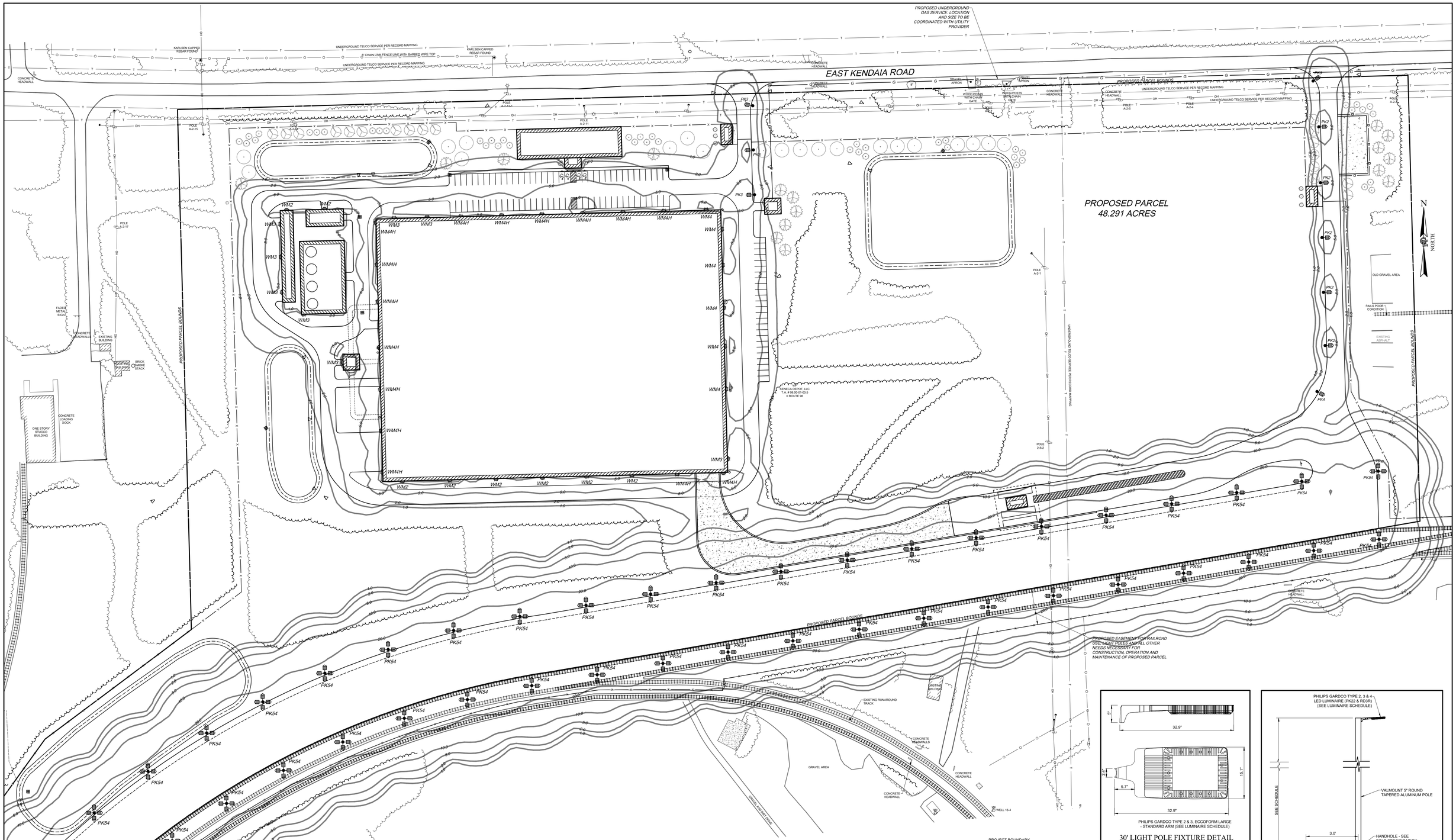
REGISTERED LANDSCAPE ARCHITECT SARAH COSTICH 002674 STATE OF NEW YORK

PROJECT ENGINEER M.O.R.
DRAWN BY C.J.M.
BOUNDARY ---
TOPOBASE D.T.H.
DATE 11/01/2017
SCALE 1"=60'

Costich Engineering
• Civil Engineering
• Land Surveying
• Landscape Architecture
217 Lake Avenue Rochester, NY 14608 (585) 458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY
TITLE OF DRAWING: LANDSCAPING PLAN
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5 PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK
CLIENT: CIRCULAR enerG LLC, 400 ANDREWS STREET, SUITE 360, ROCHESTER, NEW YORK 14604
DWG # C3320
LA140
SHEET 7 OF 15



Luminaire Schedule

TYP	SYMBOL	DESCRIPTION	LAMP	LUMENS	POLE/BASE/MTG. HGT.	LLF	QTY
PK2		PHILIPS GARDCO Type 2 (1) "W2" ECF-L-96L-800-NW-G2-2	(1)	46318	27 feet 3 feet 30 feet	0.85	5
PK3		PHILIPS GARDCO Type 3 (1) "W3" ECF-L-96L-800-NW-G2-3	(1)	40402	27 feet 3 feet 30 feet	0.85	4
PK4		PHILIPS GARDCO Type 4 (1) "W4" ECF-L-96L-800-NW-G2-4	(1)	37144	27 feet 3 feet 30 feet	0.85	1
PK54		PHILIPS LUMEC Type 5 (4) "P5B" HFL-276L-1050-NW-G1-5M	(4)	97353	50 ft High Mast	0.85	44
WM2		PHILIPS GARDCO Type 2 (1) "W2" ECF-L-96L-800-NW-G2-2	(1)	46318	N/A N/A 30 feet	0.85	8
WM3		PHILIPS GARDCO Type 3 (1) "W3" ECF-L-96L-800-NW-G2-3	(1)	40402	N/A N/A 30 feet	0.85	8
WM4		PHILIPS GARDCO Type 4 (1) "W4" ECF-L-96L-800-NW-G2-4	(1)	37144	N/A N/A 30 feet	0.85	6
WM4H		PHILIPS GARDCO Type 4 (1) "W4A" ECF-L-96L-1.2A-NW-G2-4	(1)	37144	N/A N/A 30 feet	0.85	16

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GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft. 34" x 44"
1 inch = 120 ft. 17" x 22"

NO.	DATE	REVISION	BY	CHKD	APVLS

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STATE OF NEW YORK · MARK R. COSTICH · No. 065973 · Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPOBASE: D.T.H.
DATE: 11/01/2017
SCALE: 1"=60'

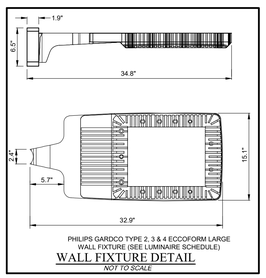
Costich Engineering
• Civil Engineering
• Land Surveying
• Landscape Architecture
217 Lake Avenue
Rochester, NY 14608
(585)458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY
TITLE OF DRAWING: LIGHTING PLAN
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK
CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604
DWG # C3320
EA150
SHEET 8 OF 15

PROJECT BOUNDARY
EXISTING RIGHT-OF-WAY LINE
EXISTING CONCRETE CURB
EXISTING EDGE OF PAVEMENT
PROPOSED CONCRETE CURB
PROPOSED EDGE OF PAVEMENT
EXISTING EDGE OF GRAVEL
EXISTING BUILDING
PROPOSED BUILDING
EXISTING WATER MAIN, VALVE, & HYDRANT
EXISTING SANITARY SEWER, & MANHOLE
EXISTING DRAINAGE SEWER, FIELD INLET, INLET MANHOLE, MANHOLE, & END SECTION
EXISTING OVERHEAD UTILITIES
EXISTING TELEPHONE
EXISTING UNDERGROUND UTILITIES
EXISTING GAS
EXISTING ELECTRIC
EXISTING GUARD RAIL
BARBED WIRE,STOCKADE & CHAIN LINK FENCE
PROPOSED WATER MAIN, VALVE, & HYDRANT
PROPOSED SANITARY SEWER, & MANHOLE
PROPOSED DRAINAGE SEWER, FIELD INLET, INLET MANHOLE, MANHOLE, & END SECTION
EXISTING CONCRETE PAD/ CONCRETE SIDEWALK

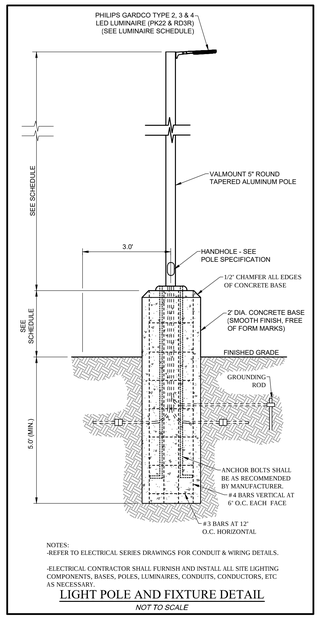
PHILIPS GARDCO TYPE 2 & 3, ECCOFORM LARGE - STANDARD ARM (SEE LUMINAIRE SCHEDULE)

30' LIGHT POLE FIXTURE DETAIL
NOT TO SCALE



PHILIPS GARDCO TYPE 2, 3 & 4 ECCOFORM LARGE WALL FIXTURE (SEE LUMINAIRE SCHEDULE)

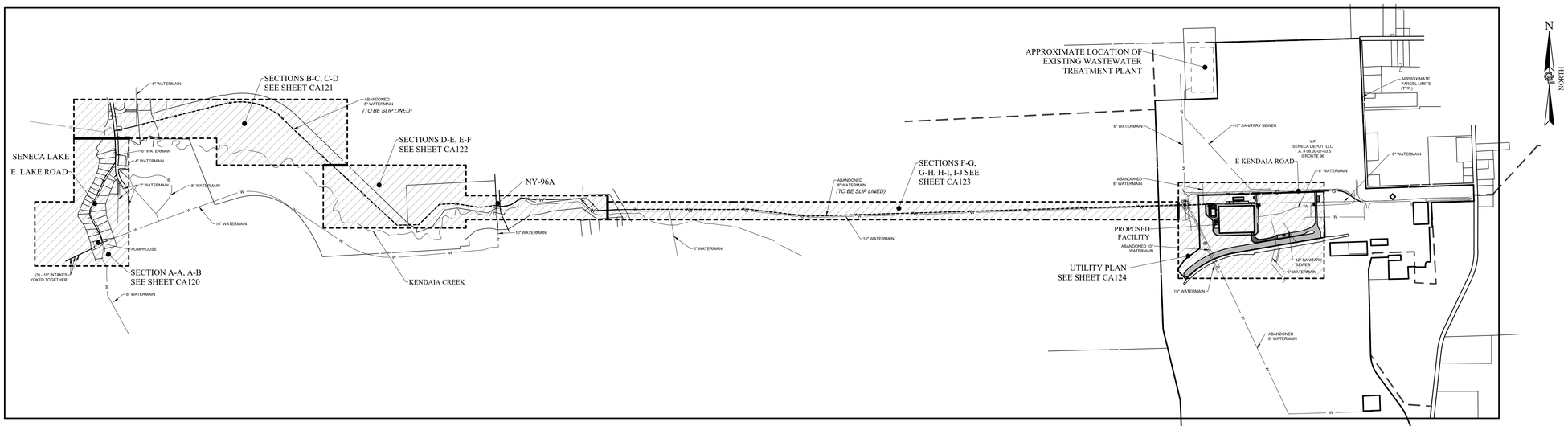
WALL FIXTURE DETAIL
NOT TO SCALE



NOTES:
-REFER TO ELECTRICAL SERIES DRAWINGS FOR CONDUIT & WIRING DETAILS.

-ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SITE LIGHTING COMPONENTS, BASES, POLES, LUMINAIRES, CONDUITS, CONDUCTORS, ETC AS NECESSARY.

LIGHT POLE AND FIXTURE DETAIL
NOT TO SCALE



NOTE:
EXISTING FEATURES SHOWN PER
RECORD MAPPING AND AERIAL IMAGERY

OVERALL WATER SYSTEM

SCALE: 1" = 800'

GRAPHIC SCALE

(IN FEET)
1 inch = 800 ft. 34" x 44"
1 inch = 1600 ft. 17" x 22"

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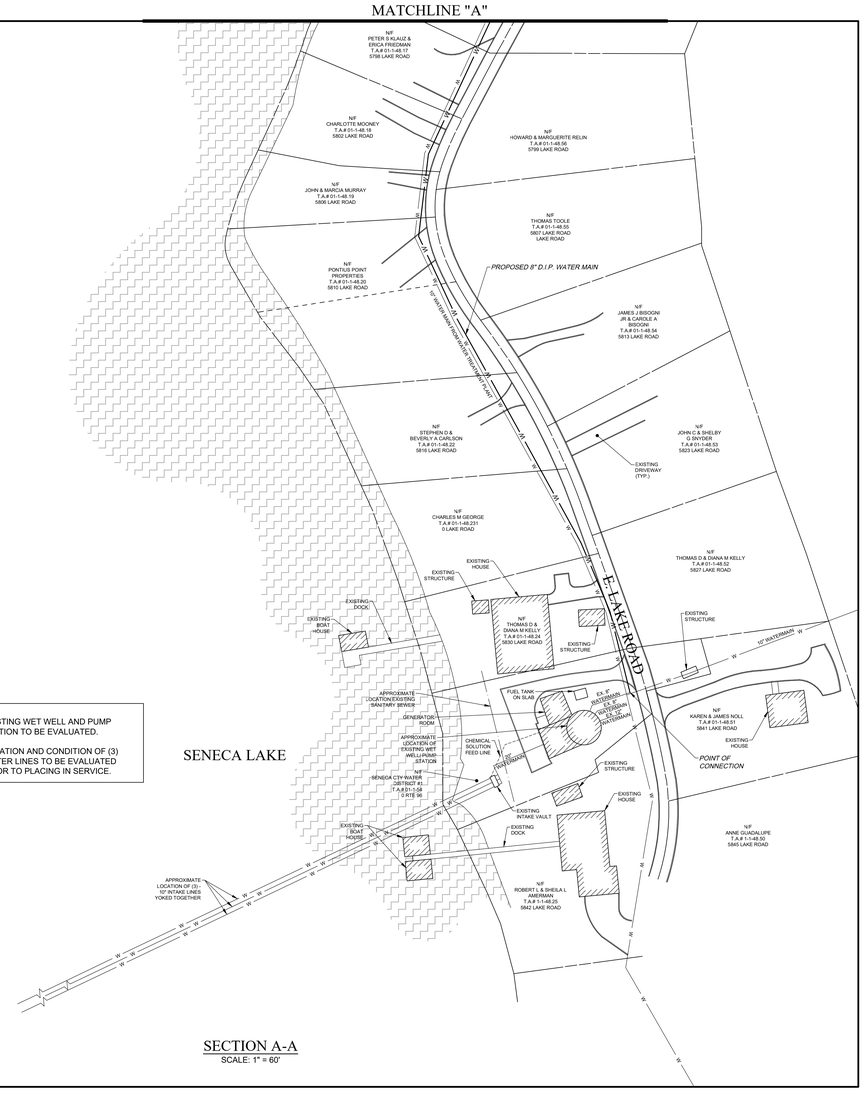
REFERENCES:

1. PER A SET OF PLANS ENTITLED "REPLACE WATERLINE" PREPARED BY RIST FROST STEPHENS ENGINEERING ARCHITECTURE, HAVING FILE NUMBER 7527-4051 STAMPED "RECORD DRAWING OF WORK AS-BUILT" DATED SEPTEMBER 2, 1985.
2. PER A SET OF PLANS ENTITLED "SENECA ARMY DEPOT MASTER PLAN BASIC INFORMATION MAPS" PREPARED BY STV / LYON ASSOCIATES, INC. HAVING PROJECT NUMBER 4468-01-62 DATED MARCH 1988.
3. PER A FIELD SURVEY PERFORMED BY COSTICH ENGINEERING, D.P.C. PERFORMED IN AUGUST 2017.
4. APPROXIMATE LOCATION OF EXISTING FEATURES OUTSIDE OF PROJECT AREA SHOWN HEREON PER REFERENCES 1 AND 2, TAXMAPS, AND AERIAL IMAGERY.

MATCHLINE "A"

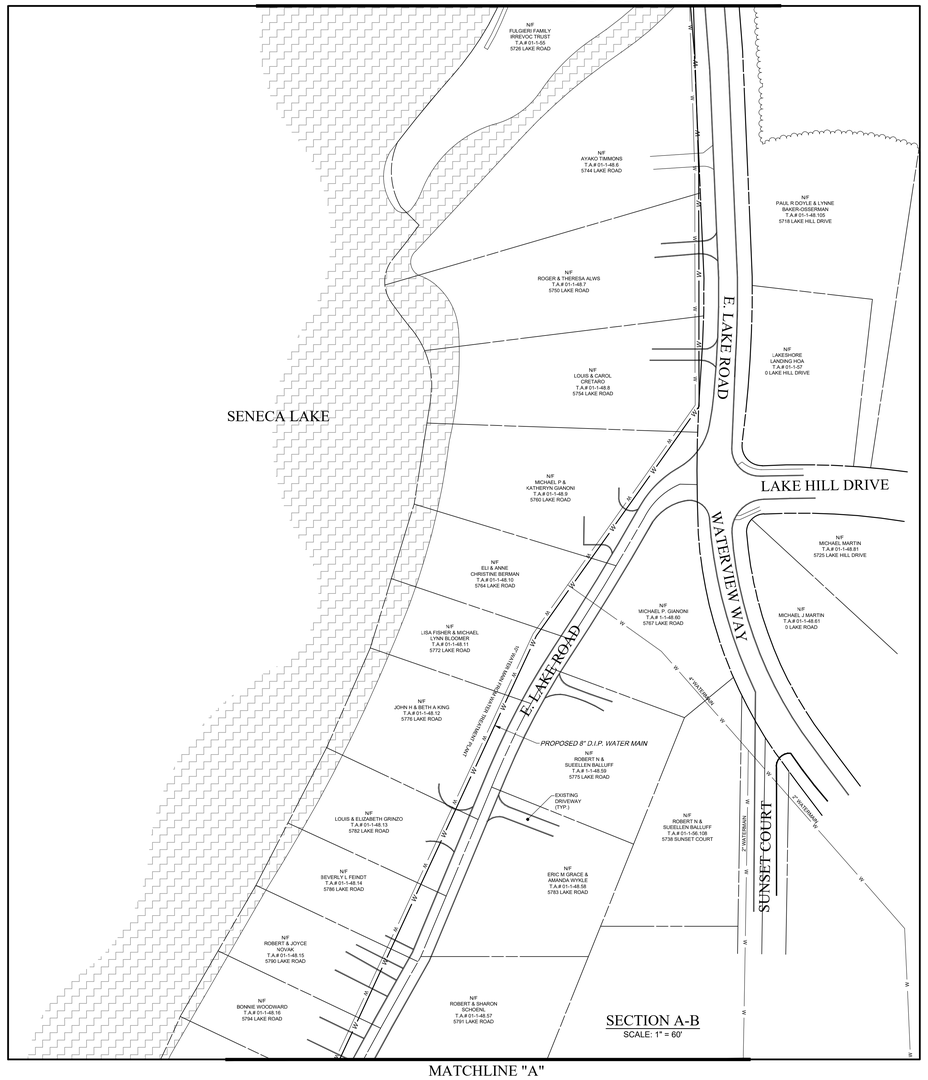


NOTES:
1. EXISTING WET WELL AND PUMP STATION TO BE EVALUATED.
2. LOCATION AND CONDITION OF (3) WATER LINES TO BE EVALUATED PRIOR TO PLACING IN SERVICE.

SECTION A-A

SCALE: 1" = 60'

MATCHLINE "B" - SEE SHEET CA161



SECTION A-B

SCALE: 1" = 60'

MATCHLINE "A"

EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF, OR CLOSELY PARALLEL TO, OR UNDER, THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES. THE CONTRACTOR SHALL ALSO NOTIFY UNDERGROUND UTILITY LOCATION SERVICE AT LEAST 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft. 34" x 44"
1 inch = 120 ft. 17" x 22"

NO.	DATE	REVISION	BY	CHKD.	APVLS

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STATE OF NEW YORK · MARK R. COSTICH · 065021 · Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPO/BASE: D.T.H.
DATE: 11/01/2017
SCALE: AS NOTED

Costich Engineering
- Civil Engineering
- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

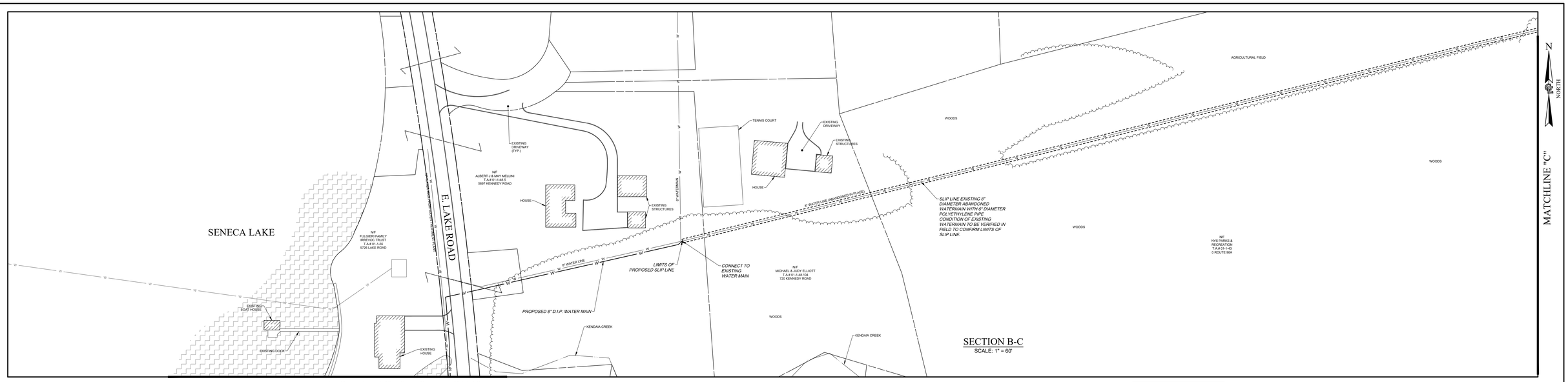
TITLE OF PROJECT: CIRCULAR enerG FACILITY

TITLE OF DRAWING: SCHEMATIC PROCESS WATER PLAN (SHEET 1 OF 4)

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS,
COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG # C3320
CA160
SHEET 9 OF 15



SECTION B-C
SCALE: 1" = 60'

MATCHLINE "B" - SEE SHEET CA160

NOTE:
BORING AND RECEIVING PIT LOCATIONS TO BE DETERMINED IN FIELD.

REFERENCES:

1. PER A SET OF PLANS ENTITLED "REPLACE WATERLINE" PREPARED BY RIST FROST STEPHENS ENGINEERING ARCHITECTURE, HAVING FILE NUMBER 7527-4051 STAMPED "RECORD DRAWING OF WORK AS-BUILT" DATED SEPTEMBER 2, 1985.
2. PER A SET OF PLANS ENTITLED "SENECA ARMY DEPOT MASTER PLAN BASIC INFORMATION MAPS" PREPARED BY STV / LYON ASSOCIATES, INC. HAVING PROJECT NUMBER 4468-01-62 DATED MARCH 1988.
3. PER A FIELD SURVEY PERFORMED BY COSTICH ENGINEERING, D.P.C. PERFORMED IN AUGUST 2017.
4. APPROXIMATE LOCATION OF EXISTING FEATURES OUTSIDE OF PROJECT AREA SHOWN HEREON PER REFERENCES 1 AND 2, TAXMAPS, AND AERIAL IMAGERY.

SECTION C-D
SCALE: 1" = 60'

MATCHLINE "D" - SEE SHEET CA162

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- Dig With Care

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GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft. 34" x 44"
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NO.	DATE	REVISION	BY	CHKD.	APVL'S

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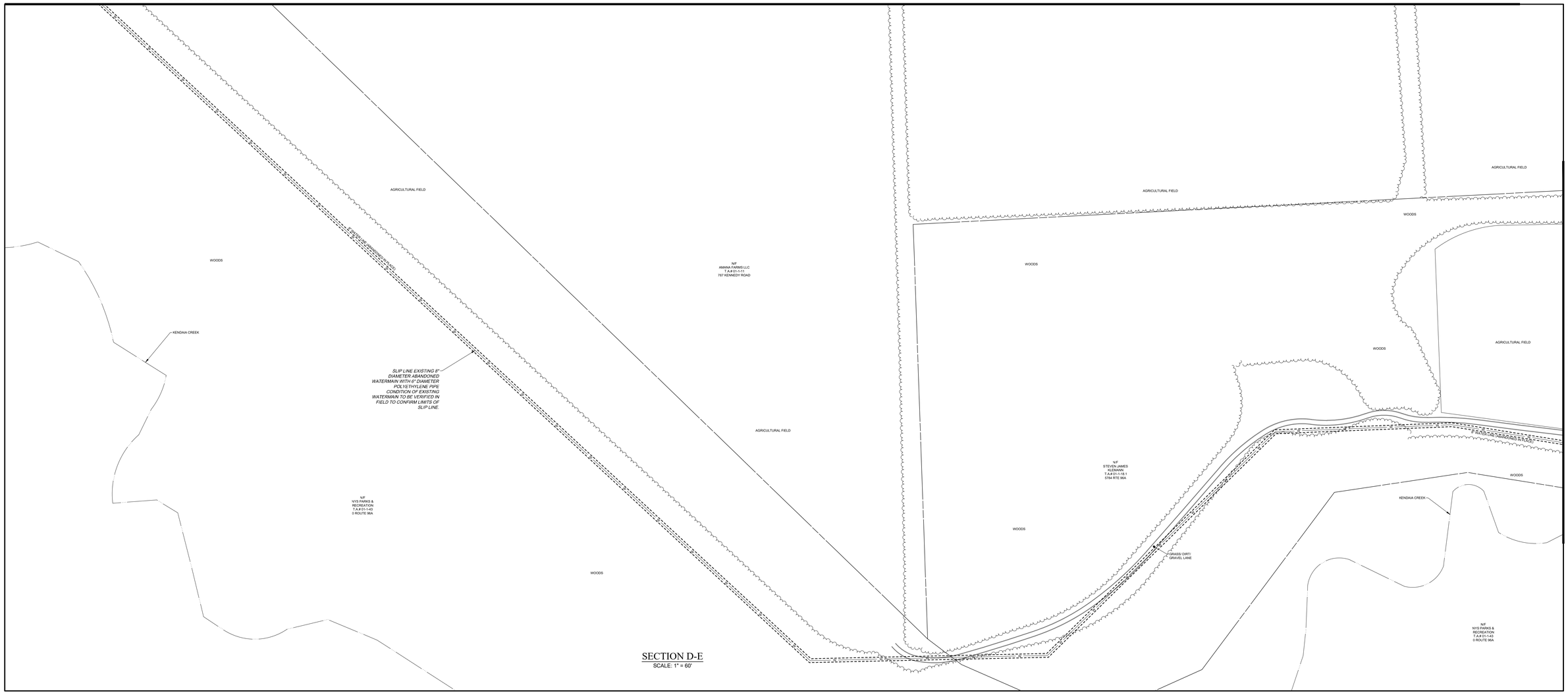
STATE OF NEW YORK
MARK R. COSTICH
LICENSED PROFESSIONAL ENGINEER
NO. 065971

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPO/BASE: D.T.H.
DATE: 11/01/2017
SCALE: 1"=60'

Costich Engineering
217 Lake Avenue
Rochester, NY 14608
(585) 458-3025
• Civil Engineering
• Land Surveying
• Landscape Architecture

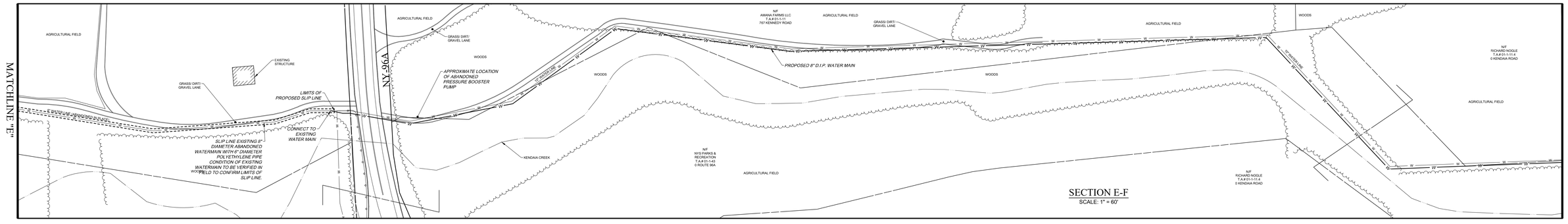
TITLE OF PROJECT: CIRCULAR enerG FACILITY
TITLE OF DRAWING: SCHEMATIC PROCESS WATER PLAN (SHEET 2 OF 4)
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK
CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604
DWG # C3320
CA161
SHEET 10 OF 15

MATCHLINE "D" - SEE SHEET CA161



SECTION D-E
SCALE: 1" = 60'

NOTE:
BORING AND RECEIVING PIT LOCATIONS TO BE DETERMINED IN FIELD.



SECTION E-F
SCALE: 1" = 60'

REFERENCES:

1. PER A SET OF PLANS ENTITLED "REPLACE WATERLINE" PREPARED BY RIST FROST STEPHENS ENGINEERING ARCHITECTURE, HAVING FILE NUMBER 7527-4051 STAMPED "RECORD DRAWING OF WORK AS-BUILT" DATED SEPTEMBER 2, 1985.
2. PER A SET OF PLANS ENTITLED "SENECA ARMY DEPOT MASTER PLAN BASIC INFORMATION MAPS" PREPARED BY STV / LYON ASSOCIATES, INC. HAVING PROJECT NUMBER 4468-01-62 DATED MARCH 1988.
3. PER A FIELD SURVEY PERFORMED BY COSTICH ENGINEERING, D.P.C. PERFORMED IN AUGUST 2017.
4. APPROXIMATE LOCATION OF EXISTING FEATURES OUTSIDE OF PROJECT AREA SHOWN HEREON PER REFERENCES 1 AND 2, TAXMAPS, AND AERIAL IMAGERY.

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- Wait The Required Time
- Confirm Utility Response
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GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft. 34" x 44"
1 inch = 120 ft. 17" x 22"

NO.	DATE	REVISION	BY	CHKD.	APVLS

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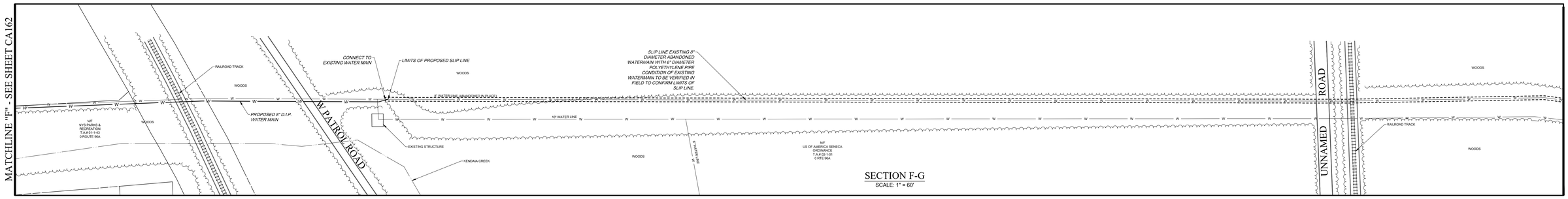
STATE OF NEW YORK
MARK R. COSTICH
Licensed Professional Engineer
065971

PROJECT ENGINEER	M.O.R.
DRAWN BY	C.J.M.
BOUNDARY	---
TOPO/BASE	D.T.H.
DATE	11/01/2017
SCALE	1"=60'

Costich Engineering
217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

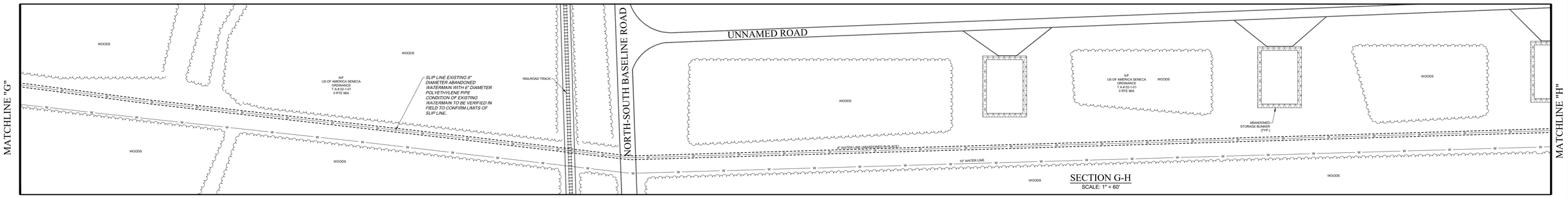
- Civil Engineering
- Land Surveying
- Landscape Architecture

TITLE OF PROJECT	CIRCULAR enerG FACILITY
TITLE OF DRAWING	SCHEMATIC PROCESS WATER PLAN (SHEET 3 OF 4)
LOCATION OF PROJECT	TAX PARCEL NO 08.00-01-03.5 PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK
CLIENT	CIRCULAR enerG LLC 400 ANDREWS STREET, SUITE 360 ROCHESTER, NEW YORK 14604
DWG # C3320	CA162 SHEET 11 OF 15

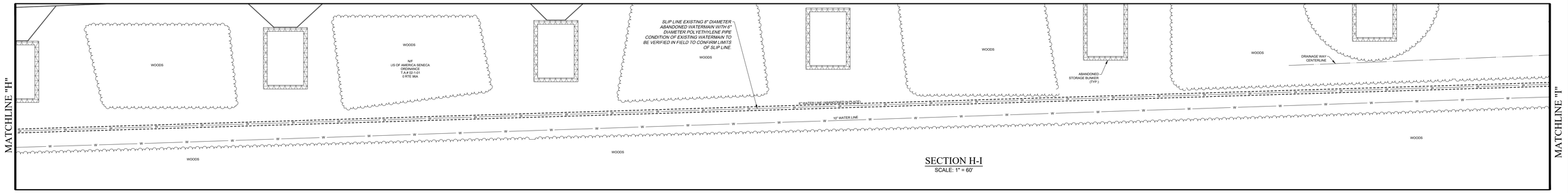


SECTION F-G
SCALE: 1" = 60'

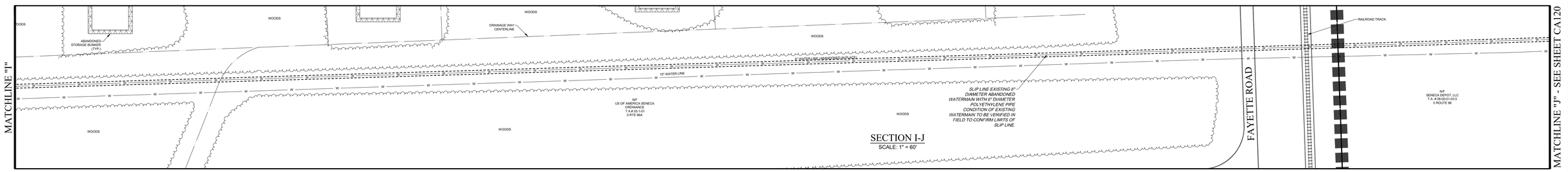
NOTE:
BORING AND RECEIVING PIT LOCATIONS TO BE DETERMINED IN FIELD.



SECTION G-H
SCALE: 1" = 60'



SECTION H-I
SCALE: 1" = 60'



SECTION I-J
SCALE: 1" = 60'

REFERENCES:

1. PER A SET OF PLANS ENTITLED "REPLACE WATERLINE" PREPARED BY RIST FROST STEPHENS ENGINEERING ARCHITECTURE, HAVING FILE NUMBER 7527-4051 STAMPED "RECORD DRAWING OF WORK AS-BUILT" DATED SEPTEMBER 2, 1985.
2. PER A SET OF PLANS ENTITLED "SENECA ARMY DEPOT MASTER PLAN BASIC INFORMATION MAPS" PREPARED BY STV / LYON ASSOCIATES, INC. HAVING PROJECT NUMBER 4468-01-62 DATED MARCH 1988.
3. PER A FIELD SURVEY PERFORMED BY COSTICH ENGINEERING, D.P.C. PERFORMED IN AUGUST 2017.
4. APPROXIMATE LOCATION OF EXISTING FEATURES OUTSIDE OF PROJECT AREA SHOWN HEREON PER REFERENCES 1 AND 2, TAXMAPS, AND AERIAL IMAGERY.

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GRAPHIC SCALE
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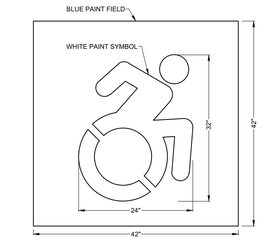
STATE OF NEW YORK
MARK A. COSTICH
No. 065971
Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPO/BASE: D.T.H.
DATE: 11/01/2017
SCALE: 1"=60'

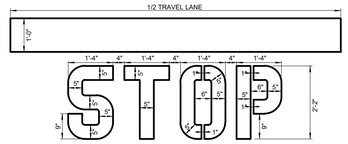
Costich Engineering
• Civil Engineering
• Land Surveying
• Landscape Architecture
217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY
TITLE OF DRAWING: SCHEMATIC PROCESS WATER PLAN (SHEET 4 OF 4)
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK
CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604
DWG. # CA163
SHEET 12 OF 15



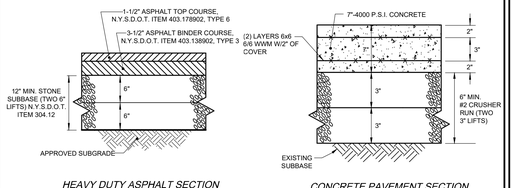
ACCESSIBLE SYMBOL PAVEMENT MARKING DETAIL

NOT TO SCALE



STOP BAR DETAIL

NOT TO SCALE

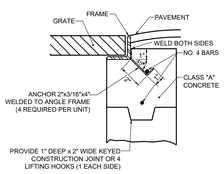


HEAVY DUTY ASPHALT SECTION

CONCRETE PAVEMENT SECTION

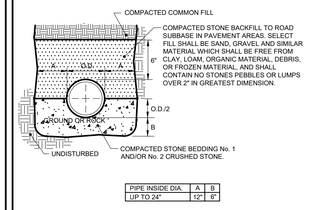
TYPICAL PAVEMENT SECTIONS

NOT TO SCALE



FRAME AND GRATE ANCHORS

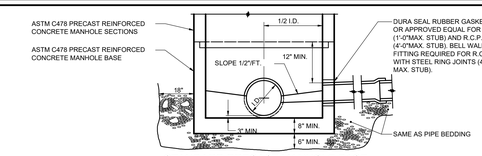
NOT TO SCALE



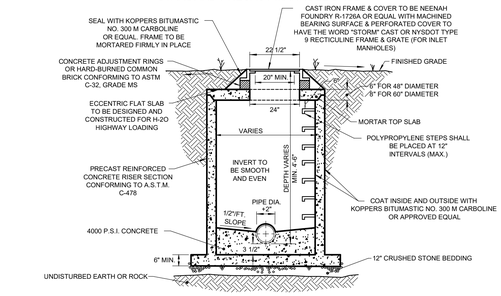
PIPE INSIDE DIA.	A	B
UP TO 24"	12"	6"

STORM SEWER BEDDING DETAIL

NOT TO SCALE

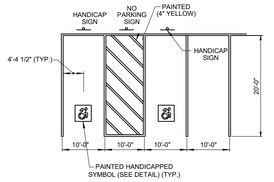


STANDARD PRECAST MANHOLE BASE



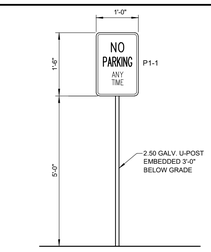
STANDARD STORM MANHOLE DETAIL

NOT TO SCALE



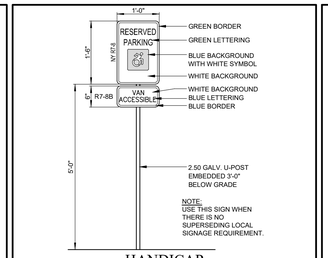
TYPICAL PARKING AND STRIPING DETAIL

NOT TO SCALE



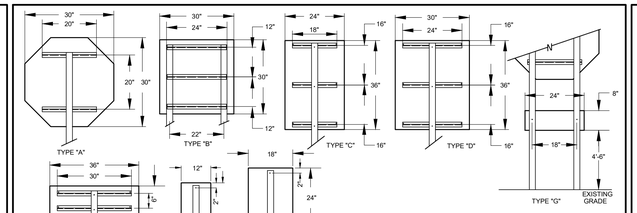
NO PARKING SIGN / POST

NOT TO SCALE



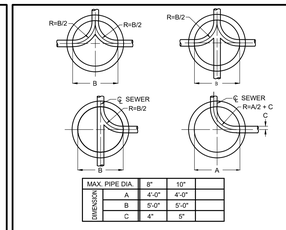
HANDICAP PARKING SIGN / POST DETAIL

NOT TO SCALE



TYPICAL SIGN WIND BRACING DETAILS

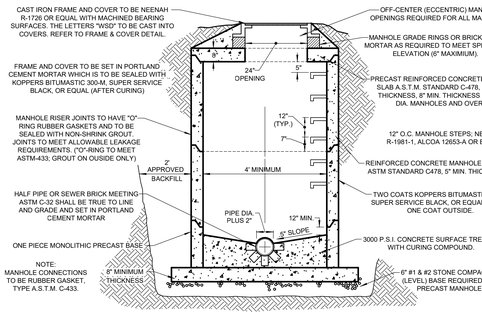
NOT TO SCALE



DIMENSION	MAX. PIPE DIA.	8"	10"	
	A	4'-0"	4'-0"	
	B	5'-0"	5'-0"	
	C	4"	5"	

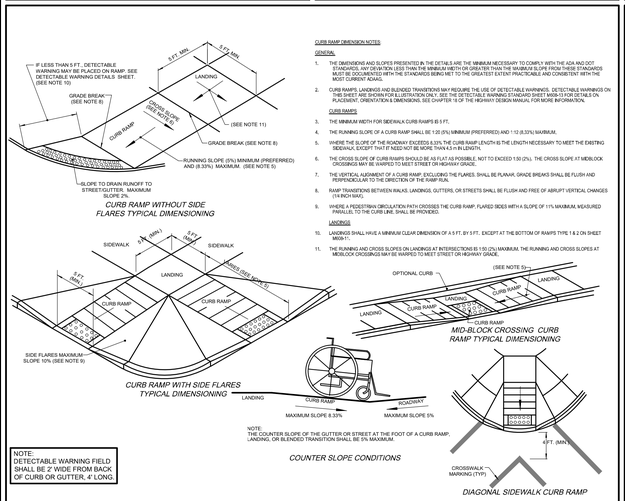
SANITARY STANDARD MAHOLE DIMENSIONS

NOT TO SCALE



TYPICAL SANITARY MANHOLE DETAIL

NOT TO SCALE



CURB RAMP DIMENSION NOTES

GENERAL

1. THE DIMENSIONS AND SLOPES PRESENTED IN THE DETAILS ARE THE MINIMUM NECESSARY TO COMPLY WITH THE ADA AND DOT STANDARDS. WHEN POSSIBLE, EITHER EQUAL TO OR GREATER THAN THE MINIMUM LIMITS OR LESS THAN THE MAXIMUM SLOPE FROM THESE STANDARDS MUST BE DOCUMENTED WITH THE STANDARDS BEING MET TO THE GREATEST EXTENT PRACTICABLE AND CONSISTENT WITH THE MOST CURRENT ADAAG.
2. CURB RAMPS, LANDINGS AND SLOPED TRANSITIONS ONLY REQUIRED WHEN THE USE OF DETECTABLE WARNINGS, DETECTABLE WARNINGS ON SIDE FLARES, AND DETECTABLE WARNINGS ON LANDINGS ARE ILLUSTRATION ONLY. SEE THE DETECTABLE WARNINGS STANDARD SHEET MMSA-11 FOR SIZE, PLACEMENT, ORIENTATION & DIMENSIONS. SEE CHAPTER 15 OF THE HIGHWAY DESIGN MANUAL FOR MORE INFORMATION.

CURB RAMPS

3. THE MINIMUM WIDTH FOR SIDEWALK CURB RAMPS IS 5 FT.
4. THE RUNNING SLOPE OF A CURB RAMP SHALL BE 1:20 (5%) MINIMUM (PREFERRED) AND 1:12 (8.33%) MAXIMUM.
5. WHERE THE SLOPE OF THE ROADWAY EXCEEDS 8.33%, THE CURB RAMP LENGTH (6 FT) THE LENGTH NECESSARY TO MEET THE EXISTING SIDEWALK, EXCEPT THAT IT NEED NOT BE MORE THAN 4.5 m IN LENGTH.
6. THE CROSS SLOPE OF CURB RAMPS SHOULD BE AS FLAT AS POSSIBLE, NOT TO EXCEED 1:50 (2%). THE CROSS SLOPE AT MIDBLOCK CROSSINGS MAY BE WARPED TO MEET STREET OR HIGHWAY GRADE.
7. THE VERTICAL ALIGNMENT OF A CURB RAMP, EXCLUDING THE FLARES, SHALL BE PLANAR. GRADE BREAKS SHALL BE FLUSH AND PERPENDICULAR TO THE DIRECTION OF THE RAMP RUN.
8. RAMP TRANSITIONS BETWEEN WALKS, LANDINGS, GUTTERS, OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT VERTICAL CHANGES (1/4 INCH MAX).
9. WHERE A PEDESTRIAN CIRCULATION PATH CROSSES THE CURB RAMP, FLARED SIDES WITH A SLOPE OF 11% MAXIMUM, MEASURED PARALLEL TO THE CURB LINE, SHALL BE PROVIDED.

LANDINGS

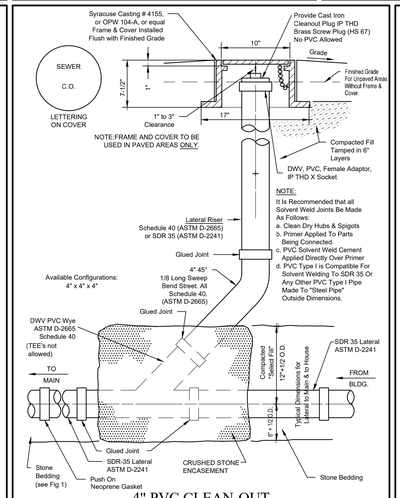
10. LANDINGS SHALL HAVE A MINIMUM CLEAR DIMENSION OF A 5 FT. BY 5 FT., EXCEPT AT THE BOTTOM OF RAMPS TYPE 1 & 2 ON SHEET MMSA-11.
11. THE RUNNING AND CROSS SLOPES ON LANDINGS AT INTERSECTIONS 8:1 (1%) MAXIMUM. THE RUNNING AND CROSS SLOPES AT MIDBLOCK CROSSINGS MAY BE WARPED TO MEET STREET OR HIGHWAY GRADE.

NOTE:
THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE FOOT OF A CURB RAMP, LANDING, OR BLENDED TRANSITION SHALL BE 5% MAXIMUM.

NOTE:
DETECTABLE WARNING FIELD SHALL BE 2' WIDE FROM BACK OF CURB OR GUTTER, 4' LONG.

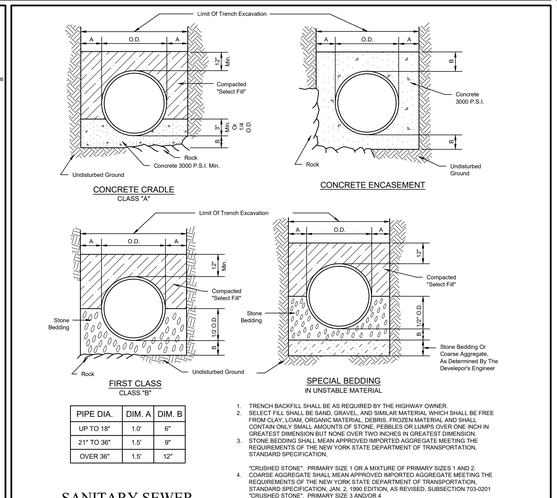
SIDEWALK CURB RAMP DIMENSIONS (DIMENSIONS, DETAILS AND GEOMETRY)

NOT TO SCALE



4" PVC CLEAN-OUT DETAIL FOR LATERAL CONNECTION

NOT TO SCALE



PIPE DIA.	DIM. A	DIM. B
UP TO 18"	1.0'	6"
21" TO 36"	1.5'	9"
OVER 36"	1.5'	12"

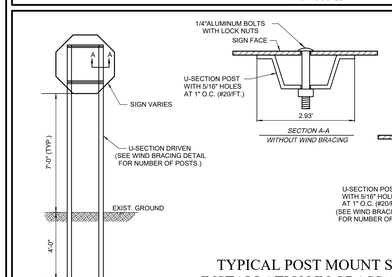
SANITARY SEWER BEDDING DETAILS

NOT TO SCALE

1. TRENCH BACKFILL SHALL BE AS REQUIRED BY THE HIGHWAY OWNER.
2. SELECT FILL SHALL BE SAND, GRAVEL, AND SIMILAR MATERIAL WHICH SHALL BE FREE FROM CLAY, LOAM, ORGANIC MATERIAL, DEBRIS, FROZEN MATERIAL AND SHALL CONTAIN ONLY SMALL AMOUNTS OF STONE, PEBBLES OR LUMPS OVER ONE INCH IN GREATEST DIMENSION BUT NONE OVER TWO INCHES IN GREATEST DIMENSION.
3. STONE BEDDING SHALL MEAN APPROVED IMPORTED AGGREGATE MEETING THE REQUIREMENTS OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATION.

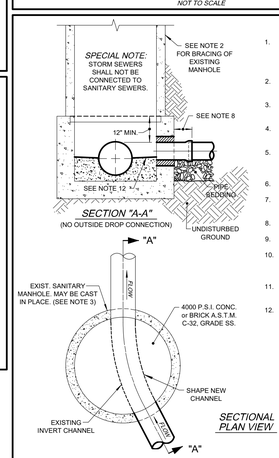
"CRUSHED STONE": PRIMARY SIZE 1 OR A MIXTURE OF PRIMARY SIZES 1 AND 2.

4. COARSE AGGREGATE SHALL MEAN APPROVED IMPORTED AGGREGATE MEETING THE REQUIREMENTS OF THE NEW YORK STATE DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATION, JAN. 2, 1990 EDITION, AS REVISED. SUBSECTION 703-0201 "CRUSHED STONE". PRIMARY SIZE 3 AND/OR 4.
5. THIS FIGURE APPLIES TO SANITARY MAINLINE and LATERAL PIPE INSTALLATIONS.
6. IN PAVEMENT AREAS BACKFILL SHALL CONSIST OF COMPACTED IMPORTED STONE MEETING N.Y.S.D.O.T. ITEM NO. 304.03 SPECIFICATION.



TYPICAL POST MOUNT SIGN INSTALLATION IN GRASS AREAS

NOT TO SCALE

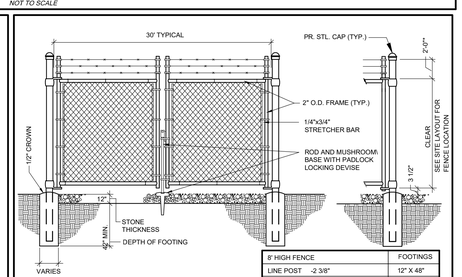


NOTES:

1. THE CROWN OF THE NEW SEWER SHALL NOT BE CONSTRUCTED LOWER THAN THE CROWN OF THE EXISTING MAIN SEWER. THE INVERT OF THE NEW SEWER SHALL BE CONSTRUCTED AT LEAST 3 INCHES ABOVE THE EXISTING MAIN SEWER INVERT.
2. EXISTING MANHOLE STRUCTURE SHALL BE SUFFICIENTLY BRACED AND PROTECTED TO PREVENT ANY SHIFTING OR DAMAGE TO THE EXISTING MANHOLE.
3. THE EXISTING MANHOLE BASE MAY BE ROUND OR SQUARE, DEPENDING ON THE TIME THE MANHOLE WAS CONSTRUCTED.
4. GENERALLY, A DROP CONNECTION SHALL BE PROVIDED WHEN DIMENSION "e" EXCEEDS 2 FEET IN A SANITARY MANHOLE AND 5 FEET IN A STORM MANHOLE.
5. CONTRACTOR MUST COAT ALL DISTURBED AREAS OF THE MANHOLE WITH 2 COATS OF SKILGUARD NO. 62 FOR INTERIOR OF BASE AND 2 COATS OF SUPER SERVICE BLACK FOR ALL OTHER SURFACES.
6. STUB, AT MANHOLE, SHALL NOT EXCEED 100 DEGREES ALIGNMENT ENTERING AGAINST EXIST. UPSTREAM SEWER.
7. THE TOWN OF HENRIETTA MUST BE NOTIFIED 48 hrs. IN ADVANCE OF CONSTRUCTION FOR INSPECTION OF CONNECTION.
8. STUBS TO BE 4" MAX. R.C.P. AND D.I.P., 1' MAX. FOR ALL OTHER PIPE MATERIALS, FROM OUTSIDE OF FACE.
9. CORED OPENINGS, IN MANHOLE RISER SECTIONS, SHALL BE NOT LESS THAN 6" FROM A RISER JOINT.
10. CONTRACTOR MAY CORE BORE OR DRILL A NEW OPENING IF REQUIRED. NO IMPACT DEVICES WILL BE ALLOWED TO BE USED FOR MAKING NEW HOLES IN EXISTING MANHOLES OR CHAMBERS.
11. USE FLEXOLITH GEL BY DURAL OR SIKADUR 33 BY SIKA EPOXY MORTAR TO FILL AROUND PIPE. NO SLEEVE REQUIRED.
12. CUT OUT EXISTING BENCH AND INVERT. SHAPE NEW INVERT BY FILLING IN WITH CONCRETE OR BRICK AS SHOWN ON THE PLAN VIEW. ALL SLOPES ARE TO BE A MINIMUM OF 1/2" PER FOOT. (ALSO SEE NOTE 5)

CONNECTION TO EXISTING SANITARY SEWER

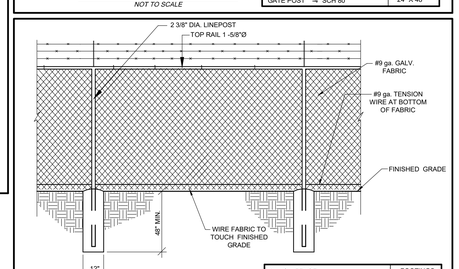
NOT TO SCALE



8' HIGH FENCE	FOOTINGS
LINE POST -2 3/8"	12" X 48"
CORNER POST -4" SCH 80	24" X 48"
GATE POST -4" SCH 80	24" X 48"

DOUBLE SWING GATE

NOT TO SCALE



8' HIGH FENCE	FOOTINGS
LINE POST -2 3/8"	12" X 48"
CORNER POST -4" SCH 80	24" X 48"

TYPICAL CHAIN LINK FENCING

NOT TO SCALE

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STATE OF NEW YORK · MARK R. COSTICH · No. 065971 · Licensed Professional Engineer

PROJECT ENGINEER	M.O.R.
DRAWN BY	C.J.M.
BOUNDARY	---
TOPO/BASE	---
DATE	11/01/2017
SCALE	AS NOTED

Costich Engineering
• Civil Engineering
• Land Surveying
• Landscape Architecture
217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY

TITLE OF DRAWING: DETAIL SHEET

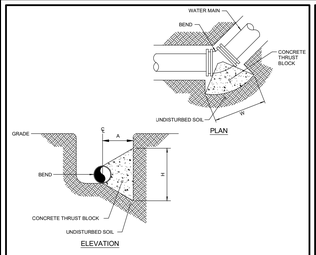
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5 PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK

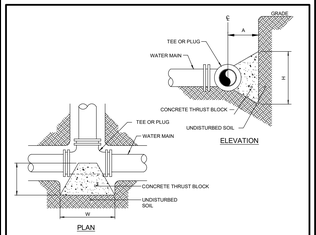
CLIENT: CIRCULAR enerG LLC, 400 ANDREWS STREET, SUITE 360, ROCHESTER, NEW YORK 14604

DWG # C3320

CA500

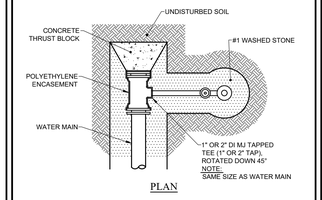
SHEET 13 OF 15

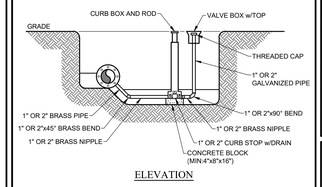




HORIZONTAL THRUST BLOCKS FOR TEES AND PLUGS

NOT TO SCALE





TAPPED TEE WITH 1" or 2" BLOW-OFF

DETAIL DRAWN & PROVIDED BY THE MONROE COUNTY WATER AUTHORITY
M.C.W.A FIGURE NO: DME-18 (REV: 7-8-99) - NOT TO SCALE

VERTICAL

BEND *	MINIMUM VOLUME OF CONCRETE	MINIMUM ALLOWABLE DIMENSIONS FOR VERTICAL THRUST BLOCKS (IN FEET)				
	DIMENSIONS	A	B	C	D	E
4" x 11-1/4°	1.00 CY	3.0	1.0	1.3	3.0	1.0
4" x 22-1/2°	1.50 CY	4.0	1.0	1.8	3.0	1.0
4" x 45°	2.50 CY	6.0	1.5	2.0	3.0	1.7
4" x 90°	4.00 CY	7.0	1.5	2.5	3.0	2.5
6" x 11-1/4°	1.00 CY	4.5	1.0	1.8	3.0	1.0
6" x 22-1/2°	1.50 CY	4.0	1.0	1.8	3.0	1.0
6" x 45°	2.50 CY	6.0	1.5	2.0	3.0	1.7
6" x 90°	4.00 CY	7.0	1.5	2.5	3.0	2.5
8" x 11-1/4°	1.00 CY	3.0	1.0	1.3	3.0	1.0
8" x 22-1/2°	1.50 CY	4.0	1.0	1.8	3.0	1.0
8" x 45°	2.50 CY	6.0	1.5	2.0	3.0	1.7
8" x 90°	4.00 CY	7.0	1.5	2.5	3.0	2.5
10" x 22-1/2°	1.50 CY	6.5	1.5	2.5	3.0	1.0
10" x 45°	2.50 CY	8.0	2.0	3.0	3.0	2.0
10" x 90°	4.00 CY	9.0	2.5	3.5	3.0	3.0

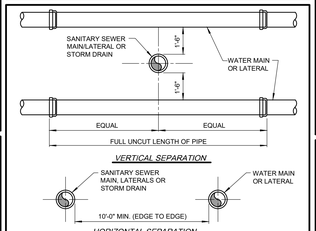
HORIZONTAL

MINIMUM HORIZONTAL THRUST BLOCK DIMENSIONS IN FEET, TO BE POURED AGAINST UNDISTURBED SOIL			
FITTING *	H	W	A
4" x 11-1/4° BEND	1.0	1.0	1.5
4" x 22-1/2° BEND	1.5	2.0	1.5
4" x 45° BEND	2.0	2.5	1.5
4" x 90° BEND	3.0	3.5	1.5
4" TEE OR PLUG	1.5	2.5	1.0
6" x 11-1/4° BEND	1.0	1.0	1.5
6" x 22-1/2° BEND	1.5	2.0	1.5
6" x 45° BEND	2.0	2.5	1.5
6" x 90° BEND	3.0	3.5	1.5
6" TEE OR PLUG	1.5	2.5	1.0
8" x 11-1/4° BEND	1.0	1.0	1.5
8" x 22-1/2° BEND	1.5	2.0	1.5
8" x 45° BEND	2.0	2.5	1.5
8" x 90° BEND	3.0	3.5	1.5
8" TEE OR PLUG	1.5	2.5	1.0
10" x 22-1/2° BEND	1.5	2.0	1.5
10" x 45° BEND	2.0	2.5	1.5
10" x 90° BEND	3.0	3.5	1.5
10" TEE OR PLUG	1.5	2.5	1.0

NOTE: WIDTH (W) OF BLOCK SHALL NOT EXCEED TWICE THE HEIGHT (H).

THRUST BLOCK CHARTS

NOT TO SCALE

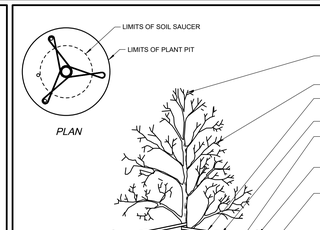


NOTES:

1. CROSSINGS (VERTICAL SEPARATION)
   A. WATER MAINS CROSSING SEWERS SHALL BE LAID TO PROVIDE A MINIMUM VERTICAL DISTANCE OF 26 INCHES BETWEEN THE OUTSIDE OF THE WATER MAIN AND THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHERE THE WATER MAIN IS EITHER ABOVE OR BELOW THE SEWER WITH PREFERENCE TO THE WATER MAIN LOCATED ABOVE THE SEWER.
   B. AT CROSSINGS, ONE FULL LENGTH OF WATER PIPE SHALL BE LOCATED SO BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE. SPECIAL STRUCTURAL SUPPORT FOR THE WATER AND SEWER PIPES MAY BE REQUIRED.
2. PARALLEL INSTALLATION (HORIZONTAL SEPARATION)
   A. WATER MAINS SHALL BE LAID AT LEAST 10 FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED GRAVITY SANITARY OR STORM SEWER, SEPTIC TANK, OR SUBSOIL TREATMENT SYSTEM. THE DISTANCE SHALL BE MEASURED EDGE TO EDGE.
   B. IN CASES WHERE IT IS NOT PRACTICAL TO MAINTAIN A 10-FOOT SEPARATION, THE REVIEWING AUTHORITY MAY ALLOW DEVIATION ON A CASE-BY-CASE BASIS, IF SUPPORTED BY DATA FROM THE DESIGN ENGINEER.

WATER / SEWER SEPARATION REQUIREMENT DETAIL

NOT TO SCALE

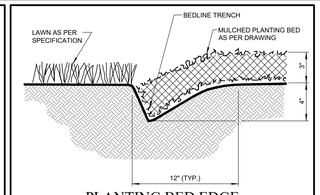


NOTES:

1. MAINTAIN A 3" MINIMUM RADIUS CLEAR OF MULCH AROUND THE TRUNK.
2. THE DISTANCE BETWEEN THE BOTTOM OF THE TRUNK FLARE AND THE FINISHED GRADE SHALL BE AS FOLLOWS:
   FOR SANDY OR LOAMY SOILS: 1"
   FOR CLAY OR POORLY DRAINED SOILS: 3"
   THE CONTRACTOR SHALL REVIEW THE APPROPRIATE PLANTING DEPTH WITH THE OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
3. WHEN TAGGING TREES AT THE NURSERY, MARK THE NORTH SIDE OF THE TREE IN THE FIELD AND WHEN INSTALLING, ROTATE TREE TO FACE NORTH WHENEVER POSSIBLE

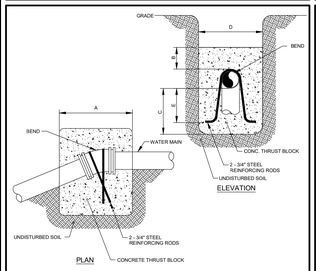
DECIDUOUS TREE PLANTING LESS THAN 4" CAL. DETAIL

NOT TO SCALE



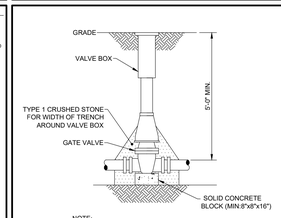
PLANTING BED EDGE TREATMENT DETAIL

NOT TO SCALE



VERTICAL THRUST BLOCKS

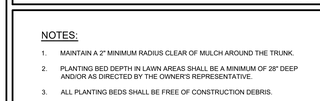
NOT TO SCALE



NOTE:
1. VALVE BOX SHALL BE CENTERED ON VALVE & SET ON COMPACTED BACKFILL.
2. VALVE SHALL NOT SUPPORT VALVE BOX.
3. ALL BODY AND BONNET BOLTS SHALL BE STAINLESS STEEL.
4. ALL VALVES SHALL BE OPEN LEFT EXCEPT VALVES 12" AND SMALLER INSTALLED IN THE TOWN OF WEBSTER (WHICH SHALL BE OPEN RIGHT).

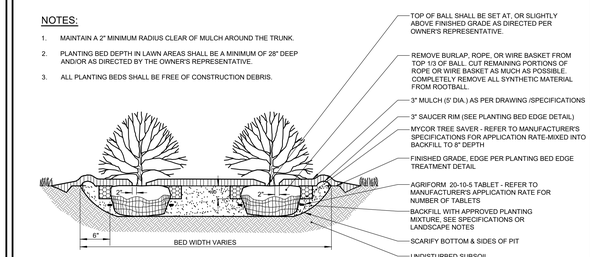
WATER VALVE

NOT TO SCALE



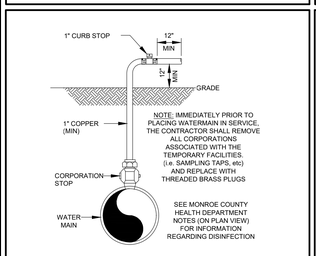
NOTES:

1. MAINTAIN A 2" MINIMUM RADIUS CLEAR OF MULCH AROUND THE TRUNK.
2. PLANTING BED DEPTH IN LAWN AREAS SHALL BE A MINIMUM OF 28" DEEP AND/OR AS DIRECTED BY THE OWNER'S REPRESENTATIVE.
3. ALL PLANTING BEDS SHALL BE FREE OF CONSTRUCTION DEBRIS.



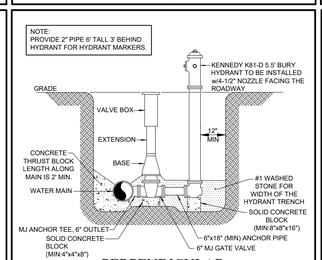
SHRUB PLANTING DETAIL

NOT TO SCALE



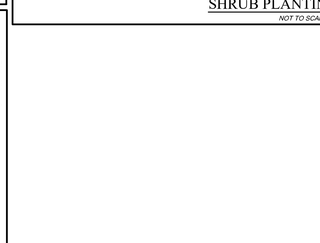
DISINFECTION BLOW-OFF SAMPLING TAP

NOT TO SCALE



PERPENDICULAR HYDRANT ASSEMBLY

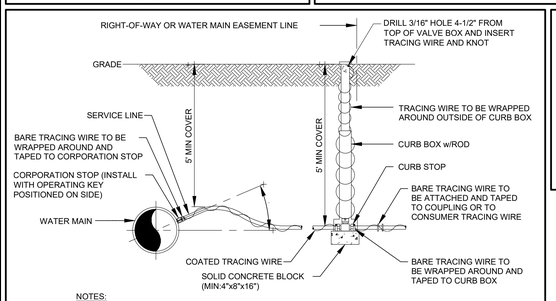
NOT TO SCALE



NOTE: BEDDING AND BACKFILL SHALL BE PER MCWA SPECIVICATIONS.

WATERMAIN TRENCH

NOT TO SCALE

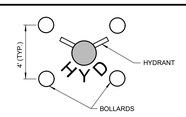


NOTES:

1. COPPER SERVICE TO BE USED UNLESS OTHERWISE APPROVED BY THE ENGINEER.
2. TRACING WIRE TO BE USED WITH POLYETHYLENE SERVICE ONLY.

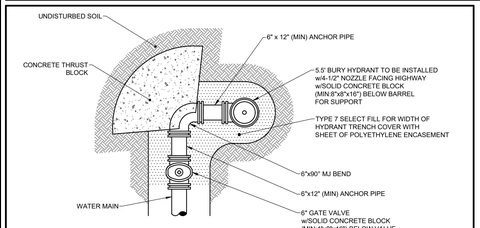
SERVICE INSTALLATION

NOT TO SCALE



HYDRANT BOLLARD PROTECTION DETAIL

NOT TO SCALE



DEAD END PERPENDICULAR HYDRANT ASSEMBLY

NOT TO SCALE

NO.	DATE	REVISION	BY	CHKD.	APV'LS.

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STATE OF NEW YORK · MARK R. COSTICH · 065937 · Licensed Professional Engineer

PROJECT ENGINEER	M.O.R.
DRAWN BY	C.J.M.
BOUNDARY	---
TOPO/BASE	---
DATE	11/01/2017
SCALE	AS NOTED

Costich Engineering
• Civil Engineering
• Land Surveying
• Landscape Architecture
217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

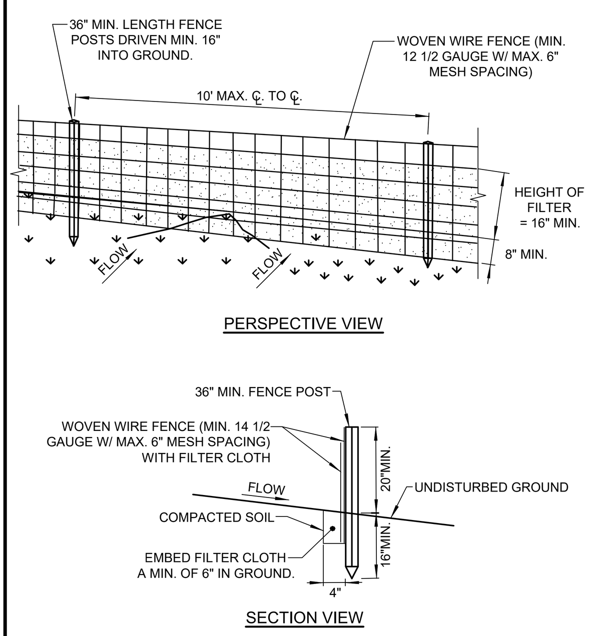
TITLE OF PROJECT: CIRCULAR enerG FACILITY

TITLE OF DRAWING: DETAIL SHEET

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS,
COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG # C3320
CA501
SHEET 14 OF 15

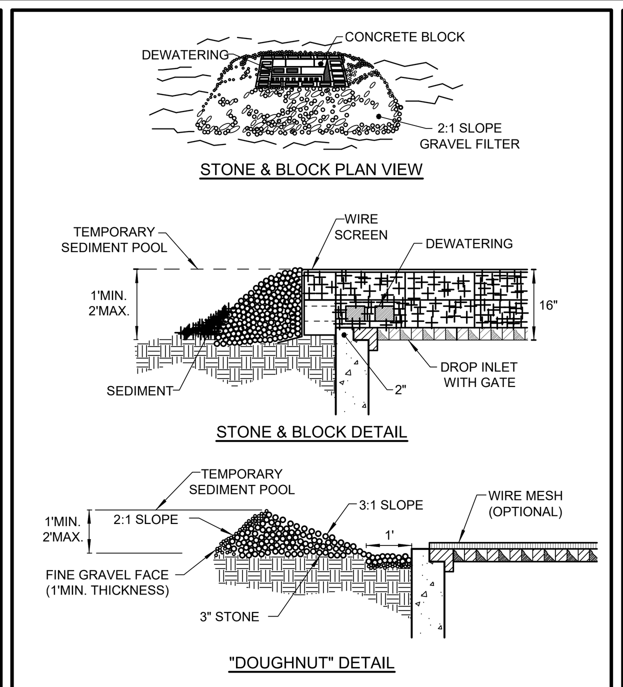


CONSTRUCTION SPECIFICATIONS

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL EITHER "T" OR "U" TYPE OR HARDWOOD.
2. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE, 12 1/2 GAUGE, 6" MAXIMUM MESH OPENING.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 100X, STABILINKA T140N, OR APPROVED EQUIVALENT.
4. PREFABRICATED UNITS SHALL BE GEOFAB, ENVIROFENCE, OR APPROVED EQUIVALENT.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE OR 50% OF THE HEIGHT OF THE SILT FENCE IS COVERED.

SILT FENCE DETAIL

NOT TO SCALE



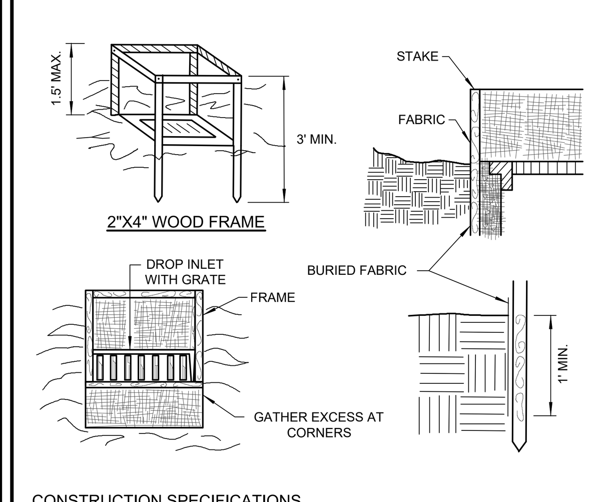
CONSTRUCTION SPECIFICATIONS

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MINIMUM BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2-3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 SLOPE OR FLATTER.
4. FOR STONE STRUCTURES ONLY, A 1 FOOT THICK LAYER OF THE FILTER STONE WILL BE PLACED AGAINST THE 3 INCH STONE AS SHOWN ON THE DRAWINGS.

MAXIMUM DRAINAGE AREA 1 ACRE

STONE AND BLOCK DROP INLET PROTECTION DETAIL

NOT TO SCALE



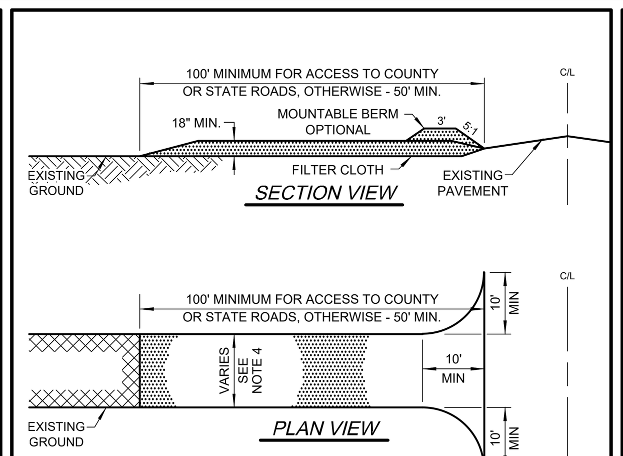
CONSTRUCTION SPECIFICATIONS

1. FILTER FABRIC SHALL HAVE AN EOS OF 40-85. BURLAP MAY BE USED FOR SHORT TERM APPLICATIONS.
2. CUT FABRIC FROM A CONTINUOUS ROLL TO ELIMINATE JOINTS. IF JOINTS ARE NEEDED THEY WILL BE OVERLAPPED TO THE NEXT STAKE.
3. STAKE MATERIALS WILL BE STANDARD 2" x 4" WOOD OR EQUIVALENT. METAL WITH A MINIMUM LENGTH OF 3 FEET.
4. SPACE STAKES EVENLY AROUND INLET 3 FEET APART AND DRIVE A MINIMUM 18 INCHES DEEP. SPANS GREATER THAN 3 FEET MAY BE BRIDGED WITH THE USE OF WIRE MESH BEHIND THE FILTER FABRIC FOR SUPPORT.
5. FABRIC SHALL BE EMBEDDED 1 FOOT MINIMUM BELOW GROUND AND BACKFILLED. IT SHALL BE SECURELY FASTENED TO THE STAKES AND FRAME.
6. A 2" x 4" WOOD FRAME SHALL BE COMPLETED AROUND THE CREST OF THE FABRIC FOR OVER FLOW STABILITY.
7. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE OR 50% OF THE HEIGHT OF THE SILT FENCE IS COVERED.

MAXIMUN DRAINAGE AREA 1 ACRE

FILTER FABRIC DROP INLET PROTECTION DETAIL

NOT TO SCALE

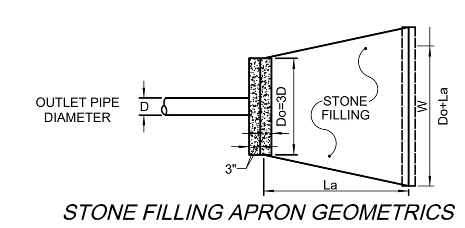


CONSTRUCTION SPECIFICATIONS AND NOTES

1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - AS REQUIRED, 100 FT. MIN. FOR ACCESS TO COUNTY OR STATE ROADS, OTHERWISE, 50 FT. (EXCEPT ON SINGLE RESIDENCE LOT WHERE A 30 FT. MINIMUM LENGTH SHALL APPLY.
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TEN (10) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. (20) FT. MINIMUM FOR STATE ROAD ACCESS.
5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
6. SURFACE WATER - ALL SURFACE WATER FLOWING AND/OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF THE PIPING IS IMPRACTICAL, A MOUNTING BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS MAY DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP ANY SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION & NEEDED MAINTENANCE SHALL BE PROVIDED

STABILIZED CONSTRUCTION ENTRANCE DETAIL

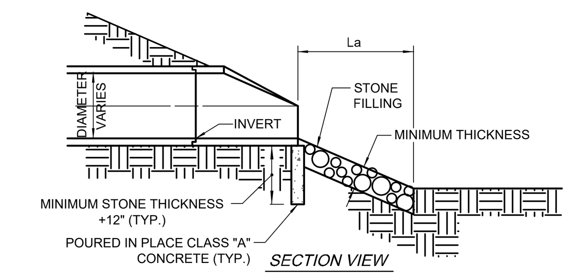
NOT TO SCALE



STONE FILLING APRON GEOMETRICS

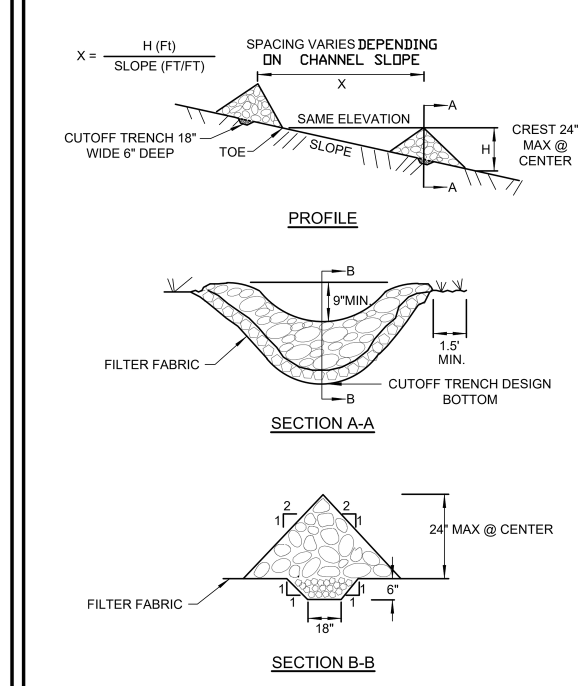
END SECTION STONE FILLING APRON SCHEDULE

END SECTION DESIGNATION	D (INCHES)	La (FT.)	Do (FT.)	W (FT.)	MINIMUM THICKNESS (INCHES)	NYSDOT ITEM NO.
D, DA, DB, DC, DE, DD, DG, DH, DL, DL-1	12	6.0	3.0	9.0	12	620.03 LIGHT
DF, DF-1, DI, DI-1	15	8.0	3.75	11.75	15	620.03 LIGHT
DK, DL	18	9.0	4.5	13.5	15	620.03 LIGHT
DJ, DJ-1	24	16.0	7.5	23.5	15	620.03 LIGHT



END SECTION STABILIZATION DETAIL

NOT TO SCALE

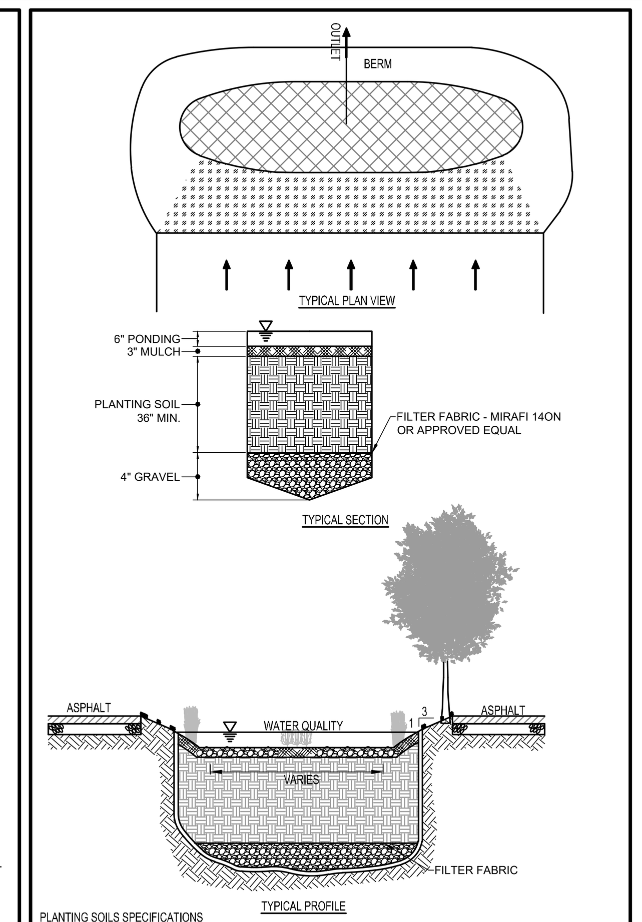


CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE. MAXIMUM DRAINAGE AREA 2 ACRES.

CHECK DAM DETAIL

NOT TO SCALE



PLANTING SOILS SPECIFICATIONS
THE PLANTING SOIL SHOULD BE A SANDY LOAM, LOAMY SAND, LOAM (USDA), OR A LOAM/SAND MIX (SHOULD CONTAIN 50% SAND AND 50% TOPSOIL WITH AN ORGANIC CONTENT OF 5%, BY VOLUME). A PERMEABILITY OF AT LEAST 1.0 FEET PER DAY (0.5"/HR) IS REQUIRED. THE SOIL SHOULD BE FREE OF STONES, STUMPS, ROOTS, OR OTHER WOODY MATERIAL OVER 1" IN DIAMETER, BRUSH OR SEED FROM NOXIOUS WEEDS. PLACEMENT OF THE PLANTING SOIL SHOULD BE IN LIFTS OF 6" TO 8", LOOSELY COMPACTED.

MULCH LAYER SPECIFICATIONS
THE MULCH LAYER SHOULD BE STANDARD LANDSCAPE STYLE, SINGLE OR DOUBLE SHREDDED HARDWOOD MULCH OR CHIPS. THE MULCH LAYER SHOULD BE WELL AGED (STOCKPILED OR STORED FOR AT LEAST 12 MONTHS), UNIFORM IN COLOR, AND FREE OF OTHER MATERIALS, SUCH AS WEED SEEDS, SOIL, ROOTS, ETC. THE MULCH SHOULD BE APPLIED MAXIMUM DEPTH OF THREE INCHES. GRASS CLIPPINGS SHOULD NOT BE USED FOR MULCH MATERIALS.

NOTE: BIORETENTION PLANTING SOIL AND MULCH SPECIFICATIONS ARE PER APPENDIX H OF NYSSWDM

BIO RETENTION AREA 'A' DOES NOT HAVE A DISCHARGE PIPE

NOTE:
SEE SHEETS CA120 AND CA130 FOR INVERTS AND ELEVATIONS

BIO RETENTION DETAIL

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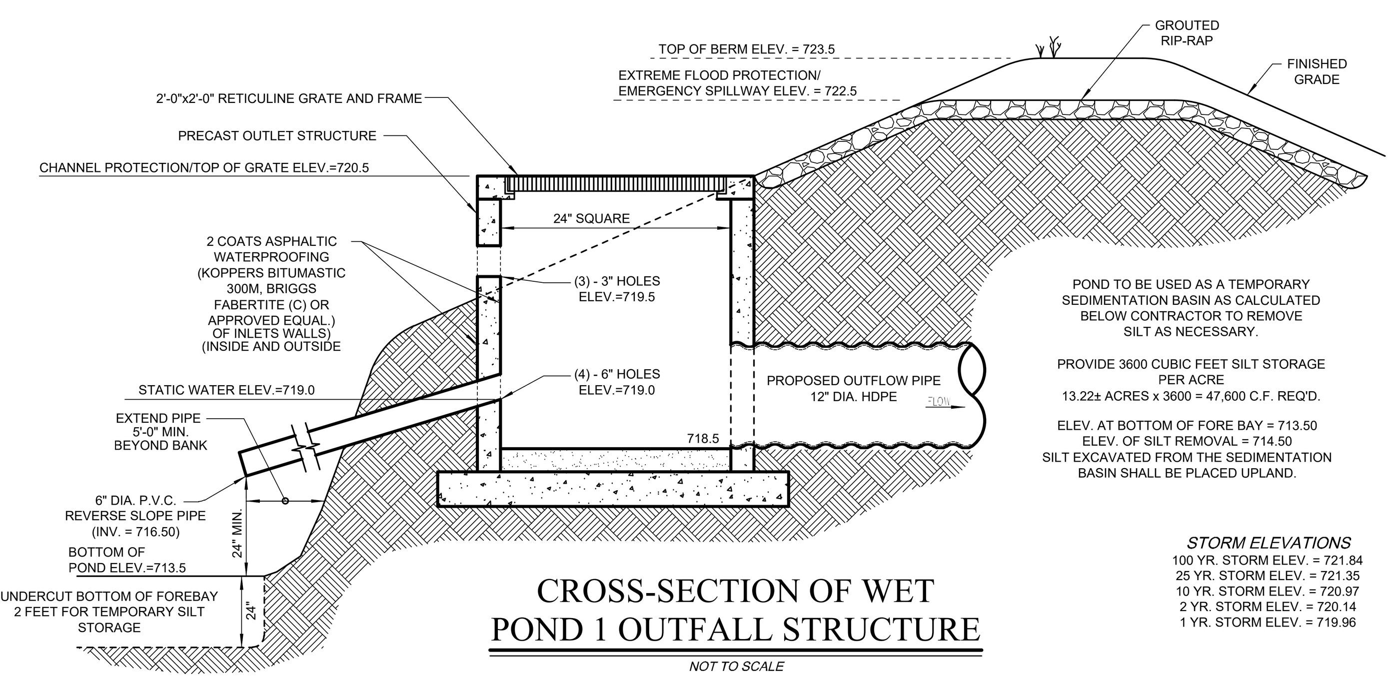

CROSS-SECTION OF WET POND 1 OUTFALL STRUCTURE

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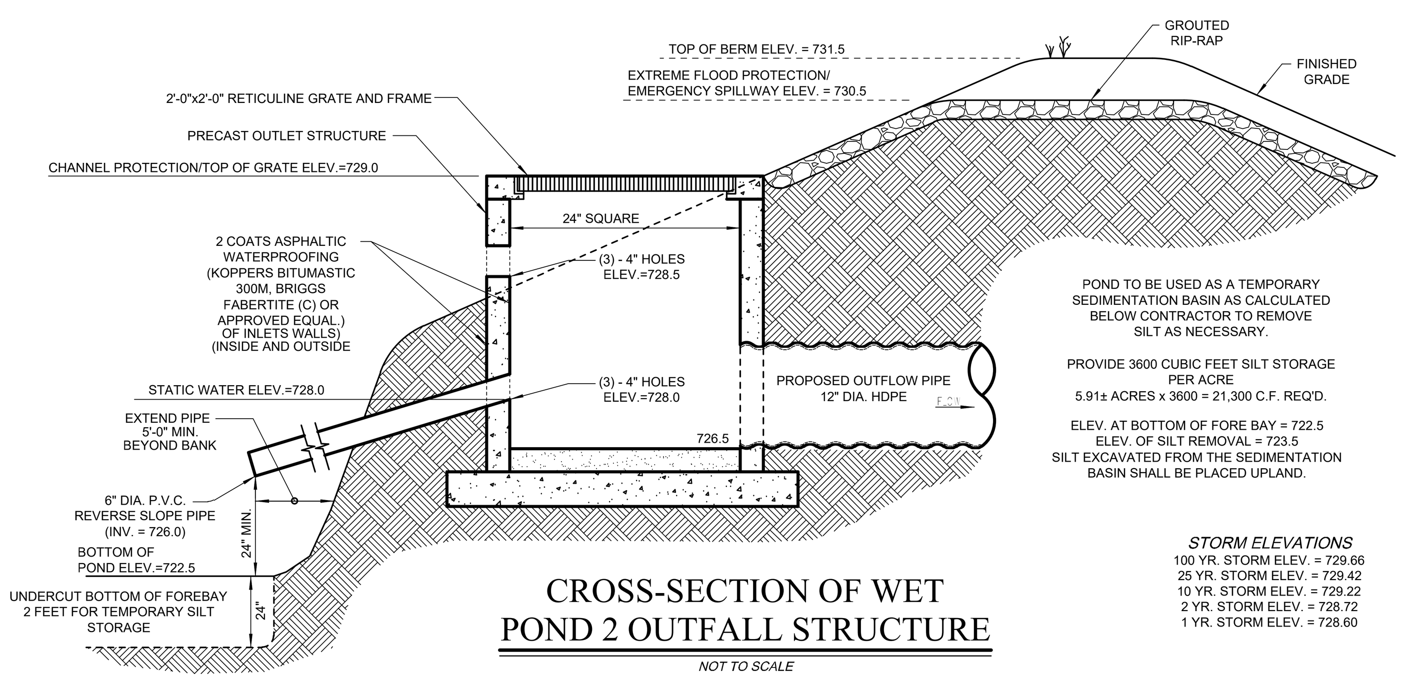

CROSS-SECTION OF WET POND 2 OUTFALL STRUCTURE

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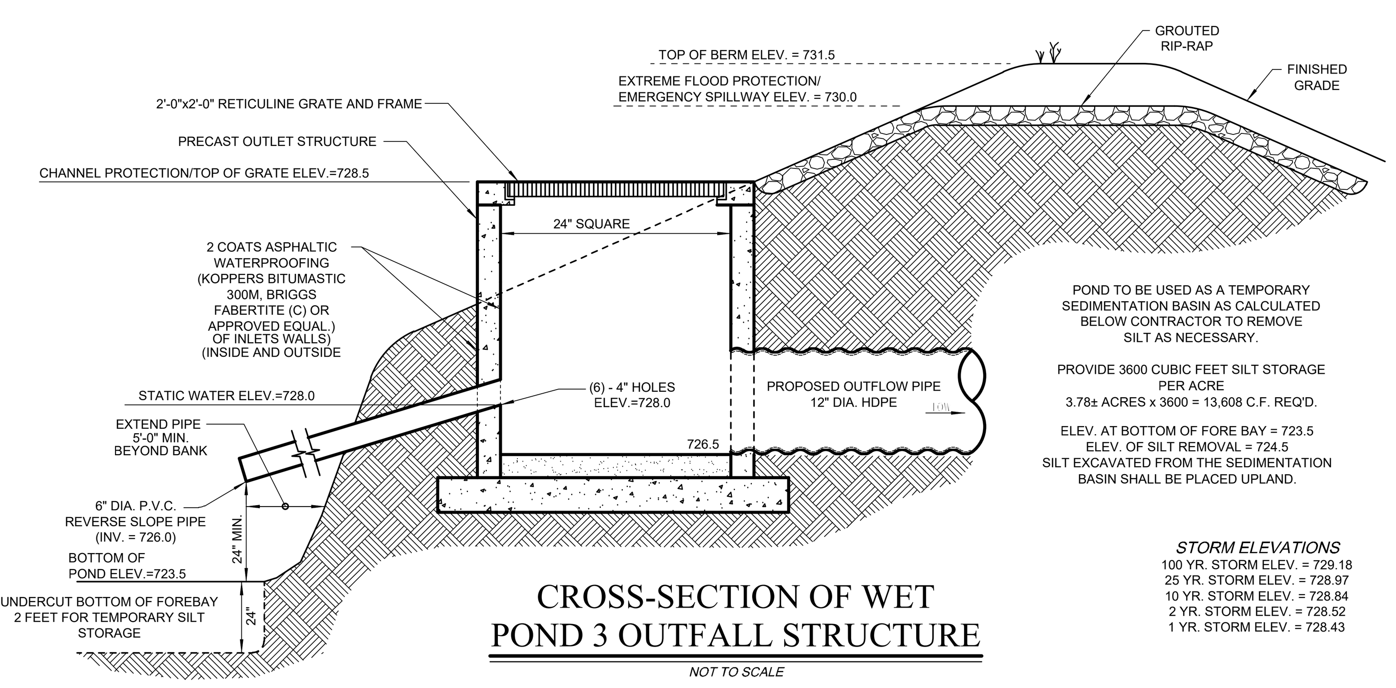

CROSS-SECTION OF WET POND 3 OUTFALL STRUCTURE

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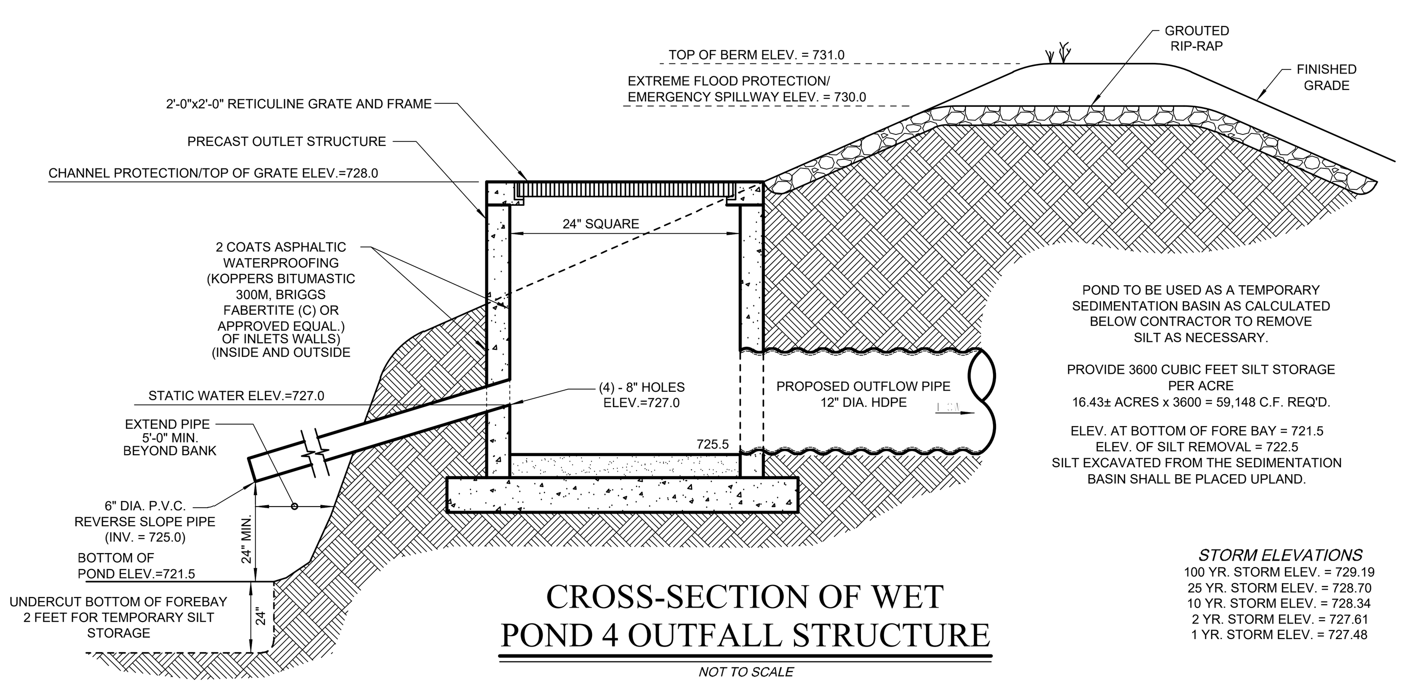

CROSS-SECTION OF WET POND 4 OUTFALL STRUCTURE

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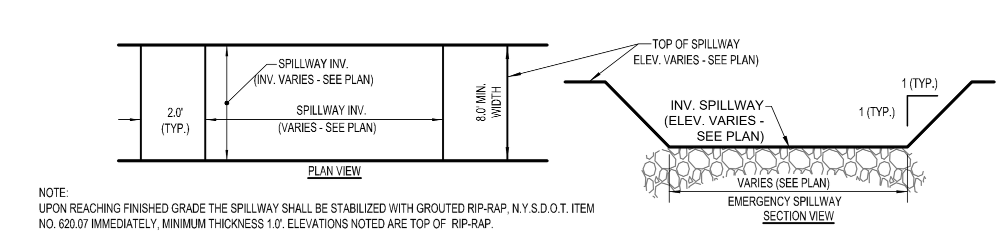

NOTE:
UPON REACHING FINISHED GRADE THE SPILLWAY SHALL BE STABILIZED WITH GROUTED RIP-RAP, N.Y.S.D.O.T. ITEM NO. 620.07 IMMEDIATELY, MINIMUM THICKNESS 1.0'. ELEVATIONS NOTED ARE TOP OF RIP-RAP.

EMERGENCY SPILLWAY (TYPICAL OF 7)

NOT TO SCALE

NO.	DATE	REVISION	BY	CHKD.	APVLS.

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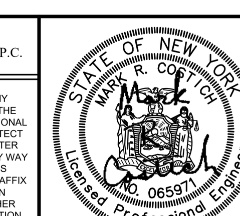


PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPO/BASE: ---
DATE: 11/01/2017
SCALE: AS NOTED

Costich Engineering
• Civil Engineering
• Land Surveying
• Landscape Architecture
217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY
TITLE OF DRAWING: DETAIL SHEET
LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5 PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK
CLIENT: CIRCULAR enerG LLC, 400 ANDREWS STREET, SUITE 360, ROCHESTER, NEW YORK 14604
DWG. # C3320
CA502
SHEET 15 OF 15

A COMPARABLE FACILITY

MAIN PROCESSING BUILDING

The main processing building is the heart of the facility and includes the following major components:

- Enclosed waste unloading platform and feeding hoppers:
    - The waste unloading platform and entrance ramp is sized to allow deliveries by transfer-trailers; that is, 48 foot walking floor trailers with a capacity of 20-30 tons depending on truck permit limitations
- 44,000 yd^3 (33,640 m^3) waste bunker;
- Leachate collection and transfer pit;
- Four 660 tpd (600 mtpd) moving grate furnaces;
- Four waste heat boilers;
- Air pollution control system:
    - Selective Non-catalytic Reduction system

    - Lime storage and lime slurry preparation
    - Activated carbon storage and injection
    - Rotary atomizer and semi-dry reactor
    - Bag filter
    - ID fan and exhaust
    - Fly ash conveyor and storage
- 260ft (80m) continuous emissions monitoring stack;
- Bottom and fly ash processing facilities:
    - Screen [1.25 in (32mm)] with overhead magnets
    - Screen [0.4 in (10mm)]
    - Magnetic drum
    - Eddy current separator
    - Impact Crusher
    - Truck loading hopper.
- Air cooled steam generators totaling 50MW;
- Electrical switching and motor control systems;
- Two 115 kV transformers; and
- Laboratories, control rooms and offices.

Cooling Towers and Water Storage

Steam that is not lost to evaporation is cooled and collected as condensate at the cooling tower, to be recirculated as process water. The collected process water is stored in a divided 475,000 gallon (1,800 m^3) concrete tank located at the base of the cooling towers, with 171,000 gallon (648 m^3) reserved for fire protection. In the adjacent water pump house, a pumping system circulates process water and pressurizes the fire protection system.

WATER SUPPLY AND TREATMENT

Fresh water requirements include high purity boiler feed water, makeup water for boilers and cooling, fire protection and potable water for domestic use. According to information supplied by engineers of an operating WTE facility and the design criteria for the NYWTE facility, raw water demand will be 445,000 gallons per day (gpd) (1,685m^3/d) which will be withdrawn from Seneca Lake, approximately 3.75 miles (6.0km) west of the site. Required improvements include relining an abandoned 8-inch (20 cm) pipe, and installing a new pump in the existing wet well.

Raw water will be tested during the final design stage to identify the specific treatment processes and equipment. Treatment is anticipated to include membrane filters and desalination. Once treated, the water will be stored in underground tanks, and pressurized at the water pump house for use as process water and fire suppression.

Domestic water, for use in the facility lavatories, laboratories and kitchens would be obtained from the Village of Waterloo municipal water supply. An existing 8-inch (20 cm) water main adjacent to the facility is capable of supplying the estimated 5,500 gpd (21 m^3/d) domestic water supply.

ADMINISTRATION BUILDING

The administration building will house office space, training rooms, restrooms meeting rooms and a lounge area. This building will be located near the gated entrance and main parking area.

WEIGH STATION/SECURITY BUILDING

The weigh station will include three truck scales and a building enclosure with offices for the weighmaster and security personnel.

AUXILIARY FUEL COMPRESSOR STATION

Auxiliary fuel is required to start the furnaces and to supplement the combustion process when needed to maintain temperature in the boilers. Natural gas will be used as auxiliary fuel. The natural gas supplier for the area is NYSEG. A compressor station will be needed required. The specifications of this station will need to be coordinated with the natural gas supplier.

MISCELLANEOUS OPERATIONS

Other appurtenant facilities on site will include a residential drop-off area to accept local waste from Town of Romulus residents and small commercial loads, security fencing and a 10 KV generator for start-up and as a back-up source of power.

RAILHAUL FACILITY

The CFP illustrates the intermodal rail facility capable of delivering up to 2,000 tpd (1,800 mtpd) of waste to the site via the Finger Lakes Railway (FGLK) shortline. To handle daily rail deliveries, new track and improvements to existing track will be required. Additional infrastructure would include the construction of the loading/unloading platform, access roadways and drainage features. Track improvements include a new loading/unloading track, a new storage track and a runaround track that connects to the existing track at the site.

The intermodal railhaul facility is designed to the following parameters:

- Waste is hauled to the site in 20 foot (6m) long top loading, rear dumping sealed containers, holding 20 tons of waste per container;

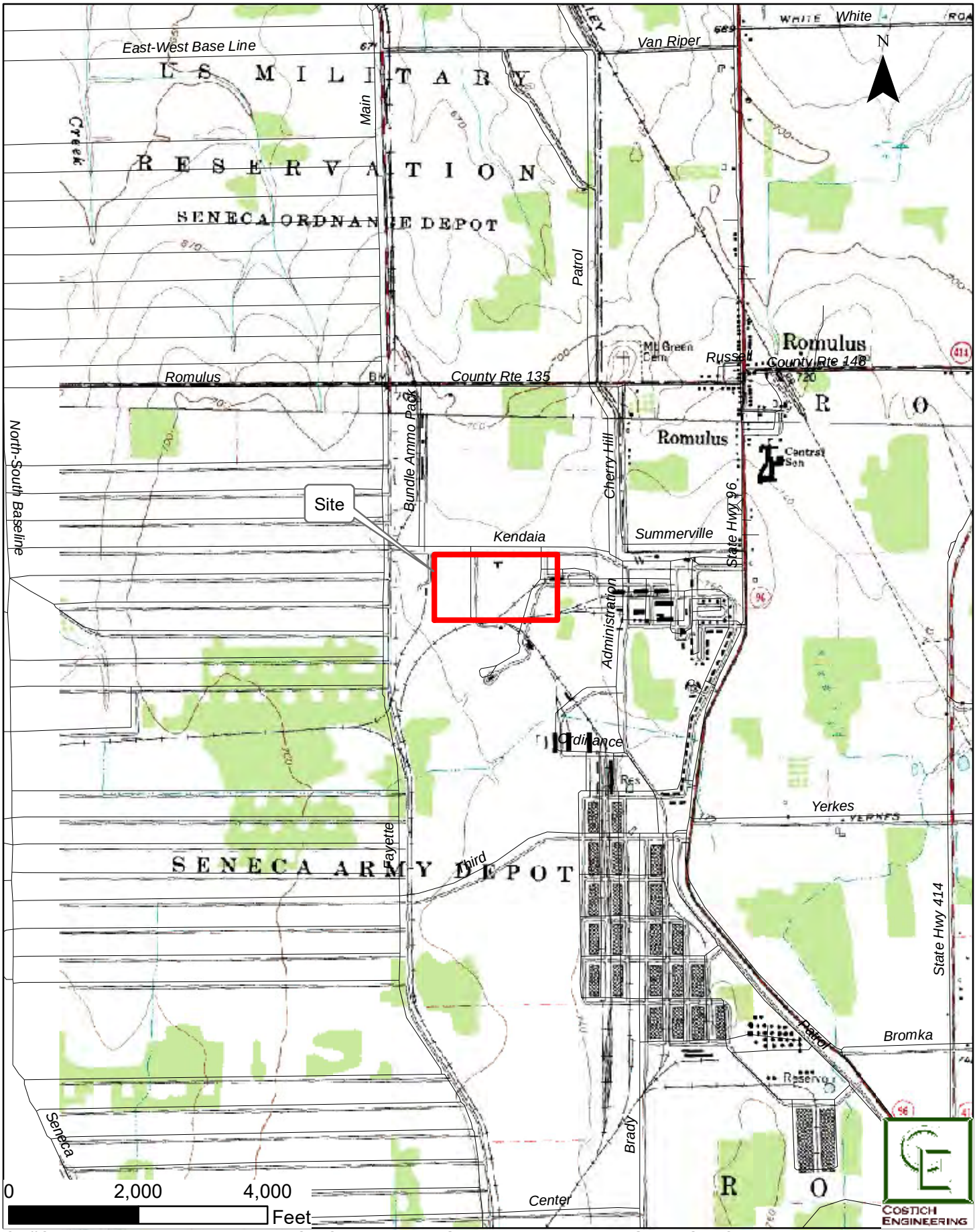
- A 36 turn/year, or 10-day cycle:
    - Cycle is the time to load from the customer transfer station to the WTE facility and return
        - Account for the railroad's schedule, loading/unloading times, holidays
    - A 10-day cycle requires 10 sets of rail cars and containers to receive a shipment of waste six days per week
- A truck dumping cycle is 20 minutes; and
- The reach stacker can load/unload 15 trucks per hour.

Based on the above parameters, the railhaul facility will require the following equipment:

- 1,200-top loading rear dumping sealed intermodal containers;
- 300-85 foot (25 m) or 89 foot (27 m) railcars (container flats);
- Five intermodal container hooklift trucks;
- Hercules railcar mover; and
- Hyster reach stacker.

Railhaul operations include deliveries of 30 flat railcars carrying 120 sealed containers Monday through Saturday each week. The FGLK locomotive will stage the railcars with loaded containers on the unloading track, and then use the runaround track to maneuver to the storage track to recover the railcars with the empty containers before leaving the site.

The reach stacker will unload each container from the railcar and place it on the truck for transfer to the enclosed waste unloading platform. Once the container is emptied, the truck will return to the loading/unloading pad where the reach stacker will place the empty container back on the railcar. Once all the containers have been emptied, the railcar mover will transfer the railcars from the unloading track to the storage track.



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CIRCULAR ENERG RENEWABLE ENERGY PROJECT
TOWN OF ROMULUS, SENECA COUNTY
USGS MAP

PORTIONS OF ROMULUS & OVID QUADS

DISCLAIMER: This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

WETLAND DELINEATION REPORT
Green Energy Facility

ROMULUS, NEW YORK

Prepared on behalf of:

Circular EnerG, LLC
400 Andrews Street, Suite 360
Rochester, New York 14604

Prepared by:

DAIGLER ENGINEERING, P.C.
CIVIL & GEO-ENVIRONMENTAL ENGINEERING
2620 Grand Island Blvd.
Grand Island, New York 14072-2131

August 2017

WETLAND DELINEATION REPORT
Green Energy Facility

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2620 Grand Island Blvd.
Grand Island, New York 14072-2131

August 2017

Wetland Delineation Report
Green Energy Facility

Circular EnerG, LLC

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Attachment 2 Representative Photos

Attachment 3 References

1 INTRODUCTION

Circular EnerG, LLC (Circular) is evaluating the feasibility of permitting a green energy facility to be located at the former Seneca Army Depot, in the Town of Romulus, Seneca County, New York. Figure 1-1 shows the proposed project location on an aerial map. The proposed project location is near the eastern central portion of the former Seneca Army Depot, south of E. Kendaia Road. Figure 1-2 displays the proposed project location on a USGS quadrangle map, and Figure 1-3 depicts an aerial map of the proposed project area.

Circular has retained Daigler Engineering, PC (DE) to conduct a wetland delineation at the site. The wetland delineation was conducted to determine the extent of any United States Army Corps of Engineers (USACE) or New York State Department of Environmental Conservation (NYSDEC) jurisdictional wetlands in accordance with Section 404 of the Clean Water Act and Article 15 and Article 24 of the New York State Environmental Conservation Law respectively over the proposed project area.

DE performed the wetland delineation on July 10-11, 19-20, and 26, 2017. The delineation was conducted in accordance with the January 1987 *Corps of Engineers Wetland Delineation Manual*, and the January 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2). The purpose of this report is to describe the site conditions, the wetland delineation procedure, the results, and provide recommendations.

N

SOURCE: GOOGLE EARTH
ACCESSED: AUGUST 8, 2017

Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 1-1 REGIONAL MAP.dwg 8/3/2017 3:13 PM

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CIVIL & GEO-ENVIRONMENTAL ENGINEERING
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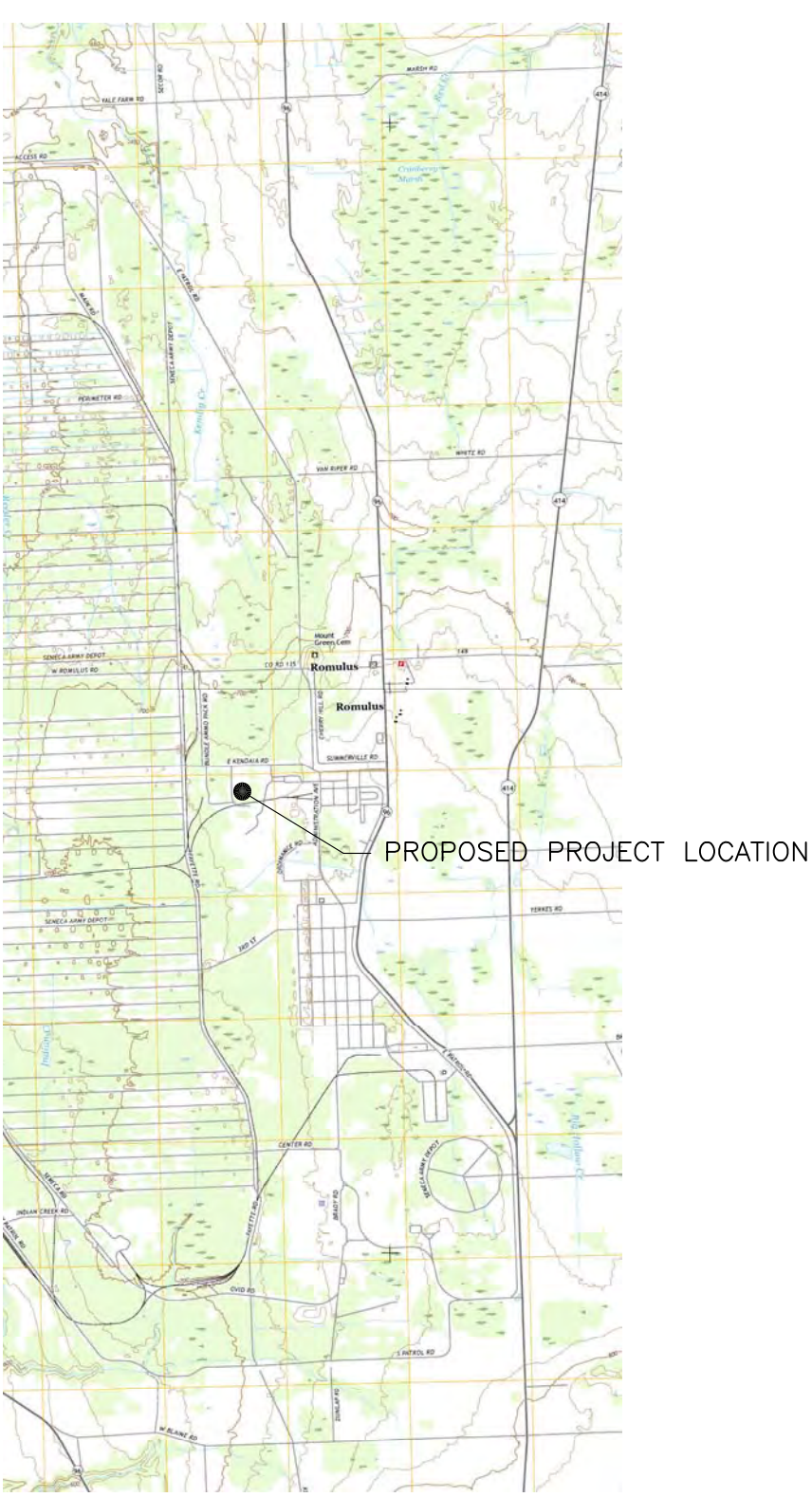
(716) 773-6872 (716) 773-6873 FAX

REGIONAL MAP WETLAND DELINEATION REPORT			
CIRCULAR EnerG, LLC			FIGURE 1-1
TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	
August 2017	SCALE: NOT TO SCALE	REVISION # 0	



SOURCE: USGS 7.5 MINUTE TOPOGRAPHICAL MAP QUAD OVID & ROMULUS
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Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 1-2 VICINITY MAP.dwg 8/11/2017 12:00 PM

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VICINITY MAP WETLAND DELINEATION REPORT			
CIRCULAR EnerG LLC			FIGURE 1-2
TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	
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SOURCE: GOOGLE EARTH
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PROJECT AREA MAP

WETLAND DELINEATION REPORT

CIRCULAR EnerG LLC			FIGURE 1-3
TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	
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Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 1-3 PROJECT AREA ARIAL.dwg 8/3/2017 3:41 PM

2 SITE DESCRIPTION

The proposed project area consists of an approximate 52-acre area within the east central portion of the former Seneca Army Depot, south of E. Kendaia Road as shown on Figure 1-3. The site is within the Seneca Watershed (USGS Unit 04140201) which includes Keuka Lake, Seneca Lake, Cayuga Lake, Owasco Lake, Skaneateles Lake, and Otisco Lake. The Seneca Watershed flows downstream to the Oswego Watershed which flows to Lake Ontario at Oswego, New York. The topography of the site is generally flat with slopes between 0 and 3 percent.

The proposed project area has historically been used to support the Seneca Army Depot operations. The area still contains a number of former support facilities, including buildings, roads, fencing, utilities, and railroad berms. Three buildings are located along the northern portion of the proposed project area along E. Kendaia Road, one building is located in the central portion. Asphalt roads travel from north to south from E. Kendaia Road and then east to west across the project area. Railroad tracks enter the project area from the west and then branch into three spurs which continue to the east. The two northern railroad berms are abandoned. The southern portion of the project area consists of a cleared and filled area which formerly contained an incinerator.

There are no major drainage features within the proposed project area. Drainage ditches are located along the roads and the active railroad tracks. The upland vegetation consists of successional old field, successional shrubland and pine plantation. The wetland vegetation communities consist of shallow emergent marsh, shrub swamp and hardwood swamp.

3 ENVIRONMENTAL RESOURCE ANALYSIS

In preparation for the wetland delineation several sources of information were analyzed to identify potential wetland and waterbody features within the proposed project area and become more familiar with the site conditions. The sources analyzed include:

- United States Department of Agriculture (USDA) National Resources Conservation Service Soil Survey;
- NYSDEC Environmental Mapper; and,
- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Mapper.

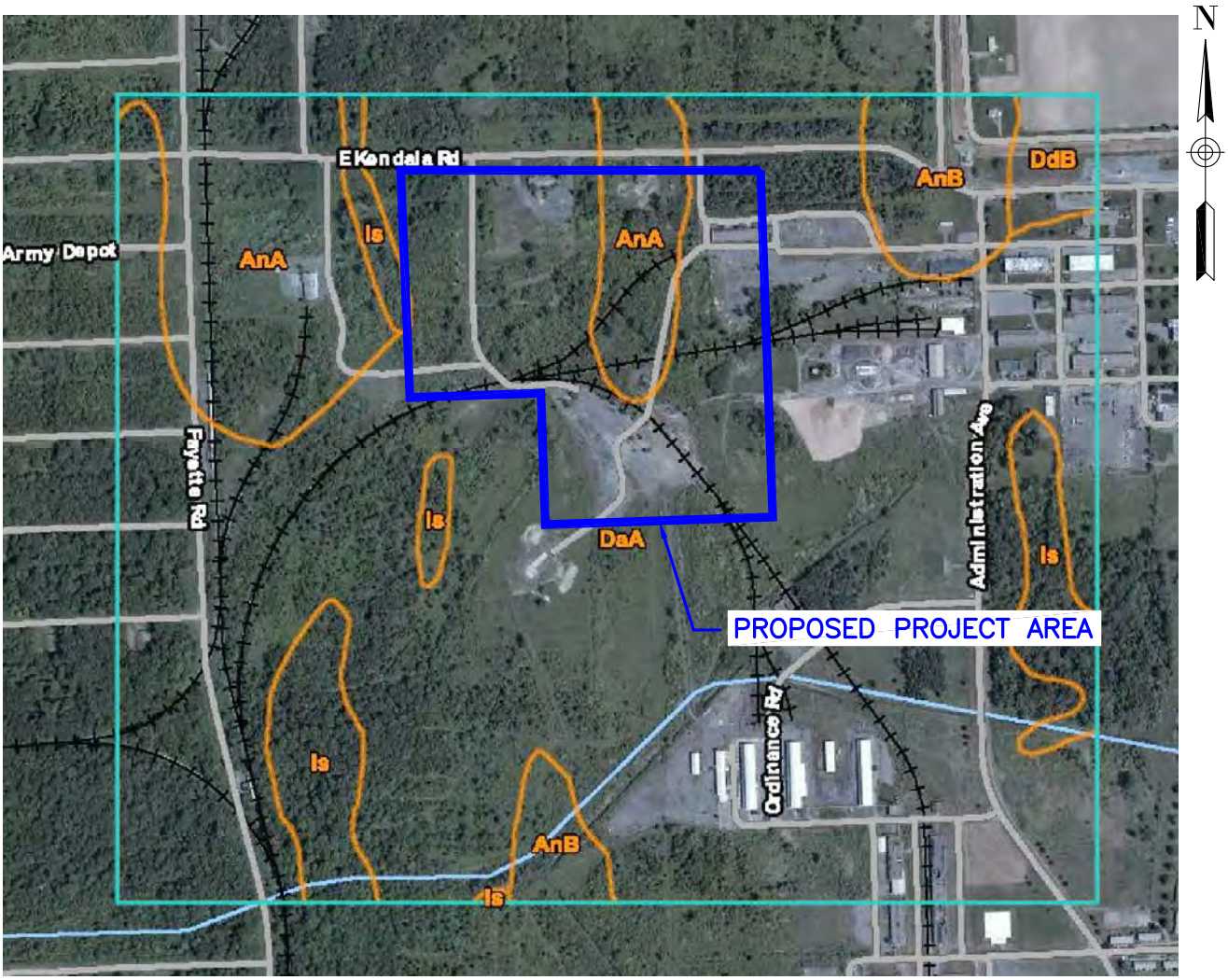
3.1 SOIL SURVEY

Figure 3-1 shows the USDA National Resources Conservation Service soil survey results for the proposed project area. As Figure 3-1 shows, there are three mapped soil types within the project area which are listed in Table 3-1:

Table 3-1 Soil Survey Results

Map Unit Symbol	Map Unit Name	Hydric Soil Rating
AnA	Angola silt loam, 0 to 3 percent slopes	5
DaA	Darien silt loam, 0 to 3 percent slopes	7
Is	Ilion silty clay loam	95

The soil map was analyzed for the presence of hydric soil inclusions, which are defined by the National Technical Committee for Hydric Soils as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Angola silt loam consists of loamy till derived mainly from shale and siltstone, and is found on benches, ridges and till plains. Angola



Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

LEGEND:

AnA	ANGOLA SILT LOAM
DaA	DARIEN SILT LOAM
Is	ILION SILTY CLAY LOAM

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SOIL SURVEY MAP WETLAND DELINEATION REPORT			
CIRCULAR EnerG LLC			FIGURE 3-1
TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	
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Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 3-1 SOIL SURVEY MAP.dwg 8/10/2017 10:43 AM

silt loam is classified as somewhat poorly drained, and is in hydrologic soil group D. Five percent of the Angola silt loam map units are rated hydric. Darien silt loam consists of loamy till derived predominantly from calcareous gray shale, and is found on hills, till plains, and drumlinoid ridges. Darien silt loam covers most of the proposed project area and is classified as somewhat poorly drained, and is in hydrologic soil group C/D. Seven percent of the Darien silt loam map units were rated as hydric. Ilion silty clay loam consists of loamy till derived from calcareous dark shale and is found within depressions. The natural drainage class is poorly drained, and the hydrologic soil group is C/D. Ilion silty clay loam has a much higher hydric soil rating than the other mapped soils, 95 percent of the map units are rated hydric.

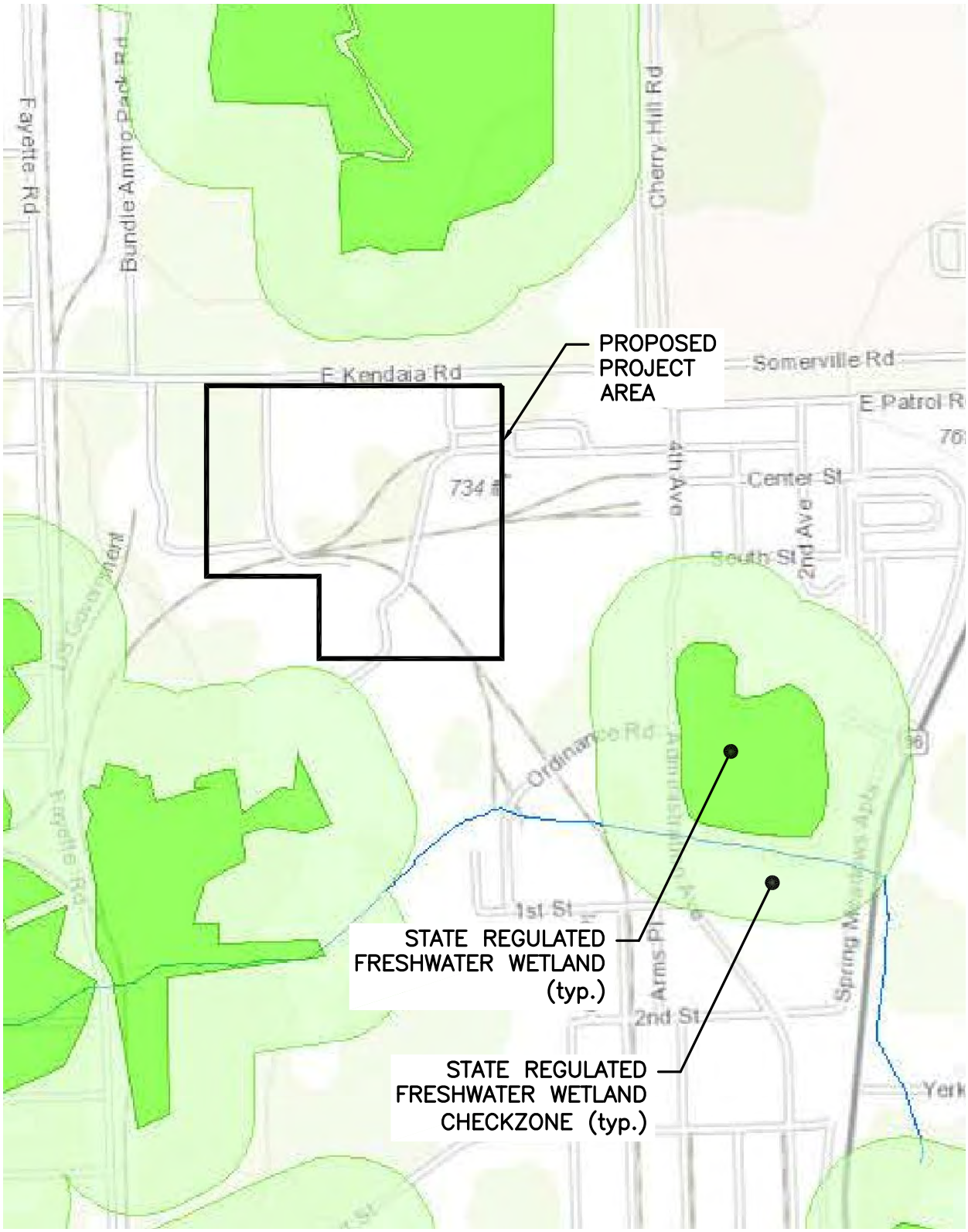
3.2 Environmental Resource Mapper

The results of the NYSDEC Environmental Resource Mapper review are shown on Figure 3-2. As Figure 3-2 shows, state regulated wetlands and their associated check zone are located to the north, southwest, and southeast of the proposed project area. No NYSDEC rivers or streams are shown within the project area. The entire area is also classified as an area of rare plants and animals which is not shown on Figure 3-2.

3.3 National Wetlands Inventory Mapper

The results of the USFWS NWI mapper are shown on Figure 3-3. As shown on Figure 3-3 two NWI wetland areas are located within the project area. One area is located in the north eastern portion of the project area and is labeled PFO1E, a Plaustrine, forested, broad leaved deciduous, seasonally flooded or saturated wetland. This wetland appears to be located in the mapped Ilion silty clay loam soils on the site, which has a relatively high hydric soil rating.

Another area classified as riverine is shown across the central portion of the project area and continues past the project area to the north and the south. The term riverine includes all wetlands and deep-water habitats contained in natural or artificial channels periodically or continuously containing flowing water or which forms a connecting link between two bodies of standing water. The wetland area is labeled as R4SBCx, which stands for riverine, intermittent streambed, seasonally flooded, and excavated. The term excavated indicates a basin or channel dug, gouged, blasted, or suctioned though artificial means by man. Several wetland areas, some



SOURCE: DEC.NY.GOV/GIS/ERM
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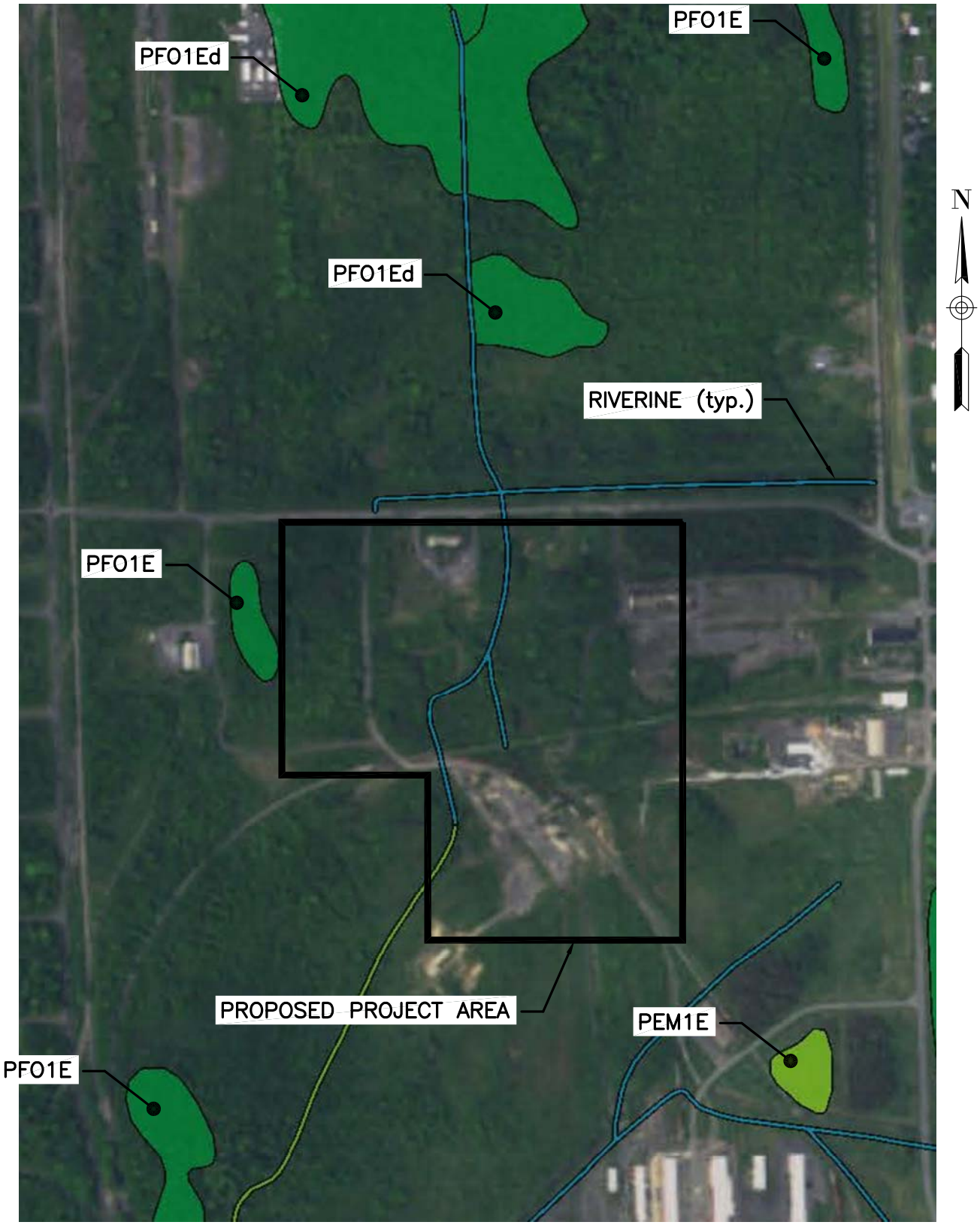
NYSDEC ENVIRONMENTAL RESOURCE MAP WETLAND DELINEATION REPORT			
CIRCULAR EnerG, LLC			FIGURE 3-2
TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	
August 2017	SCALE: NOT TO SCALE	REVISION # 0	

Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 3-2 ENV RES MAP.dwg 8/11/2017 11:59 AM



SOURCE: FWS.GOV/WETLANDS/DATA/MAPPER
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NATIONAL WETLANDS INVENTORY MAP WETLAND DELINEATION REPORT			
CIRCULAR EnerG LLC			FIGURE 3-3
TOWN OF LEWISTON	NIAGARA COUNTY	NEW YORK	
August 2017	SCALE: NOT TO SCALE	REVISION # 0	

Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 3-3 WETLAND INVENTORY.dwg 8/11/2017 12:44 PM

of which have apparent connections to one another and the drainage ditch along E. Kendaia Road were delineated near the mapped feature. The wetland delineation results are discussed in Section 5 of this report.

The NWI mapper riverine area is not a part of the state wetlands shown on the NYSDEC mapper, as it does not meet the definition for a freshwater wetland provided in Section 24-0107(I) of Article 24 Freshwater Wetlands. The definition for freshwater wetlands included in Section 24-0107 states that "freshwater wetlands" include lands and waters of the state as shown on the freshwater wetlands map which contain lands and submerged lands commonly called marshes, swamps, sloughs, bogs, and flats supporting aquatic or semi-aquatic vegetation. NYSDEC wetlands must also have an area of at least 12.4 acres, or if smaller, have unusual local importance as determined by the commissioner pursuant to Section 24-0301(1).

4 WETLAND DELINEATION METHOD

The wetland delineation within the proposed project area was completed in accordance with the January 1987 *Corps of Engineers Wetlands Delineation Manual* and the January 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2). The Level 2 Routine Determination Method described in Part IV Section D of the January 1987 *Corps of Engineers Wetlands Delineation Manual* was used. The Level 2 Routine Determination method requires onsite inspection, as insufficient information was available for making a desktop wetland determination across the entire project site.

The site was evaluated to determine if any atypical conditions existed, such as sufficient natural or human-induced alteration to significantly alter the area vegetation, soils and/or hydrology. No atypical situations were discovered. Normal environmental conditions were present, the project area was not lacking in hydrophytic, or hydrologic indicators due to annual or seasonal fluctuations in precipitation, ground water levels, or temperature. In total 30 observation points were used to characterize the proposed project area. Wetland Determination Data Forms were completed for each observation point and are included in Attachment 1. For each observation point, determinations are made regarding the presence of the following wetland indicators:

- Wetland Hydrology Indicators;
- Hydric Soil Indicators; and,
- Hydrophytic Vegetation.

4.1 WETLAND HYDROLOGY INDICATORS

The January 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2) provides guidelines for determining the presence of wetland hydrology indictors. The criteria for the presence of wetland hydrology are met if one primary indicator is observed or a minimum of two secondary indicators are observed. The primary and secondary hydrologic indicators are listed on the Wetland Determination Data Forms. Primary indicators include surface water, soil saturation, water marks, sparsely vegetated concave surface, and water-stained leaves among others. Secondary indicators of wetland

hydrology include surface soil cracks, saturation visible on aerial images, and micro-topographic relief among others.

4.2 Hydric Soil Indicators

The January 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2) provides guidelines for determining the presence of hydric soil indicators. The *Field Indicators of Hydric Soils in the Unites States: A Guide for Identifying and delineating Hydric Soil* Version 7.0 was also used. Hydric soil indicators are formed predominantly by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment. Hydric soil indicators are organized into three groups including All Soils, Sandy Soils, and Loamy and Clayey Soils. Hydric soil indicators are based on the soil color and presence of redox features formed by the accumulation or loss of iron, manganese, sulfur, or carbon compounds in a saturated and anaerobic environment.

Soils were examined in the field by digging test pits using a sharpshooter shovel. The test pits were dug to the depth needed to document a hydric soil indicator or to confirm the absence of indicators. The soil colors were identified using a 2009 *Munsell Soil Color Book* and recorded on the Wetland Determination Data Forms. The presence of redox concentrations and depletions, and soil texture were also recorded on the Wetland Determination Data Forms. The soils were evaluated both within and outside the wetland boundaries.

4.3 Hydrophytic Vegetation Determination

The January 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2) provides guidelines for determining the predominance of hydrophytic vegetation. Species present in the following plot sizes and vegetation strata were recorded on the Wetland Determination Data Forms:

- Tree Stratum (woody plants three inches or more in diameter at breast height): 30-foot radius;

- Sapling/Shrub Stratum (woody plants less than three inches in diameter at breast height and greater than or equal to one meter tall): 15-foot radius;

- Herb Stratum (all herbaceous plants and woody plants less than one meter tall): five-foot radius; and,

- Woody Vines (all woody vines greater than one meter in height): 30-foot radius.

The abundance of each species was determined by using areal coverage estimates and recorded on the Wetland Determination Data Forms. Dominant plant species were determined using the 50/20 rule, in which plant species that cover 50 percent or 20 percent of the aerial coverage of a stratum are identified as dominant species. The wetland indicator status is also listed for each plant species, using the USACE *Northcentral and Northeast 2016 Regional Wetland Plant List*. The wetland indicator status categories include the following:

- OBL: Plants that have a greater than 99 percent chance of occurring in wetlands under natural conditions, and a less than one percent chance of occurring in non-wetlands;

- FACW: Plants that have a 67 to 99 percent chance of occurring in wetlands under natural conditions, and a one to 33 percent chance of occurring in non-wetlands;

- FAC: Plants that have a 33 to 67 percent chance of occurring in both wetlands and non-wetlands;

- FACU: Plants that have a one to 33 percent chance of occurring in wetlands, and a 67 to 99 percent chance of occurring in non-wetlands; and,

- UPL: Plants that have a less than one percent chance of occurring in wetlands, and a greater than 99 percent chance of occurring in non-wetlands.

To determine the predominance of hydrophytic vegetation a four-tiered approach of indicators is used, including:

- Rapid Test for Hydrophytic Vegetation: All dominant species across all strata are rated OBL or FACW, or a combination of these two categories;

- Dominance Test: More than 50 percent of the dominant plant species across all strata are rated OBL, FACW, or FAC;

- Prevalence Index: The prevalence index is calculated per the Wetland Determination Data Form, an index of three or less indicates that hydrophytic vegetation is present; and,

- Morphological adaptations: The plant community passes either the dominance test or the prevalence index after reconsideration of the wetland indicator status of a certain plant species that exhibit morphological adaptations for life in wetlands.

For select observation points that were located outside of the proposed project area the hydrophytic vegetation determination was not made. The observation points that did not include a hydrophytic vegetation determination include D1, D2, D4, and D16. A hydrophytic vegetation determination was also not made at observation point D27 which was selected to confirm the absence of hydric soils within a drainage ditch dug within gravelly fill along an access road.

If the hydrology, soils, and vegetation at an observation point all met the required wetland indicators, the boundary of the wetland was determined and marked with pink and black nylon flagging labeled "Wetland Delineation". Wetlands and their associated flag numbers were labeled in numerical order. The location of each flag and the observation points were recorded with the Garmin Montana 680t handheld Global Positioning System (GPS). Identified wetlands were classified according to the March 2014 *Ecological Communities of New York State* Second Edition (Edinger et al.). The results of the wetland delineation are discussed in Section 5 of this report.

5 WETLAND DELINEATION RESULTS

The wetland delineation was conducted within the proposed project area on July 10-11, 19-20 and 26, 2017. The delineation identified 25 wetland areas within the proposed project area totaling 7.00 acres. Table 5-1 lists the delineated wetlands, their area, community type, and the apparent jurisdictional determination. Figure 5-1 shows the wetland vegetation communities within the project area. The upland within the project area consisted of successional old field, successional shrub land, and pine plantation. The wetland areas were classified as shallow emergent marsh, shrub swamp, and hardwood swamp communities. The vegetation communities are described based on the March 2014 *Ecological Communities of New York State* Second Edition (Edinger et al.).

The successional old field community was dominated by the following plant species: tall fescue (*Festuca arundinacea*), timothy (*Phleum pratense*), Canada goldenrod (*Solidago canadensis*), autumn olive (*Elaeagnus umbellata),* gray dogwood (*Cornus racemosa*), and black locust (*Robinia pseudoacacia*).

The successional shrubland community was dominated by the following plant species: buckthorn (Rhamnus cathartica), hawthorn (*Crataegus*), gray dogwood (*Cornus racemosa*), prickly ash (Zanthoxylum americanum), poison ivy (*Toxicodendron radicans*), and fox grape (*Vitis labrusca*).

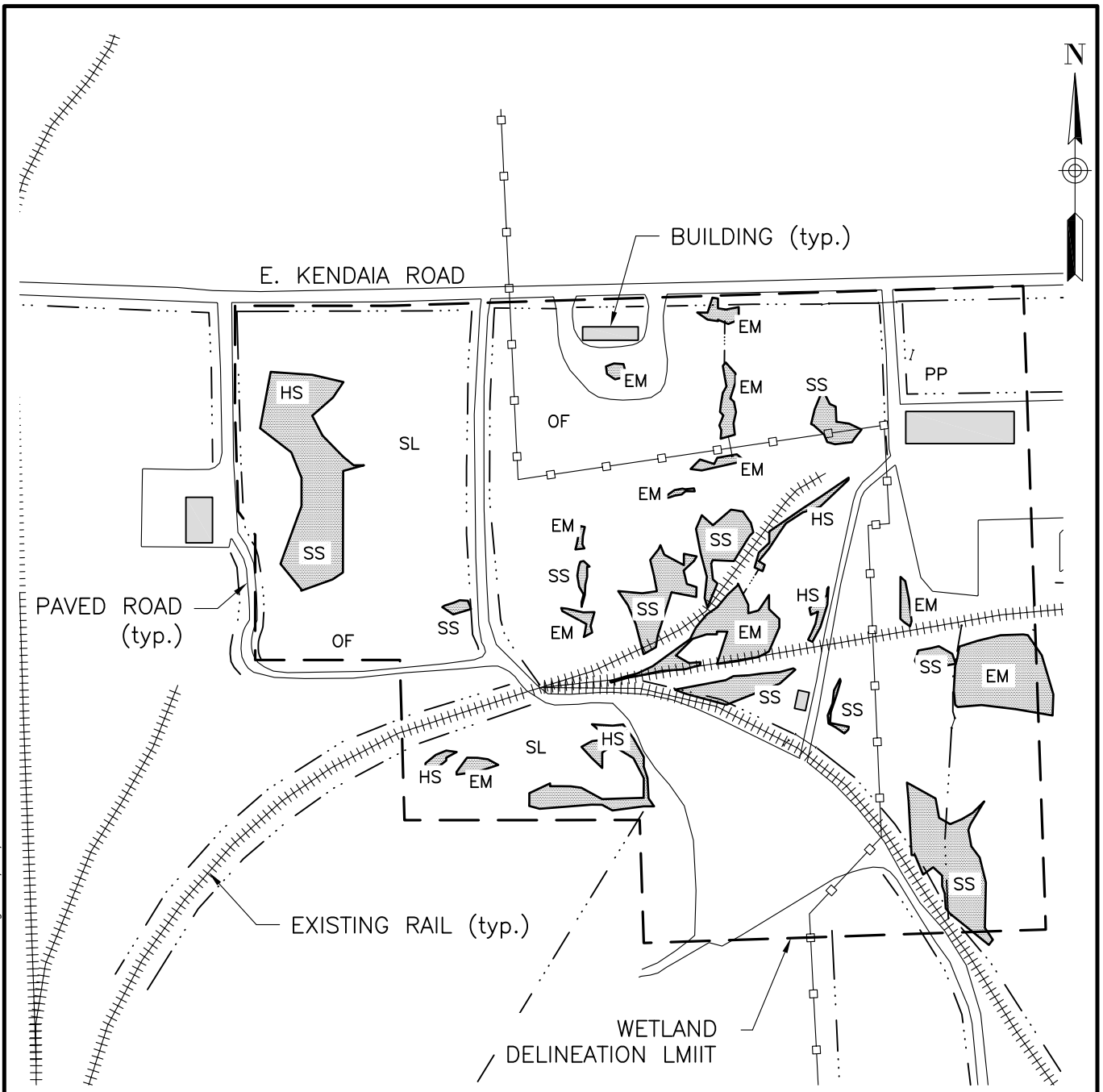
The pine plantation community was dominated by the following plant species: scots pine (*Pinus sylvestris*), buckthorn (*Rhamnus cathartica*), gray dogwood (Cornus racemose), poison ivy (*Toxicodendron radicans*), and fox grape (*Vitis labrusca*).

Figure 5-2 shows the wetland boundaries, and observation point locations within the proposed project area. Representative photos of the observation points are shown in Attachment 2. Wetland 1 and Wetland 3 are outside the proposed project area and therefore are not included in this report. References used for the wetland delineation are included in Attachment 3.

Wetland 2 is a 1.70-acre hardwood swamp dominated by the following plant species: eastern cottonwood (*Populus deltoides*), buckthorn (*Rhamnus cathartica*), silky dogwood (*Cornus*

Table 5-1 Wetland Delineation Results Summary

Wetland Identification Number	Wetland Boundary Flags	Area (Acres)	Vegetation Community (Reschke)	Apparent Jurisdictional Determination
Wetland 2	W2-1 Through W2-22	1.7	Hardwood Swamp	Isolated
Wetland 4	W4-1 Through W4-7	0.06	Shallow Emergent Marsh	Isolated
Wetland 5	W5-1 Through W5-10	0.04	Hardwood Swamp	Isolated
Wetland 6	W6-1 Through W6-8	0.04	Shallow Emergent Marsh	Isolated
Wetland 7	W7-1 Through W7-7	0.02	Shallow Emergent Marsh	Isolated
Wetland 8	W8-1 through W8-13	0.04	Shrub Swamp	Isolated
Wetland 9	W9-1 Through W9-10	0.05	Shallow Emergent Marsh	Isolated
Wetland 10	W10-1 Through W10-36	0.48	Hardwood Swamp	Jurisdictional
Wetland 11	W11-1 Through W11-15	0.06	Shallow Emergent Marsh	Jurisdictional
Wetland 12	W12-1 Through W12-12	0.1	Hardwood Swamp	Isolated
Wetland 13	W13-1 Through W13-37	0.66	Shallow Emergent Marsh	Isolated
Wetland 14	W14-1 Through W14-16	0.97	Shallow Emergent Marsh	Jurisdictional
Wetland 15	W15-1 Through W15-26	0.97	Shrub Swamp	Jurisdictional
Wetland 16	W16-1 Through W16-8	0.1	Shrub Swamp	Isolated
Wetland 17	W17-1 Through W17-7	0.06	Shallow Emergent Marsh	Isolated
Wetland 18	W18-1 Through W18-14	0.19	Shrub Swamp	Isolated
Wetland 19	W19-1 Through W19-14	0.06	Hardwood Swamp	Isolated
Wetland 20	W20-1 Through W20-8	0.06	Shallow Emergent Marsh	Jurisdictional
Wetland 21	W21-1 Through W21-14	0.03	Shrub Swamp	Isolated
Wetland 22	W22-1 Through W22-22	0.47	Shrub Swamp	Isolated
Wetland 23	W23-1 Through W23-7	0.04	Shrub Swamp	Isolated
Wetland 24	W24-1 Through W24-18	0.13	Shallow Emergent Marsh	Jurisdictional
Wetland 25	W25-1 Through W25-10	0.02	Shallow Emergent Marsh	Isolated
Wetland 26	W26-1 Through W26-17	0.37	Shrub Swamp	Isolated
Wetland 27	W27-1 Through W27-12	0.28	Shrub Swamp	Jurisdictional
	Total Acreage:	7.00		



LEGEND:

	WETLAND AREA
	DRAINAGE WAY / SWALE
PP	PINE PLANTATION
OF	SUCCESSIONAL OLD FIELD
SL	SUCCESIONAL SHRUBLAND
EM	SHALLOW EMERGENT MARSH
SS	SHRUB SWAMP
HS	HARDWOOD SWAMP

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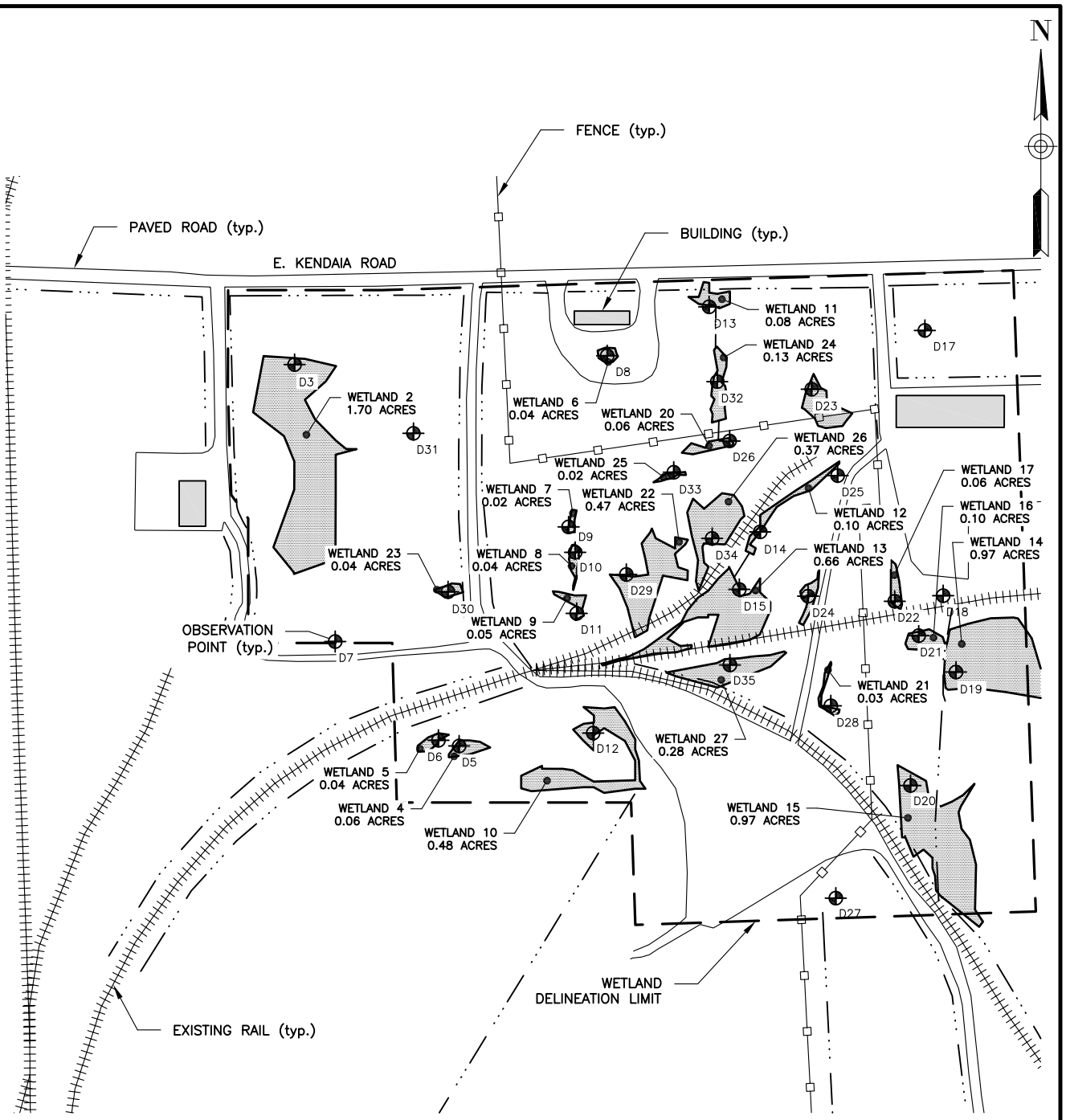
WETLAND VEGETATION MAP

WETLAND DELINEATION REPORT

CIRCULAR EnerG LLC			FIGURE 5-1
TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	
August 2017	SCALE: 1"=400'	REVISION # 0	

Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 5-1 GENERAL VEG MAP.dwg 8/11/2017 12:00 PM



LEGEND:

WETLAND AREA

D2 OBSERVATION POINT

DRAINAGE CHANNEL / SWALE

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WETLAND DELINEATION MAP

WETLAND DELINEATION REPORT

CIRCULAR EnerG LLC			FIGURE 5-2
TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	
August 2017	SCALE: 1"=400'	REVISION # 0	

Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 5-2 WETLAND DELIN MAP.dwg 8/10/2017 10:36 AM

amomum), and purple stem American aster (*Symphyotrichum puniceum*). The wetland hydrology indicators included a high-water table, saturated soil, and water stained leaves. The soils within Wetland 2 are mapped as Ilion silty clay loam. The topsoil color was 10YR 4/1, and the subsoil color was 10YR 4/1 with 15 percent 2.5YR 5/6 mottles, which met the depleted matrix hydric soil indicator. Wetland 2 is shown on the USFWS NWI mapper. Wetland 2 has no apparent connection to waters of the United States, and is therefore considered non-jurisdictional.

Wetland 4 is a .06-acre shallow emergent marsh dominated by the following plant species: prickly bog sedge (*Carex atlantica*), eastern cottonwood (*Populus deltoides*), and quaking aspen (*Populus tremuloides*). The wetland hydrology indicators observed included surface water, and saturated soils. The soils are mapped as Darien silt loam, and the soil color was 10YR 5/2 with 15 percent 5YR 5/6 mottles, which meet the depleted matrix hydric soil indicator. Wetland 4 has no apparent connection to waters of the United States, and is therefore considered non-jurisdictional.

Wetland 5 is .04-acre hardwood swamp dominated by the following plant species: eastern cottonwood (*Populus deltoides*), quaking aspen (*Populus tremuloides*), buckthorn (*Rhamnus cathartica*), autumn olive (*Elaeagnus umbellata*), and Indian hemp (*Apocynum cannabinum*). The wetland hydrology indicators observed included water marks, algal mat, water stained leaves, and a sparsely vegetated concave surface. The soils are mapped as Darien silt loam, the soil color was 10YR 5/1 with five percent 7.5 YR 6/8 mottles which met the depleted matrix hydric soil indicator. Wetland 4 has no apparent connection to waters of the United States, and is therefore considered non-jurisdictional.

Wetland 6 is a .04-acre shallow emergent marsh dominated by the following plant species: swamp milkweed (*Asclespias incarnata*), green bulrush (*Scirpus atrovirens*), black willow (*Salix nigra*), and eastern cottonwood (*Populus deltoides*). This wetland is surrounded by an abandoned asphalt road/parking area. Based on aerial photos the location of Wetland 6 was once occupied by a building. The wetland was flagged based on the strong presence of wetland indicator plants which included 3 of 4 dominant species classified as OBL. The wetland hydrology indicators observed included surface water, and water stained leaves. The soil is

mapped as Darien silt loam, the soil color was 5YR 3/1 and the texture consisted of gravelly fill. Wetland 6 has no apparent connection to waters of the United States, and is therefore considered non-jurisdictional.

Wetland 7 is a .02-acre shallow emergent marsh dominated by the following plant species: creeping bentgrass (*Agrostis stolonifera*), silky dogwood (*Cornus amomum*), hawthorn (*Crataegus crus-galli*), and gray dogwood (*Cornus racemosa*). The wetland hydrology indicators observed included saturated soils, water stained leaves, and sparsely vegetated concave surface. The soil is mapped as Darien silt loam. The topsoil color was 10YR 4/1 with ten percent 2.5YR 3/4 mottles, the subsoil color was 10YR 5/1 with 15 percent 5YR 6/8 mottles, which met the depleted matrix hydric soil indicator. Wetland 7 has no apparent connection to waters of the United States, and therefore is considered non-jurisdictional.

Wetland 8 is a .04-acre shrub swamp dominated by the following plant species: pussy willow (*Salix discolor*), gray dogwood (*Cornus racemosa*), silky dog wood (*Cornus amomum*), swamp milkweed (*Asclepius incarnate*), Indian hemp (*Apocynum cannabinum*), and Canadian rush (*Juncus canadensis*). The wetland hydrology indicators observed included a sparsely vegetated concave surface, and water stained leaves. The soil is mapped as Darien silt loam. The topsoil color was 10YR 5/1 with 20 percent 5YR 5/6 mottles, the subsoil color was 10YR 5/2 with 20 percent 5YR 5/8 mottles which met the depleted matrix hydric soil indicator. Wetland 8 has no apparent connection to waters of the United States, and therefore is considered non-jurisdictional.

Wetland 9 is a .04-acre shallow emergent marsh dominated by the following plant species: creeping bentgrass (*Agrostis stolonifera*), gray dogwood (*Cornus racemosa*), and silky dogwood (*Cornus amomum*). The wetland hydrology indicators observed included sparsely vegetated concave surface, and water stained leaves. The soil is mapped as Darien silt loam. The top soil color was 10YR 4/1 with 10 percent 2.5YR 4/6 mottles, and the subsoil color was 10YR 5/1 with 15 percent 5YR 6/6 mottles, which met the depleted matrix hydric soil indicator. Wetland 9 has no apparent connection to waters of the United States, and therefore is considered non-jurisdictional.

Wetland 10 is a .48-acre hardwood swamp dominated by the following plant species: eastern cottonwood (*Populus deltoides*), black willow (*Salix nigra*), quaking aspen (*Populus tremuloides*), autumn olive (*Elaeagnus umbellata*), lessor poverty rush (*Juncus tenuis*), and tall fescue (*Festuca arundinacea*). The wetland hydrology indicators observed included saturated soil, sparsely vegetated concave surface, water stained leaves, and microtopographic relief. The soil is mapped as Darien silt loam. The topsoil color was 10YR 3/1, the subsoil color was 10YR 5/2 with 15 percent 2.5YR 5/8 mottles with met the depleted matrix hydric soil indicator. Wetland 10 is considered jurisdictional as it is connected to a ditch which travels to the southwest.

Wetland 11 is a .06-acre shallow emergent marsh dominated by creeping bentgrass (*Agrostis stolonifera*). The wetland hydrology indicators observed include surface water, high water table and saturated soils. The soil color was 10YR 3/2 with 20 percent 5YR 5/6 mottles with met the redox dark surface hydric soil indicator. The soil is mapped as Angola silt loam. Wetland 11 is considered jurisdictional as it is connected to the roadside ditch along E. Kendaia Road.

Wetland 12 is a .10-acre hardwood swamp dominated by the following plant species: eastern cottonwood (*Populus deltoides*), pussy willow (*Salix discolor*), buckthorn (*Rhamnus cathartica*), and gray dogwood (*Cornus Racemosa*). The wetland hydrology indicators observed included a sparsely vegetated concave surface, and water stained leaves. The wetland is a manmade abandoned ditch segment along an abandoned rail road grade. The soil is mapped as Angola silt loam. The top soil color is 10YR 2/1, the sub soil color is 10YR 5/2 with 10 percent 2.5 YR 4/6 mottles which met the depleted matrix hydric soil indicator. Wetland 12 has no apparent connection to waters of the United States and therefore is considered non-jurisdictional.

Wetland 13 is a .66-acre shallow emergent marsh dominated by the following plant species: yellow nut sedge (*Cyperus escalentus*), buckthorn (*Rhamnus cathartica*), American elm (*Ulmus americana*), and eastern cottonwood (*Populus deltoides*). The wetland hydrology indicators observed included surface water, highwater table, saturated soils, water stained leaves, and microtopographic relief. The soil is mapped as Angola silt loam, the soil color was 10YR 3/1 with five percent 2.5YR 6/6 mottles which met the redox dark surface hydric soil indicator. Wetland 13 is positioned between two railroad berms and is connected to Wetland 12 by a swale

along the abandoned railroad berm. Wetland 13 has no apparent connection to waters of the United States and therefore is considered non-jurisdictional.

Wetland 14 is a .97-acre shallow emergent marsh dominated by the following plant species: Canadian rush (*Juncus canadensis*), three seed sedge (*Carex trisperma*), yellow nut sedge (*Cyperus escalentus*), and timothy (*Phleum pratense*). The wetland hydrology indicators observed included surface water, high water table, and saturated soil. The soil is mapped as Darien silt loam. The topsoil color is 10YR 3/1, the subsoil color is 10YR 5/2 with 20 percent 7YR 4/6 mottles, which met the depleted matrix hydric soil indicator. Wetland 14 is considered jurisdictional as it is connected to a dich which flows south and connects to a drainage ditch along railroad tracks.

Wetland 15 is a .97-acre shrub swamp which is dominated by the following plant species: gray dogwood (*Cornus racemosa*), buckthorn (*Rhamnus cathartica*), and tall fescue (*Festuca arundinacea*). The wetland hydrology indicators observed included surface water, high water table, and saturated soil. The soils are mapped as Darien silt loam. The topsoil color was 10YR 3/2, the subsoil color was 10YR 5/2 with 15 percent 7.5YR 5/8 mottles which met the depleted matrix hydric soil indicator. Wetland 15 is considered jurisdictional as it is connected to the drainage ditch along the railroad tracks.

Wetland 16 is a .10-acre shrub swamp which is dominated by the following plant species: buckthorn (*Rhamnus cathartica*), gray dogwood (*Cornus racemosa*), and fox grape (*Vitis labrusca*). The wetland hydrology indicators observed include surface water, and saturated soils. The soils are mapped as Darien silt loam. The topsoil color was 10YR 3/1, the subsoil color was 10YR 3/1 with five percent 7.5YR 6/6 mottles, which met the redox dark surface hydric soil indicator. Wetland 16 has no apparent connection to waters of the United States and therefore is considered non-jurisdictional.

Wetland 17 is a .06-acre shallow emergent marsh which is dominated by the following plant species: harvest lice (*Agrimonia parviflora*), timothy (*Phleum pretense*), buckthorn (*Rhamnus cathartica*), and gray dogwood (*Cornus racemosa*). The wetland hydrology indicators observed included surface water, and saturated soils. The soils are mapped as Darien silt loam. The

topsoil color was 10YR 3/2, the subsoil color was 10YR 5/2 with 10 percent 7.5YR 5/8 mottles, which met the depleted matrix hydric soil indicator. Wetland 17 has no apparent connection to waters of the United States and therefore is considered non-jurisdictional.

Wetland 18 is a .19-acre shrub swamp which is dominated by the following plant species: buckthorn (*Rhamnus cathartica*), eastern cottonwood (*Populus deltoides*), and poison ivy (*Toxicodendron radicans*). The wetland hydrology indicators observed included surface water, saturated soils, and water stained leaves. The soils are mapped as Angola silt loam. The topsoil color was 7.5 YR 3/1, the subsoil color was 10YR 4/1 with 10 percent 7.5 YR 5/6 mottles, which met the depleted matrix hydric soil indicator. Wetland 18 has no apparent connection to waters of the United States and therefore is considered non-jurisdictional.

Wetland 19 is a .06-acre hardwood swamp which is dominated by the following plant species: swamp white oak (*Quercus bicolor*), buckthorn (*Rhamnus cathartica*), hawthorn (*Crataegus crus-galli*), and yellow nut sedge (*Cyperus escalentus*). The wetland hydrology indicators observed included surface water, saturated soils, and water stained leaves. The soils are mapped as Angola silt loam. The soil color was 10YR 3/1 with 2 percent 7.5YR 5/8 mottles which met the redox dark surface hydric soil indicator. Wetland 19 is located along a railroad berm and has no apparent connection to waters of the United States, and therefore is considered non-jurisdictional.

Wetland 20 is a .06-acre shallow emergent marsh which is dominated by the following plant species: yellow nut sedge (*Cyperus escalentus*), pussy willow (*Salix discolor*), buckthorn (*Rhamnus cathartica*), and prickly ash (*Zanthoxylum americanum*). The wetland hydrology indicators observed included surface water, and saturated soils. The soils are mapped as Angola silt loam. The top soil color was 10YR 3/2, the sub soil color was 2.5YR 5/2 with 10 percent 2.5YR 6/8 mottles which met the depleted matrix hydric soil indicator. Wetland 20 is connected to Wetland 24 by a culvert and eventually connects to the roadside ditch along E. Kendaia Road and is therefore considered jurisdictional.

Wetland 21 is a .03-acre shrub swamp which is dominated by the following plant species: buckthorn (*Rhamnus cathartica*), and yellow nut sedge (*Cyperus escalentus*). The wetland

hydrology indicators observed included surface water, and saturated soil. The soil is mapped as Darien silt loam. The topsoil color was 10YR 4/1, the subsoil color was 10YR 5/2 with 20 percent 7.5YR 5/8 mottles which met the depleted matrix hydric soil indicator. Wetland 21 is a depression wetland located along a road and railroad berm, and has no apparent connection to waters of the United States, and therefore is considered non-jurisdictional.

Wetland 22 is a .47-acre shrub swamp which is dominated by the following plant species: hawthorn (*Crataegus crus-galli*), eastern cottonwood (*Populus deltoides*), green ash (*Fraxinus pennslyvanica*), silky dogwood (*Cornus amomum*), gray dogwood (*Cornus racemosa*), Canadian rush (*Juncus canadensis*), and fox grape (*Vitis labrusca*). The wetland hydrology indicators observed included surface water, saturated soil, and microtopographic relief. The soil is mapped as Darien silt loam. The topsoil color was 10YR 3/1, the subsoil color was 10YR 4/2 with 20 percent 5YR 5/6 mottles, which met the depleted matrix hydric soil indicator. Wetland 22 is located along a railroad berm and has no apparent connection to waters of the United States and therefore is considered non-jurisdictional.

Wetland 23 is a .04-acre shrub swamp which is dominated by the following plant species: buckthorn (*Rhamnus cathartica*), hawthorn (*Crataegus crus-galli*), eastern cottonwood (*Populus deltoides*), blunt spike rush (*Eleocharis obtusa*), Canadian rush (*Juncus canadensis*), fox grape (*Vitis labrusca*), Virginia creeper (*Parthenocissus quinquefolia*), and poison ivy (*Toxicodendron radicans*). The wetland hydrology indicators observed included sparsely vegetated concave surface, and water stained leaves. The soil is mapped as Darien silt loam. The soil color was 10YR 4/1 with 15 percent 5YR 5/8 mottles which met the depleted matrix hydric soil indicator. Wetland 23 has no apparent connection to waters of the United States and therefore is considered non-jurisdictional.

Wetland 24 is a .13-acre shallow emergent marsh which is dominated by the following plant species: creeping jenny (*Lysimachia nummularia*), Canadian rush (Juncus canadensis), and gray dogwood (*Cornus racemosa*). The wetland hydrology indicators observed included surface water, and saturated soils. The soil is mapped as Angola silt loam. The topsoil color was 10YR 3/1, the subsoil color was 10YR 5/2 with 15 percent 7.5YR 5/8 mottles, which met the depleted

matrix hydric soil indicator. Wetland 24 is connected by a swale to Wetland 11, which is connected to the E. Kendaia Road ditch, and is therefore considered jurisdictional.

Wetland 25 is a .02-acre shallow emergent marsh which is dominated by the following plant species: hawthorn (*Crataegus crus-galli*), buckthorn (*Rhamnus cathartica*), peach-leaf willow (*Salix amygdaloides*), prickly ash (*Zanthoxylum americanum*), nanny berry (*Viburnum lentago*), creeping bentgrass (*Agrostis stolonifera*), field horsetail (*Equisetum arvense*), fox grape (*Vitis labrusca*), and Virginia creeper (*Parthenocissus quinquefolia*). The wetland hydrology indicators observed included surface water, and saturated soils. The soil is mapped as Darien silt loam. The topsoil color was 10YR 3/1 with 10 percent 7.5YR 4/6 mottles, the subsoil color was 10YR 5/2 with 15 percent 7.5YR 6/8 mottles, which met the depleted matrix hydric soil indicator. Wetland 25 has no apparent connection to waters of the United States, and therefore is considered non-jurisdictional.

Wetland 26 is a .37-acre shrub swamp which is dominated by the following plant species: buckthorn (*Rhamnus cathartica*), silky dogwood (*Cornus amomum*), poison ivy (*Toxicodendron radicans*), eastern cottonwood (*Populus deltoides*), and burr oak (*Quercus macrocarpa*). The wetland hydrology indicators observed included surface water and saturated soils. The soil is mapped as Angola silt loam. The topsoil color was 10YR 3/1 with 15 percent 10R 4/8 mottles, the subsoil color was 10YR 4/2 with 30 percent 2.5YR 4.8 mottles, which met the depleted matrix hydric soil indicator. Wetland 26 is a depression wetland located along an abandoned railroad berm, and has no apparent connection to waters of the United States, and therefore is considered non-jurisdictional.

Wetland 27 is a .28-acre shrub swamp which is dominated by the following plant species: buckthorn (*Rhamnus cathartica*), peach leaf willow (*Salix amygdaloides*), pussy willow (*Salix discolor*), green ash (*Fraxinus pennslyvanica*), creeping bentgrass (*Agrostis stolonifera*), and fox grape (*Vitis labrusca*). The wetland hydrology indicators observed included surface water and saturated soils. The soils are mapped as Angola silt loam. The soil color was 10YR 4/1 with 10 percent 7.5YR 5/8 mottles which met the depleted matrix hydric soil indicator. Wetland 27 is located between two railroad berms and is connected to the railroad track drainageway, and therefore is considered jurisdictional.

6 RECOMMENDATIONS

During the wetland delineation 25 wetland areas were identified through the methods described in the January 1987 *Corps of Engineers Wetlands Delineation Manual* and the January 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (Version 2). It is DE's professional opinion that Wetland 10, Wetland 11, Wetland 14, Wetland 15, Wetland 20, Wetland 24, Wetland 25 and Wetland 27 are regulated by the USACE under Section 404 of the Clean Water Act. It is DE's professional option that the remaining wetlands are not regulated by the USACE or the NYSDEC. The following tasks are recommended to move forward with the proposed project.

- Submit this Report to the USACE and the NYSDEC with a request for a wetland boundary confirmation and Jurisdictional Determination.

- If no impacts are proposed to USACE jurisdictional wetlands or NYSDEC jurisdictional wetlands and the associated 100-foot adjacent area, the project may proceed without a Section 404, or an Article 15 or Article 24 permit.

- If impacts are proposed to USACE jurisdictional wetlands, a Joint Application permit form will need to be filled out and submitted with supporting documents.

Attachment 1

Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/10/12

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-3

Investigator(s): DAVID LENOX, KAY RITZHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.743607 Long: -76.851013 Datum: NAD 83

Soil Map Unit Name: HONEOYE SILTY CLAY LOAM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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		**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present? Yes ✓ No		
Wetland Hydrology Present? Yes ✓ No		If yes, optional Wetland Site ID: WETLAND 2

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)
- ✓ 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 ✓ Depth (inches):

Water Table Present? Yes ✓ No ____ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes ✓ No ____ Depth (inches): 2

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-3

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	5%	NO	OBL
2. Populus deltoides	40%	YES	FAC
3. Ulmus americana	1%	NO	FACW
4.			
5.			
6.			
7.			
	46 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Fraxinus pennsylvanica	1%	NO	FACW
2. Rhamnus cathartica	30%	YES	FAC
3. Cornus racemosa	5%	NO	FAC
4. Cornus amomum	15%	YES	FACW
5.			
6.			
7.			
	51 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Alisma trivale	5%	NO	OBL
2. Asclepias incarnata	2%	NO	OBL
3. Festuca arundinacevs	10%	NO	FACW
4. Cornus amomum	1%	NO	FACW
5. Lythrum salicaria	1%	NO	OBL
6. Apocynum cannabinum	1%	NO	FAC
7. ~~Aster puniceum~~	40%	YES	OBL
8. Symphyotrichum puniceum			
9.			
10.			
11.			
12.			
	60 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	5%	YES	FACW
2. Toxicodendron radicans	1%	NO	FAC
3.			
4.			
	6 = 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: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

PHOTO # – 29

SOIL

Sampling Point: D-3

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 %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/1	100					MUCK	
2-12	10YR 4/1	85	2.5YR 3/6	15	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/10/17

Applicant/Owner: CIRCUAR ENERG, LLC State: NY Sampling Point: D-5

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.7409 Long: -76.89935 Datum: NAD 83

Soil Map Unit Name: MARIAN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? NO (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	**Is the Sampled Area within a Wetland?** Yes ✓ No _____	
Hydric Soil Present? Yes ✓ No		
Wetland Hydrology Present? Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 4	

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)
- ___ 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 _____ Depth (inches): 0

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-5

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	20%	YES	FAC
2. Populus tremuloides	5%	YES	FACU
3.			
4.			
5.			
6.			
7.			
	7 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Cornus racemosa	5%	NO	FAC
2. Populus tremuloides	5%	NO	FACU
3. Elaeagnus umbellata	5%	NO	NONE
4. Rhamnus cathartica	5%	NO	FAC
5. Fraxinus pennsylvanica	5%	NO	FACW
6. Rosa multiflora	1%	NO	FACU
7.			
	26 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Lythrum salicaria	1%	NO	OBL
2. Asclepias incarnata	1%	NO	OBL
3. Carex atlantica	60%	YES	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	62 = Total Cover		

Woody Vine Stratum (Plot size: 30')	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: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

PHOTO # 25

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-5

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
0-12"	10YR 5/2	85	5YR 5/6	15	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/10/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-6

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.740736 Long: -76.849582 Datum: NAD 83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? NO (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	**Is the Sampled Area within a Wetland?**	**Yes ✓ No**
Hydric Soil Present?	Yes ✓ No		
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID:	WETLAND 5

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)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes ___	No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-6

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	50	YES	FAC
2. Populus tremuloides	30	YES	FACU
3.			
4.			
5.			
6.			
7.			
	80 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus amomum	5	NO	FACW
2. Rhamnus cathartica	20	YES	FAC
3. Elaeagnus Umbellata	10	YES	NONE
4.			
5.			
6.			
7.			
	35 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Apocynum cannabinum	10	YES	FAC
2. Carex atlantica	1	NO	FACW
3. Rumex crispus	1	NO	FAC
4. Rhamnus cathartica	2	NO	FAC
5. Vitis labrusca	1	NO	FACU
6. Lythrum Salicaria	1	NO	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	16 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	1	NO	FACU
2. Toxicodendron radicans	1	NO	FAC
3.			
4.			
	2 = 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: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

PHOTO # 26

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-6

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
0-12"	10YR 5/1	95	7.5YR 6/8	5	C	M	SILT	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/10/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-7

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FIELD Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.716635 Long: -76.850635 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? NO Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? NO (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 ✓
Hydric Soil Present?	Yes _____	No ✓
Wetland Hydrology Present?	Yes _____	No ✓

Is the Sampled Area within a Wetland? Yes _____ No ✓

If yes, optional Wetland Site ID: _____

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)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes _____	No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches):

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-7

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Elaeagnus Umbellata	10	YES	NONE
2. Cornus racemosa	10	YES	FAC
3. Pyrus communis	1	NO	NONE
4.			
5.			
6.			
7.			
	21 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Cornus racemosa	2	NO	FAC
2. Rhamnus cathartica	1	NO	FAC
3. Pyrus communis	2	NO	NONE
4. Elaeagnus Umbellata	2	NO	NONE
5. Lotus corniculatus	5	NO	FACU
6. Festuca arundinacla	10	YES	FACU
7. Phleum pratense	10	YES	FACU
8. Achillea millefolium novae-angliae	1	NO	FACW
9. Symphyotrichum novae-angliae	5	NO	FACW
10. Euthamia graminifolia	1	NO	FAC
11. Fragaria vesca	1	NO	UPL
12. Trifolium pratense	1	NO	FACU
	41 = Total Cover		

Woody Vine Stratum (Plot size: 30')	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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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 ✓

Remarks: (Include photo numbers here or on a separate sheet.)

Photo # 30

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-7

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 %	Type[1]	Loc[2]	Texture	Remarks
0-6"	10YR 5/3	100						
6-12"	10YR 5/4	100						

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: N

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/11/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-8

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.743697 Long: -76.847894 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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
Hydric Soil Present?	Yes	No ✓
Wetland Hydrology Present?	Yes ✓	No

Is the Sampled Area within a Wetland? Yes ✓ No

If yes, optional Wetland Site ID: WETLAND 5

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)
- ✓ 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 ___	Depth (inches): 2
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-8

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix nigra	15	YES	OBL
2. Populus deltoides	30	YES	FAC
3. Robinia pseudoacacia	5	NO	FACU
4.			
5.			
6.			
7.			
	50 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5')			
1. Lythrum salicaria	5	NO	OBL
2. Euthamia graminifolia	2	NO	FAC
3. Cyperus esculentus	5	NO	FACW
4. Asclepias incarnata	70	YES	OBL
5. Centurea stoebe	1	NO	NONE
6. ~~Car~~ Scirpus atrovirens	60	YES	OBL
7. Achillea millefolium	1	NO	FACU
8.			
9.			
10.			
11.			
12.			
	94 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

Photo # - D8

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-8

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 %	Type[1]	Loc[2]	Texture	Remarks
0-1	5YR 3/1	100					MUCK	
1-12	5YR 3/1	100					GRAVEL	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✓

Remarks:

SURROUNDED BY ROAD/PARKING LOT

GRAVELY FILL SOIL

HYDROPHYTIC VEGETATION PRESENT + WETLAND HYDROLOGY

FLAGGED AS WETLAND

3 OUT of 4 DOMINANT SPECIES

OBL ~~OR FAC~~

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/11/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-9

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.74228 Long: -76.848286 Datum: NAD 83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 7

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)
- ✓ 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 ✓ Depth (inches):

Water Table Present? Yes ___ No ✓ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-9

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crus-galli	10	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	10 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus racemosa	5	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Cornus amomum	20	YES	FACW
2. Asclepias incarnata	3	NO	OBL
3. Lythrum salicaria	2	NO	OBL
4. Vitis labrusca	1	NO	FACU
5. Cornus racemosa	5	NO	FAC
6. Agrostis stolonifera	50	YES	FACW
7. Populus deltoides	1	NO	FAC
8. Bolboschoenus fluviatilis	15	NO	OBL
9. Salix discolor	3	NO	FACW
10.			
11.			
12.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	3	NO	FACU
2.			
3.			
4.			
	3 = 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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

PHOTO #-D-9

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-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"	10YR 4/1	90	2.5YR 3/4	10	C	M	SILT LOAM	
8-12"	10YR 5/1	85	5YR 6/8	15	C	M	SILT LOAM	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/11/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-10

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.7421 Long: -76.848284 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No**
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 8

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)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes ___	No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches):

Wetland Hydrology Present? **Yes** ✓ **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-10

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix discolor	5	NO	FACW
2. Cornus racemosa	15	YES	FAC
3. Cornus Amomum	15	YES	FACW
4.			
5.			
6.			
7.			
	35 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Asclepius incarnata	5	YES	OBL
2. Apocynum cannabinum	10	YES	FAC
3. Juncus canadensis	5	YES	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	1	NO	FACU
2.			
3.			
4.			
	1 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-10

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 5/1	80	5YR 5/6	20	C	M	SILTY CLAY	
6"-12"	10YR 5/2	80	5YR 5/8	20	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/11/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-11

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.791896 Long: -76.848269 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No**
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 9

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)
- ___ 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 ✓ Depth (inches):

Water Table Present? Yes _____ No ✓ Depth (inches):

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches):

Wetland Hydrology Present? **Yes** ✓ **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-11

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rosa multiflora	5	NO	FACU
2. Cornus racemosa	15	YES	FAC
3. Cornus amomum	15	YES	FACW
4.			
5.			
6.			
7.			
	35 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Toxicodendron radicans	2	NO	FAC
2. Lythrum salicaria	5	NO	OBL
3. Agrostis stolonifera	30	YES	FACW
4. Penstemon hirsutus	1	NO	NONE
5. Typha angustifolia	2	NO	OBL
6. Asclepias incarnata	2	NO	OBL
7. Solidago canadensis	2	NO	FACU
8. Cyperus esculentus	1	NO	FACW
9.			
10.			
11.			
12.			
	45 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	1	NO	FACU
2.			
3.			
4.			
	1 = 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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

PHOTO - D-11

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-11

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 %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/1	90	2.5YR 4/6	10	C	M	SILTY CLAY	
8-12	10YR 5/1	85	5YR 6/6	15	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: ~~D-12~~ 7/11/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: ~~7-11-17~~ D-12

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): _____ Lat: 42.740985 Long: -76.888106 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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		**Is the Sampled Area within a Wetland?** **Yes** ✓ **No**
Hydric Soil Present? Yes ✓ No		
Wetland Hydrology Present? Yes ✓ No		If yes, optional Wetland Site ID: WETLAND 10

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)
- ✓ 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 ✓ Depth (inches):

Water Table Present? Yes ___ No ✓ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-12

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	40	YES	FAC
2. Salix nigra	20	YES	OBL
3. Populus tremuloides	30	YES	FACU
4. Pyrus communis	1	NO	NONE
5.			
6.			
7.			
	91 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Elaeagnus umbellata	10	YES	NONE
2. Cornus rosemosa	2	NO	FAC
3. Rhomnus cathartica	2	NO	FAC
4. Cornus amomum	2	NO	FACW
5.			
6.			
7.			
	16 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Typha augustifolia	2	NO	OBL
2. Lythrum salicaria	1	NO	OBL
3. Juncus tenuis	5	YES	FAC
4. Cyperus esculentus	1	NO	FACW
5. Festuca arundinacla	10	YES	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	19 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	1	NO	FACU
2.			
3.			
4.			
	1 = 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: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	23	x 1 = 23
FACW species	3	x 2 = 6
FAC species	49	x 3 = 147
FACU species	41	x 4 = 164
UPL species		x 5 =
Column Totals:	116 (A)	340 (B)

Prevalence Index = B/A = 2.9

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRANGS AND ANGELA WARREN

SOIL

Sampling Point: D-12

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 3/1	100					MUCK	
2-12	10YR 5/2	85	2.5YR 5/8	15	C	M	SILT/CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/11/17
Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-13
Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____
Landform (hillslope, terrace, etc.): DEPRESSIONAL Local relief (concave, convex, none): CONCAVE Slope (%): 0
Subregion (LRR or MLRA): LAKES STATES Lat: 42.774026 Long: -76.846998 Datum: _____
Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PEM
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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		**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present? Yes ✓ No		
Wetland Hydrology Present? Yes ✓ No		If yes, optional Wetland Site ID: WETLAND 11

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)
- ✓ 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 _____ Depth (inches): 2
Water Table Present? Yes ✓ No _____ Depth (inches): 0
Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-13

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus rosemosa	2	NO	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	2 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Typha augustifolia	3	NO	OBL
2. Cornus rosemosa	2	NO	FAC
3. Lythrum Salicaria	5	NO	OBL
4. Vitis labrusca	1	NO	FACU
5. Solidago canadensis	1	NO	FACU
6. Agrostis stolonifera	70	YES	FACW
7. Cornus serica	10	NO	FACW
8. Cornus alba	3	NO	FACW
9. Agrimonia parviflora	1	NO	FAC
10.			
11.			
12.			
	96 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-13

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
0-12	10YR 3/2	80	5YR 5/6	20	C	M	MUCK	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/11/12

Applicant/Owner: CIRCUCAR ENERG, LLC State: NY Sampling Point: D-14

Investigator(s): DANIO LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKESSTATES Lat: 42.742432 Long: -76.846503 Datum: NAD 83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 12

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)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes ___	No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-14

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	10	YES	FAC
2. Salix discolor	10	YES	FACW
3. Rhamnus cathartica	10	YES	FAC
4.			
5.			
6.			
7.			
	30 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Cornus racemosa	5	YES	FAC
2. Ulmus americana	1	NO	FACW
3.			
4.			
5.			
6.			
7.			
	6 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Lythrum salicaria	1	NO	OBL
2. Rhamnus cathartica	1	NO	FAC
3. Cyperus esculentus	.5	NO	FACW
4. Symphyotrichum puniceum	.5	NO	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	3 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	2	NO	FACW
2.			
3.			
4.			
	2 = 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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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 ___

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY
TOM DRAVES AND ANGELA WARREN

Sampling Point: D-4

SOIL

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 2/1	100					TOPSOIL ORGANIC	
2-12"	10YR 5/2	40	2.5YR 4/6	10%	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/11/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-5

Investigator(s): DAVID LENOX, KAY RITCHIE Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.742023 Long: -76.846793 Datum: NAD83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No**
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 13

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)
- ✓ 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 ___	Depth (inches): 2
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-15

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus americanus	10	YES	FACW
2. Populus deltoides	35	YES	FAC
3.			
4.			
5.			
6.			
7.			
	45 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Rhamnus cathartica	10	YES	FAC
2. Cornus racemosa	2	NO	FAC
3. Elaeagnus umbellata	1	NO	NONE
4.			
5.			
6.			
7.			
	13 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Cyperus escalentus	80	YES	FACW
2. Lythrum salicaria	5	NO	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	95 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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 ___

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY
TOM DRAJES AND ANGELA WARREN

SOIL

Sampling Point: D-15

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
0-12	10YR 3/2	95	2.5YR 6/6	5	C	M	SiCLWW	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: None

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

7/19/17

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: ~~7/17~~

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-17

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLAT Local relief (concave, convex, none): CONVEX Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: _____ Long: _____ Datum: NAD83

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

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)
- ___ 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 _____	Depth (inches):
Water Table Present?	Yes _____	No _____	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes _____	No _____	Depth (inches):

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

CONIFER PLANT COMMUNITY

VEGETATION – Use scientific names of plants.

Sampling Point: D-17

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhamnus Cathartica	25	YES	FAC
2. Pinus sylvestris	10	~~YES~~	NONE
3. Pyrus communis	10	NO	NONE
4. Ulmus americanus	10	NO	FACW
5.			
6.			
7.			
	55	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus racemosa	15	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Bidens frondosa	1	NO	FACW
2. Geum macrophyllum	1	NO	FACW
3. Rhamnus cathartica	5	YES	FAC
4. Cornus racemosa	5	YES	FAC
5. Toxicodendron radicans	5	YES	FAC
6. Fragaria virginiana	1	NO	FACU
7. Oxalis stricta	1	NO	FACU
8.			
9.			
10.			
11.			
12.			
	19	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	30	YES	FACU
2. ~~Toxicodendron radicans~~	~~2~~	~~NO~~	
3. Parthenocissus quinquefolia	1	NO	FACU
4.			
	31	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM CRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-17

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 %	Type[1]	Loc[2]	Texture	Remarks
0-8	10 YR 4/1	100					SILTY CLAY	
8-12	10 YR 4/2	100					SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/19/17

Applicant/Owner: CIRCULAR ENERGY LLC State: NY Sampling Point: D-18

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLAT Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.74198 Long: -76.844732 Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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
Hydric Soil Present?	Yes _____	No ✓
Wetland Hydrology Present?	Yes ✓	No

Is the Sampled Area within a Wetland? Yes _____ No ✓

If yes, optional Wetland Site ID: _____

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)
- ✓ 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 ✓	Depth (inches):
Water Table Present?	Yes ✓	No _____	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-18

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	15	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5')			
1. Asclepius incarnata	1	NO	OBL
2. Phleum pratense	1	NO	FACU
3. Cinna arundinacea	1	NO	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	3 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Toxicodendron radicans	1	NO	FAC
2.			
3.			
4.			
	1 = 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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-18

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 %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100					~~SILTY CLAY~~ GRAVELY FILL	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✓

Remarks:

GRAVELY FILL, MAN HOLE PRESENT

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/19/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-18

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.740628 Long: -76.845046 Datum: NAD 83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND H

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)
- ✓ 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 _____ Depth (inches): 6

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

EMERGENT VEGETATION

VEGETATION – Use scientific names of plants. Sampling Point: D-19

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5')			
1. Phleum pratense	20	YES	FACU
2. Asclepius incarnata	2	NO	OBL
3. Lythrum salicaria	2	NO	OBL
4. Juncus canadensis	40	YES	OBL
5. Solidago canadensis	1	NO	FACU
6.			
7. Cyperus escalentus	10	NO	FACW
8. Prunella vulgaris	.5	NO	FAC
9.			
10. Carex trispecma	20	YES	OBL
11.			
12.			
	~~95~~ 95.5 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
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: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: 0-19

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 %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					~~SILTY CLAY~~ MUCK	
5-12	10YR 5/2	80	7YR 4/6	20	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/19/17

Applicant/Owner: CIRCUVAR ENERGY, LLC State: NY Sampling Point: D-20

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.740629 Long: -76.845082 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 15

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)
- ✓ 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 ___	Depth (inches): 2
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-20

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Viburnum lentago	1	NO	FAC
2. Rhamnus cathartica	5	YES	FAC
3.			
4.			
5.			
6.			
7.			
	6 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	1	NO	FACU
2. Zanthoxylum americanum	1	NO	FACU
3. Solidago canadensis	2	NO	FACU
4. Agrimonia parviflora	1	NO	FAC
5. Prunella vulgaris	1	NO	FAC
6. Festuca arundinacea	60	YES	NONE
7. Cornus racemosa	30	YES	FAC
8.			
9.			
10.			
11.			
12.			
	96 = Total Cover		

Woody Vine Stratum (Plot size: 30')	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: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: .67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-20

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 %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	100					MUCK ~~SILTY CLAY~~	
5-12	10YR 5/2	85	7.5YR 5/8	15	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/11/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-21

Investigator(s): DAVID LENOX, SAM DAWLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.71695 Long: -76.844967 Datum: NAD 83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 16

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)
- ✓ 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 ___	Depth (inches): 6
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: O-21

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhamnus cathartica	15	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Corylus racemosa	60	yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	60 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Carex amomum	1	No	FACW
2. Corylus racemosa	1	NO	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	2 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	15	YES	FACU
2.			
3.			
4.			
	15 = 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: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY
TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-21

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 %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/1	100					MUCK ~~SILTY CLAY~~	
6-12	10YR 3/1	95	7.5YR 6/6	5	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- __ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- __ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- __ 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)

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)**
- __ Dark Surface (S7) **(LRR K, L, M)**
- __ 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 (TF12)
- __ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/19/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-22

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.741939 Long: -76.845199 Datum: NAD 83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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		**Is the Sampled Area within a Wetland?** **Yes** ✓ **No**
Hydric Soil Present? Yes ✓ No		
Wetland Hydrology Present? Yes ✓ No		If yes, optional Wetland Site ID: WETLAND 17

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)
- ✓ 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 _____ Depth (inches): 2

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-22

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus sylvestris	2	NO	NONE
2. Populus deltaides	1	NO	FAC
3.			
4.			
5.			
6.			
7.			
	3 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus racemosa	5	YES	FAC
2. Elaeagnus umbellata	1	NO	NONE
3. Rhamnus cathartica	10	YES	FAC
4.			
5.			
6.			
7.			
	16 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Agrimonia parviflora	5	YES	FAC
2. Bolboschoenus fluviatilis	3	NO	OBL
3. Asclepias incarnata	3	NO	OBL
4. Lythrum salicaria	1	NO	OBL
5. Toxicodendron radicans	1	NO	FAC
6. Phleum pretense	5	YES	FACU
7.			
8. Salix amygdaloides	1	NO	FACW
9.			
10.			
11.			
12.			
	20 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	1	NO	FACU
2.			
3.			
4.			
	1 = 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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY
TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-22

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 %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					~~SILT CLAY~~ Muck	
6-12	10YR 5/2	90	7.5YR 5/8	10	C	M	SILT CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/19/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-23

Investigator(s): DAVID LENOX, SAM DAILLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.743446 Long: -76.846007 Datum: NAD83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 18

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)
- ✓ 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 ___	Depth (inches): 6
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-23

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	30	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	30 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Rhamnus cathartica	65	YES	FAC
2. Corylus racemosa	5	NO	FAC
3.			
4.			
5.			
6.			
7.			
	70 = Total Cover		

Herb Stratum (Plot size: 5')			
1.			
2. Toxicodendron radicans	30	YES	FAC
3. Bolboschoenus fluviatilis	2	NO	OBL
4. Symphyotrichum puniceum	2	NO	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	34 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	3	NO	FACU
2.			
3.			
4.			
	3 = 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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-23

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 3/1	100					~~SILTY CLAY~~ MUCK	
8-14	10YR 4/1	90	7.5YR 5/6	10	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/19/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-29

Investigator(s): DAVID LENOX, SAM DAILLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.741979 Long: -76.846035 Datum: NAD83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PFO

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 19

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)
- ✓ 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 ___	Depth (inches): 2
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-24

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus americana	1	NO	FACW
2. Gleditsia triacanthos	5	NO	FAC
3. Quercus bicolor	70	YES	FACW
4. Fraxinus pennsylvanica	1	NO	FACW
5.			
6.			
7.			
	77 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhamnus cathartica	15	YES	FAC
2. Cornus Amomum	2	NO	FACW
3. Cornus racemosa	5	NO	FAC
4. Crataegus crus-galli	15	YES	FAC
5.			
6.			
7.			
	37 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Lotus corniculatus	1	NO	FACU
2. Cyperus escalentus	5	YES	FACW
3. Toxico dendron radicans	1	NO	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	7 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	3	NO	FACU
2.			
3.			
4.			
	3 = 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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-24

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
0-12	10YR 3/1	98	7.5YR 5/8	2	C	M	Muck ~~Silty clay~~	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/18/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-25

Investigator(s): DAVID LENOX, SAM OAIGER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLAT Local relief (concave, convex, none): NONE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.742832 Long: -76.845754 Datum: NAD83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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 ✓	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes _____ No ✓	If yes, optional Wetland Site ID: _____

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)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes _____	No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches):

Wetland Hydrology Present? **Yes** _____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-25

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5')			
1. SOLIDAGO canadensis	30	YES	FACU
2. Rosa multiflora	2	NO	FACU
3. Robinia pseudoacacia	25	YES	FACU
4. Elaeagnus umbellata	25	YES	NONE
5. Cornus racemosa	25	YES	FAC
6.			
7. BIDENS cernua	2	NO	OBL
8.			
9.			
10.			
11.			
12.			
	100% = Total Cover		

Woody Vine Stratum (Plot size: 30')			
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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	2	x 1 =	2
FACW species		x 2 =	
FAC species	25	x 3 =	75
FACU species	48	x 4 =	192
UPL species	25	x 5 =	125
Column Totals:	100 (A)		394 (B)

Prevalence Index = B/A = 3.94

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 ✓

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-25

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 %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/3	100						

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/19/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-26

Investigator(s): DAVID LENOX, SAM DAILLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.743076 Long: -76.846798 Datum: NAD83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 20

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)
- ✓ 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 ___	Depth (inches): 2
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: O-26

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Zanoxylem americanum	5	YES	FACU
2. Rhamnus cathartica	4	YES	FAC
3. Viburnum dentatum	1	NO	FAC
4. Elaeagnus umbellata	1	NO	NONE
5.			
6.			
7.			
	11 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Malus species	2	NO	NONE
2. Ulmus americana	2	NO	FACW
3. Cornus amomum	2	NO	FACW
4. Pyrus communis	2	NO	NONE
5. Fraxinus pennsylvanica	1	NO	FACW
6. Salix discolor	25	YES	FACW
7. Agrimonia parviflora	2	NO	FAC
8. Lythrum salicaria	5	NO	OBL
9. Prunella vulgaris	2	NO	FAC
10. Cyperus escalentus	25	YES	FACW
11.			
12.			
	68 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	2	NO	FACU
2.			
3.			
4.			
	2 = 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: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY
TOM GRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-26

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 %	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 3/2						MUCK ~~SILTY CLAY~~	
9-15	2.5YR 5/2	90	2.5YR 6/8	10	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/20/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D-22

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): TRENCH Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKE STATES Lat: 42.739826 Long: -76.895759 Datum: NAD 83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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
Hydric Soil Present?	Yes _____	No ✓
Wetland Hydrology Present?	Yes ✓	No

Is the Sampled Area within a Wetland? Yes _____ No ✓

If yes, optional Wetland Site ID: _____

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)
- ✓ 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 _____	Depth (inches): 12
Water Table Present?	Yes ✓	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
MOAT DUG OUT OF GRAVELY FILL MATERIAL
CHECKED FOR HYDRIC SOILS

VEGETATION – Use scientific names of plants. Sampling Point: D-27

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		

Woody Vine Stratum (Plot size: 30')			
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		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

CHECKED for HYDRIC SOILS

– MAN MADE CHANNEL

SOIL

Sampling Point: D-27

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 %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					GRAVEL	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✓

Remarks:

GRAVELY FILL MATERIAL

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/20/17

Applicant/Owner: CIRCUAR ENERG, LLC State: NY Sampling Point: D-28

Investigator(s): DAVID LENOX, SAMOALLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.74114 Long: -76.845813 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 21

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)
- ✓ 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 ___	Depth (inches): 6
Water Table Present?	Yes ✓	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-28

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhamnus cathartica	55	YES	FAC
2. Corous sericea	1	NO	FACW
3. Cornus racemosa	15	NO	FAC
4. Elaeagnus umbellata	5	NO	NONE
5.			
6.			
7.			
	76 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Lythrum salicaria	5	NO	OBL
2. Toxicodendron radicans	1	NO	FAC
3. Malus species	1	NO	NONE
4. Symphyotrichum puniceum	1	NO	OBL
5. Agrimonia parviflora	2	NO	FAC
6. Cyperus escalentus	30	YES	FACW
7. Agrotis stolonifera	1	NO	FACW
8.			
9.			
10.			
11.			
12.			
	41 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	3	NO	FACU
2.			
3.			
4.			
	3 = 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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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 ___

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-28

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 %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/1						SILTY CLAY	
8-14	10YR 5/2	80	7.5YR 5/8	20	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

7/19/17

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: ~~D-29~~

Applicant/Owner: ~~DAVID LENOX, SAM DAIGLER~~ CIRCULAR ENERGY, LLC State: NY Sampling Point: D-29

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.742124 Long: -76.847791 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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		**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present? Yes ✓ No		If yes, optional Wetland Site ID: WETLAND 22
Wetland Hydrology Present? Yes ✓ No		

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)
- ✓ 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 _____ Depth (inches): 2

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-29

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus crusgalli	10	YES	FAC
2. Salix discolor	5	NO	FACW
3. Populus deltoides	10	YES	FAC
4. Fraxinus pennsylvanica	10	YES	FACW
5.			
6.			
7.			
	35 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Cornus amomum	10	YES	FACW
2. Salix amygdaloides	2	NO	FACW
3. Cornus racemosa	5	YES	FAC
4. Viburnum lentago	2	NO	FAC
5. Lonicera japonica	3	NO	FACU
6. Rhamnus cathartica	2	NO	FAC
7.			
	24 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Juncus canadensis	5	YES	OBL
2. Agrimonia parviflora	1	NO	FAC
3. Symphyotrichum puniceum	2	NO	OBL
4. Lythrum salicaria	3	NO	OBL
5. Lonicera japonica	2	NO	FACU
6. Cynanchus nigrum	1	NO	NONE
7. Vitis labrusca	1	NO	FACU
8. Fragaria virginiana	2	NO	FACU
9. Asclepius incarnata	1	NO	OBL
10. Cyperus escalentus	2	NO	FACW
11. Bidens cernua	2	NO	OBL
12. Inula helenium	1	NO	FACU
	23 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	5	YES	FACU
2.			
3.			
4.			
	5 = 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: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 86 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY
TOM GRAVES AND ANGELA WARREN

Sampling Point: 0-29

SOIL

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
0-4"	10YR 3/2						MUCK ~~SILTY CLAY~~	
4-12	10YR 4/2	80	5YR 5/6	20	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/20/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-30

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.741927 Long: -76.849512 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓	No	
Wetland Hydrology Present?	Yes ✓	No	If yes, optional Wetland Site ID: WETLAND 23

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)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes ___	No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-30

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	1	NO	FACW
2. Crataegus crus-galli	5	YES	FAC
3. Populus deltoides	10	YES	FAC
4. Gleditsia triacanthos	2	NO	FAC
5.			
6.			
7.			
	18 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus racemosa	10	NO	FAC
2. Cornus amomum	5	NO	FACW
3. Rhamnus cathartica	50	YES	FAC
4. Elaeagnus umbellata	1	NO	NONE
5. Malus species	1	NO	NONE
6. Lonicera japonica	2	NO	FACU
7. Fraxinus pennsylvanica	1	NO	FACW
8. Salix discolor 2		NO	FACW
9. Pyrus communis 1		NO	NONE
	73 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Eleocharis obtusa	10	YES	OBL
2. Pyrus communis	1	NO	NONE
3.			
4. Juncus canadensis	20	YES	OBL
5. Vitis labrusca	2	NO	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	33 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	2	YES	FACU
2. Parthenocissus quinquefolia	2	YES	FACU
3. Toxicodendron radicans	2	YES	FAC
4.			
	6 = 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: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: U-30

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
0-12	10YR 4/1	85	5YR 5/8	15	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: ~~D31~~ 7/20/17

Applicant/Owner: CIRCULAR ENERGY, LLC State: NY Sampling Point: D31

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): FLAT Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): UNITED STATES Lat: 42.73123 Long: -76.849851 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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 ✓
Hydric Soil Present?	Yes _____	No ✓
Wetland Hydrology Present?	Yes _____	No ✓

Is the Sampled Area within a Wetland? Yes _____ No ✓

If yes, optional Wetland Site ID: _____

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)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes _____	No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches):

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-31

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus pedicellata	100	YES	NONE
2.			
3.			
4.			
5.			
6.			
7.			
	100 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Zanthoxylem americanum	5	YES	FACU
2. Cornus racemosa	2	YES	FAC
3.			
4.			
5.			
6.			
7.			
	7 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Parthenocissus quinquefolia	1	NO	FACU
2. Fraxinus pennsylvanica	5	YES	FACW
3. Rhamnus cathartica	2	NO	FAC
4. Lonicera japonica	1	NO	FACU
5. Toxico dendron radicans	1	NO	FAC
6.			
7. Elaagnus virginiana	1	NO	FACU
8.			
9.			
10. Carex cayana	1	NO	~~FACW~~ NONE
11. Zanoxylem americanum	2	NO	FACU
12.			
	14 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	50	YES	FACU
2. Toxico dendron radicans	10	YES	FAC
3.			
4.			
	60 = 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: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	5	x 2 =	10
FAC species	15	x 3 =	45
FACU species	59	x 4 =	236
UPL species		x 5 =	
Column Totals:	79 (A)		291 (B)

Prevalence Index = B/A = 3.7

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 ✓

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-31

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
0-12"	10YR 4/2	100					SICT LOAM	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/20/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-32

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.743198 Long: -76.846919 Datum: NAD 83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 29

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)
- ✓ 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 _____ Depth (inches): 6

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D-32

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus racemosa	5	YES	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	5 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Cornus racemosa	10	NO	FAC
2. Cornus sericea	10	NO	FACW
3. Agrimona parviflora	5	NO	FAC
4. Lythrum salicaria	2	NO	OBL
5. Vitis labrusca	1	NO	FACU
6. Cyperus escalentus	10	NO	FACW
7. Lysimachia nummularia	30	YES	FACW
8. Juncus canadensis	31	YES	OBL
9. Geranium macalatum	1	NO	FACU
10.			
11.			
12.			
	100 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
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 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-32

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 %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100					MUCK ~~SILTY CLAY~~	
5-12	10YR 5/2	85	7.5YR 5/8	15	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/20/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-33

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.742852 Long: -76.847336 Datum: NAD83

Soil Map Unit Name: DARIEN SILT LOAM NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 25

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)
- ✓ 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 ____	Depth (inches): 2
Water Table Present?	Yes ✓	No ____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No ____	Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-33

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Crataegus-crus-galli	25	YES	FAC
2. Rhamnus cathartica	10	YES	FAC
3. Salix amygdaloides	10	YES	FACW
4.			
5.			
6.			
7.			
	45 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus amomum	1	NO	FACW
2. Zanthoxylum americanum	15	YES	FACU
3. Viburnum dentatum	1	NO	FAC
4. Viburnum lentago	5	YES	FAC
5.			
6.			
7.			
	22 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Lonicera japonica	1	NO	FACU
2. Festuca arundinacea	1	NO	FACU
3. Toxico dendron radicans	1	NO	FAC
4. Cornus amomum	1	NO	FAC
5. Zanthoxylem americanum	1	NO	FACU
6. Rhamnus cathartica	1	NO	FAC
7. Agrostis stolonifera	70	YES	FACW
8. Agrimonia parviflora	1	NO	FAC
9. Equisetum arvense	20	YES	FAC
10. Parthenocissus quinquefolia	1	NO	FACU
11. Cynanchus nigrum	1	NO	NONE
12.			
	99 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Vitis labrusca	20	YES	FACU
2. ~~Toxico dendron radicans~~ ~~10~~			
3. Parthenocissus quinquefolia	10	YES	FACU
4.			
	30 = 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: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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 ___

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY
TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-33

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 3/1	90	7.5YR 4/6	10	C	M	MUCK ~~SILTY CLAY~~	
6-12	10YR 5/2	85	7.5YR 6/8	15	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS/SENECA Sampling Date: 7/20/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-39

Investigator(s): DAVID LENOX, SAM DAIGLER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): DEPRESSION Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.748382 Long: -76.846964 Datum: NAD83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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	**Is the Sampled Area within a Wetland?** **Yes** ✓ **No**
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID: WETLAND 26

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)
- ✓ 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 _____	Depth (inches): 2
Water Table Present?	Yes ✓	No _____	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D-34

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Populus deltoides	15	YES	FAC
2. Quercus macrocarpa	15	YES	FACU
3.			
4.			
5.			
6.			
7.			
	30 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Cornus racemosa	10	NO	FAC
2. Rhamnus cathartica	70	YES	FAC
3. Cornus amomum	20	YES	FACW
4.			
5.			
6.			
7.			
	91 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Agrimonia parviflora	3	NO	FAC
2. Lonicera japonica	1	NO	FACU
3. Toxicodendron radicans	5	YES	FAC
4. Taraxacum officinale	1	NO	FACU
5. Carex cayana	3	NO	NONE
6.			
7. Geum macrophyllum	3	NO	FACW
8. Rhamnus cathartica	5	YES	FAC
9.			
10.			
11.			
12.			
	21 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. Toxicodendron radicans	5	YES	FAC
2. Vitis labrusca	5	YES	FACU
3.			
4.			
	10 = 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: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

SOIL

Sampling Point: D-38

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 3/1	85	10R 4/8	15	C	M	SILTY CLAY	
6-12	10YR 4/2	70	2.5YR 4/8	30	C	M	SILTY CLAY	

[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) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ 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)

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**)
- ___ Dark Surface (S7) (**LRR K, L, M**)
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: SENECA ARMY DEPOT City/County: ROMULUS / SENECA Sampling Date: 7/20/17

Applicant/Owner: CIRCULAR ENERG, LLC State: NY Sampling Point: D-35

Investigator(s): DAVID LENOX, SAM DAIGER Section, Township, Range: _____

Landform (hillslope, terrace, etc.): POND Local relief (concave, convex, none): CONCAVE Slope (%): 0

Subregion (LRR or MLRA): LAKES STATES Lat: 42.7419/6 Long: -76.846913 Datum: NAD 83

Soil Map Unit Name: ANGOLA SILT LOAM NWI classification: PSS

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ 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		**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present? Yes ✓ No		
Wetland Hydrology Present? Yes ✓ No		If yes, optional Wetland Site ID: WETLAND 27

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)
- ✓ 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 _____ Depth (inches): 12

Water Table Present? Yes ✓ No _____ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: O-35

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Fraxinus pennsylvanica	5	YES	FACW
2. Salix discolor	10	YES	FACW
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhamnus cathartica	10	YES	FAC
2. Salix amygdaloides	40	YES	FAC
3.			
4.			
5.			
6.			
7.			
	50 = Total Cover		

Herb Stratum (Plot size: 5')	Absolute % Cover	Dominant Species?	Indicator Status
1. Equisetum arvense	5	NO	FAC
2. Lythrum salicaria	2	NO	OBL
3. Apocynum cannabinum	5	NO	FAC
4. Agrostis stolonifera	30	YES	FACW
5. Cornus amomum	1	NO	FACW
6. Alisma trivale	2	NO	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	45 = Total Cover		

Woody Vine Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Vitis labrusca	5	YES	FACW
2.			
3.			
4.			
	5 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

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

Remarks: (Include photo numbers here or on a separate sheet.)

VEGETATION SAMPLING CONDUCTED BY TOM DRAVES AND ANGELA WARREN

Sampling Point: D-35

SOIL

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
0-12	10YR 4/1	90	7.5YR 5/8	10	C	M	SILTY CLAY	

[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) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ 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)

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)**
- ___ Dark Surface (S7) **(LRR K, L, M)**
- ___ 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 (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: NONE

Depth (inches): NA

Hydric Soil Present? Yes ✓ No ___

Remarks:

Attachment 2

Representative Photos

Photo 1 - Observation Point 3 Showing Wetland 2 Looking North

Photo 2 - Observation Point 5 Showing Wetland 4 Looking East

Wetland Delineation Report **Seneca Army Depot** **Circular EnerG, LLC**	**Representative Photographs** **1**

Photo 3 - Observation Point 6 Showing Wetland 5 Looking North

Photo 4 - Observation Point 7 Showing Old Field Community

Wetland Delineation Report **Seneca Army Depot** **Circular EnerG, LLC**	**Representative Photographs** **2**

Photo 5 - Observation Point 8 Showing Wetland 6 Looking South

Photo 6 - Observation Point 9 Showing Wetland 7 Looking South

Wetland Delineation Report **Seneca Army Depot** **Circular EnerG, LLC**	**Representative Photographs** **3**

Photo 7 - Observation Point 10 Showing Wetland 8 Looking South

Photo 8 - Observation Point 11 Showing Wetland 9 Looking South

Photo 9 - Observation Point 12 Showing Wetland 10 Looking East

Photo 10 - Observation Point 13 Showing Wetland 11 Looking North

Wetland Delineation Report **Seneca Army Depot** **Circular EnerG, LLC**	**Representative Photographs**
	5

Photo 11 - Observation Point 14 Showing Wetland 12 Looking East

Photo 12 - Observation Point 15 Showing Wetland 13 Looking North

Wetland Delineation Report **Seneca Army Depot** **Circular EnerG, LLC**	**Representative Photographs** **6**

Photo 13 - Observation Point 17 Showing the Pine Plantation Looking East

Photo 14 - Observation Point 18 Looking South

Wetland Delineation Report **Seneca Army Depot** **Circular EnerG, LLC**	**Representative Photographs**
	7

Photo 15 - Observation Point 19 Showing Wetland 14 Looking East

Photo 16 - Observation Point 20 Showing Wetland 15 Looking North

Photo 17 - Observation Point 21 Showing Wetland 16 Looking East

Photo 18 - Observation Point 22 Showing Wetland 17 Looking South

Photo 19 - Observation Point 23 Showing Wetland 18 Looking West

Photo 20 - Observation Point 24 Showing Wetland 17 Looking East

Photo 21- Observation Point 25 Showing Old Field Looking East

Photo 22 - Observation Point 26 Showing Wetland 20 Looking West

Wetland Delineation Report **Seneca Army Depot** **Circular EnerG, LLC**	**Representative Photographs** **11**

Photo 23- Observation Point 28 Showing Wetland 21 Looking North

Photo 24 - Observation Point 29 Showing Wetland 22 Looking South

Photo 25- Observation Point 30 Showing Wetland 23 Looking West

Photo 26 - Observation Point 31 Showing Successional Shrubland Looking East

Photo 27- Observation Point 32 Showing Wetland 24 Looking East

Photo 28 - Observation Point 33 Showing Wetland 25 Looking South

Photo 29- Observation Point 34 Showing Wetland 26 Looking East

Photo 30 - Observation Point 35 Showing Wetland 27 Looking South

Attachment 3

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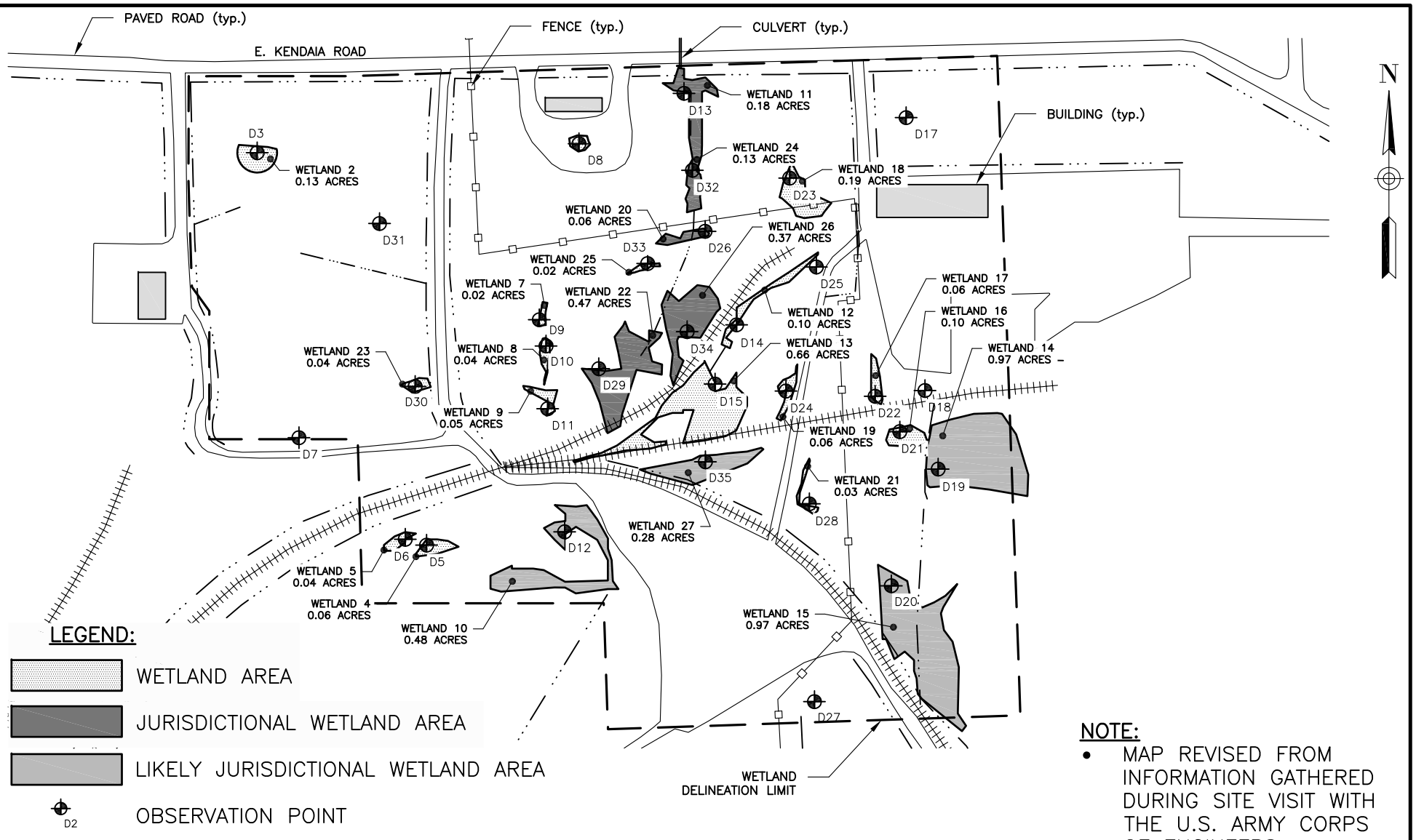

LEGEND:

- WETLAND AREA
- JURISDICTIONAL WETLAND AREA
- LIKELY JURISDICTIONAL WETLAND AREA
- D2 OBSERVATION POINT
- DRAINAGE CHANNEL / SWALE

NOTE:

- MAP REVISED FROM INFORMATION GATHERED DURING SITE VISIT WITH THE U.S. ARMY CORPS OF ENGINEERS, OCTOBER 24, 2017

DAIGLER ENGINEERING, P.C.
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CIRCULAR EnerG LLC	WETLAND DELINEATION MAP WETLAND DELINEATION REPORT		FIGURE 5-2
SCALE: NOT TO SCALE / REVISION # 1			
October 2017	TOWN OF ROMULUS	SENECA COUNTY	NEW YORK

Q:\Circular EnerG LLC\62-0217 Wetland Delineation\ACAD\FIGURE 5-2 WETLAND DELIN MAP.dwg 10/26/2017 9:43 AM

STORMWATER POLLUTION PREVENTION PLAN FOR CIRCULAR enerG FACILITY

Town of Romulus, County of Seneca,
State of New York

PREPARED FOR:
Circular enerG, LLC
400 Andrews Street, Suite 360
Rochester, New York 14604

PREPARED BY:

COSTICH ENGINEERING

217 Lake Avenue
Rochester, New York 14608

PROJECT NO. C3320

November, 2017

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CIRCULAR enerG FACILITY
TOWN OF ROMULUS
SENECA COUNTY, NEW YORK STATE
STORMWATER POLLUTION PREVENTION PLAN

OVERVIEW

The Stormwater Pollution Prevention Plan for the construction of the proposed development located in the Town of Romulus, New York is outlined in this report. The Town of Romulus is not listed as an MS4. The development is located within the Seneca Army Depot on East Kendaia Road. Federal wetlands exist within the proposed development. An Archeological Investigation has been completed at the site and SHPO has concluded that no negative impacts upon cultural resources or historic places will occur. Per the US Fish and Wildlife Service, there are endangered species within the project area, but the project will not have a negative impact. Please refer to the site maps in Appendix I for details.

The proposed development project consists of the construction of a renewable energy plant with associated parking, access roads and stormwater management facilities with access via East Kendaia Road. The construction for the proposed development will disturb approximately 46.8 acres of land. A 5-acre waiver will be required from the NYSDEC.

This report will analyze the effect the proposed construction will have on storm water runoff. In addition, this report details the onsite erosion and sediment control plan designed in accordance with NYSDEC criteria set forth in the Standards and Specifications for Erosion and Sediment Control, July 2016.

BASIS FOR DESIGN

The design criteria used for this analysis is based on the "New York State Department of Environmental Conservation's Phase II Stormwater Rules" and the "New York State Stormwater Management Design Manual" (Design Manual), dated January 2015, in association with "SPDES General Permit for Stormwater Discharges from Construction Activity", dated January 2015 (GP-0-15-002). Existing and developed drainage sheds will be modeled using the SCS method to determine volume and peak rates of stormwater runoff.

DESCRIPTION OF SOILS

According to the Natural Resources Conservation Service Web Soil Survey 2.0, the predominant soils present onsite are classified as Hydrological Soil Group (HSG) Type C/D & D. For soils that are assigned a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for areas undrained areas. Only soils in their natural condition in group "D" are assigned a dual class. The soils on site are listed as the Angola (AnA), Darien (DaA) and Ilion (Is) Series.

The Angola, (HSG) Type D consists of moderately deep, somewhat poorly drained soils. Bedrock is at a depth of 20 to 40 inches. Permeability is low to moderate in the mineral surface and slow in the subsoil and substratum. The potential for runoff is low to high. Slopes range from 0-15 percent.

The Darien Series, (HSG) Type C/D consists of very deep, somewhat poorly drained soils. Permeability is moderately slow in the subsoil and slow in the substratum. The potential for runoff is low to very high. Slope ranges from 0-25 percent.

The Ilion series, (HSG) Type C/D consists of very deep, poorly drained soils. Permeability is moderate or moderately slow above the subsoil and slow or very slow in the lower subsoil and substratum. The potential for surface runoff is very low to very high. Slope ranges from 0-9 percent.

EXISTING CONDITIONS

Under existing conditions, stormwater runoff from the site drains overland to the northeast through a portion of the abandoned Seneca Army Depot. Stormwater from the site ultimately flows either north to Kendig Creek, or west to an unnamed tributary to Seneca Lake. Seneca Lake, Kendig Creek and the unnamed tributary are not listed as a 303(d) waterbodies. The existing drainage areas to be analyzed in this report are the areas that will be affected by the proposed construction activities. 3 areas totaling approximately 67.9± acres were determined to be hydrologically impacted by the construction of the proposed development.

Drainage area (E-1) consists of 48.8± acres, and was calculated to have a time of concentration (Tc) of 115.2 minutes and a curve number (CN) of 89. This area is mostly comprised of mature woods, meadow, buildings, gravel and asphalt roads and parking lots, and railroad beds. Runoff from this drainage area generally flows from south to north to a ditch along Kendaia road where it passes through a 24 inch diameter culvert (DP-1) beneath Kendaia road and continues to flow north into Kendig Creek.

Drainage area (E-2) consists of 11.5± acres, and was calculated to have a time of concentration (Tc) of 70.9 minutes and a curve number (CN) of 82. This area is mostly comprised of mature woods, meadow, buildings, gravel and asphalt roads and parking lots, and railroad beds. Runoff from this drainage area flows from south east to northwest into a 12” diameter culvert (DP-2) where it is discharged from the project area. Runoff from this area ultimately drains to an unnamed tributary to Seneca Lake.

Drainage area (E-3) consists of 7.6± acres, and was calculated to have a time of concentration (Tc) of 41.4 minutes and curve number (CN) of 83. Runoff from this drainage area flows from north to south along railroad tracks where it leaves the project area. This drainage area ultimately passes through a 12” diameter culvert (DP-3) beneath the railroad tracks and ultimately drains to an unnamed tributary to Seneca Lake.

Please refer to the Existing Drainage Map in Appendix I for details. Table 1 provides a summary of pre-developed peak flow rates.

TABLE 1 – PRE-DEVELOPED PEAK FLOW RATES (67.9± Acres)

Area Designation	Q_1 (cfs)	Q_2 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{100} (cfs)
E-1 (48.8 acres) (DP-1)	19.00	23.21	42.14	51.03	62.91
E-2 (11.5 acres) (DP-2)	3.99	5.19	10.98	13.84	17.74
E-3 (7.6 acres) (DP-3)	4.22	5.44	11.18	13.98	17.79
Total = 67.9± acres	27.21	33.84	64.30	78.85	98.44

All supporting data and calculations used to derive these results can be found in Appendix I.

DEVELOPED CONDITIONS

The developed drainage area is comprised of the same 67.9-acre drainage area as existing conditions. The proposed overall drainage area is divided up into 8 sub areas.

The first drainage area (D-1) consists of 13.2 acres, and contains the proposed truck access ramp, scales, rail car loading / unloading area, train tracks, a bioretention area "A" and proposed wet pond 1. Runoff from this drainage area discharges to DP-3 after being detained in the bioretention facility designed to provide water quality treatment and the wet pond designed to provide water quantity, quality and channel protection volumes. This runoff area has a curve number CN=93 and a time of concentration of 7.6 minutes.

Drainage area (D-2) consists of 5.9 acres, and contains the southwest corner of the proposed main processing building, a portion of the operations road, a portion of the water pump house, the fire protection pond and cooling towers building, bioretention area "B" and proposed wet pond 2. Runoff from this drainage area discharges to DP-3 after being detained in the bioretention facility designed to provide water quality treatment and the wet pond designed to provide water quantity, quality and channel protection volumes. This runoff area has a curve number CN=89 and a time of concentration of 27.8 minutes.

Drainage area (D-3) consists of 3.8 acres, and contains the northwest corner of the proposed main processing building, a portion of the operations road, the remainder of the water pump house, the raw water treatment building, a portion of the administration building and proposed wet pond 3. Runoff from this drainage area discharges to DP-1 after being detained the wet pond designed to provide water quantity, quality and channel protection volumes. This runoff area has a curve number CN=91 and a time of concentration of 20.2 minutes.

Drainage area (D-4) consists of 16.4 acres, and contains the remainder of the proposed main processing building, a portion of the operations road, the remainder of the administration building, bioretention area "C" and proposed wet pond 4. Runoff from this drainage area discharges to DP-1 after being detained in the bioretention facility designed to provide water quality treatment and the wet pond designed to provide water quantity, quality and channel protection volumes. This runoff area has a curve number CN=86 and a time of concentration of 8.6 minutes.

Drainage area (D-5) is a bypass area and consists of 19.9 acres, and contains existing and proposed asphalt, lawn areas and wetland areas. Runoff from this drainage area cannot be detained in a stormwater management facility and will be discharged to DP-1. This runoff area has a curve number CN=83 and a time of concentration of 34.8 minutes.

Drainage area (D-6) is a bypass area and consists of 1.1 acres, and contains proposed asphalt, existing and proposed train track and lawn areas. Runoff from this drainage area cannot be detained in a stormwater management facility and will be discharged to DP-3. This runoff area has a curve number CN=91 and a time of concentration of 4.6 minutes.

Drainage area (D-7) is a bypass area and consists of 5.6 acres, and contains existing and proposed lawn and wooded areas. Runoff from this drainage area cannot be detained in a stormwater management facility and will be discharged to DP-2. This runoff area has a curve number CN=82 and a time of concentration of 163.2 minutes.

Drainage area (D-8) is a bypass area and consists of 2.0 acres, and contains existing and proposed lawn and wooded areas. Runoff from this drainage area cannot be detained in a stormwater management facility and will be discharged to DP-3. This runoff area has a curve number CN=83 and a time of concentration of 21.5 minutes.

Table 2 summarizes the post-developed peak flow rates for the drainage areas prior to detention.

TABLE 2 - DEVELOPED PEAK FLOW RATES (67.9± Acres)

Area Designation	Q_1 (cfs)	Q_2 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{100} (cfs)
D-1 (13.2 acres)	31.80	37.41	61.58	72.65	87.31
D-2 (5.9 acres)	6.42	7.82	14.06	16.97	20.85
D-3 (3.8 acres)	5.59	6.70	11.56	13.80	16.77
D-4 (16.4 acres)	23.26	29.30	57.22	70.57	88.54
D-5 (19.9 acres)	12.49	16.06	32.97	41.20	52.37
D-6 (1.1 acres)	2.65	3.16	5.38	6.39	7.74
D-7 (5.6 acres)	1.02	1.33	2.84	3.58	4.60
D-8 (2.0 acres)	1.73	2.22	4.52	5.63	7.14
Overall (67.9 acres)	84.96	104.00	190.13	230.79	285.32

All supporting data and calculations used to derive the post-developed peak flow rates can be found in Appendix II.

ROUTED OUTFLOWS

The proposed storm water management facilities are designed to accommodate the proposed development in order to reduce the developed peak flow rates to less than the existing rates. For discharge points DP-1 and DP-2, the developed drainage areas were routed using a "Link" node feature in HydroCAD. The "Link" node feature is used to accurately detail the connection of the drainage areas as depicted on the Developed Drainage Area Map.

Table 3 summarizes the results of routing the developed hydrograph through the facility using an inflow-storage-outflow scenario.

TABLE 3 - HYDROGRAPH RESERVOIR ROUTINGS (D-1) (WET POND) (13.2 acres)

Storm Frequency (yrs)	Inflow Hydrograph Peak (cfs)	Storage Provided (ft.^{3})	Maximum Water Elevation (ft.)	Peak Outflow (cfs)
1	31.80	33,915	719.97	2.88
2	37.41	40,917	720.16	3.15
10	61.58	73,007	720.98	4.11
25	72.65	88,559	721.35	4.49
100	87.31	109,888	721.84	4.93

All supporting data and calculations used to derive the routed outflows can be found in Appendix 2.

TABLE 4 - HYDROGRAPH RESERVOIR ROUTINGS (D-2) (WET POND) (5.9 acres)

Storm Frequency (yrs)	Inflow Hydrograph Peak (cfs)	Storage Provided (ft.^{3})	Maximum Water Elevation (ft.)	Peak Outflow (cfs)
1	6.42	11,755	728.59	1.04
2	7.82	14,385	728.72	1.36
10	14.06	25,751	729.22	2.99
25	16.97	30,357	729.41	4.30
100	20.85	36,239	729.65	6.16

All supporting data and calculations used to derive the routed outflows can be found in Appendix 2.

TABLE 5 - HYDROGRAPH RESERVOIR ROUTINGS (D-3) (WET POND) (3.8 acres)

Storm Frequency (yrs)	Inflow Hydrograph Peak (cfs)	Storage Provided (ft.^{3})	Maximum Water Elevation (ft.)	Peak Outflow (cfs)
1	5.59	8,097	728.43	1.29
2	6.70	9,827	728.52	1.51
10	11.56	16,424	728.84	3.34
25	13.80	19,378	728.98	3.95
100	16.77	24,011	729.19	4.16

All supporting data and calculations used to derive the routed outflows can be found in Appendix 2.

TABLE 6 - HYDROGRAPH RESERVOIR ROUTINGS (D-4) (WET POND) (16.4 acres)

Storm Frequency (yrs)	Inflow Hydrograph Peak (cfs)	Storage Provided (ft.^{3})	Maximum Water Elevation (ft.)	Peak Outflow (cfs)
1	23.26	23,461	727.48	2.56
2	29.30	29,766	727.61	3.52
10	57.22	67,291	728.34	4.16
25	70.57	86,707	728.70	4.41
100	88.54	113,634	729.18	4.74

All supporting data and calculations used to derive the routed outflows can be found in Appendix 2.

Table 7 summarizes the combining of developed drainage areas (D-1, D-2, D-6 and D-8) utilizing the "Link" node.

TABLE 7 – DEVELOPED DRAINAGE AREAS (D-1, D-2, D-6, D-8) COMBINED WITH "LINK" NODE TO DISCHARGE POINT 1 (DP-1) (22.2± Acres)

Area Designation	Q_1 (cfs)	Q_2 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{100} (cfs)
DP-1 D-1 + D-2 + D-6 + D-8 (22.2 acres)	6.21	7.21	11.44	13.46	16.13

TABLE 8 –DEVELOPED DRAINAGE AREAS (D-3, D-4, D-5) COMBINED WITH "LINK" NODE TO DISCHARGE POINT 3 (DP-3) (40.1± Acres)

Area Designation	Q_1 (cfs)	Q_2 (cfs)	Q_{10} (cfs)	Q_{25} (cfs)	Q_{100} (cfs)
DP-3 (D-3 + D-4 + D-5) (40.1 acres)	16.20	20.98	40.14	49.45	61.10

All supporting data and calculations used to derive the post-developed peak flow rates can be found in Appendix II.

TABLE 9 - EXISTING VS. DEVELOPED PEAK FLOW RATES (DP-1)

Storm Frequency	$Q_{Existing}$ (cfs)	$Q_{Developed}$ (cfs)	% Change
1	19.00	16.20	-14.7
2	23.21	20.98	-9.6
10	42.14	40.14	-4.8
25	51.03	49.45	-3.1
100	62.91	61.10	-2.9

These results show a reduction in overall peak rate discharge from DP-1 is achieved.

TABLE 10 - EXISTING VS. DEVELOPED PEAK FLOW RATES (DP-2)

Storm Frequency	$Q_{Existing}$ (cfs)	$Q_{Developed}$ (cfs)	% Change
1	3.99	1.02	-74.4
2	5.19	1.33	-74.4
10	10.98	2.84	-74.1
25	13.84	3.58	-74.1
100	17.74	4.60	-74.1

These results show a reduction in overall peak rate discharge from DP-2 is achieved.

TABLE 11 - EXISTING VS. DEVELOPED PEAK FLOW RATES (DP-3)

Storm Frequency	$Q_{Existing}$ (cfs)	$Q_{Developed}$ (cfs)	% Change
1	3.99	6.21	+35.8
2	5.19	7.21	+28.0
10	10.98	11.44	+4.0
25	13.84	13.46	-2.8
100	17.74	16.13	-9.1

These results show a reduction in overall peak rate discharge from DP-3 is achieved during the 25 and 100 year storms. The minor increase in runoff during the 1, 2 and 10 year storm events should not have a negative effect to downstream structures.

SUMMARY OF PEAK FLOW RATES

Table 12 compares the existing vs. developed peak flow rates for the overall development after routing through the proposed stormwater management facilities.

TABLE 12 - EXISTING VS. DEVELOPED PEAK FLOW RATES (OVERALL 67.9± ACRES)

Storm Frequency	$Q_{Existing}$ (cfs)	$Q_{Developed}$ (cfs)	% Change
1	27.21	23.43	-13.9
2	33.84	29.52	-12.8
10	64.30	54.42	-15.4
25	78.85	66.49	-15.7
100	98.44	81.83	-16.9

These results show a reduction in overall peak rate discharge from the site is achieved.

WATER QUALITY, CHANNEL PROTECTION, AND RUNOFF REDUCTION VOLUME

In keeping with the goals of the NYSDEC Stormwater Pollution Prevention Control and SPDES General Permit GP-0-15-002 associated with long term development, in order to meet pollutant removal goals, Runoff Reduction and Source Control practices have been implemented to provide at least minimum required Runoff Reduction volume. Water Quality volume and Stream Channel Protection volume is proposed to be provided within the proposed wet ponds. The total Water Quality volume is the sum of the volume in the detention areas and the total provided Runoff Reduction volume. Table 13, below shows the required and provided Water Quality, Channel Protection, and Runoff Reduction volumes for the development.

TABLE 13 - WATER QUALITY, CHANNEL PROTECTION, AND RUNOFF REDUCTION VOLUME

Water Quality		***Channel Protection***		***Runoff Reduction (min.)***	
WQv Req'd	WQv Provided	CPv Req'd	CPv Provided	Min RRv Req'd	RRv Provided
(ac-ft)	***(ac-ft)***	***(ac-ft)***	***(ac-ft)***	***(ac-ft)***	***(ac-ft)***
1.537	8.979	4.574	5.876	0.307	0.419

STORMWATER MANAGEMENT PLANNING

The NYS Stormwater Design Manual has created a five-step planning process for addressing stormwater management in new developments. This process is intended to guide the designer through steps that maintain pre-construction hydrologic conditions of the site.

The five steps include:

1. site planning to preserve natural features and reduce impervious cover,
2. calculations of the water quality volume for the site,
3. incorporation of green infrastructure techniques and standard SMP's with Runoff Reduction Volume (RRv) capacity,
4. use of standard SMP's where applicable, to treat the portion of water quality volume not addressed by green infrastructure techniques and standard SMP's with RRv capacity, and
5. Design of volume and peak rate control practices where required.

The five-step process has been applied to this site as follows:

1. As best as possible, the site has been developed in the less sensitive areas of the site. The development is located within the former Seneca Army Depot.
2. Calculations for water quality volume can be found in Appendix II.
3. Green Infrastructure Planning practices have been incorporated into the design of the project. Reduction of clearing and grading and soil restoration are two examples of planning practices used in this development. Bioretention Basins have been proposed to provide the required runoff reduction volume.
4. Wet ponds have been designed to treat the remaining required water quality volume for the development. (See Appendix II)
5. Wet Ponds have been designed to control the peak flows. (See Appendix II)

TECHNICAL JUSTIFICATION FOR RUNOFF REDUCTION REQUIREMENTS

In order to meet pollutant removal goals, bioretention facilities will be constructed in areas as shown on "Bioretention Basin Drainage Area Map". The bioretention facilities are an example of green infrastructure. The basins treat stormwater runoff from the largest areas of impervious surfaces. Table 13, above shows the required minimum and the provided Runoff Reduction Volume for the development.

Green Infrastructure Planning requires Runoff Reduction volumes for the site to be reached. If the original Runoff Reduction volumes cannot be met, the minimum must be met, and a justification must be given for each technique as to why that technique could not be used.

TECHNICAL JUSTIFICATION FOR RUNOFF REDUCTION REQUIREMENTS (Per NYS SWDM Ch. 5)

<u>Preservation of Natural Features and Conservation Design</u>

- Preservation of Undisturbed Areas: Undisturbed areas will be conserved during and after construction.
- Preservation of Buffers: All buffers will be conserved during and after construction.
- Reduction of Clearing and Grading: Clearing and Grading limits shall be the minimum necessary to build the driveway, foundations, utilities, and the stormwater management facilities.
- Locating Development in Less Sensitive Areas: The Development has been located in areas that will create the least impact to sensitive areas. The development is located within the former Seneca Army Depot.
- Open Space Design: Open space design techniques have been utilized to the greatest extent practical.
- Soil Restoration: Deep Ripping and Decompaction will be done in grass areas; where practical, following construction. Soil amendments (profile or approved equal) will be added to the hydro seed mix.

Planning Practices for Reduction of Impervious Cover

- Roadway Reduction: Minimum roadway widths and lengths have been utilized. The proposed width is the minimum necessary to allow fire apparatus to the proposed development.
- Sidewalk Reduction: No sidewalks are proposed.
- Driveway Reduction: Driveway lengths and widths have been minimized as much as possible. The proposed width is the minimum necessary to allow fire apparatus to the proposed development.
- Cul-de-sac Reduction: N/A
- Building Footprint Reduction: The proposed building footprints depicted within the project plans are believed to be the minimum sizes to conduct business operations.
- Parking Reduction: Proposed parking as shown is believed to be the minimum required to operate the facility.

Techniques for Runoff Reduction

- Conservation of Natural Areas: Undisturbed areas will be conserved during and after construction, these areas will not be placed into a permanent easement.
- Sheet flow to Riparian Buffers or Filter Strips: Stormwater flows will be treated through stormwater management areas and grass filter strips prior to discharging offsite.
- Vegetated Swale: Proposed storm sewers and vegetated swales are proposed to convey runoff to the wet ponds.
- Tree Planting: Trees will be planted in accordance with the landscaping plan.
- Rooftop Disconnection: Rooftop runoff will be directed to the storm sewer.
- Stream Daylighting: The existing wetland/ stream on site will remain intact and undisturbed.
- Rain Gardens: Rain gardens are not practical in this development due to size of the project. Bioretention facilities are proposed.
- Green Roofs: Green roofs will not be used to treat runoff from the proposed buildings. Rooftop runoff will be directed to the storm sewer and treated through proposed stormwater management facilities.
- Stormwater Planters: Stormwater Planters will not be used to treat runoff from the proposed buildings due to space limitations/ constraints.
- Rain Barrels/Cisterns: Rain Barrels/ Cisterns will not be used be used to treat runoff from the proposed buildings. Infrequent use of the collection system by the property owner could cause unintended discharge of the collected water.
- Porous Pavement: Porous pavement will not be used to treat runoff because of “D” soils.

DURATION OF ACTIVITY

Earth moving activities including the construction of the stormwater Wet Ponds is proposed to begin after all necessary local and state approvals have been granted and be completed within 2 years.

POLLUTION PREVENTION CONTROL MEASURES

Temporary stabilization practices for this site include siltation fence, stone and block inlet protection in paved areas; filter fabric drop inlet protection of new inlets and stabilized construction entrances on Kendaia Road. See drawing numbers C3320-CA130 and C3320-CA502 entitled "Grading and Erosion Control Plan" and "Detail Sheet" for additional Erosion and Sediment Control Details and Notes.

ONSITE CONSTRUCTION MATERIAL STORAGE

All site work shall be performed in accordance with Title 29 of the Federal Regulations, Part 1926 Safety and Health Regulations for Construction (OSHA). In addition, the site subcontractor shall follow all material management practices that will reduce the risk of exposure of any material to stormwater runoff. The site subcontractor shall adhere to all of the following construction practices in regard to material storage:

- All materials shall be stored in an orderly manner with their appropriate manufacturer's labels and storage recommendations visible, and where possible, store any spillable materials under a roof or in a storage container.
- Materials should not be mixed with one another unless recommended by the manufacturer. All materials mixed or not mixed shall be sealed properly when not being used.
- Subcontractor shall follow manufacturer's storage recommendations for proper storage of all materials, and a regular inspection shall be made.
- Every vehicle shall be checked for leakage regularly and stored in the designated area. Any containers used to store petroleum or other liquids for vehicles shall be stored in proper containers and in a place protected from spilling or mixing with other liquids and placed in secondary containment.
- Subcontractor shall provide proper storage for fertilizers, herbicides, pesticides and paints with manufacturer's labels and storage recommendations visible. All fertilizers, herbicides, pesticides and paints shall be applied using the minimum amount recommended by the manufacturer.

In addition to the standard management practices to be followed above, the sites subcontractor shall also follow the following spill clean-up procedures:

- Spills of petroleum, toxins or hazardous materials will be reported to the New York State Health Department and the New York State Department of Environmental Conservation.
- Manufacturer's recommended methods for spill clean up will be clearly posted and site personnel will be made aware of the procedures and location of clean up supplies.
- Materials and equipment necessary for clean up will be kept in a material storage area onsite to be identified by the site subcontractor.
- Equipment and materials will include, but not be limited to brooms, dust pans, mops, rags, gloves, goggles, speed-dry, sand, sawdust and trash containers.
- Spills will be cleaned up immediately upon discovery.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with the spilled substance.

- A spill report will be completed and filed on site.

TEMPORARY AND PERMANENT EROSION CONTROL MEASURES

All erosion and sediment control measures were designed in accordance with the New York State Standards and Specifications for Erosion and Sediment Control." The site subcontractor shall adhere to all erosion and sediment control measures shown on the Storm Water Pollution Prevention Plan provided in the Appendix. The following temporary measures must be followed to control any potential pollutants leaving the construction site.

- Installation of Erosion & Sediment Control Practices. Erosion and Sediment Control Practices shall be in place prior to beginning any mass earthwork operations.
- Clearing and grubbing.
- Mass earthwork operations including construction of wet ponds.
- Grade areas for building pads and parking lot.
- Installation of the proposed building foundations.
- Installation of the proposed storm sewer inlets and pipes.
- Installation of the proposed, sanitary sewer and water utility laterals.
- Construction of the parking lots.
- Final grading.
- Permanent stabilization with topsoil, seed, and mulch as specified.
- Construction of the bio-retention facilities and installation of landscaping.
- In addition to these measures, the contractor shall comply with whatever additional measures may be required as ordered by the Town of Romulus.

These activities shall be performed in such a manner that all components of activities will be completed and stabilized with vegetation and compacted stone base on the road before proceeding to the next section.

The following permanent stabilization procedures shall be implemented:

- Disturbed portions of the site where construction activities have been completed shall be stabilized with topsoil, permanent seed and covered with straw no later than 7 days after the last construction activity has occurred. Soil amendments shall be added where required.
- All disturbed areas shall be restored in accordance with Chapter 5, Table 5.3 of the 2015 New York State Stormwater Management Design Manual.

LOCATION OF EROSION CONTROL MEASURES

See Grading and Erosion Sediment Control Plan, drawing number C3320-CA130 and C3320-CA502 for location, size and lengths of erosion control measures.

IMPLEMENTATION SCHEDULE

Stabilization measures shall initiate as soon as practicable in portion of the site where construction activities have temporarily or permanently ceased, however, in no case more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased. This requirement does not apply in the following instances:

- Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently ceased is precluded by snow cover or frozen ground conditions, stabilization measures shall be initiated as soon as practicable. Temporary stabilization with straw tracked into the disturbed areas is required.

The onsite construction supervisor shall visually inspect all erosion control measures daily. Any measure that is damaged or becomes inoperative shall be replaced immediately. All erosion/sediment control measures must remain in place and properly inspected and operable until all disturbed areas have been seeded and germination has been obtained.

MAINTENANCE AND INSPECTION SCHEDULE

A qualified site supervisor shall assess the site prior to construction beginning and certify in an inspection report that all erosion and sediment facilities have been completely and properly installed and functional. Once construction begins, an inspection shall be done every seven (7) day. The following should be included in the inspectors report following each site visit:

- On a site map, indicate the extent of all disturbed site areas and drainage pathways. Indicate site areas that are expected to undergo initial disturbance or significant site work within the next 14-day period.
- Indicate on a site plan areas that have had temporary or permanent stabilization.
- Indicate on a site plan areas that have not had active site work within the past 14 days.
- All erosion and sediment controls shall be inspected and the approximate percent of remaining silt storage capacity (in the sediment trap basins) shall be reported in the inspection report on a weekly basis.
- Inspection of erosion and sediment control practices and any maintenance requirements should be recorded. Depths of sediment should be measured, and effectiveness should be recorded. If any
- methods of erosion or sediment control are found to be inadequate, a recommendation should be made that would bring all facilities to standards set forth by the NYSDEC.
- An on site logbook shall be maintained and weekly inspections should be kept updated and available for permitting authorities upon request. Prior to construction, the site supervisor shall certify in the site logbook that the SWPPP prepared in accordance with stormwater permit GP-0-15-002 meets all Federal, and State erosion and sediment control requirements. Prior to filing notice of Termination or the end of the permit, the site supervisor shall perform a final site inspection. The site supervisor shall report that 80% germination has been completed. The report should also state all erosion and sediment methods have been removed.

IMPLEMENTATION OF RESPONSIBILITY

Each contractor(s) and subcontractor(s) shall be responsible for implementing the SWPPP temporary practices, structures and controls. The owner shall be responsible for implementing all permanent operation and maintenance practices and procedures. All contractor(s) and subcontractor(s) and owner shall sign the certification statement. Any new contractor(s) or subcontractor(s) must likewise be added to the certification.

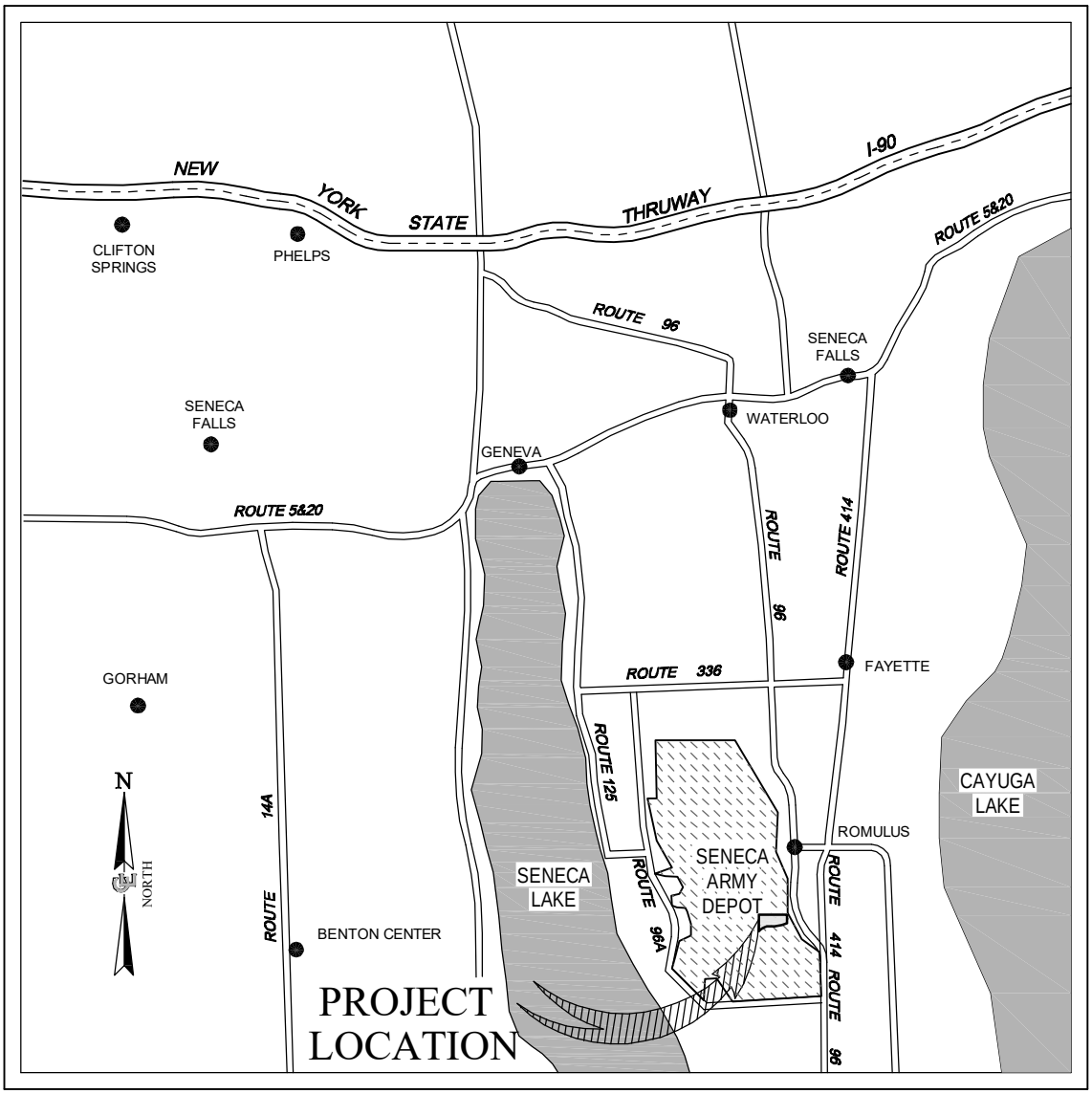
POST-CONSTRUCTION OPERATIONS AND MAINTENANCE

Circular enerG LLC shall be responsible for the long term maintenance and continuation of stormwater control measures for the development. Refer to the NYSDEC's standard maintenance checklist located in Appendix 3 of this SWPPP. The owner shall maintain, clean, repair, replace (if necessary) the stormwater control measures for the site. The facility owner shall be responsible for all expenses related to maintenance of the stormwater management facilities. The facility owner shall provide periodic inspection of stormwater control measures, not less than once every three-year period to determine the condition and integrity of the measures.

CONCLUSION

Stormwater runoff from the proposed development site will be captured and conveyed to the proposed storm water management facilities. The storm water management facilities will provide 1 through 100-year storm event peak flow attenuation for the site as well as water quality, runoff reduction and stream channel protection volumes. Design and construction criteria conform with the "New York State Department of Environmental Conservation's Phase II Stormwater Rules" and the "New York State Stormwater Management Design Manual", dated January 2015 in association with "SPDES General Permit for Stormwater Discharges from Construction Activity", dated January, 2015 (GP-0-15-002).

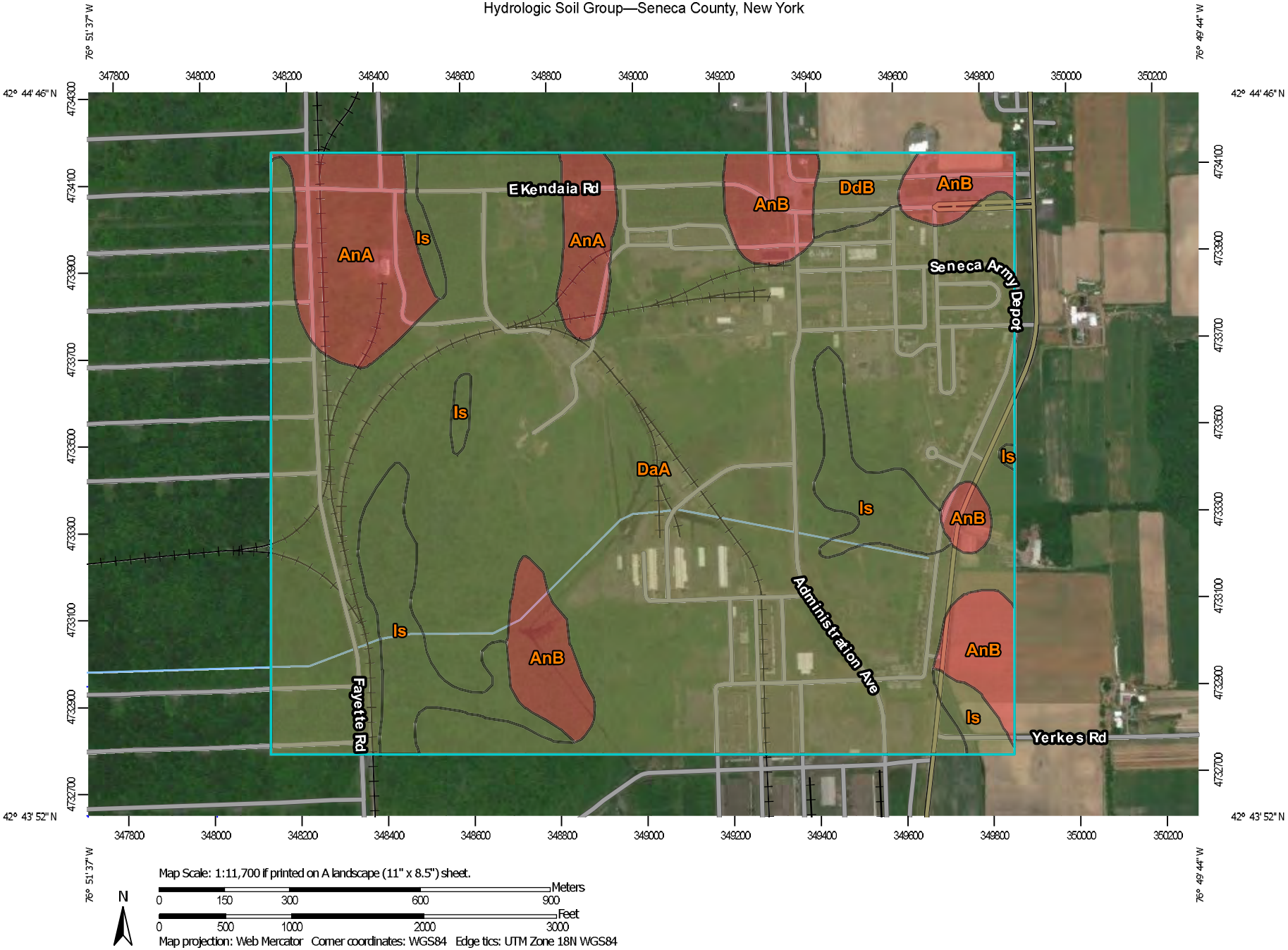
APPENDIX I



LOCATION MAP

NOT TO SCALE

Hydrologic Soil Group—Seneca County, New York



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Seneca County, New York
Survey Area Data: Version 13, Sep 24, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 22, 2013—Oct 11, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Seneca County, New York (NY099)				
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AnA	Angola silt loam, 0 to 3 percent slopes	D	43.7	7.4%
AnB	Angola silt loam, 3 to 8 percent slopes	D	46.8	7.9%
DaA	Darien silt loam, 0 to 3 percent slopes	C/D	445.3	75.4%
DdB	Darien-Danley-Cazenovia silt loams, 3 to 8 percent slopes	C/D	8.2	1.4%
Is	Ilion silty clay loam	C/D	46.8	7.9%
Totals for Area of Interest			**590.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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Please set your printer orientation to "Landscape".

SENECA DEPOT

MinX: 347840, MaxX: 350223, MinY: 4734284, MaxY: 4732783

Visible Layers

- Major Roads
- Regulated MS4s
  - Automatic
  - Designation 2003
  - Designation 2008
  - Designation 2010
- Planimetric Maps
- Towns

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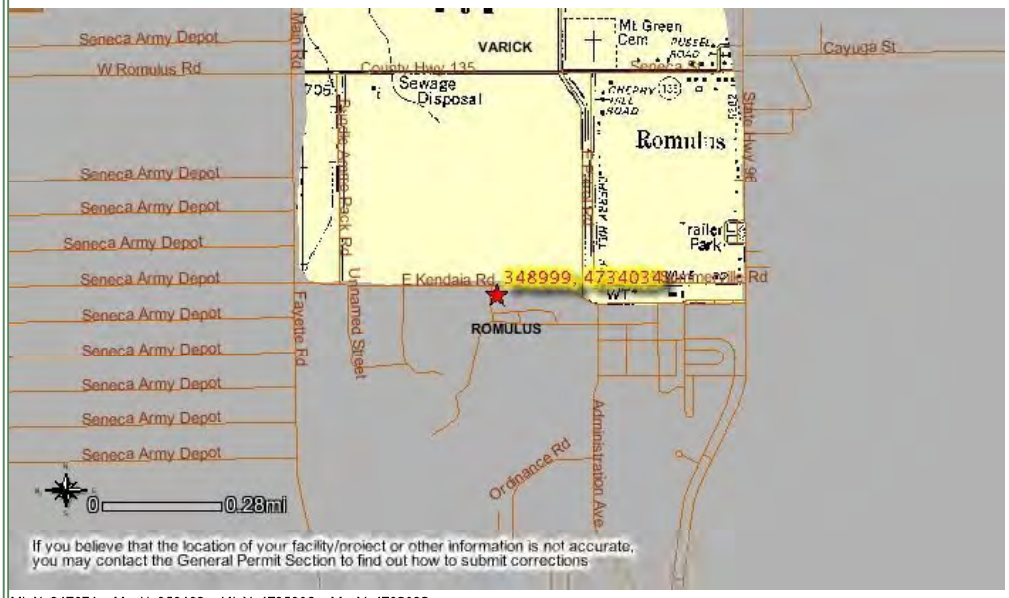
Please set your printer orientation to "Landscape".

SENECA DEPOT

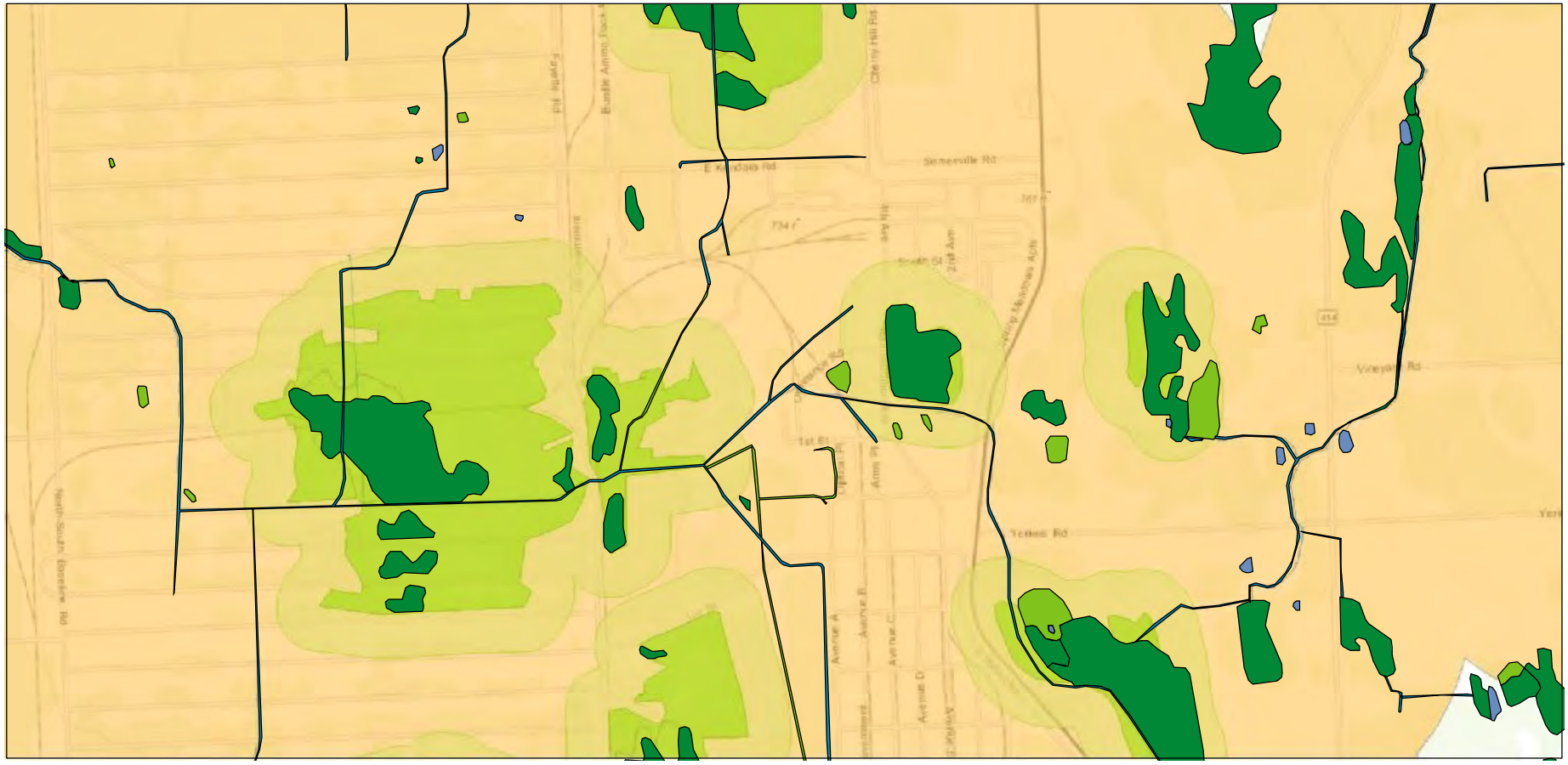


MinX: 347671, MaxX: 350402, MinY: 4735096, MaxY: 4732938

Visible Layers

- Major Roads
- Regulated MS4s
  - Automatic
  - Designation 2003
  - Designation 2008
  - Designation 2010
- 303D Streams Construction
- 303D Estuary Construction
- 303D Lake Construction
- Class AA AAS Watersheds
- Planimetric Maps
- Towns

SENECA DEPOT



September 18, 2017

1:18,056

0 0.2 0.4 0.8 mi

0 0.35 0.7 1.4 km

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

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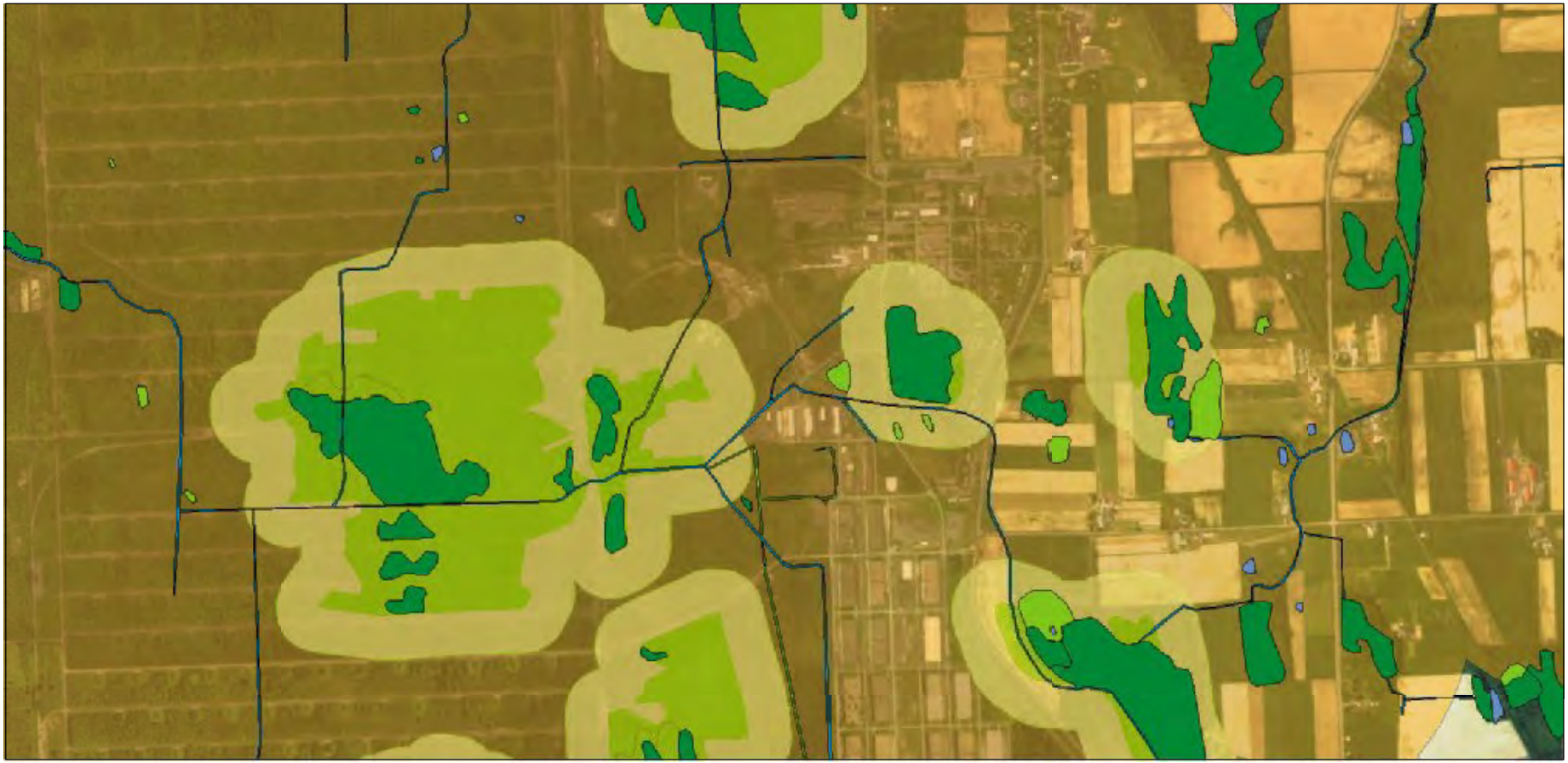
SENECA DEPOT



September 18, 2017

1:18,056

0 0.2 0.4 0.8 mi

0 0.35 0.7 1.4 km

Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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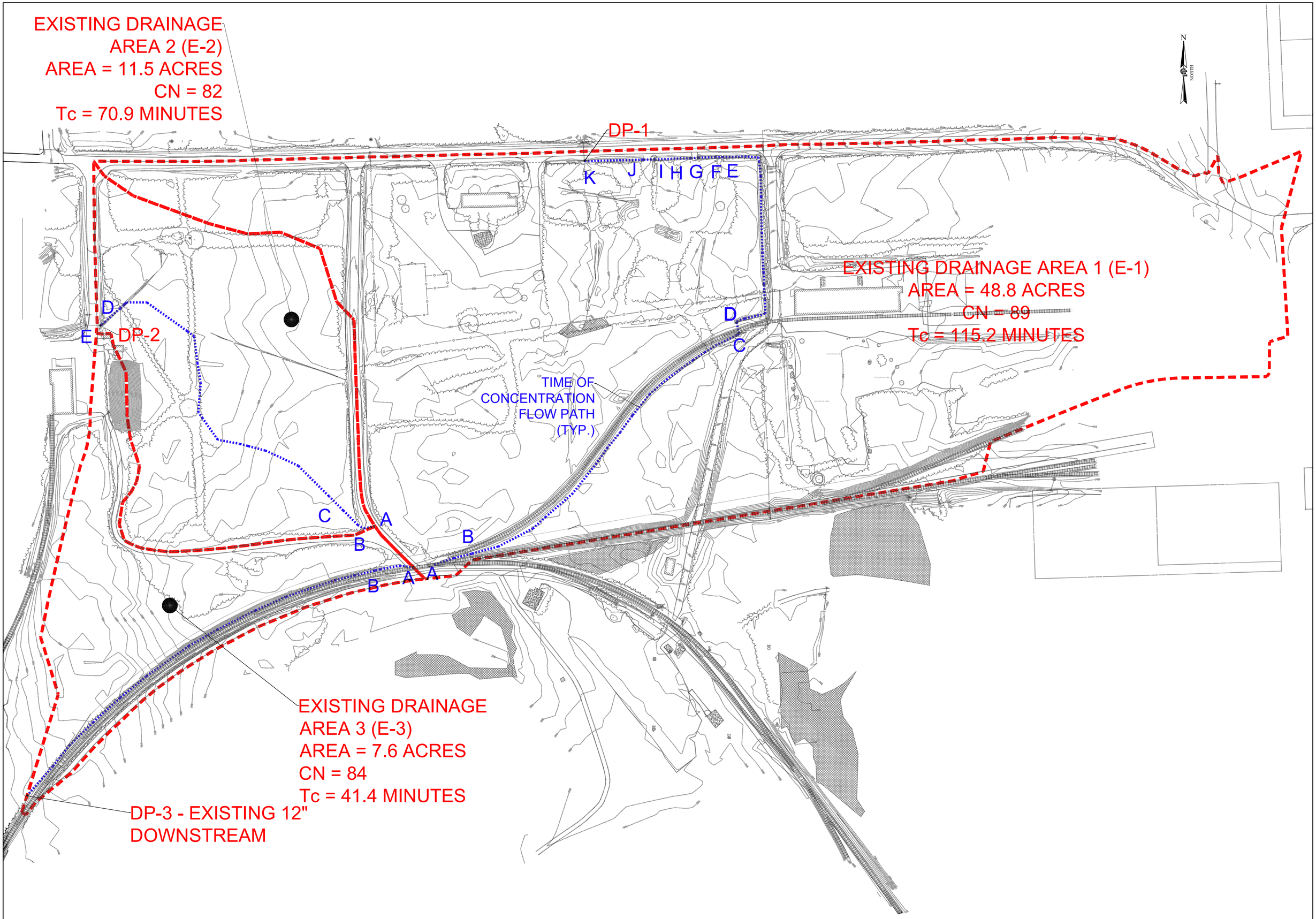

EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF, OR CLOSELY PARALLEL TO, OR UNDER, THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES. THE CONTRACTOR SHALL ALSO NOTIFY UNDERGROUND UTILITY LOCATION SERVICE AT LEAST 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft. 34" x 44"
1 inch = 160 ft. 17" x 22"

NO.	DATE	REVISION	BY	CHKD.	APVLS.

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STATE OF NEW YORK
MARK R. CONSTICH
Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: ---
TOPOGRAPHY: D.T.H.
DATE: 10/30/2017
SCALE: 1"=80'

Costich Engineering

- Civil Engineering
- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

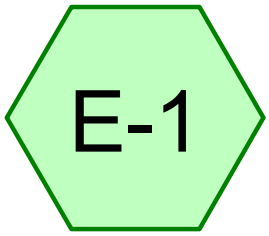
TITLE OF PROJECT: CIRCULAR enerG FACILITY

TITLE OF DRAWING: EXISTING DRAINAGE AREA MAP

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS, COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG # 3320
DE100
SHEET 1 OF 1



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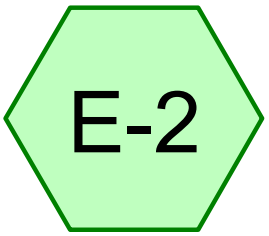

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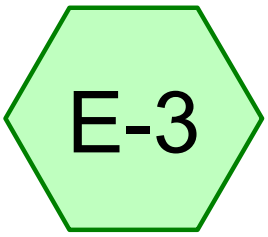

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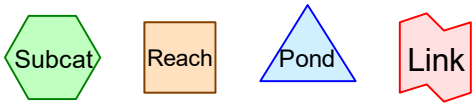


Routing Diagram for EXISTING
Prepared by Costich Engineering, D.P.C, Printed 11/2/2017
HydroCAD® 10.00-20 s/n 08278 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.000	96	Gravel surface, HSG D (E-1, E-3)
16.200	98	Paved parking, HSG D (E-1, E-2, E-3)
0.920	98	Roofs, HSG D (E-1, E-2, E-3)
45.800	82	Woods/grass comb., Fair, HSG D (E-1, E-2, E-3)
67.920	87	TOTAL AREA

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
67.920	HSG D	E-1, E-2, E-3
0.000	Other	
67.920		TOTAL AREA

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	5.000	0.000	5.000	Gravel surface	E-1, E-3
0.000	0.000	0.000	16.200	0.000	16.200	Paved parking	E-1, E-2, E-3
0.000	0.000	0.000	0.920	0.000	0.920	Roofs	E-1, E-2, E-3
0.000	0.000	0.000	45.800	0.000	45.800	Woods/grass comb., Fair	E-1, E-2, E-3
0.000	0.000	0.000	67.920	0.000	67.920	TOTAL AREA	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	E-1	0.00	0.00	30.0	0.0150	0.020	18.0	0.0	0.0
2	E-1	0.00	0.00	20.0	0.0190	0.025	15.0	0.0	0.0
3	E-1	0.00	0.00	22.0	0.0168	0.025	15.0	0.0	0.0
4	E-1	0.00	0.00	30.0	0.0083	0.013	15.0	0.0	0.0
5	E-1	0.00	0.00	48.0	0.0021	0.013	24.0	0.0	0.0
6	E-2	0.00	0.00	38.0	0.0266	0.020	12.0	0.0	0.0

Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: E-1
Runoff Area=48.800 ac 33.61% Impervious Runoff Depth>1.16"
Flow Length=2,003' Tc=115.2 min CN=89 Runoff=19.00 cfs 4.710 af

Subcatchment E-2: E-2
Runoff Area=11.510 ac 1.82% Impervious Runoff Depth>0.77"
Flow Length=1,071' Tc=70.9 min CN=82 Runoff=3.99 cfs 0.734 af

Subcatchment E-3: E-3
Runoff Area=7.610 ac 6.70% Impervious Runoff Depth>0.82"
Flow Length=1,160' Tc=41.4 min CN=83 Runoff=4.22 cfs 0.523 af

Total Runoff Area = 67.920 ac Runoff Volume = 5.967 af Average Runoff Depth = 1.05"
74.79% Pervious = 50.800 ac 25.21% Impervious = 17.120 ac

Summary for Subcatchment E-1: E-1

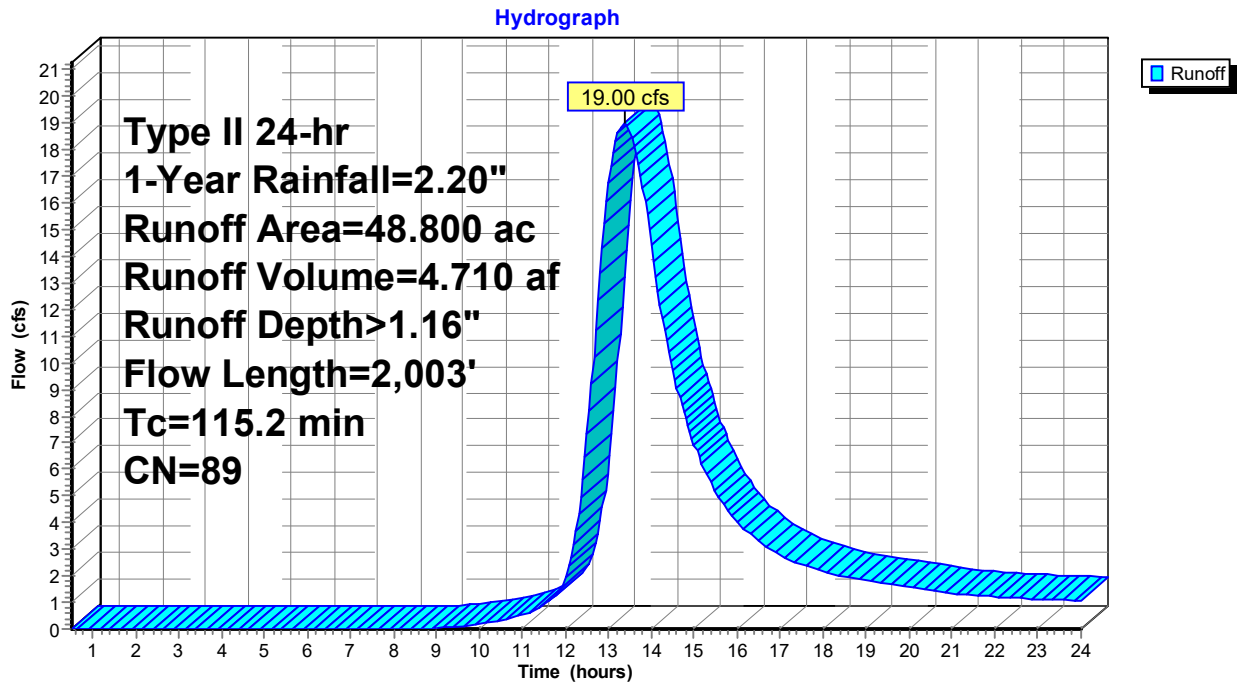
Runoff = 19.00 cfs @ 13.39 hrs, Volume= 4.710 af, Depth> 1.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
15.500	98	Paved parking, HSG D
4.800	96	Gravel surface, HSG D
0.900	98	Roofs, HSG D
27.600	82	Woods/grass comb., Fair, HSG D
48.800	89	Weighted Average
32.400		66.39% Pervious Area
16.400		33.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
51.7	100	0.0121	0.03		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
57.9	903	0.0027	0.26		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.1	30	0.0150	4.73	8.36	Pipe Channel, C-D PIPE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.020 Corrugated PE, corrugated interior
1.9	567	0.0061	5.07	202.90	Parabolic Channel, D-E DITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.1	20	0.0190	3.77	4.63	Pipe Channel, E-F PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
0.2	41	0.0076	4.16	49.91	Parabolic Channel, F-G DITCH W=9.00' D=2.00' Area=12.0 sf Perim=10.1' n= 0.035 Earth, dense weeds
0.1	22	0.0168	3.55	4.35	Pipe Channel, G-H PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.4	90	0.0001	0.63	17.59	Parabolic Channel, H-I DITCH W=14.00' D=3.00' Area=28.0 sf Perim=15.6' n= 0.035 Earth, dense weeds
0.1	30	0.0083	4.80	5.89	Pipe Channel, I-J PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.5	152	0.0074	5.52	187.52	Parabolic Channel, J-K DITCH W=17.00' D=3.00' Area=34.0 sf Perim=18.3' n= 0.035 Earth, dense weeds
0.2	48	0.0021	3.30	10.37	Pipe Channel, K-L PIPE DISCHARGE POINT 1 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
115.2	2,003	Total			

Subcatchment E-1: E-1



Summary for Subcatchment E-2: E-2

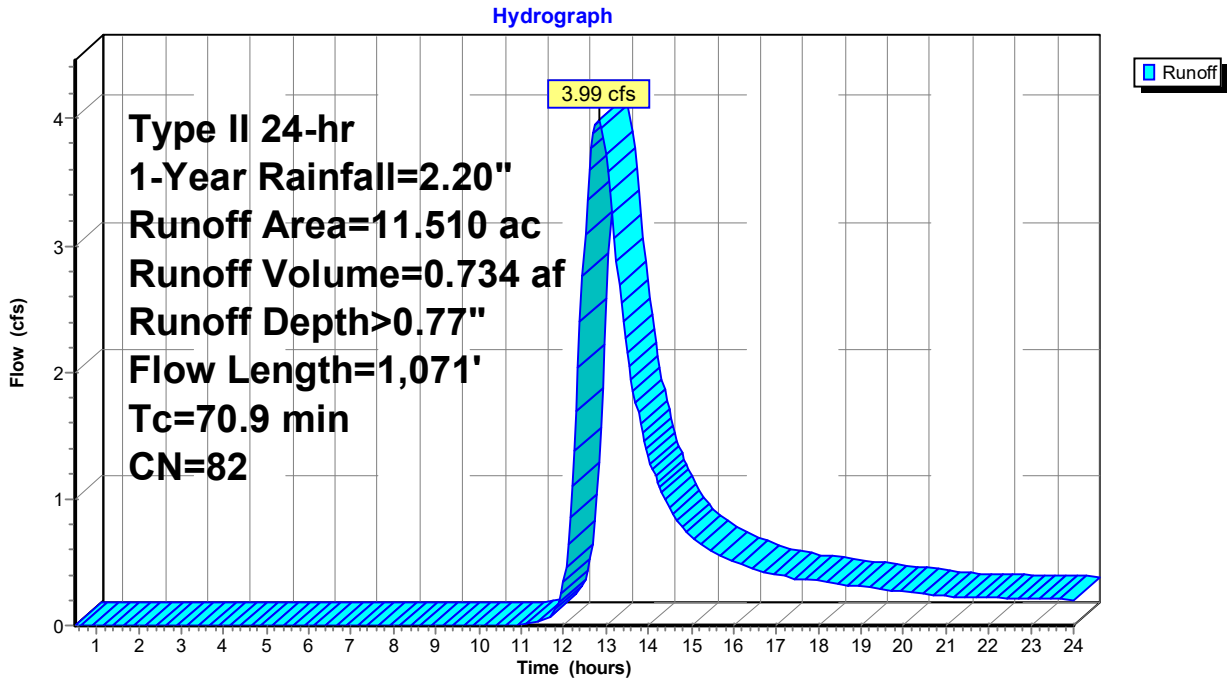
Runoff = 3.99 cfs @ 12.82 hrs, Volume= 0.734 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.010	98	Roofs, HSG D
11.300	82	Woods/grass comb., Fair, HSG D
11.510	82	Weighted Average
11.300		98.18% Pervious Area
0.210		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	28	0.0012	0.31		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
38.5	72	0.0131	0.03		Sheet Flow, B-C SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
30.8	933	0.0102	0.50		Shallow Concentrated Flow, C-D SHALLOW Woodland Kv= 5.0 fps
0.1	38	0.0266	4.81	3.78	Pipe Channel, D-E DISCHARGE POINT 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.020 Corrugated PE, corrugated interior
70.9	1,071	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

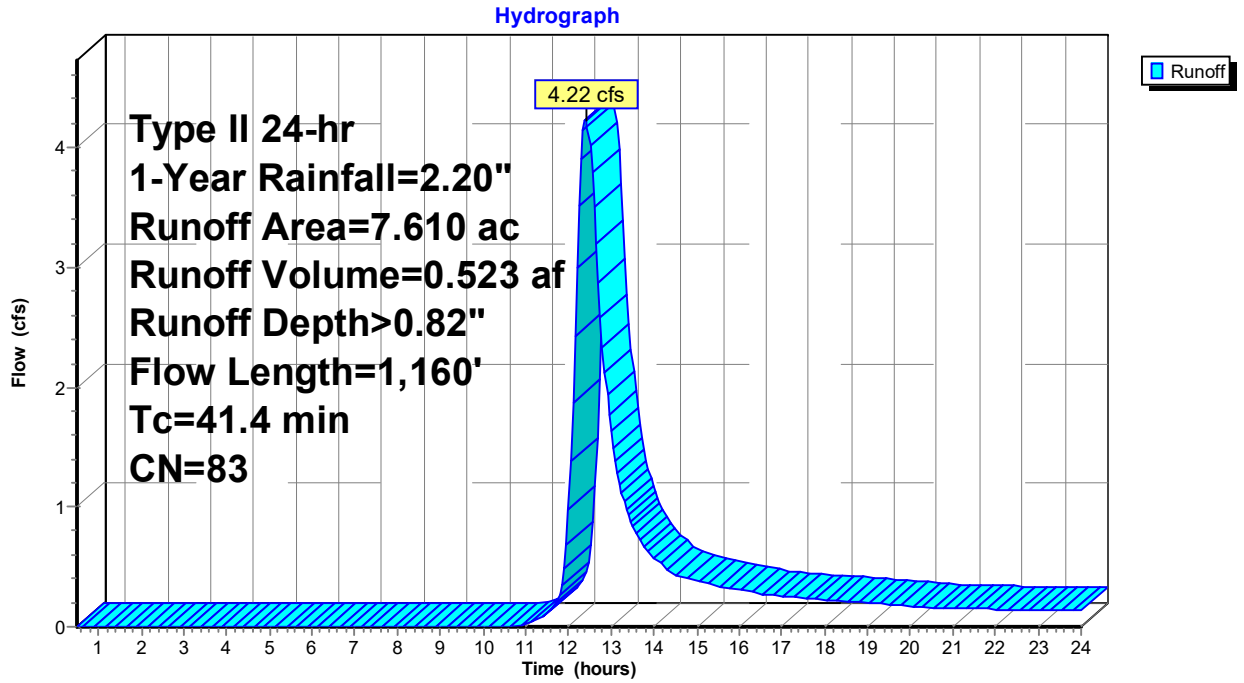
Runoff = 4.22 cfs @ 12.41 hrs, Volume= 0.523 af, Depth> 0.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
0.200	96	Gravel surface, HSG D
0.010	98	Roofs, HSG D
6.900	82	Woods/grass comb., Fair, HSG D
7.610	83	Weighted Average
7.100		93.30% Pervious Area
0.510		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.4	100	0.0272	0.04		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
4.0	1,060	0.0094	4.45	41.50	Parabolic Channel, B-C DITCH DISCHARGE POINT 3 W=7.00' D=2.00' Area=9.3 sf Perim=8.3' n= 0.035 Earth, dense weeds
41.4	1,160	Total			

Subcatchment E-3: E-3



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: E-1
Runoff Area=48.800 ac 33.61% Impervious Runoff Depth>1.41"
Flow Length=2,003' Tc=115.2 min CN=89 Runoff=23.21 cfs 5.736 af

Subcatchment E-2: E-2
Runoff Area=11.510 ac 1.82% Impervious Runoff Depth>0.98"
Flow Length=1,071' Tc=70.9 min CN=82 Runoff=5.19 cfs 0.936 af

Subcatchment E-3: E-3
Runoff Area=7.610 ac 6.70% Impervious Runoff Depth>1.04"
Flow Length=1,160' Tc=41.4 min CN=83 Runoff=5.44 cfs 0.661 af

Total Runoff Area = 67.920 ac Runoff Volume = 7.333 af Average Runoff Depth = 1.30"
74.79% Pervious = 50.800 ac 25.21% Impervious = 17.120 ac

Summary for Subcatchment E-1: E-1

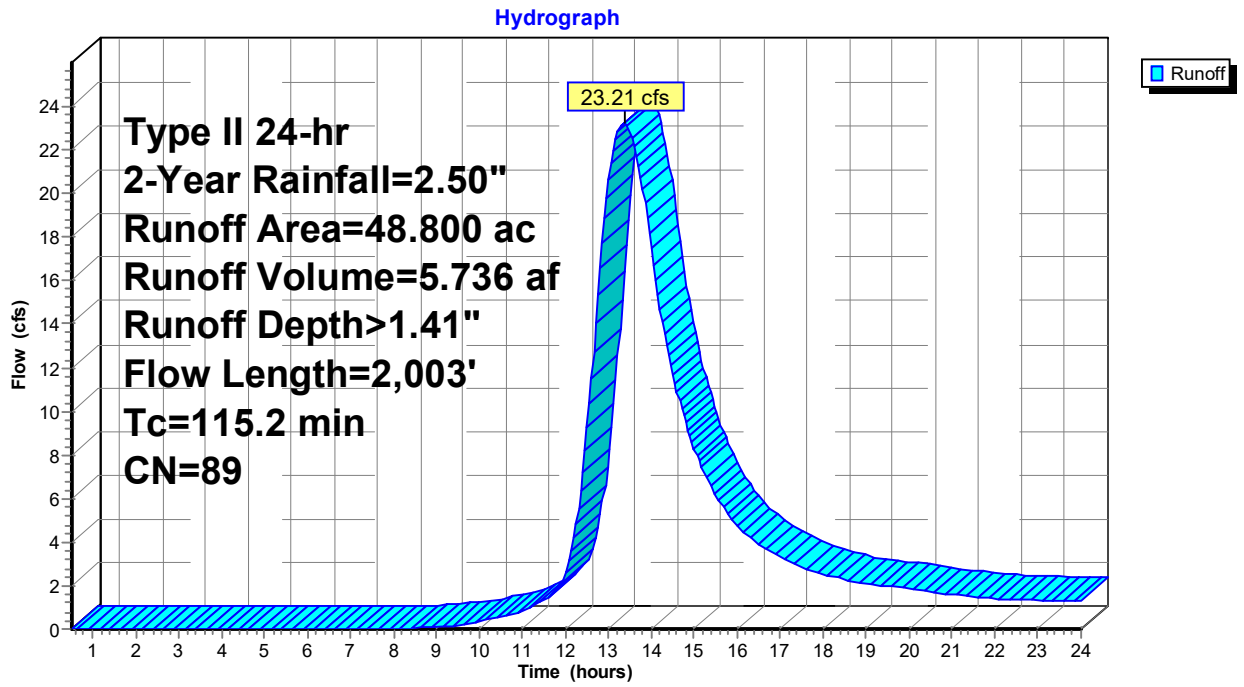
Runoff = 23.21 cfs @ 13.38 hrs, Volume= 5.736 af, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
15.500	98	Paved parking, HSG D
4.800	96	Gravel surface, HSG D
0.900	98	Roofs, HSG D
27.600	82	Woods/grass comb., Fair, HSG D
48.800	89	Weighted Average
32.400		66.39% Pervious Area
16.400		33.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
51.7	100	0.0121	0.03		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
57.9	903	0.0027	0.26		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.1	30	0.0150	4.73	8.36	Pipe Channel, C-D PIPE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.020 Corrugated PE, corrugated interior
1.9	567	0.0061	5.07	202.90	Parabolic Channel, D-E DITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.1	20	0.0190	3.77	4.63	Pipe Channel, E-F PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
0.2	41	0.0076	4.16	49.91	Parabolic Channel, F-G DITCH W=9.00' D=2.00' Area=12.0 sf Perim=10.1' n= 0.035 Earth, dense weeds
0.1	22	0.0168	3.55	4.35	Pipe Channel, G-H PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.4	90	0.0001	0.63	17.59	Parabolic Channel, H-I DITCH W=14.00' D=3.00' Area=28.0 sf Perim=15.6' n= 0.035 Earth, dense weeds
0.1	30	0.0083	4.80	5.89	Pipe Channel, I-J PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.5	152	0.0074	5.52	187.52	Parabolic Channel, J-K DITCH W=17.00' D=3.00' Area=34.0 sf Perim=18.3' n= 0.035 Earth, dense weeds
0.2	48	0.0021	3.30	10.37	Pipe Channel, K-L PIPE DISCHARGE POINT 1 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
115.2	2,003	Total			

Subcatchment E-1: E-1



Summary for Subcatchment E-2: E-2

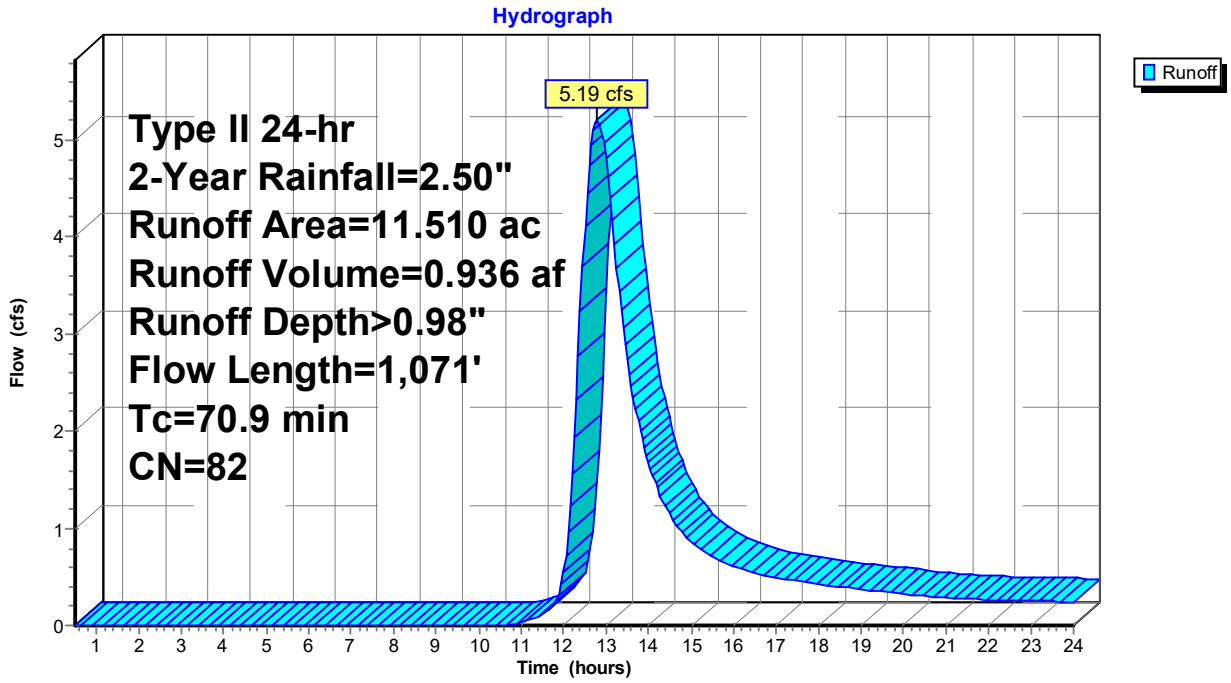
Runoff = 5.19 cfs @ 12.81 hrs, Volume= 0.936 af, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.010	98	Roofs, HSG D
11.300	82	Woods/grass comb., Fair, HSG D
11.510	82	Weighted Average
11.300		98.18% Pervious Area
0.210		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	28	0.0012	0.31		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
38.5	72	0.0131	0.03		Sheet Flow, B-C SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
30.8	933	0.0102	0.50		Shallow Concentrated Flow, C-D SHALLOW Woodland Kv= 5.0 fps
0.1	38	0.0266	4.81	3.78	Pipe Channel, D-E DISCHARGE POINT 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.020 Corrugated PE, corrugated interior
70.9	1,071	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

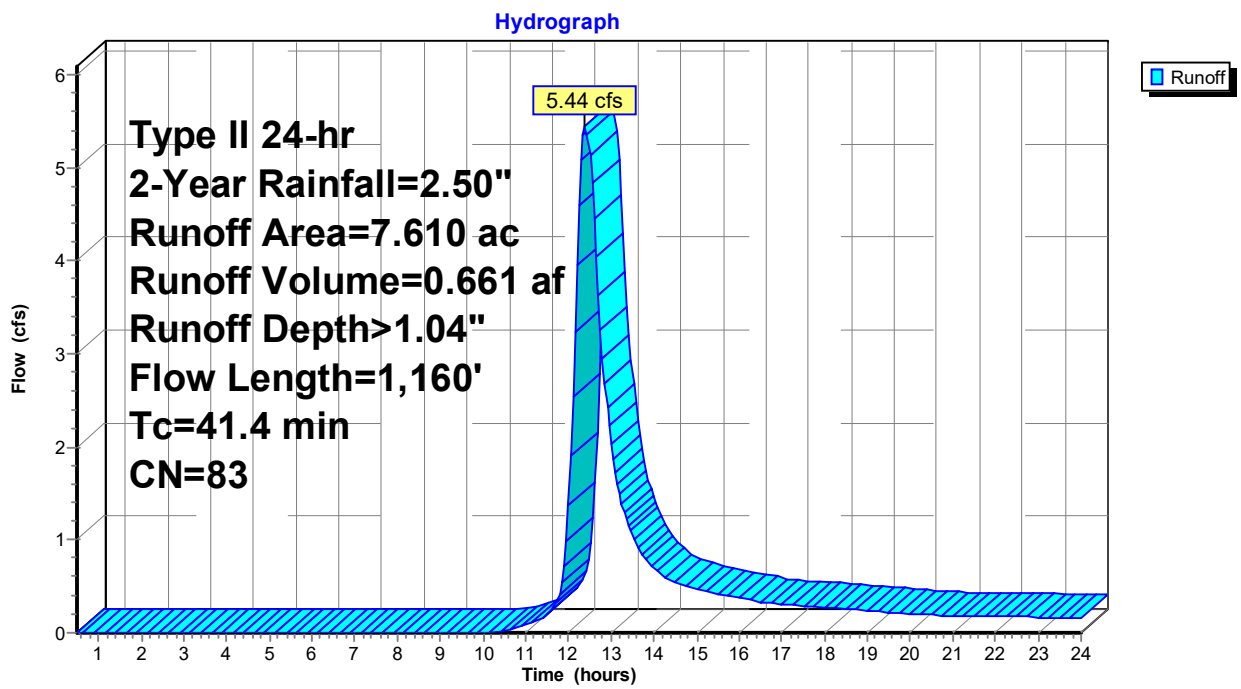
Runoff = 5.44 cfs @ 12.40 hrs, Volume= 0.661 af, Depth> 1.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
0.200	96	Gravel surface, HSG D
0.010	98	Roofs, HSG D
6.900	82	Woods/grass comb., Fair, HSG D
7.610	83	Weighted Average
7.100		93.30% Pervious Area
0.510		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.4	100	0.0272	0.04		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
4.0	1,060	0.0094	4.45	41.50	Parabolic Channel, B-C DITCH DISCHARGE POINT 3 W=7.00' D=2.00' Area=9.3 sf Perim=8.3' n= 0.035 Earth, dense weeds
41.4	1,160	Total			

Subcatchment E-3: E-3



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: E-1
Runoff Area=48.800 ac 33.61% Impervious Runoff Depth>2.56"
Flow Length=2,003' Tc=115.2 min CN=89 Runoff=42.14 cfs 10.427 af

Subcatchment E-2: E-2
Runoff Area=11.510 ac 1.82% Impervious Runoff Depth>1.99"
Flow Length=1,071' Tc=70.9 min CN=82 Runoff=10.98 cfs 1.913 af

Subcatchment E-3: E-3
Runoff Area=7.610 ac 6.70% Impervious Runoff Depth>2.09"
Flow Length=1,160' Tc=41.4 min CN=83 Runoff=11.18 cfs 1.326 af

Total Runoff Area = 67.920 ac Runoff Volume = 13.666 af Average Runoff Depth = 2.41"
74.79% Pervious = 50.800 ac 25.21% Impervious = 17.120 ac

Summary for Subcatchment E-1: E-1

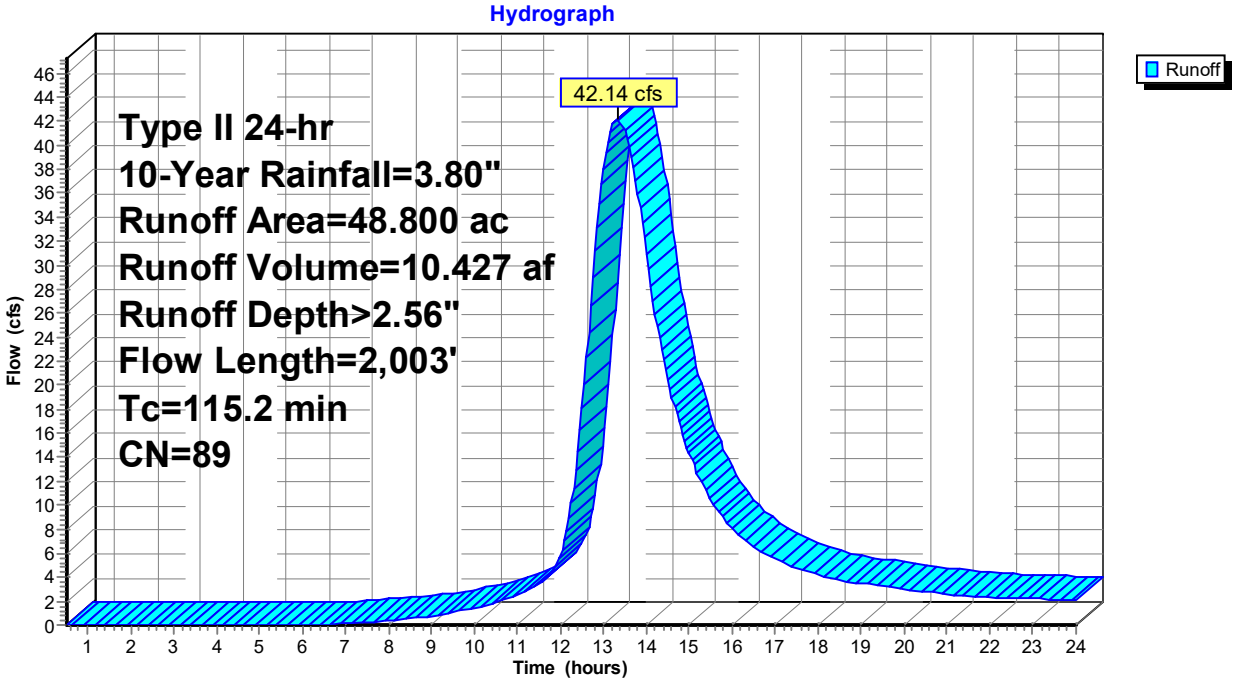
Runoff = 42.14 cfs @ 13.32 hrs, Volume= 10.427 af, Depth> 2.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
15.500	98	Paved parking, HSG D
4.800	96	Gravel surface, HSG D
0.900	98	Roofs, HSG D
27.600	82	Woods/grass comb., Fair, HSG D
48.800	89	Weighted Average
32.400		66.39% Pervious Area
16.400		33.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
51.7	100	0.0121	0.03		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
57.9	903	0.0027	0.26		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.1	30	0.0150	4.73	8.36	Pipe Channel, C-D PIPE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.020 Corrugated PE, corrugated interior
1.9	567	0.0061	5.07	202.90	Parabolic Channel, D-E DITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.1	20	0.0190	3.77	4.63	Pipe Channel, E-F PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
0.2	41	0.0076	4.16	49.91	Parabolic Channel, F-G DITCH W=9.00' D=2.00' Area=12.0 sf Perim=10.1' n= 0.035 Earth, dense weeds
0.1	22	0.0168	3.55	4.35	Pipe Channel, G-H PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.4	90	0.0001	0.63	17.59	Parabolic Channel, H-I DITCH W=14.00' D=3.00' Area=28.0 sf Perim=15.6' n= 0.035 Earth, dense weeds
0.1	30	0.0083	4.80	5.89	Pipe Channel, I-J PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.5	152	0.0074	5.52	187.52	Parabolic Channel, J-K DITCH W=17.00' D=3.00' Area=34.0 sf Perim=18.3' n= 0.035 Earth, dense weeds
0.2	48	0.0021	3.30	10.37	Pipe Channel, K-L PIPE DISCHARGE POINT 1 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
115.2	2,003	Total			

Subcatchment E-1: E-1



Summary for Subcatchment E-2: E-2

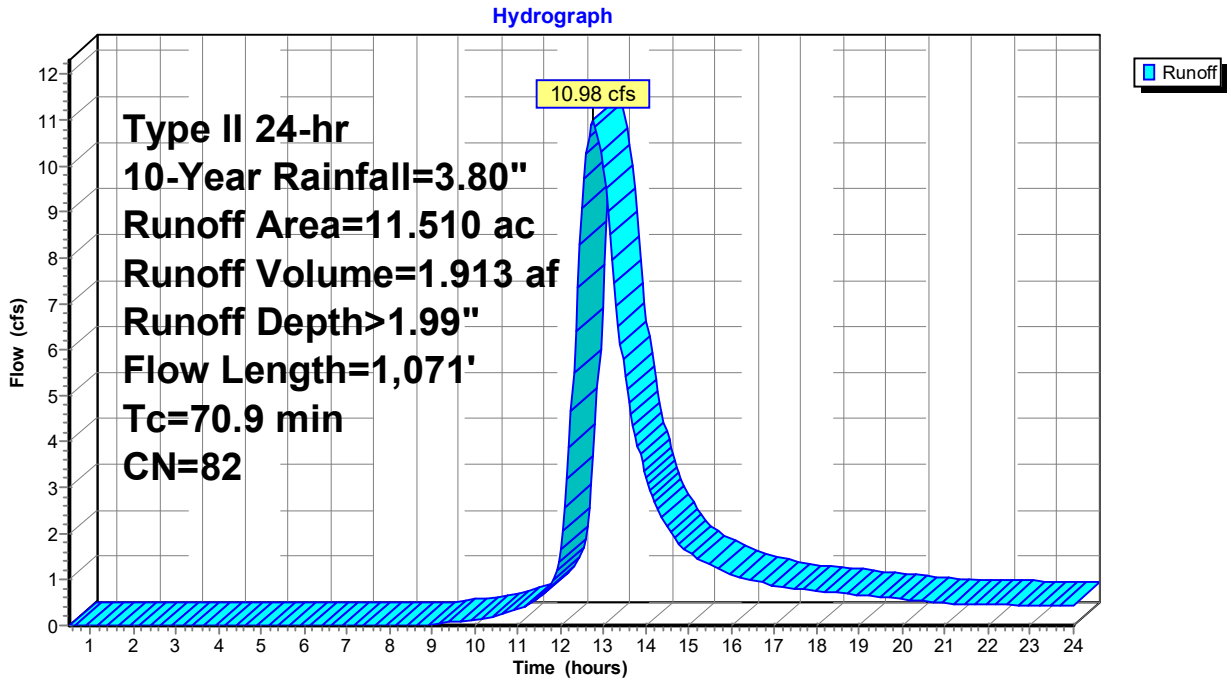
Runoff = 10.98 cfs @ 12.77 hrs, Volume= 1.913 af, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.010	98	Roofs, HSG D
11.300	82	Woods/grass comb., Fair, HSG D
11.510	82	Weighted Average
11.300		98.18% Pervious Area
0.210		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	28	0.0012	0.31		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
38.5	72	0.0131	0.03		Sheet Flow, B-C SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
30.8	933	0.0102	0.50		Shallow Concentrated Flow, C-D SHALLOW Woodland Kv= 5.0 fps
0.1	38	0.0266	4.81	3.78	Pipe Channel, D-E DISCHARGE POINT 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.020 Corrugated PE, corrugated interior
70.9	1,071	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

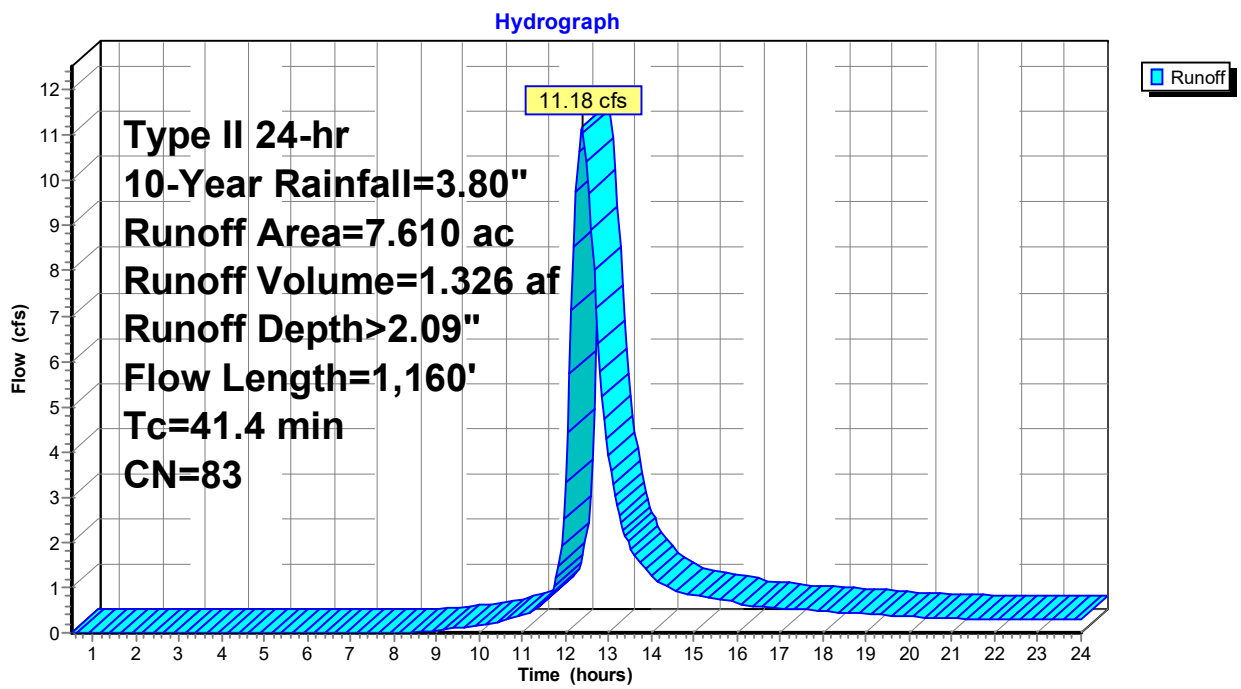
Runoff = 11.18 cfs @ 12.39 hrs, Volume= 1.326 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
0.200	96	Gravel surface, HSG D
0.010	98	Roofs, HSG D
6.900	82	Woods/grass comb., Fair, HSG D
7.610	83	Weighted Average
7.100		93.30% Pervious Area
0.510		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.4	100	0.0272	0.04		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
4.0	1,060	0.0094	4.45	41.50	Parabolic Channel, B-C DITCH DISCHARGE POINT 3 W=7.00' D=2.00' Area=9.3 sf Perim=8.3' n= 0.035 Earth, dense weeds
41.4	1,160	Total			

Subcatchment E-3: E-3



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: E-1
Runoff Area=48.800 ac 33.61% Impervious Runoff Depth>3.12"
Flow Length=2,003' Tc=115.2 min CN=89 Runoff=51.03 cfs 12.671 af

Subcatchment E-2: E-2
Runoff Area=11.510 ac 1.82% Impervious Runoff Depth>2.50"
Flow Length=1,071' Tc=70.9 min CN=82 Runoff=13.84 cfs 2.400 af

Subcatchment E-3: E-3
Runoff Area=7.610 ac 6.70% Impervious Runoff Depth>2.61"
Flow Length=1,160' Tc=41.4 min CN=83 Runoff=13.98 cfs 1.655 af

Total Runoff Area = 67.920 ac Runoff Volume = 16.726 af Average Runoff Depth = 2.96"
74.79% Pervious = 50.800 ac 25.21% Impervious = 17.120 ac

Summary for Subcatchment E-1: E-1

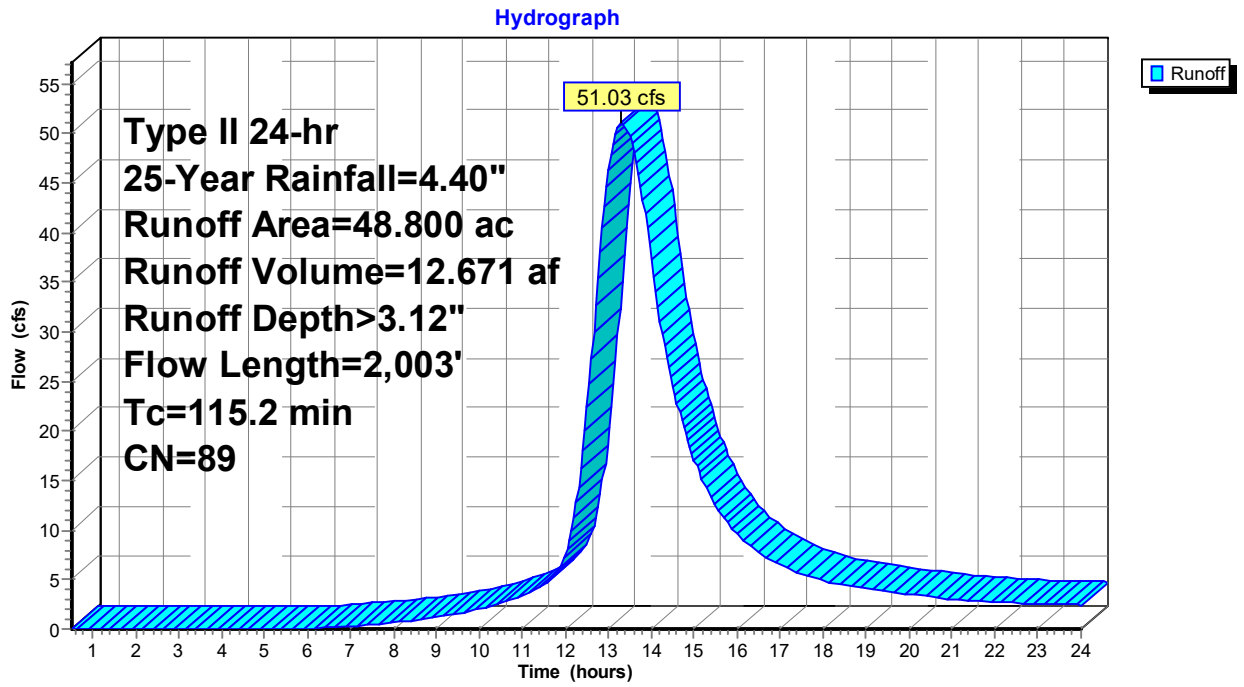
Runoff = 51.03 cfs @ 13.32 hrs, Volume= 12.671 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
15.500	98	Paved parking, HSG D
4.800	96	Gravel surface, HSG D
0.900	98	Roofs, HSG D
27.600	82	Woods/grass comb., Fair, HSG D
48.800	89	Weighted Average
32.400		66.39% Pervious Area
16.400		33.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
51.7	100	0.0121	0.03		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
57.9	903	0.0027	0.26		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.1	30	0.0150	4.73	8.36	Pipe Channel, C-D PIPE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.020 Corrugated PE, corrugated interior
1.9	567	0.0061	5.07	202.90	Parabolic Channel, D-E DITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.1	20	0.0190	3.77	4.63	Pipe Channel, E-F PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
0.2	41	0.0076	4.16	49.91	Parabolic Channel, F-G DITCH W=9.00' D=2.00' Area=12.0 sf Perim=10.1' n= 0.035 Earth, dense weeds
0.1	22	0.0168	3.55	4.35	Pipe Channel, G-H PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.4	90	0.0001	0.63	17.59	Parabolic Channel, H-I DITCH W=14.00' D=3.00' Area=28.0 sf Perim=15.6' n= 0.035 Earth, dense weeds
0.1	30	0.0083	4.80	5.89	Pipe Channel, I-J PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.5	152	0.0074	5.52	187.52	Parabolic Channel, J-K DITCH W=17.00' D=3.00' Area=34.0 sf Perim=18.3' n= 0.035 Earth, dense weeds
0.2	48	0.0021	3.30	10.37	Pipe Channel, K-L PIPE DISCHARGE POINT 1 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
115.2	2,003	Total			

Subcatchment E-1: E-1



Summary for Subcatchment E-2: E-2

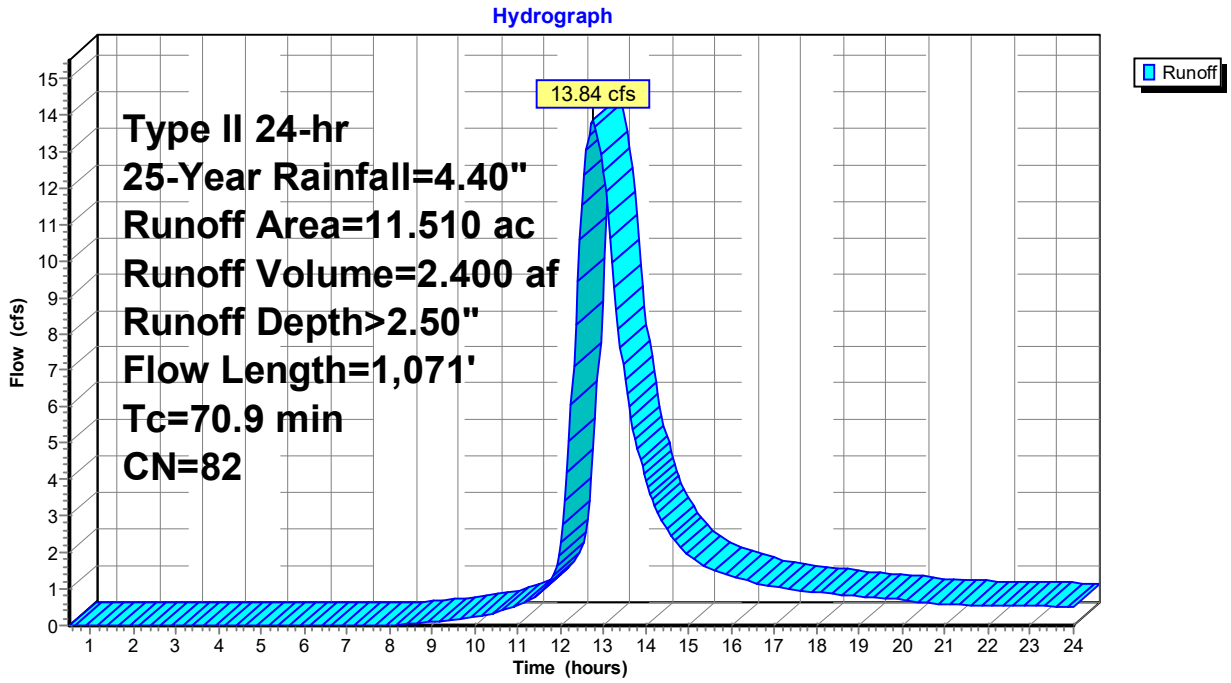
Runoff = 13.84 cfs @ 12.76 hrs, Volume= 2.400 af, Depth> 2.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.010	98	Roofs, HSG D
11.300	82	Woods/grass comb., Fair, HSG D
11.510	82	Weighted Average
11.300		98.18% Pervious Area
0.210		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	28	0.0012	0.31		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
38.5	72	0.0131	0.03		Sheet Flow, B-C SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
30.8	933	0.0102	0.50		Shallow Concentrated Flow, C-D SHALLOW Woodland Kv= 5.0 fps
0.1	38	0.0266	4.81	3.78	Pipe Channel, D-E DISCHARGE POINT 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.020 Corrugated PE, corrugated interior
70.9	1,071	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

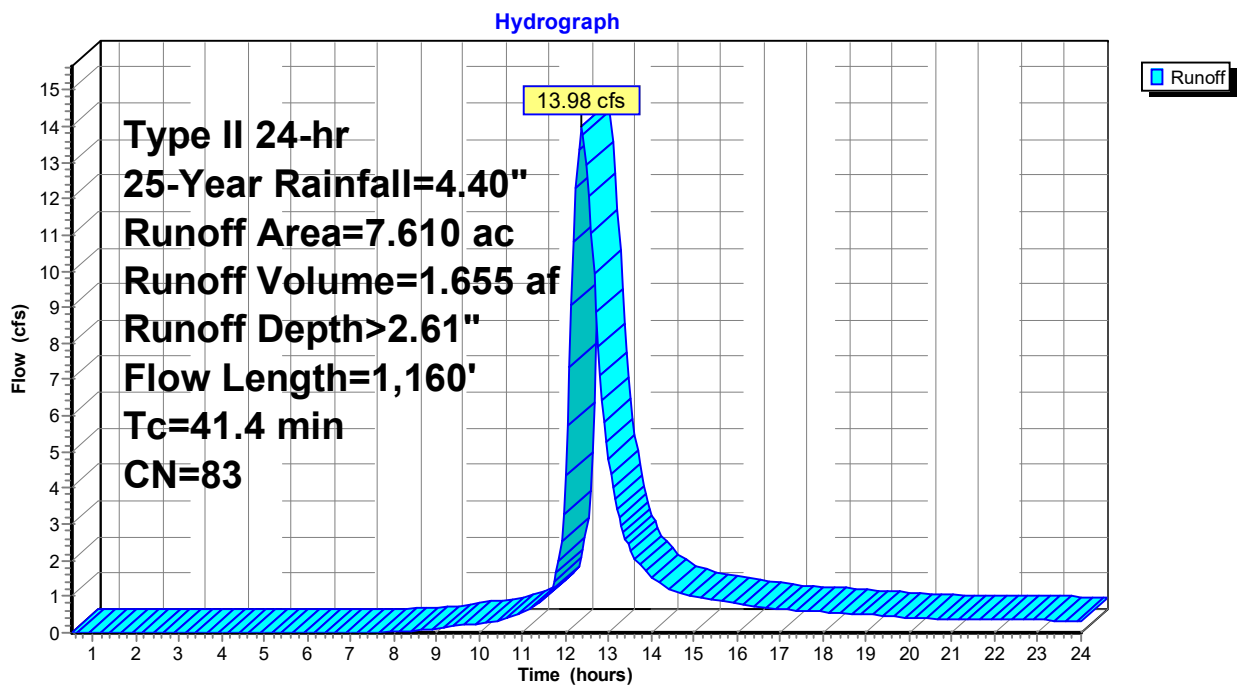
Runoff = 13.98 cfs @ 12.38 hrs, Volume= 1.655 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
0.200	96	Gravel surface, HSG D
0.010	98	Roofs, HSG D
6.900	82	Woods/grass comb., Fair, HSG D
7.610	83	Weighted Average
7.100		93.30% Pervious Area
0.510		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.4	100	0.0272	0.04		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
4.0	1,060	0.0094	4.45	41.50	Parabolic Channel, B-C DITCH DISCHARGE POINT 3 W=7.00' D=2.00' Area=9.3 sf Perim=8.3' n= 0.035 Earth, dense weeds
41.4	1,160	Total			

Subcatchment E-3: E-3



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1: E-1
Runoff Area=48.800 ac 33.61% Impervious Runoff Depth>3.86"
Flow Length=2,003' Tc=115.2 min CN=89 Runoff=62.91 cfs 15.708 af

Subcatchment E-2: E-2
Runoff Area=11.510 ac 1.82% Impervious Runoff Depth>3.20"
Flow Length=1,071' Tc=70.9 min CN=82 Runoff=17.74 cfs 3.071 af

Subcatchment E-3: E-3
Runoff Area=7.610 ac 6.70% Impervious Runoff Depth>3.32"
Flow Length=1,160' Tc=41.4 min CN=83 Runoff=17.79 cfs 2.107 af

Total Runoff Area = 67.920 ac Runoff Volume = 20.886 af Average Runoff Depth = 3.69"
74.79% Pervious = 50.800 ac 25.21% Impervious = 17.120 ac

Summary for Subcatchment E-1: E-1

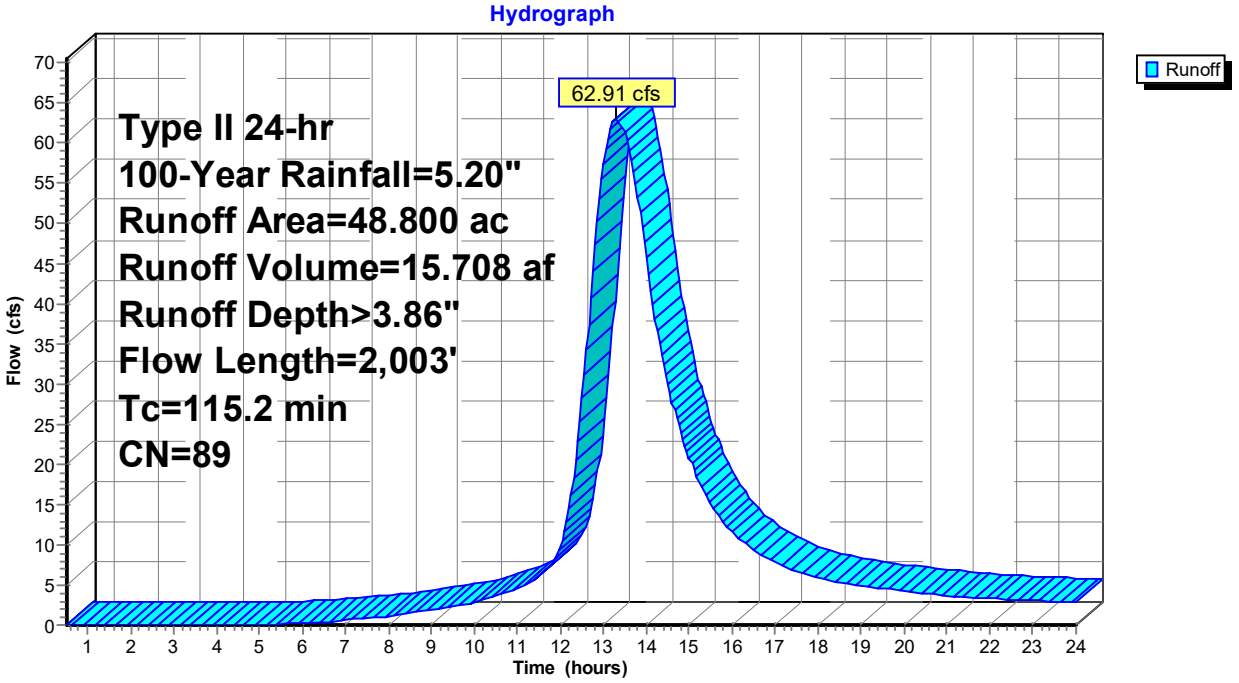
Runoff = 62.91 cfs @ 13.31 hrs, Volume= 15.708 af, Depth> 3.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
15.500	98	Paved parking, HSG D
4.800	96	Gravel surface, HSG D
0.900	98	Roofs, HSG D
27.600	82	Woods/grass comb., Fair, HSG D
48.800	89	Weighted Average
32.400		66.39% Pervious Area
16.400		33.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
51.7	100	0.0121	0.03		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
57.9	903	0.0027	0.26		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.1	30	0.0150	4.73	8.36	Pipe Channel, C-D PIPE 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.020 Corrugated PE, corrugated interior
1.9	567	0.0061	5.07	202.90	Parabolic Channel, D-E DITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.1	20	0.0190	3.77	4.63	Pipe Channel, E-F PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
0.2	41	0.0076	4.16	49.91	Parabolic Channel, F-G DITCH W=9.00' D=2.00' Area=12.0 sf Perim=10.1' n= 0.035 Earth, dense weeds
0.1	22	0.0168	3.55	4.35	Pipe Channel, G-H PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.025 Corrugated metal
2.4	90	0.0001	0.63	17.59	Parabolic Channel, H-I DITCH W=14.00' D=3.00' Area=28.0 sf Perim=15.6' n= 0.035 Earth, dense weeds
0.1	30	0.0083	4.80	5.89	Pipe Channel, I-J PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
0.5	152	0.0074	5.52	187.52	Parabolic Channel, J-K DITCH W=17.00' D=3.00' Area=34.0 sf Perim=18.3' n= 0.035 Earth, dense weeds
0.2	48	0.0021	3.30	10.37	Pipe Channel, K-L PIPE DISCHARGE POINT 1 24.0" Round Area= 3.1 sf Perim= 6.3' r= 0.50' n= 0.013 Corrugated PE, smooth interior
115.2	2,003	Total			

Subcatchment E-1: E-1



Summary for Subcatchment E-2: E-2

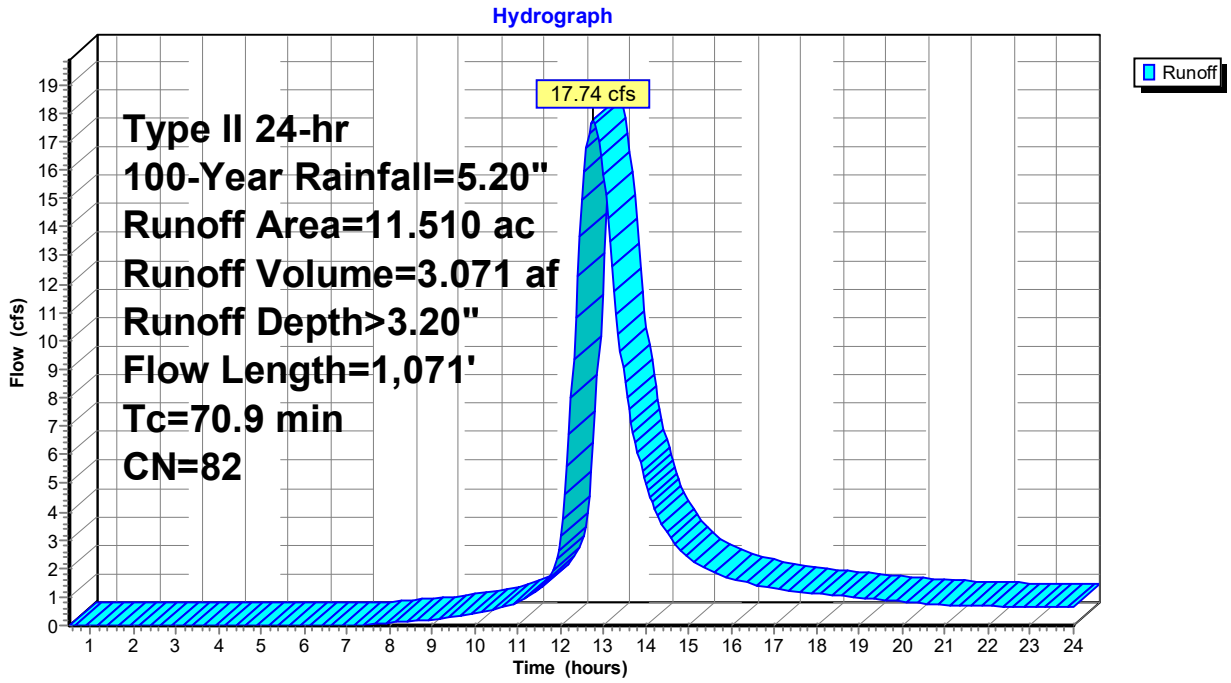
Runoff = 17.74 cfs @ 12.75 hrs, Volume= 3.071 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
0.200	98	Paved parking, HSG D
0.010	98	Roofs, HSG D
11.300	82	Woods/grass comb., Fair, HSG D
11.510	82	Weighted Average
11.300		98.18% Pervious Area
0.210		1.82% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	28	0.0012	0.31		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
38.5	72	0.0131	0.03		Sheet Flow, B-C SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
30.8	933	0.0102	0.50		Shallow Concentrated Flow, C-D SHALLOW Woodland Kv= 5.0 fps
0.1	38	0.0266	4.81	3.78	Pipe Channel, D-E DISCHARGE POINT 2 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.020 Corrugated PE, corrugated interior
70.9	1,071	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

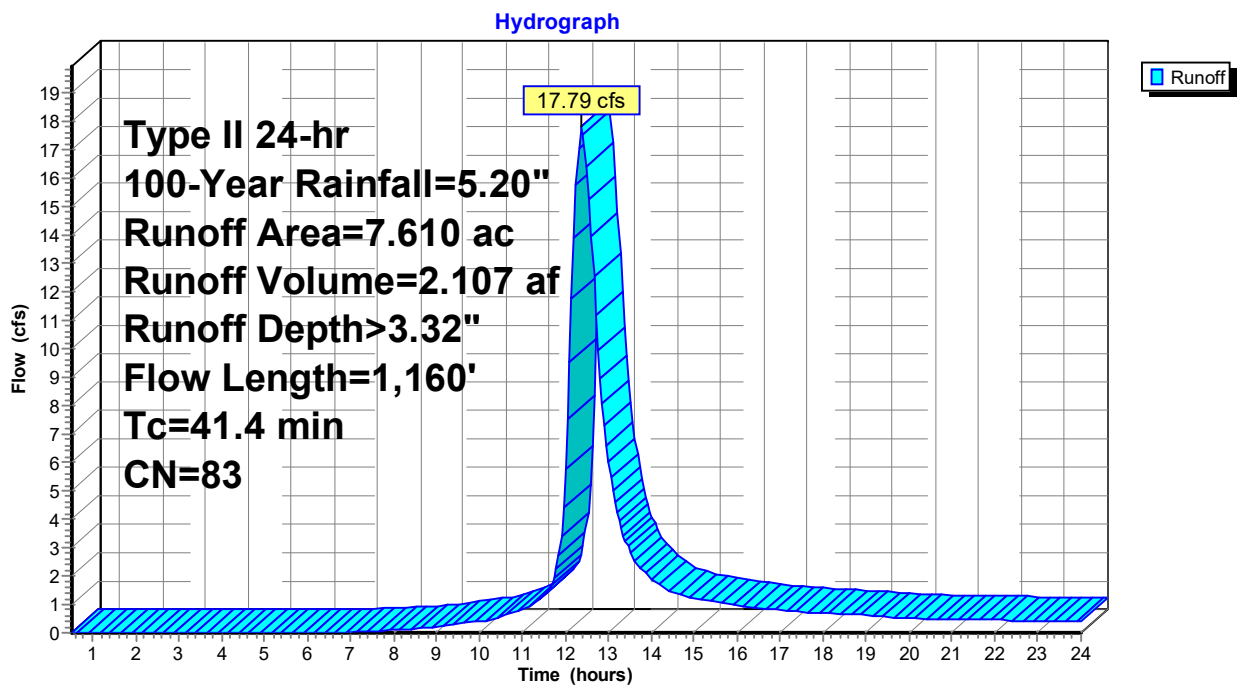
Runoff = 17.79 cfs @ 12.38 hrs, Volume= 2.107 af, Depth> 3.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

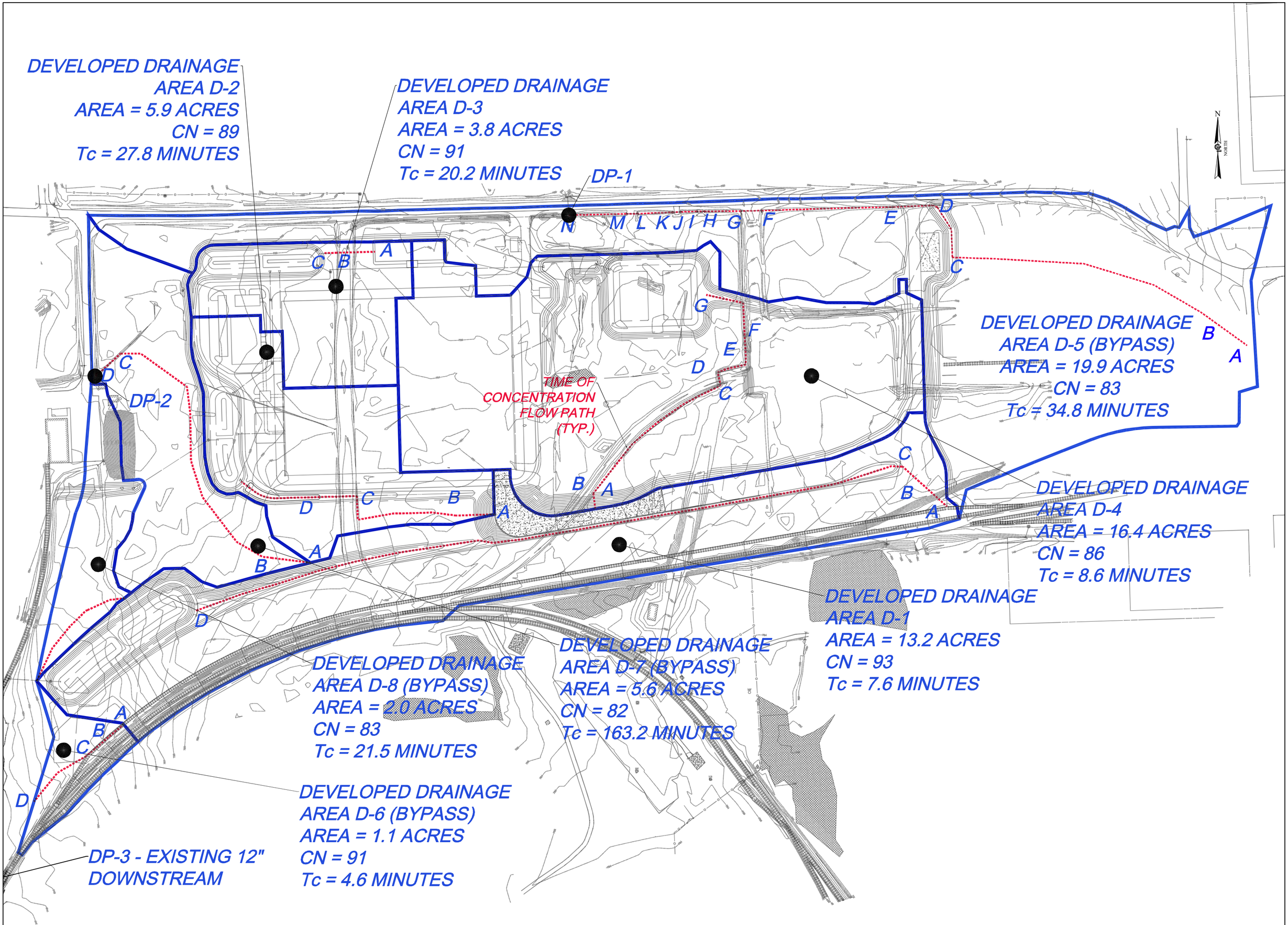
Area (ac)	CN	Description
0.500	98	Paved parking, HSG D
0.200	96	Gravel surface, HSG D
0.010	98	Roofs, HSG D
6.900	82	Woods/grass comb., Fair, HSG D
7.610	83	Weighted Average
7.100		93.30% Pervious Area
0.510		6.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
37.4	100	0.0272	0.04		Sheet Flow, A-B SHEET Woods: Dense underbrush n= 0.800 P2= 2.50"
4.0	1,060	0.0094	4.45	41.50	Parabolic Channel, B-C DITCH DISCHARGE POINT 3 W=7.00' D=2.00' Area=9.3 sf Perim=8.3' n= 0.035 Earth, dense weeds
41.4	1,160	Total			

Subcatchment E-3: E-3



APPENDIX II



EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF, OR CLOSELY PARALLEL TO, OR UNDER, THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES. THE CONTRACTOR SHALL ALSO NOTIFY UNDERGROUND UTILITY LOCATION SERVICE AT LEAST 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft. 34" x 44"
1 inch = 160 ft. 17" x 22"

NO.	DATE	REVISION	BY	CHKD.	APVLS.

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COSTICH ENGINEERING, D.P.C.

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STATE OF NEW YORK
MARK R. COSTICH
No. 065971
Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: - - -
TOPOBASE: D.T.H.
DATE: 10/30/2017
SCALE: 1"=80'

Costich Engineering

- Civil Engineering
- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

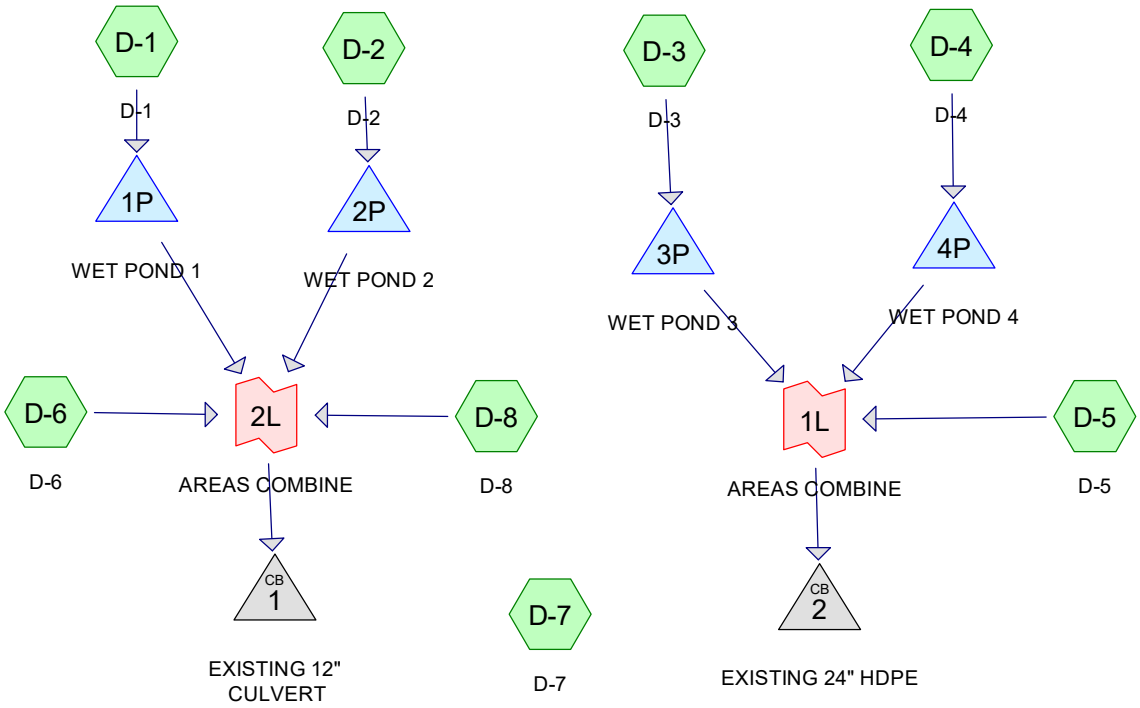
TITLE OF PROJECT: CIRCULAR enerG FACILITY

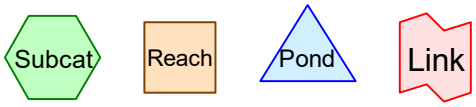
TITLE OF DRAWING: DEVELOPED DRAINAGE AREA MAP

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS,
COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG # 3320
DE101
SHEET 1 OF 1





Routing Diagram for DEVELOPED
Prepared by Costich Engineering, D.P.C, Printed 11/2/2017
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.100	80	>75% Grass cover, Good, HSG D (D-1, D-2, D-3, D-6)
4.700	96	Gravel surface, HSG D (D-1, D-5, D-6)
2.610	98	Paved parking, HSG D (D-5, D-6, D-7, D-8)
10.000	98	Paved roads w/curbs & sewers, HSG D (D-1, D-2, D-3, D-4)
7.020	98	Unconnected roofs, HSG D (D-2, D-3, D-4, D-5, D-7, D-8)
19.900	82	Woods/grass comb., Fair, HSG D (D-4, D-7, D-8)
15.600	79	Woods/grass comb., Good, HSG D (D-5)
67.930	87	TOTAL AREA

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
67.930	HSG D	D-1, D-2, D-3, D-4, D-5, D-6, D-7, D-8
0.000	Other	
67.930		TOTAL AREA

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	8.100	0.000	8.100	>75% Grass cover, Good	D-1, D-2, D-3, D-6
0.000	0.000	0.000	4.700	0.000	4.700	Gravel surface	D-1, D-5, D-6
0.000	0.000	0.000	2.610	0.000	2.610	Paved parking	D-5, D-6, D-7, D-8
0.000	0.000	0.000	10.000	0.000	10.000	Paved roads w/curbs & sewers	D-1, D-2, D-3, D-4
0.000	0.000	0.000	7.020	0.000	7.020	Unconnected roofs	D-2, D-3, D-4, D-5, D-7, D-8
0.000	0.000	0.000	19.900	0.000	19.900	Woods/grass comb., Fair	D-4, D-7, D-8
0.000	0.000	0.000	15.600	0.000	15.600	Woods/grass comb., Good	D-5
0.000	0.000	0.000	67.930	0.000	67.930	TOTAL AREA	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	D-5	0.00	0.00	100.0	0.0050	0.013	15.0	0.0	0.0
2	D-5	0.00	0.00	55.0	0.0125	0.011	15.0	0.0	0.0
3	D-5	0.00	0.00	20.0	0.0190	0.011	15.0	0.0	0.0
4	D-5	0.00	0.00	22.0	0.0168	0.011	15.0	0.0	0.0
5	D-5	0.00	0.00	30.0	0.0083	0.035	15.0	0.0	0.0
6	1	713.00	712.50	40.0	0.0125	0.011	12.0	0.0	0.0
7	1P	718.50	718.00	100.0	0.0050	0.013	12.0	0.0	0.0
8	2	724.04	723.94	48.0	0.0021	0.013	24.0	0.0	0.0
9	2P	726.50	724.00	100.0	0.0250	0.013	12.0	0.0	0.0
10	3P	726.50	726.00	100.0	0.0050	0.013	12.0	0.0	0.0
11	4P	725.50	724.50	160.0	0.0063	0.013	12.0	0.0	0.0

Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment D-1: D-1
Runoff Area=13.200 ac 54.55% Impervious Runoff Depth>1.50"
Flow Length=1,885' Tc=7.6 min CN=93 Runoff=31.80 cfs 1.647 af

Subcatchment D-2: D-2
Runoff Area=5.900 ac 52.54% Impervious Runoff Depth>1.19"
Flow Length=736' Tc=27.8 min CN=89 Runoff=6.42 cfs 0.584 af

Subcatchment D-3: D-3
Runoff Area=3.800 ac 60.53% Impervious Runoff Depth>1.33"
Flow Length=132' Slope=0.0125 '/' Tc=20.2 min CN=91 Runoff=5.59 cfs 0.422 af

Subcatchment D-4: D-4
Runoff Area=16.400 ac 24.39% Impervious Runoff Depth>0.89"
Flow Length=852' Tc=8.6 min UI Adjusted CN=84 Runoff=23.26 cfs 1.212 af

Subcatchment D-5: D-5
Runoff Area=19.900 ac 13.07% Impervious Runoff Depth>0.83"
Flow Length=1,918' Tc=34.8 min CN=83 Runoff=12.49 cfs 1.370 af

Subcatchment D-6: D-6
Runoff Area=1.100 ac 27.27% Impervious Runoff Depth>1.34"
Flow Length=312' Tc=4.6 min CN=91 Runoff=2.65 cfs 0.123 af

Subcatchment D-7: D-7
Runoff Area=5.620 ac 0.36% Impervious Runoff Depth>0.74"
Flow Length=937' Tc=163.2 min CN=82 Runoff=1.02 cfs 0.346 af

Subcatchment D-8: D-8
Runoff Area=2.010 ac 5.47% Impervious Runoff Depth>0.83"
Flow Length=333' Tc=21.5 min CN=83 Runoff=1.73 cfs 0.139 af

Pond 1: EXISTING 12" CULVERT
Peak Elev=716.19' Inflow=6.21 cfs 2.422 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0125 '/' Outflow=6.21 cfs 2.422 af

Pond 1P: WET POND 1
Peak Elev=719.97' Storage=33,914 cf Inflow=31.80 cfs 1.647 af
Outflow=2.88 cfs 1.600 af

Pond 2: EXISTING 24" HDPE
Peak Elev=726.81' Inflow=16.20 cfs 2.789 af
24.0" Round Culvert n=0.013 L=48.0' S=0.0021 '/' Outflow=16.20 cfs 2.789 af

Pond 2P: WET POND 2
Peak Elev=728.59' Storage=11,755 cf Inflow=6.42 cfs 0.584 af
Outflow=1.04 cfs 0.560 af

Pond 3P: WET POND 3
Peak Elev=728.43' Storage=8,097 cf Inflow=5.59 cfs 0.422 af
Outflow=1.29 cfs 0.389 af

Pond 4P: WET POND 4
Peak Elev=727.48' Storage=23,461 cf Inflow=23.26 cfs 1.212 af
Outflow=2.56 cfs 1.030 af

Link 1L: AREAS COMBINE
Inflow=16.20 cfs 2.789 af
Primary=16.20 cfs 2.789 af

Link 2L: AREAS COMBINE
Inflow=6.21 cfs 2.422 af
Primary=6.21 cfs 2.422 af

Total Runoff Area = 67.930 ac Runoff Volume = 5.842 af Average Runoff Depth = 1.03"
71.10% Pervious = 48.300 ac 28.90% Impervious = 19.630 ac

Summary for Subcatchment D-1: D-1

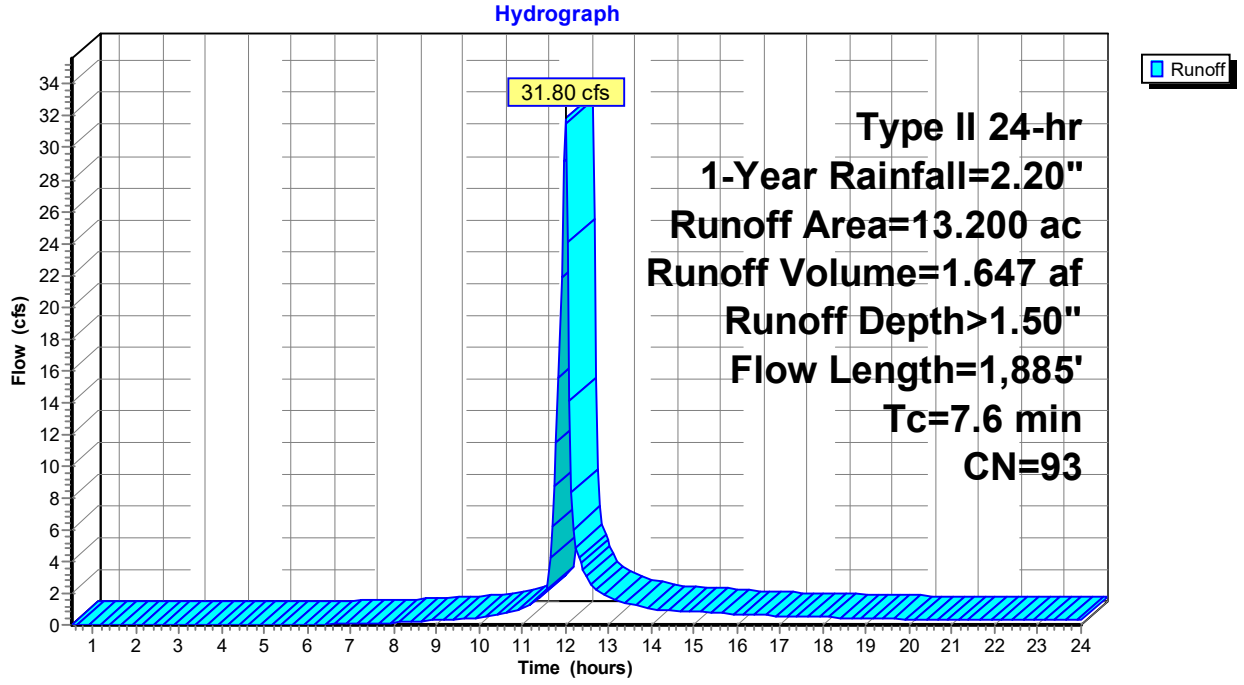
Runoff = 31.80 cfs @ 11.99 hrs, Volume= 1.647 af, Depth> 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
7.200	98	Paved roads w/curbs & sewers, HSG D
2.600	96	Gravel surface, HSG D
3.400	80	>75% Grass cover, Good, HSG D
13.200	93	Weighted Average
6.000		45.45% Pervious Area
7.200		54.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0135	1.04		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
1.0	56	0.0135	0.93		Sheet Flow, A-B CONCENTRATED Smooth surfaces n= 0.011 P2= 2.50"
5.0	1,729	0.0082	5.75	95.86	Parabolic Channel, B-C SWALE W=10.00' D=2.50' Area=16.7 sf Perim=11.5' n= 0.030 Earth, grassed & winding
7.6	1,885	Total			

Subcatchment D-1: D-1



Summary for Subcatchment D-2: D-2

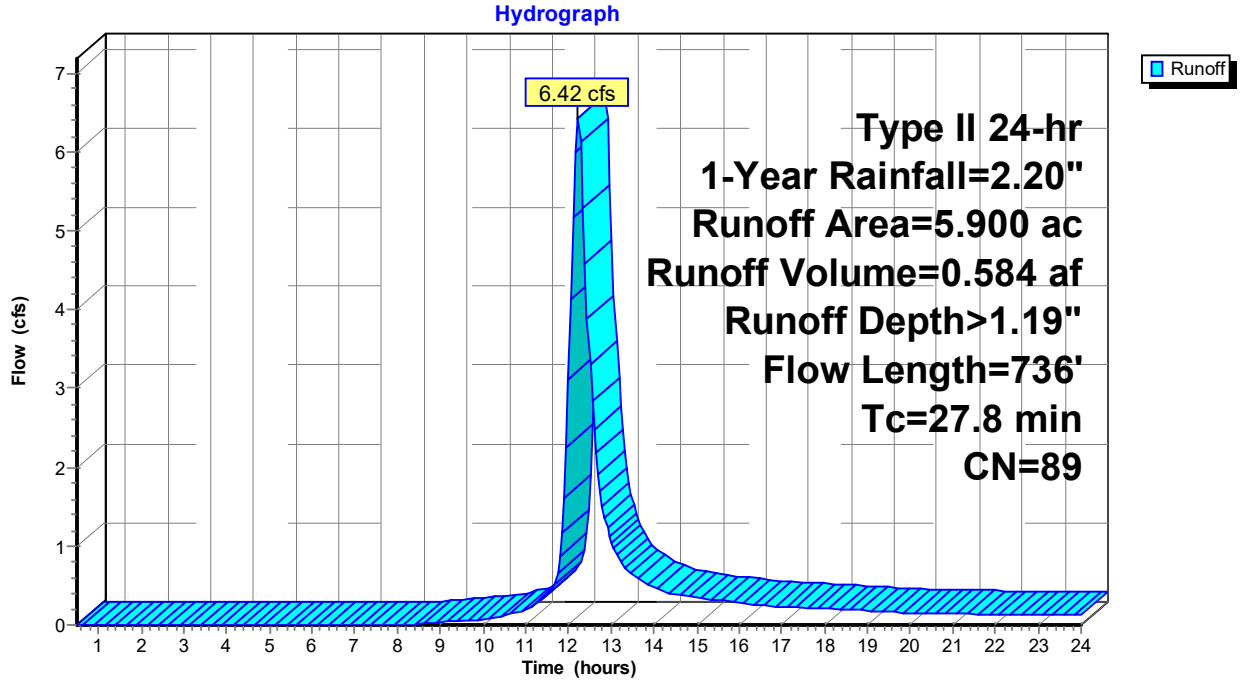
Runoff = 6.42 cfs @ 12.22 hrs, Volume= 0.584 af, Depth> 1.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
1.200	98	Paved roads w/curbs & sewers, HSG D
1.900	98	Unconnected roofs, HSG D
2.800	80	>75% Grass cover, Good, HSG D
5.900	89	Weighted Average
2.800		47.46% Pervious Area
3.100		52.54% Impervious Area
1.900		61.29% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.1259	0.22		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
19.3	322	0.0031	0.28		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.8	314	0.0050	6.42	160.47	Parabolic Channel, C-D BIO SWALE W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
27.8	736	Total			

Subcatchment D-2: D-2



Summary for Subcatchment D-3: D-3

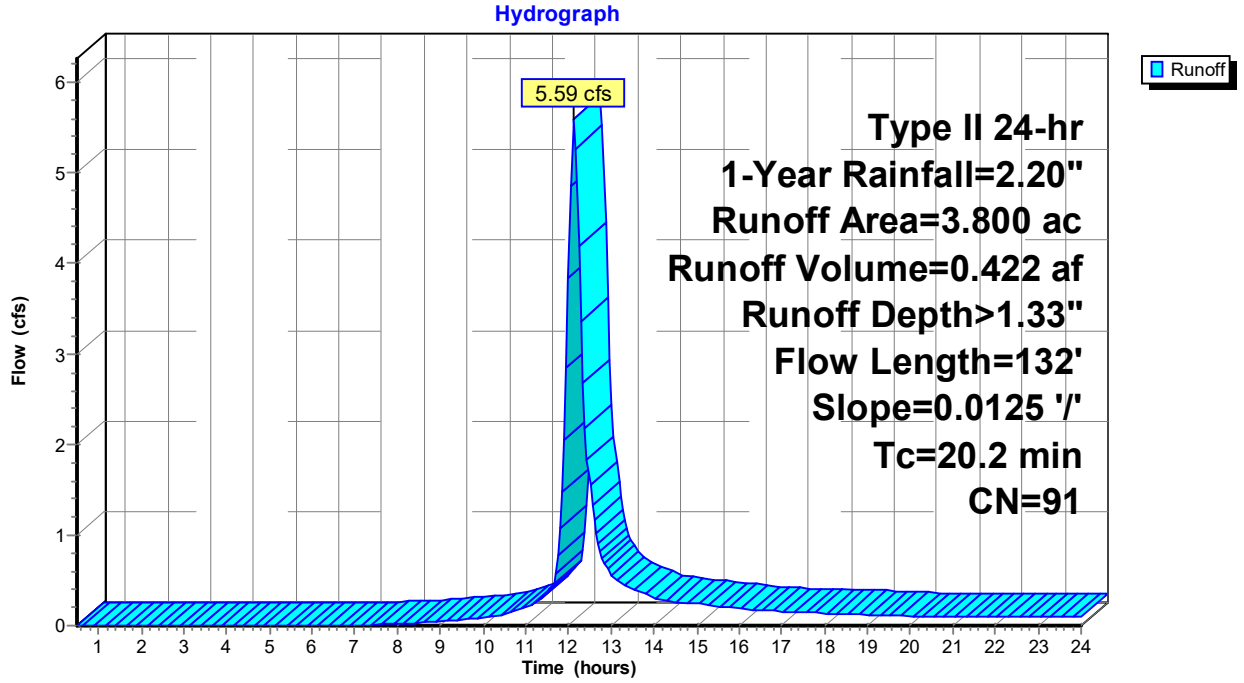
Runoff = 5.59 cfs @ 12.13 hrs, Volume= 0.422 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
0.800	98	Paved roads w/curbs & sewers, HSG D
1.500	98	Unconnected roofs, HSG D
1.500	80	>75% Grass cover, Good, HSG D
3.800	91	Weighted Average
1.500		39.47% Pervious Area
2.300		60.53% Impervious Area
1.500		65.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0125	0.09		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
0.7	32	0.0125	0.78		Shallow Concentrated Flow, B-C CONCENTRATED Short Grass Pasture Kv= 7.0 fps
20.2	132	Total			

Subcatchment D-3: D-3



Summary for Subcatchment D-4: D-4

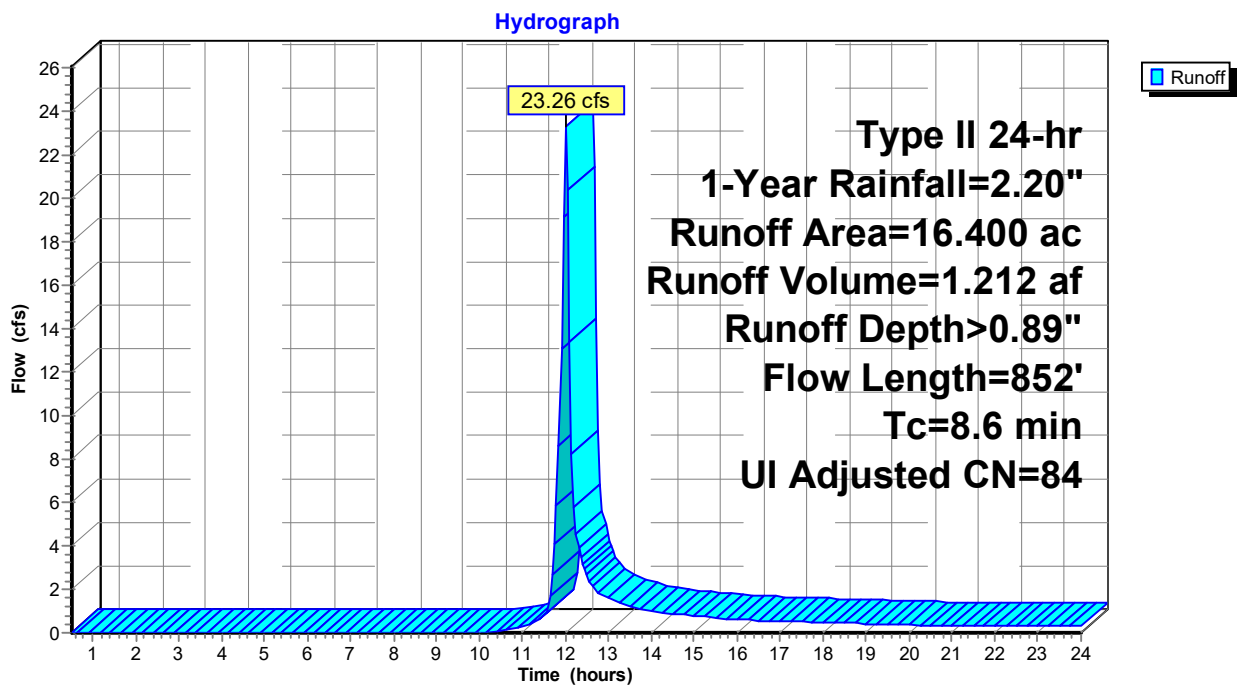
Runoff = 23.26 cfs @ 12.00 hrs, Volume= 1.212 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Adj	Description
3.200	98		Unconnected roofs, HSG D
0.800	98		Paved roads w/curbs & sewers, HSG D
12.400	82		Woods/grass comb., Fair, HSG D
16.400	86	84	Weighted Average, UI Adjusted
12.400			75.61% Pervious Area
4.000			24.39% Impervious Area
3.200			80.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	41	0.2317	0.23		Sheet Flow, A-B SHEET FLOW Grass: Dense n= 0.240 P2= 2.50"
5.6	811	0.0025	2.42	32.21	Parabolic Channel, B-C SWALE W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
8.6	852	Total			

Subcatchment D-4: D-4



Summary for Subcatchment D-5: D-5

Runoff = 12.49 cfs @ 12.32 hrs, Volume= 1.370 af, Depth> 0.83"

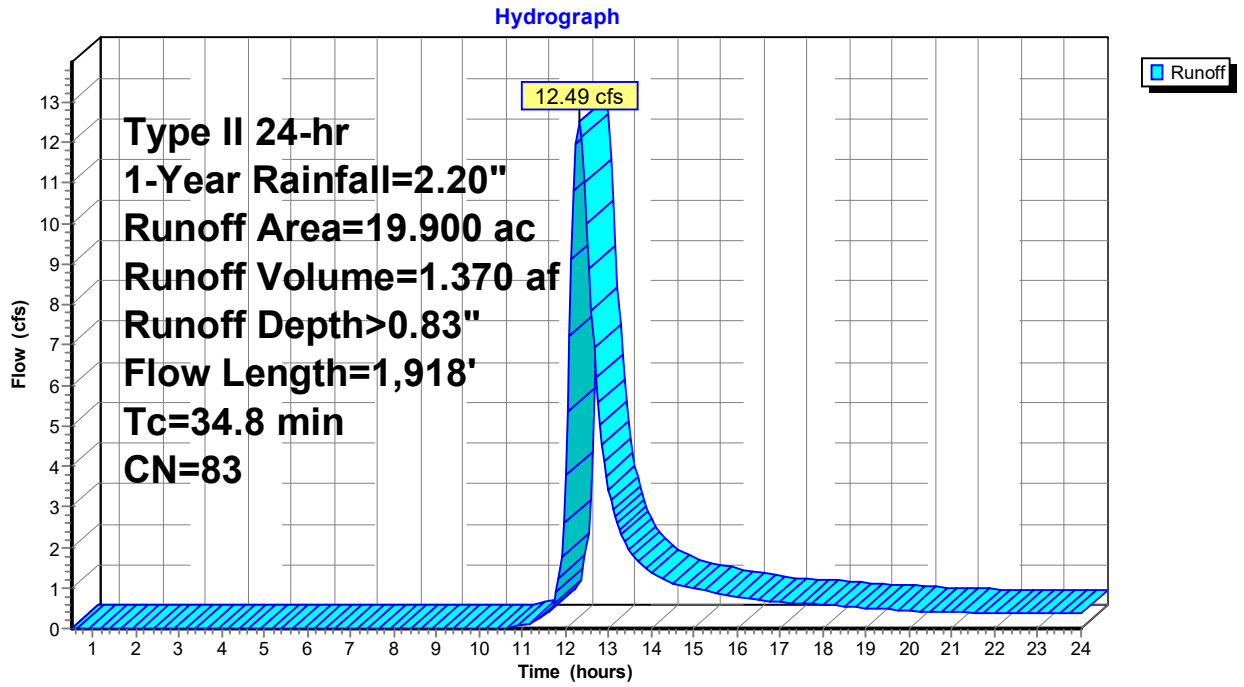
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
2.200	98	Paved parking, HSG D
1.700	96	Gravel surface, HSG D
0.400	98	Unconnected roofs, HSG D
15.600	79	Woods/grass comb., Good, HSG D
19.900	83	Weighted Average
17.300		86.93% Pervious Area
2.600		13.07% Impervious Area
0.400		15.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0240	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
15.6	725	0.0240	0.77		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.6	142	0.0050	4.20	139.87	Parabolic Channel, C-D SWALE W=25.00' D=2.00' Area=33.3 sf Perim=25.4' n= 0.030 Earth, grassed & winding
0.4	100	0.0050	3.72	4.57	Pipe Channel, D-E PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.3	346	0.0117	4.53	77.03	Parabolic Channel, E-F DITCH W=17.00' D=1.50' Area=17.0 sf Perim=17.3' n= 0.035 Earth, dense weeds
0.1	55	0.0125	6.96	8.54	Pipe Channel, F-G PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	94	0.0066	5.28	211.05	Parabolic Channel, G-HDITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.0	20	0.0190	8.58	10.52	Pipe Channel, H-I PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	46	0.0067	3.96	52.73	Parabolic Channel, I-J DITCH W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
0.0	22	0.0168	8.06	9.90	Pipe Channel, J-K PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.5	88	0.0027	3.23	84.04	Parabolic Channel, K-L DITCH W=13.00' D=3.00' Area=26.0 sf Perim=14.7' n= 0.035 Earth, dense weeds
0.3	30	0.0083	1.78	2.19	Pipe Channel, L-M PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'

n= 0.035 Earth, dense weeds					
0.5	150	0.0059	4.90	156.69	Parabolic Channel, M-N DITCH W=16.00' D=3.00' Area=32.0 sf Perim=17.4' n= 0.035 Earth, dense weeds
34.8	1,918	Total			

Subcatchment D-5: D-5



Summary for Subcatchment D-6: D-6

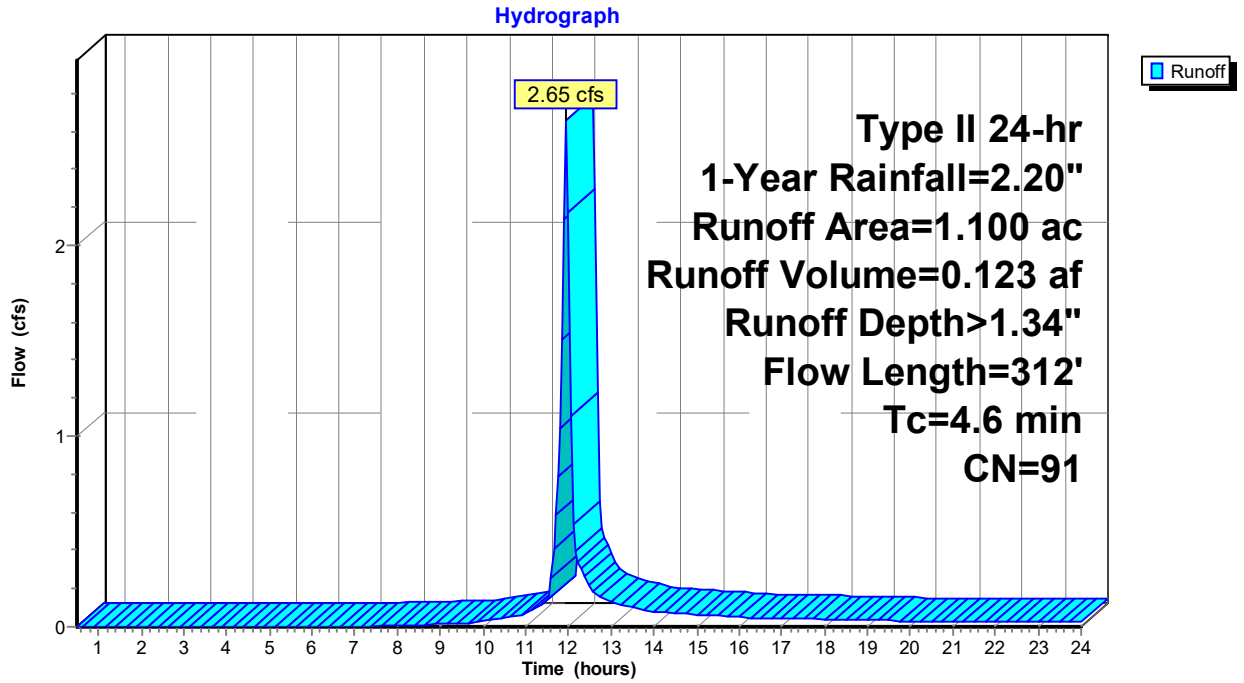
Runoff = 2.65 cfs @ 11.95 hrs, Volume= 0.123 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
0.300	98	Paved parking, HSG D
0.400	96	Gravel surface, HSG D
0.400	80	>75% Grass cover, Good, HSG D
1.100	91	Weighted Average
0.800		72.73% Pervious Area
0.300		27.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0200	2.87		Shallow Concentrated Flow, B-C CONCENTRATED Paved Kv= 20.3 fps
3.0	182	0.0210	1.01		Shallow Concentrated Flow, C-D CONCENTRATED Short Grass Pasture Kv= 7.0 fps
4.6	312	Total			

Subcatchment D-6: D-6



Summary for Subcatchment D-7: D-7

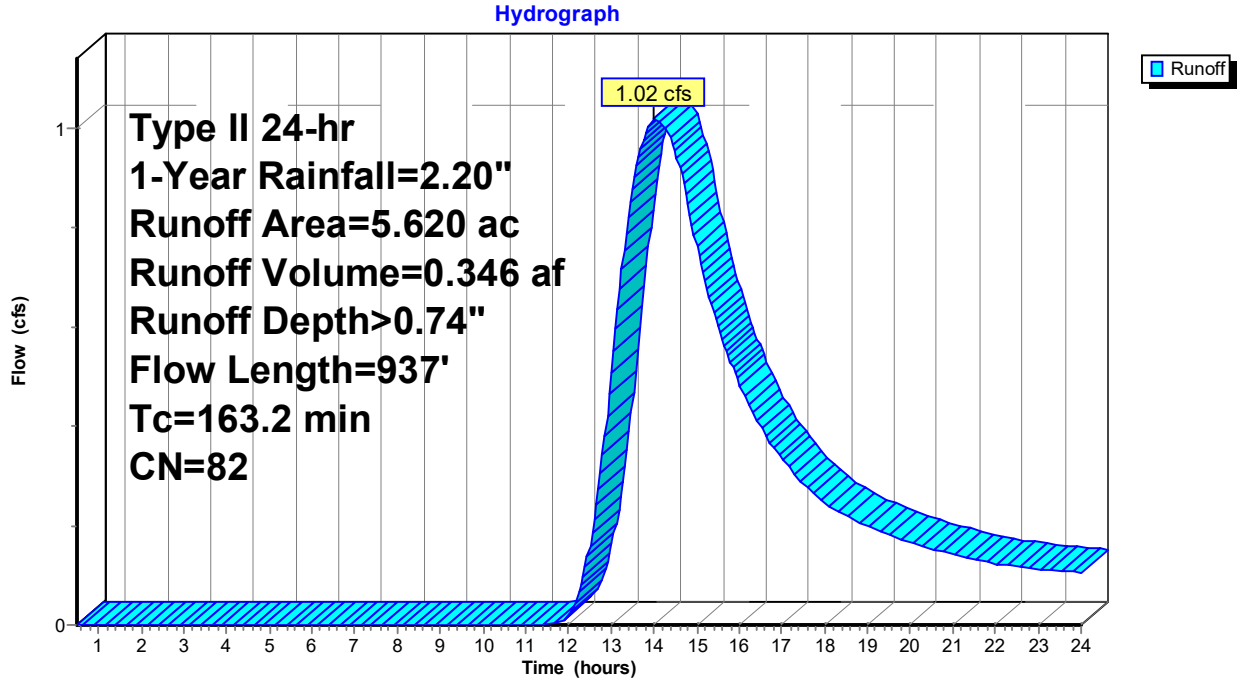
Runoff = 1.02 cfs @ 14.00 hrs, Volume= 0.346 af, Depth> 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
0.010	98	Paved parking, HSG D
5.600	82	Woods/grass comb., Fair, HSG D
0.010	98	Unconnected roofs, HSG D
5.620	82	Weighted Average
5.600		99.64% Pervious Area
0.020		0.36% Impervious Area
0.010		50.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
134.4	100	0.0001	0.01		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
28.5	745	0.0076	0.44		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.3	92	0.0261	6.06	30.30	Parabolic Channel, C-D DITCH W=5.00' D=1.50' Area=5.0 sf Perim=6.0' n= 0.035 Earth, dense weeds
163.2	937	Total			

Subcatchment D-7: D-7



Summary for Subcatchment D-8: D-8

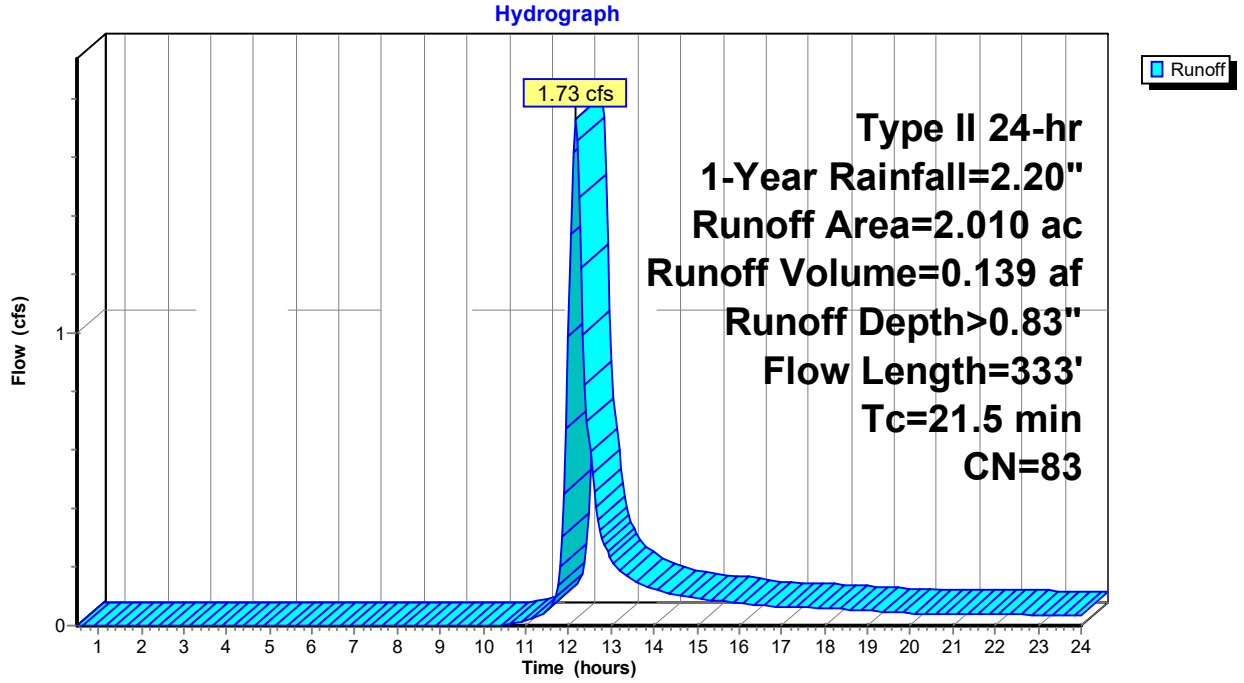
Runoff = 1.73 cfs @ 12.16 hrs, Volume= 0.139 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-Year Rainfall=2.20"

Area (ac)	CN	Description
0.010	98	Unconnected roofs, HSG D
0.100	98	Paved parking, HSG D
1.900	82	Woods/grass comb., Fair, HSG D
2.010	83	Weighted Average
1.900		94.53% Pervious Area
0.110		5.47% Impervious Area
0.010		9.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0255	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
6.9	233	0.0127	0.56		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
21.5	333	Total			

Subcatchment D-8: D-8



Summary for Pond 1: EXISTING 12" CULVERT

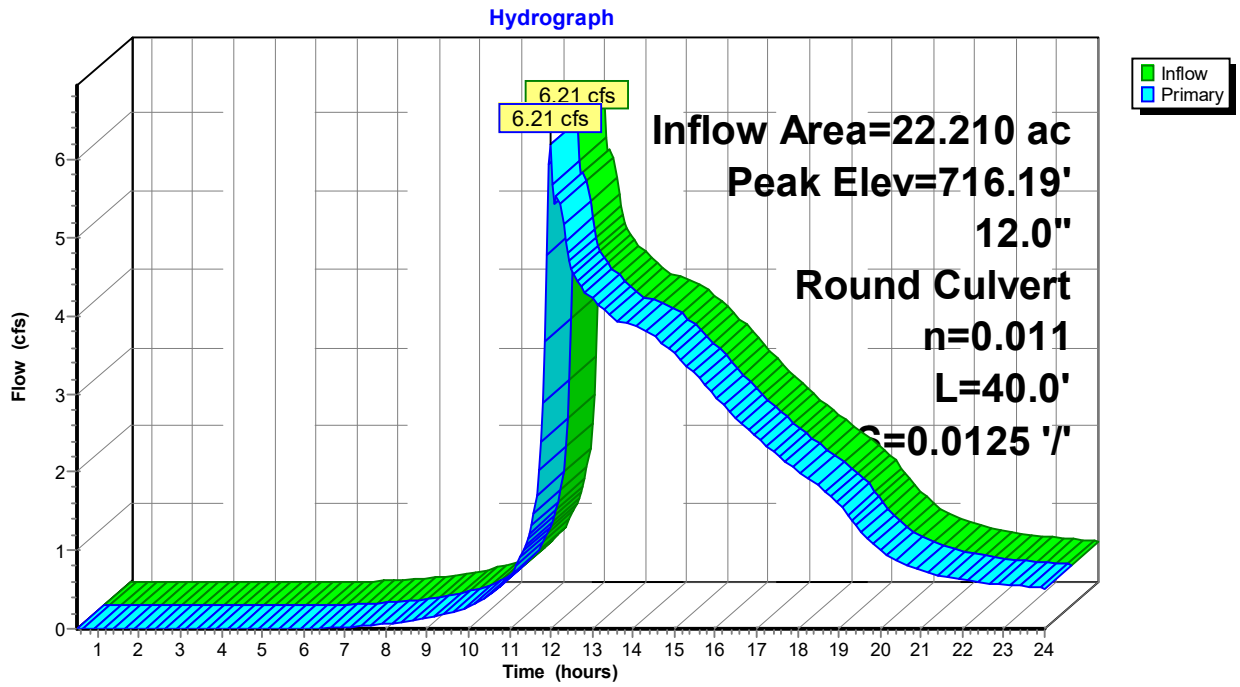
Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 1.31" for 1-Year event
Inflow = 6.21 cfs @ 11.99 hrs, Volume= 2.422 af
Outflow = 6.21 cfs @ 11.99 hrs, Volume= 2.422 af, Atten= 0%, Lag= 0.0 min
Primary = 6.21 cfs @ 11.99 hrs, Volume= 2.422 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 716.19' @ 11.99 hrs

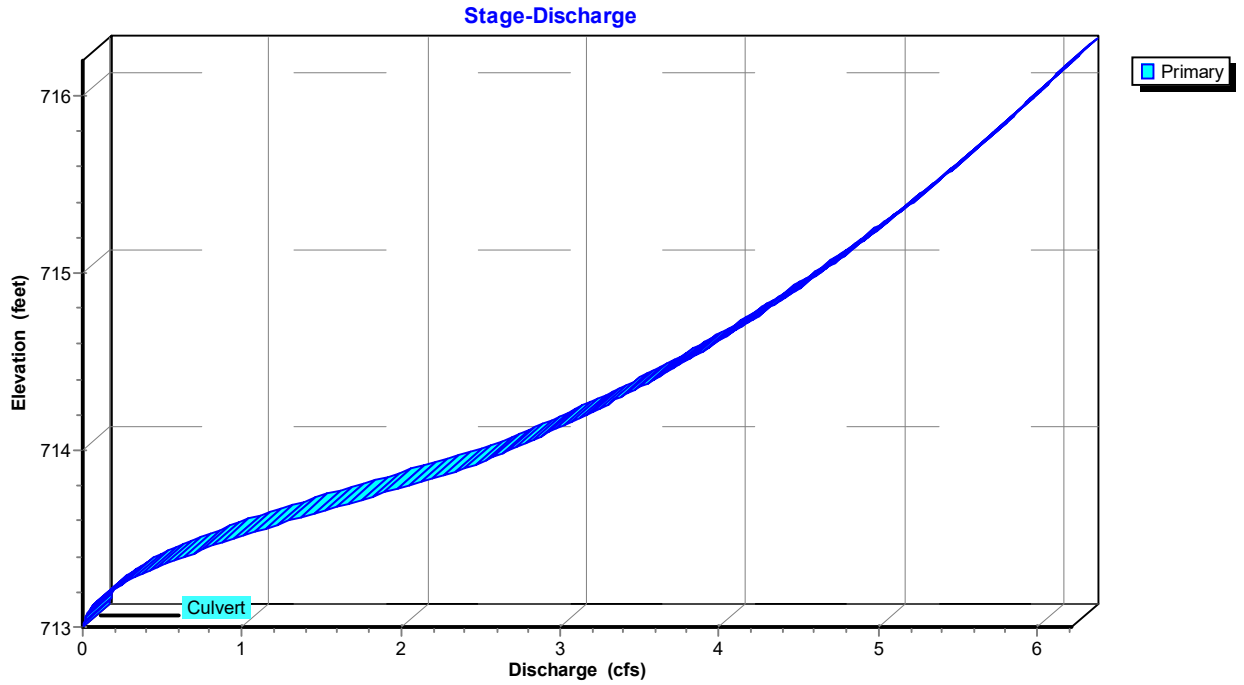
Device	Routing	Invert	Outlet Devices
#1	Primary	713.00'	12.0" Round Culvert L= 40.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 713.00' / 712.50' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=6.15 cfs @ 11.99 hrs HW=716.15' (Free Discharge)
└─1=Culvert (Inlet Controls 6.15 cfs @ 7.83 fps)

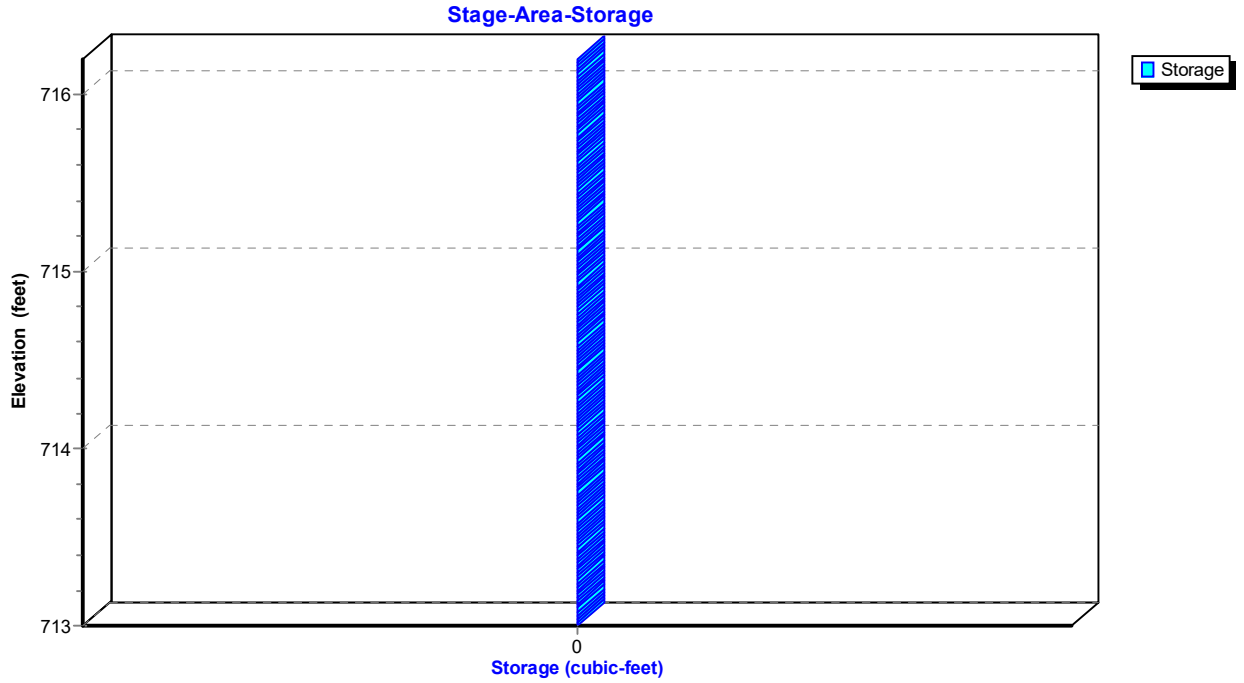
Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Summary for Pond 1P: WET POND 1

Inflow Area = 13.200 ac, 54.55% Impervious, Inflow Depth > 1.50" for 1-Year event
Inflow = 31.80 cfs @ 11.99 hrs, Volume= 1.647 af
Outflow = 2.88 cfs @ 12.51 hrs, Volume= 1.600 af, Atten= 91%, Lag= 31.4 min
Primary = 2.88 cfs @ 12.51 hrs, Volume= 1.600 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 719.97' @ 12.51 hrs Surf.Area= 36,845 sf Storage= 33,914 cf

Plug-Flow detention time= 134.4 min calculated for 1.597 af (97% of inflow)
Center-of-Mass det. time= 117.4 min (921.3 - 803.8)

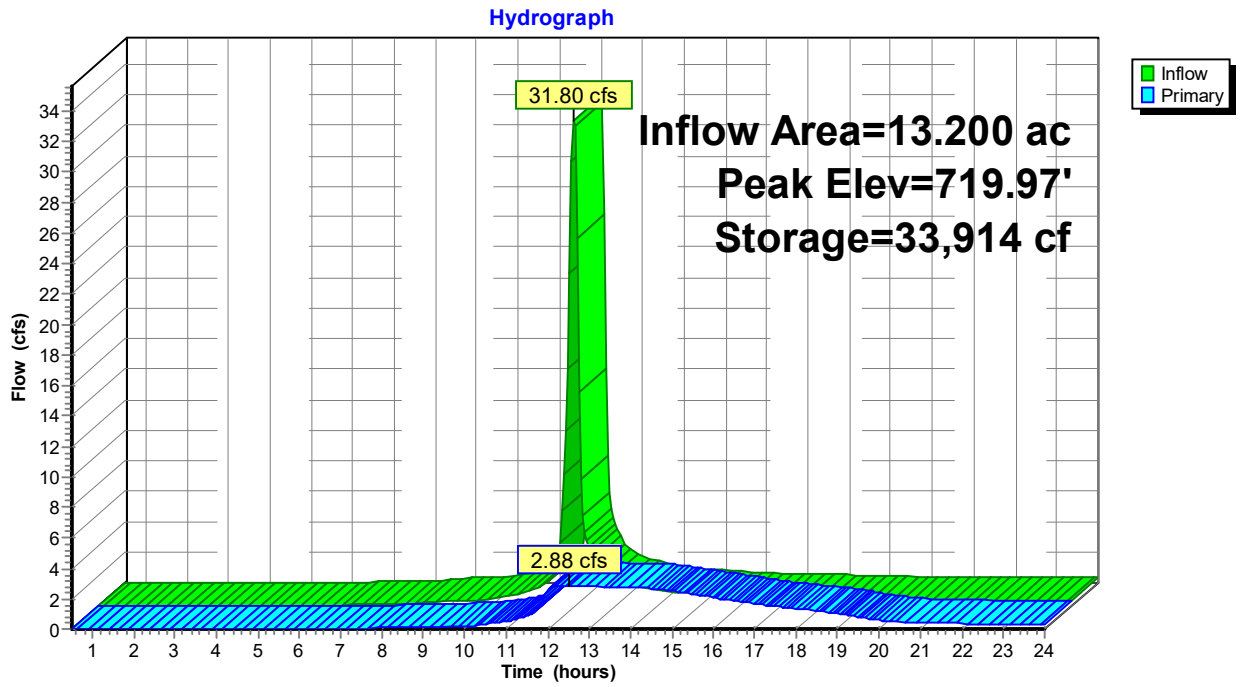
Volume	Invert	Avail.Storage	Storage Description
#1	719.00'	189,322 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
719.00	33,157	0	0
720.00	36,963	35,060	35,060
721.00	40,869	38,916	73,976
722.00	44,876	42,873	116,849
723.00	48,983	46,930	163,778
723.50	53,191	25,544	189,322

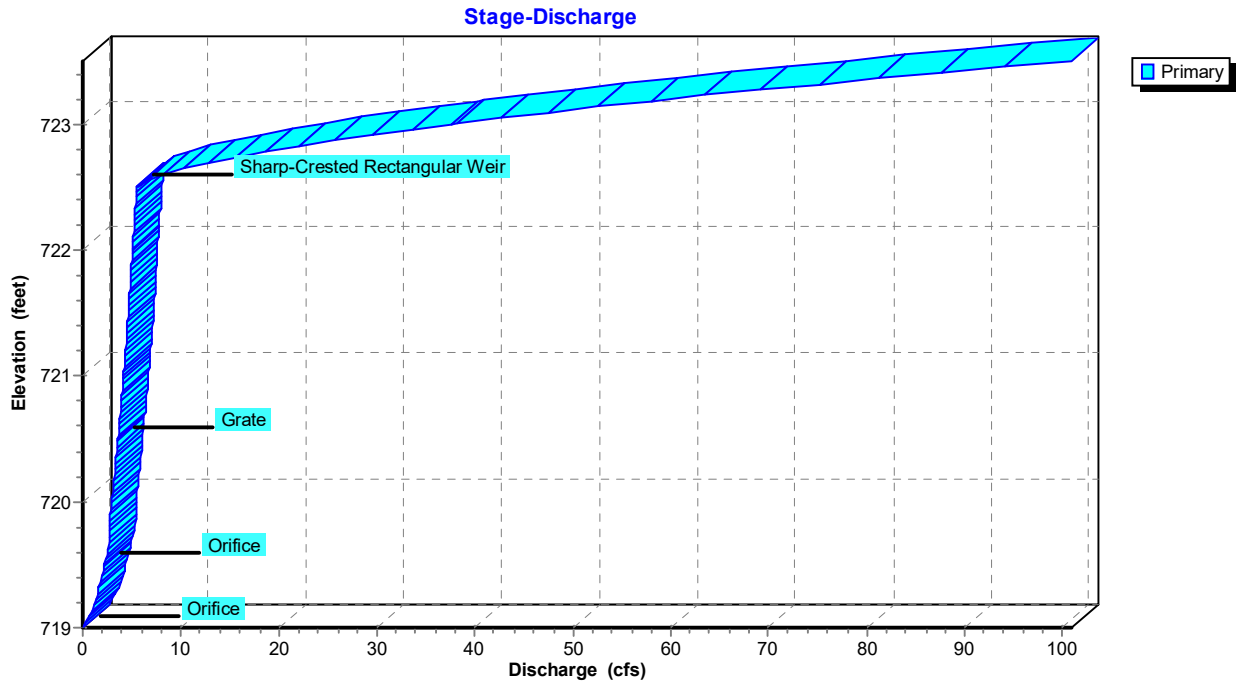
Device	Routing	Invert	Outlet Devices
#1	Primary	722.50'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	718.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 718.50' / 718.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	720.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	719.00'	6.0" Horiz. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#5	Device 2	719.50'	3.0" Vert. Orifice X 3.00 C= 0.600

Primary OutFlow Max=2.88 cfs @ 12.51 hrs HW=719.97' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 2.88 cfs @ 3.67 fps)
  - 3=Grate (Controls 0.00 cfs)
  - 4=Orifice (Passes < 3.72 cfs potential flow)
  - 5=Orifice (Passes < 0.42 cfs potential flow)

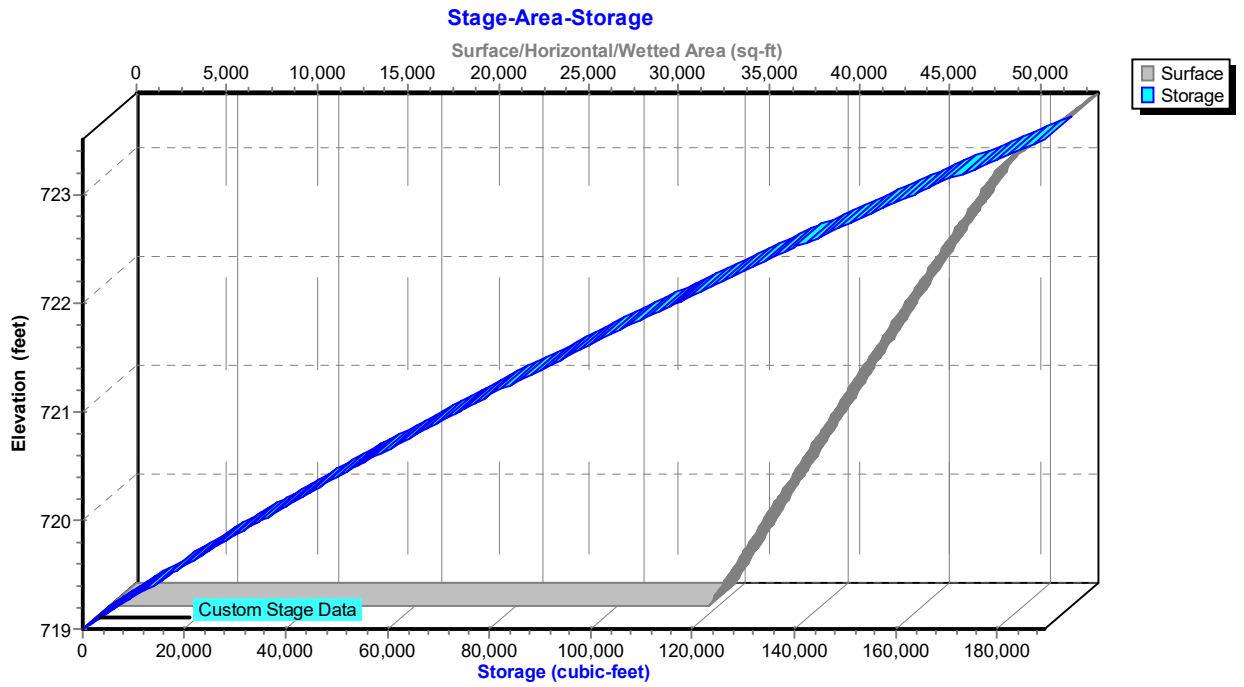
Pond 1P: WET POND 1



Pond 1P: WET POND 1



Pond 1P: WET POND 1



Summary for Pond 2: EXISTING 24" HDPE

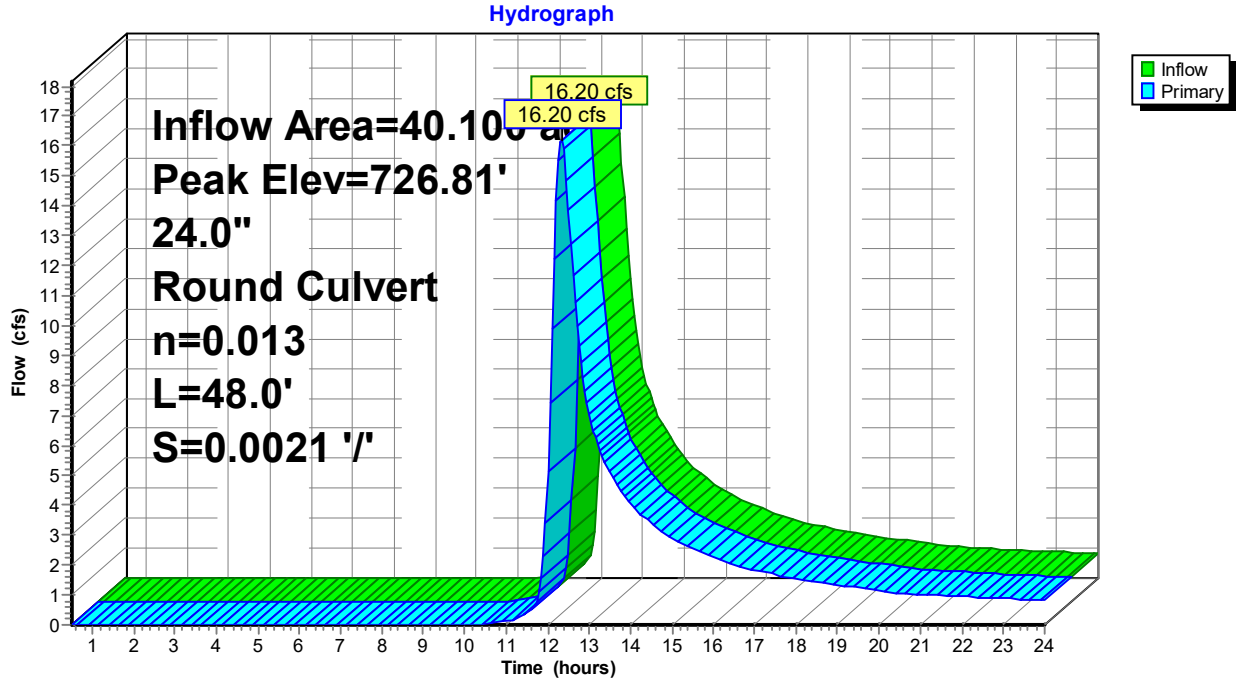
Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 0.83" for 1-Year event
Inflow = 16.20 cfs @ 12.33 hrs, Volume= 2.789 af
Outflow = 16.20 cfs @ 12.33 hrs, Volume= 2.789 af, Atten= 0%, Lag= 0.0 min
Primary = 16.20 cfs @ 12.33 hrs, Volume= 2.789 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 726.81' @ 12.33 hrs

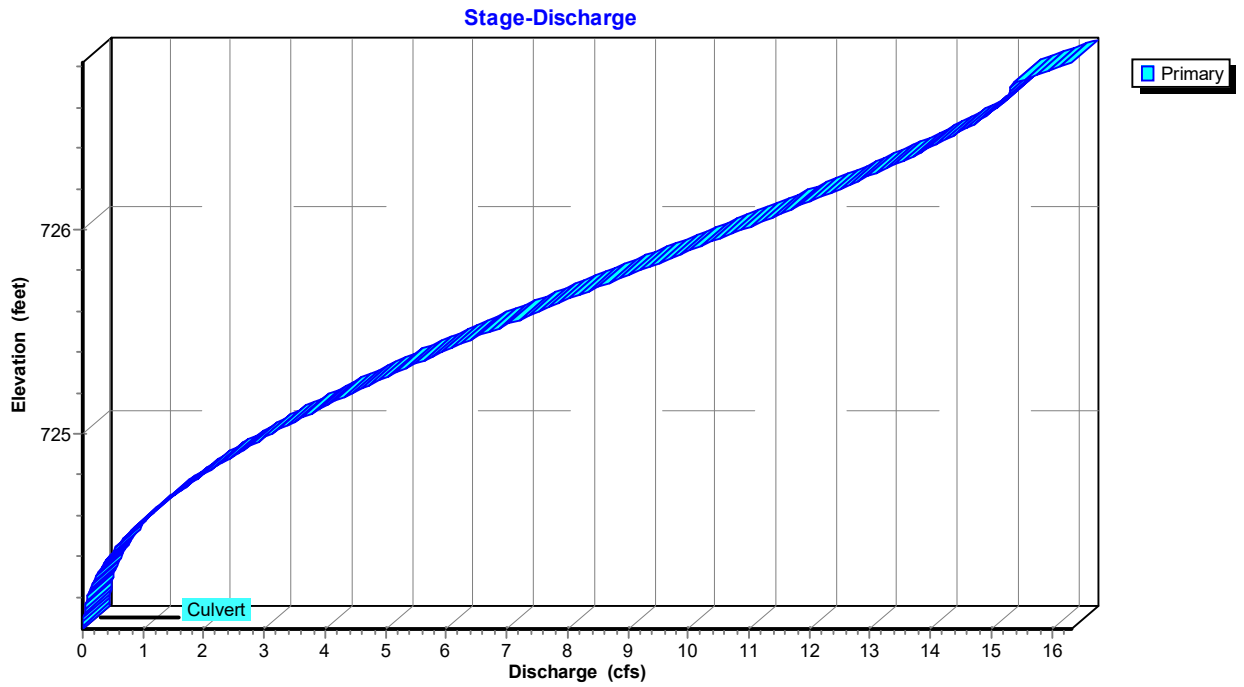
Device	Routing	Invert	Outlet Devices
#1	Primary	724.04'	24.0" Round Culvert L= 48.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 724.04' / 723.94' S= 0.0021 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.13 cfs @ 12.33 hrs HW=726.80' (Free Discharge)
└─1=Culvert (Barrel Controls 16.13 cfs @ 5.14 fps)

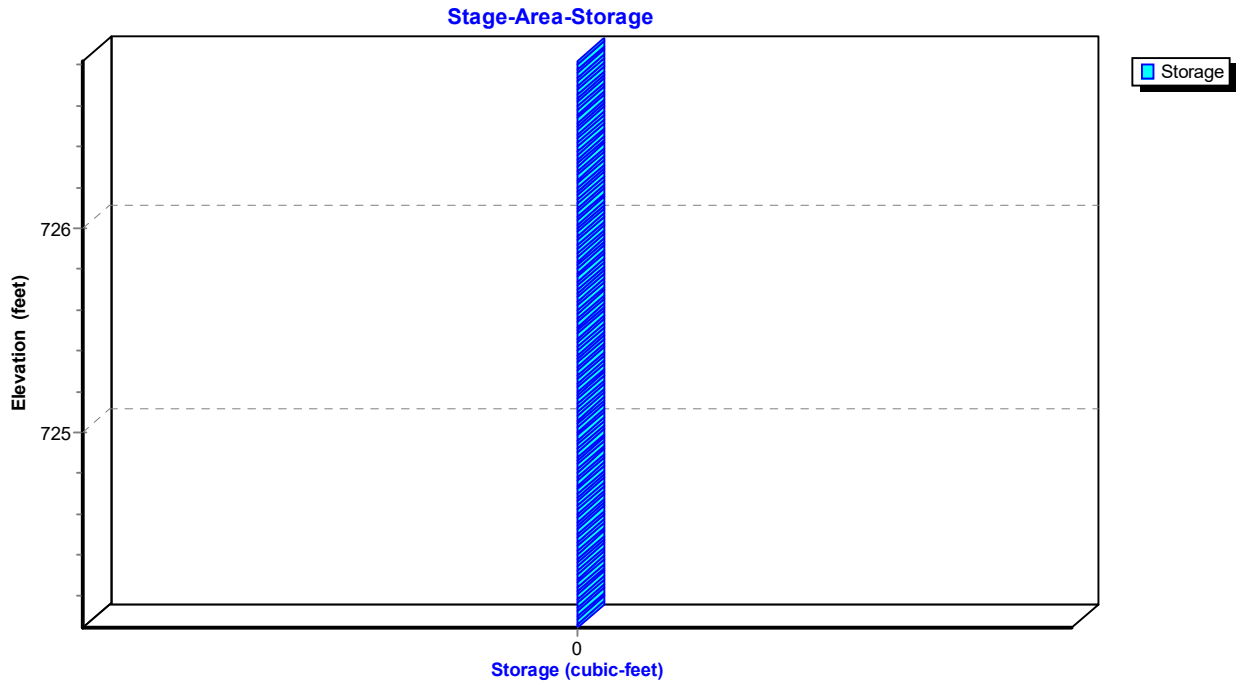
Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Summary for Pond 2P: WET POND 2

Inflow Area = 5.900 ac, 52.54% Impervious, Inflow Depth > 1.19" for 1-Year event
Inflow = 6.42 cfs @ 12.22 hrs, Volume= 0.584 af
Outflow = 1.04 cfs @ 13.01 hrs, Volume= 0.560 af, Atten= 84%, Lag= 47.5 min
Primary = 1.04 cfs @ 13.01 hrs, Volume= 0.560 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.59' @ 13.01 hrs Surf.Area= 21,049 sf Storage= 11,755 cf

Plug-Flow detention time= 146.9 min calculated for 0.559 af (96% of inflow)
Center-of-Mass det. time= 124.1 min (963.8 - 839.7)

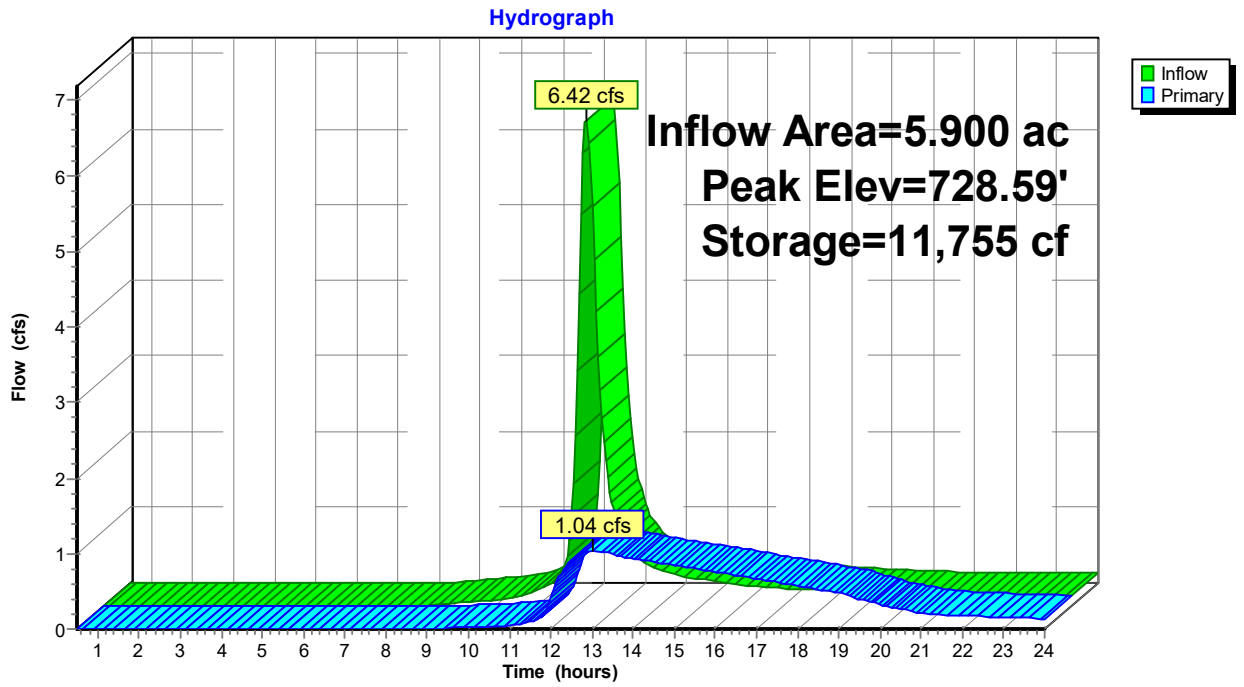
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	101,936 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,501	0	0
729.00	22,788	20,645	20,645
730.00	26,362	24,575	45,220
731.00	41,810	34,086	79,306
731.50	48,711	22,630	101,936

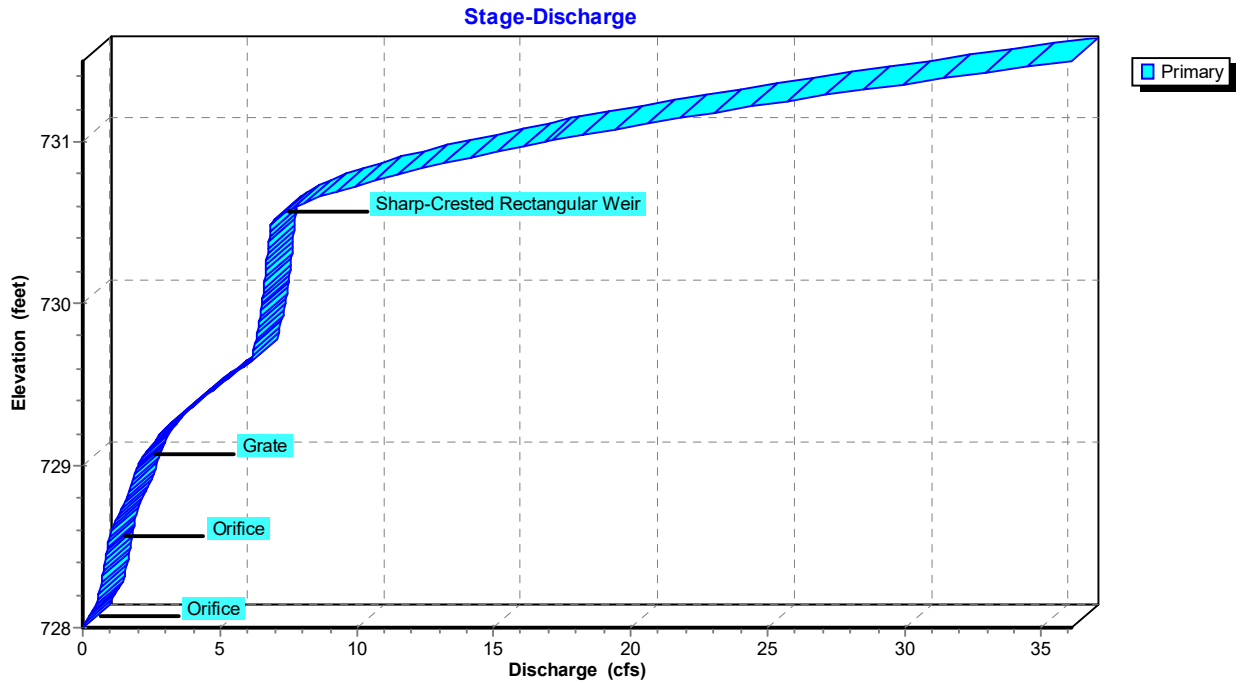
Device	Routing	Invert	Outlet Devices
#1	Primary	730.50'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 726.50' / 724.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	729.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.50'	4.0" Vert. Orifice X 3.00 C= 0.600
#5	Device 2	728.00'	4.0" Horiz. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.04 cfs @ 13.01 hrs HW=728.59' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 1.04 cfs of 4.78 cfs potential flow)
  - 3=Grate (Controls 0.00 cfs)
  - 4=Orifice (Orifice Controls 0.06 cfs @ 1.05 fps)
  - 5=Orifice (Orifice Controls 0.97 cfs @ 3.71 fps)

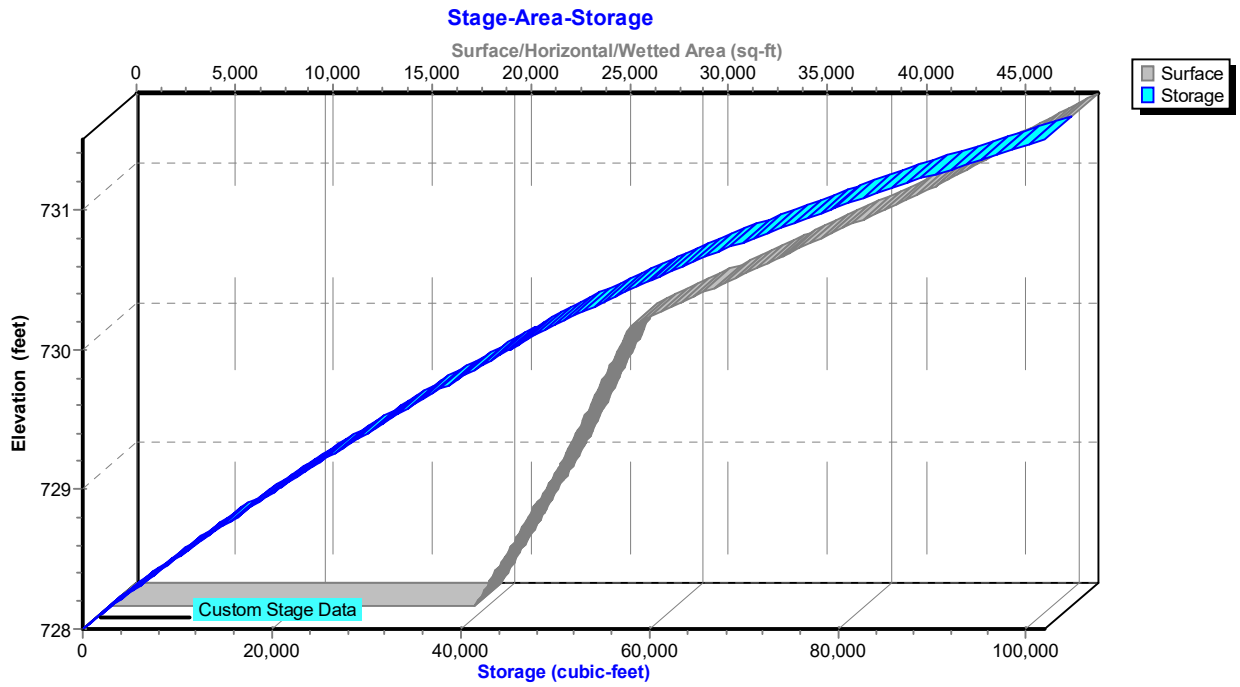
Pond 2P: WET POND 2



Pond 2P: WET POND 2



Pond 2P: WET POND 2



Summary for Pond 3P: WET POND 3

Inflow Area = 3.800 ac, 60.53% Impervious, Inflow Depth > 1.33" for 1-Year event
Inflow = 5.59 cfs @ 12.13 hrs, Volume= 0.422 af
Outflow = 1.29 cfs @ 12.56 hrs, Volume= 0.389 af, Atten= 77%, Lag= 26.1 min
Primary = 1.29 cfs @ 12.56 hrs, Volume= 0.389 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.43' @ 12.56 hrs Surf.Area= 19,583 sf Storage= 8,097 cf

Plug-Flow detention time= 125.1 min calculated for 0.388 af (92% of inflow)
Center-of-Mass det. time= 83.9 min (908.4 - 824.4)

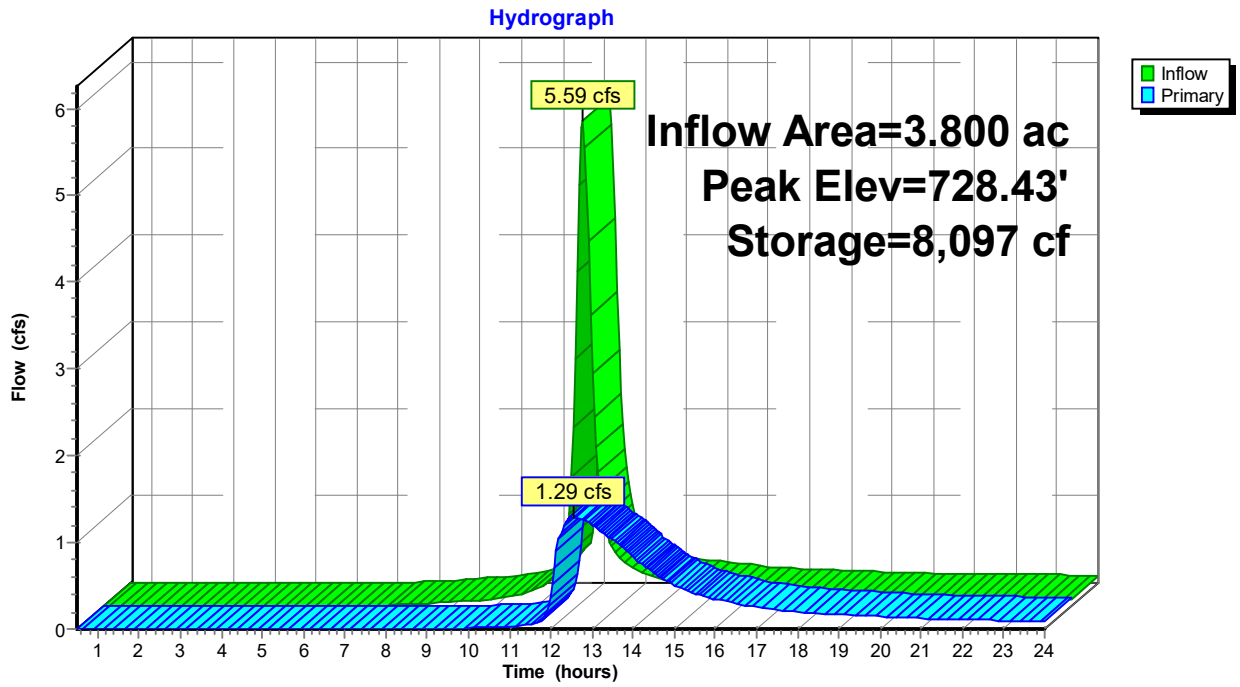
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	85,804 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,056	0	0
729.00	21,605	19,831	19,831
730.00	25,248	23,427	43,257
731.00	28,968	27,108	70,365
731.50	32,789	15,439	85,804

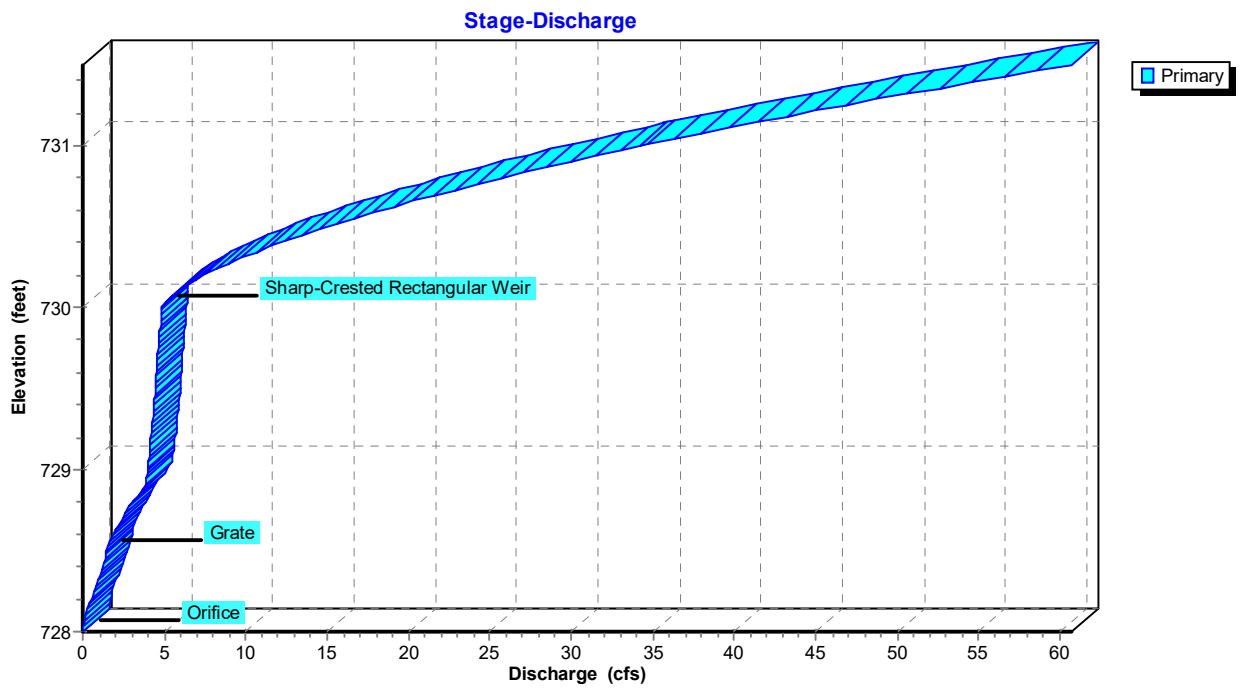
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 726.50' / 726.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.00'	4.0" Vert. Orifice X 6.00 C= 0.600

Primary OutFlow Max=1.29 cfs @ 12.56 hrs HW=728.43' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 1.29 cfs of 3.36 cfs potential flow)
  - 3=Grate (Controls 0.00 cfs)
  - 4=Orifice (Orifice Controls 1.29 cfs @ 2.47 fps)

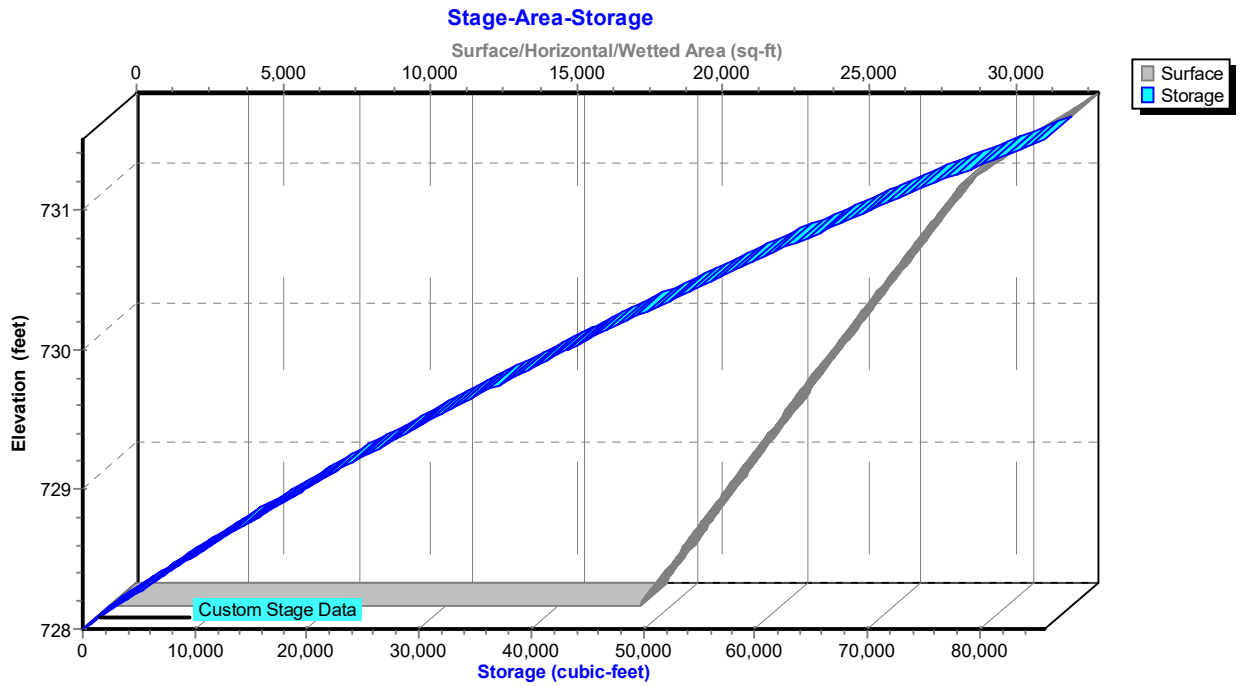
Pond 3P: WET POND 3



Pond 3P: WET POND 3



Pond 3P: WET POND 3



Summary for Pond 4P: WET POND 4

Inflow Area = 16.400 ac, 24.39% Impervious, Inflow Depth > 0.89" for 1-Year event
Inflow = 23.26 cfs @ 12.00 hrs, Volume= 1.212 af
Outflow = 2.56 cfs @ 12.52 hrs, Volume= 1.030 af, Atten= 89%, Lag= 31.0 min
Primary = 2.56 cfs @ 12.52 hrs, Volume= 1.030 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 727.48' @ 12.52 hrs Surf.Area= 49,565 sf Storage= 23,461 cf

Plug-Flow detention time= 179.2 min calculated for 1.028 af (85% of inflow)
Center-of-Mass det. time= 110.0 min (956.0 - 846.0)

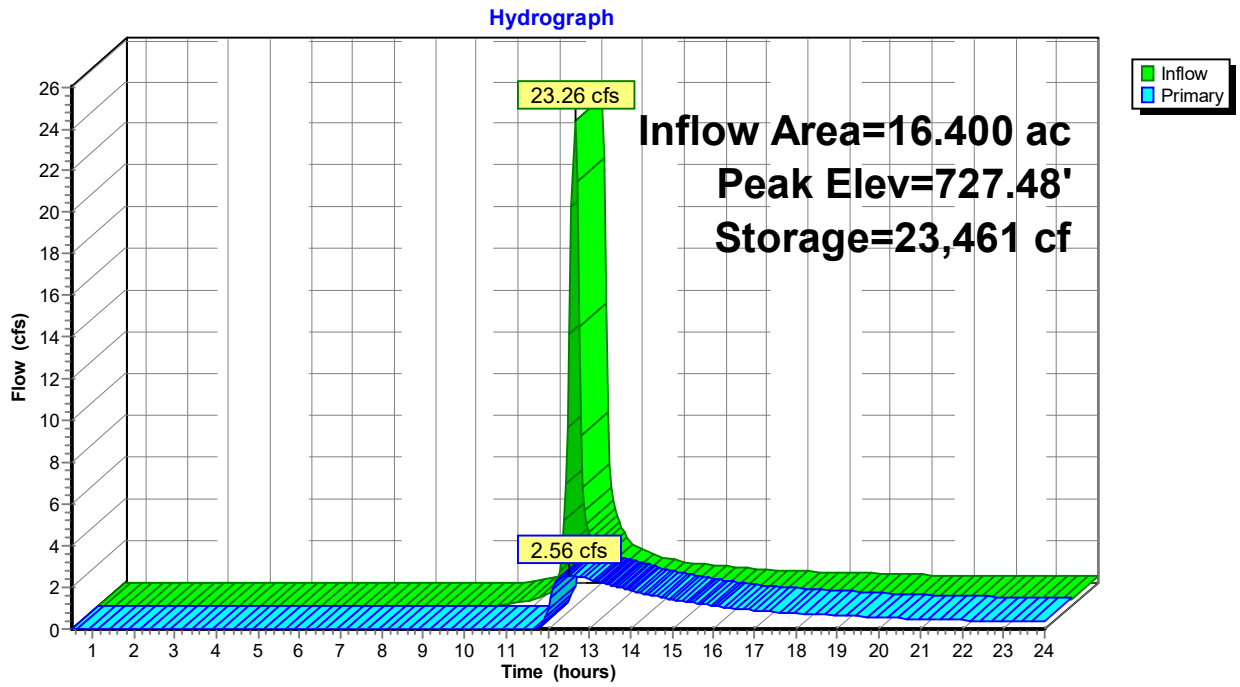
Volume	Invert	Avail.Storage	Storage Description
#1	727.00'	223,223 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
727.00	47,577	0	0
728.00	51,692	49,635	49,635
729.00	55,751	53,722	103,356
730.00	59,907	57,829	161,185
731.00	64,169	62,038	223,223

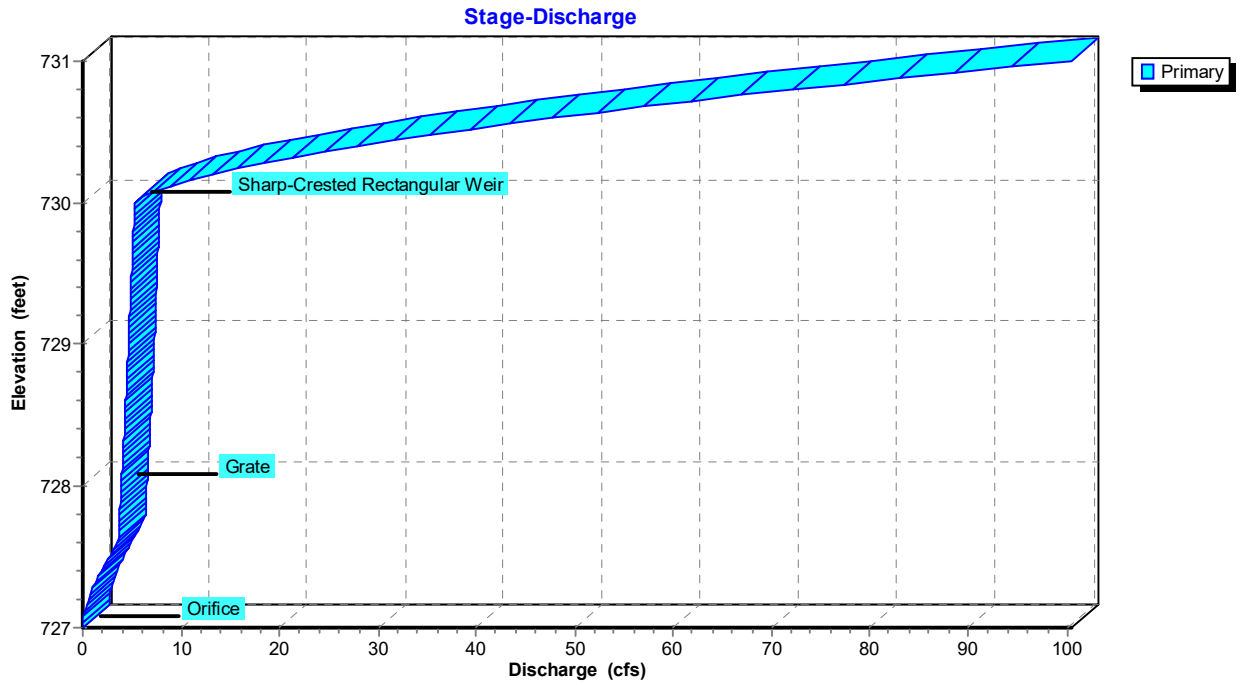
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	725.50'	12.0" Round Culvert L= 160.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.50' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	727.00'	8.0" Vert. Orifice X 4.00 C= 0.600

Primary OutFlow Max=2.56 cfs @ 12.52 hrs HW=727.48' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 2.56 cfs of 3.47 cfs potential flow)
  - 3=Grate (Controls 0.00 cfs)
  - 4=Orifice (Orifice Controls 2.56 cfs @ 2.37 fps)

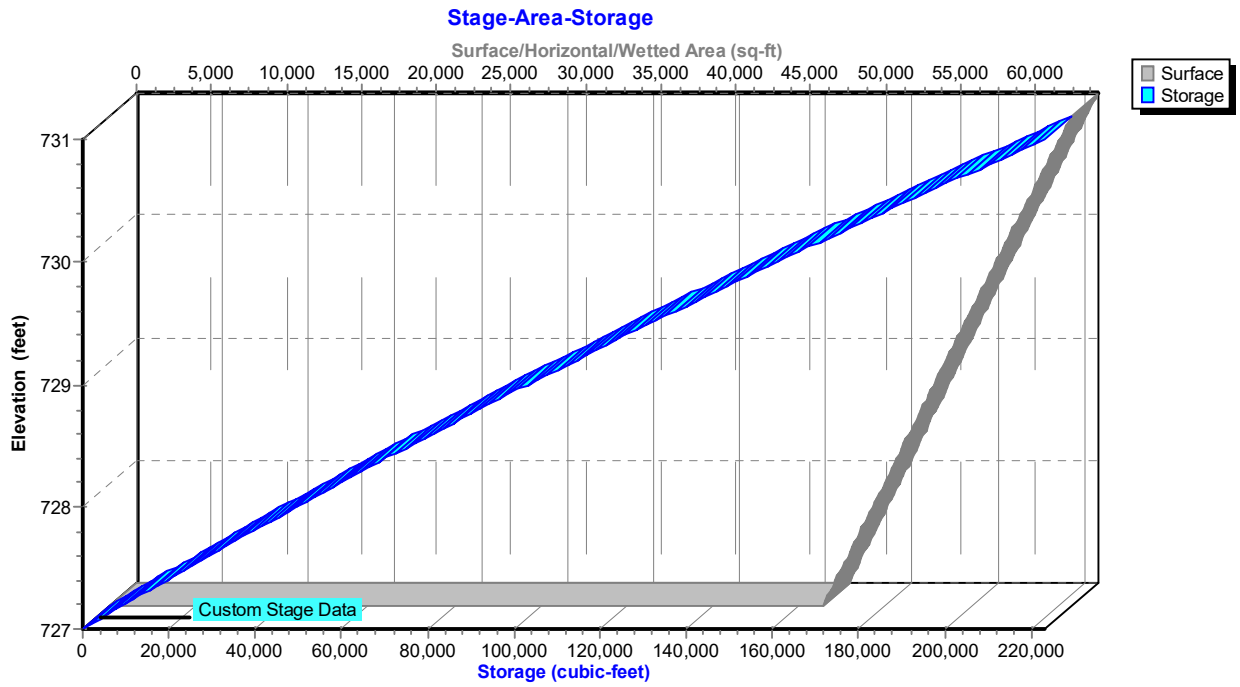
Pond 4P: WET POND 4



Pond 4P: WET POND 4



Pond 4P: WET POND 4

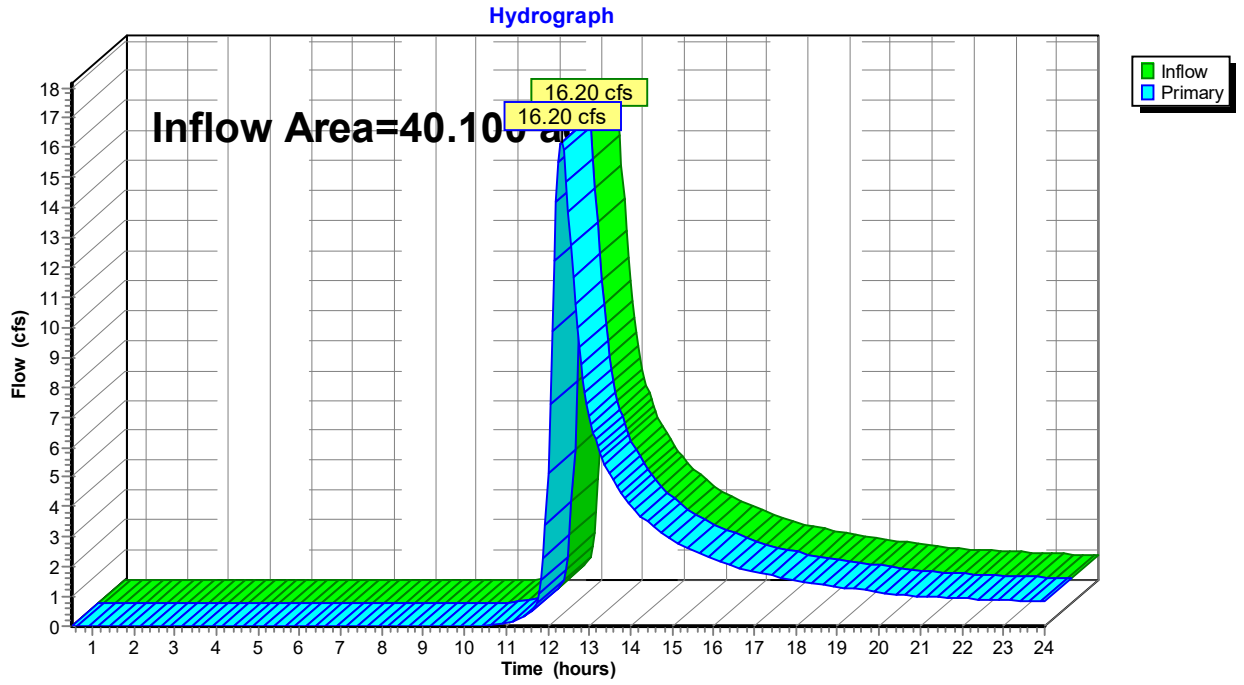


Summary for Link 1L: AREAS COMBINE

Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 0.83" for 1-Year event
Inflow = 16.20 cfs @ 12.33 hrs, Volume= 2.789 af
Primary = 16.20 cfs @ 12.33 hrs, Volume= 2.789 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 1L: AREAS COMBINE

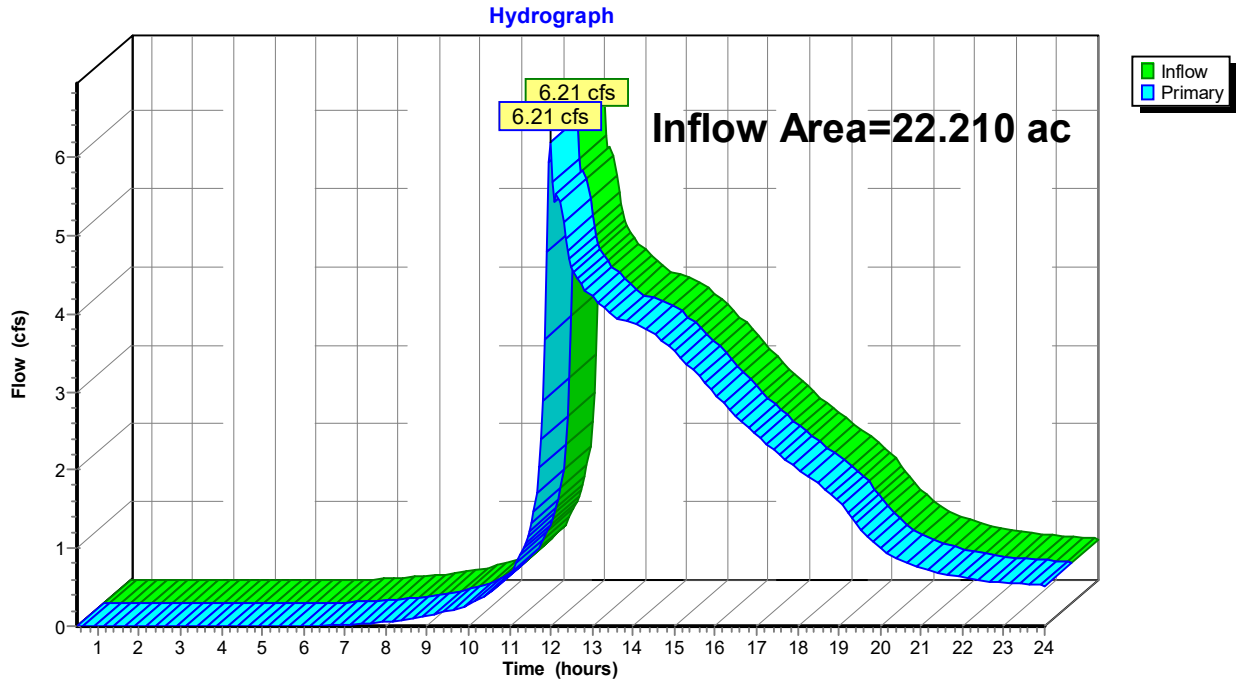


Summary for Link 2L: AREAS COMBINE

Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 1.31" for 1-Year event
Inflow = 6.21 cfs @ 11.99 hrs, Volume= 2.422 af
Primary = 6.21 cfs @ 11.99 hrs, Volume= 2.422 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 2L: AREAS COMBINE



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment D-1: D-1
Runoff Area=13.200 ac 54.55% Impervious Runoff Depth>1.78"
Flow Length=1,885' Tc=7.6 min CN=93 Runoff=37.41 cfs 1.955 af

Subcatchment D-2: D-2
Runoff Area=5.900 ac 52.54% Impervious Runoff Depth>1.44"
Flow Length=736' Tc=27.8 min CN=89 Runoff=7.82 cfs 0.710 af

Subcatchment D-3: D-3
Runoff Area=3.800 ac 60.53% Impervious Runoff Depth>1.60"
Flow Length=132' Slope=0.0125 '/' Tc=20.2 min CN=91 Runoff=6.70 cfs 0.508 af

Subcatchment D-4: D-4
Runoff Area=16.400 ac 24.39% Impervious Runoff Depth>1.11"
Flow Length=852' Tc=8.6 min UI Adjusted CN=84 Runoff=29.30 cfs 1.522 af

Subcatchment D-5: D-5
Runoff Area=19.900 ac 13.07% Impervious Runoff Depth>1.05"
Flow Length=1,918' Tc=34.8 min CN=83 Runoff=16.06 cfs 1.733 af

Subcatchment D-6: D-6
Runoff Area=1.100 ac 27.27% Impervious Runoff Depth>1.61"
Flow Length=312' Tc=4.6 min CN=91 Runoff=3.16 cfs 0.148 af

Subcatchment D-7: D-7
Runoff Area=5.620 ac 0.36% Impervious Runoff Depth>0.94"
Flow Length=937' Tc=163.2 min CN=82 Runoff=1.33 cfs 0.442 af

Subcatchment D-8: D-8
Runoff Area=2.010 ac 5.47% Impervious Runoff Depth>1.05"
Flow Length=333' Tc=21.5 min CN=83 Runoff=2.22 cfs 0.176 af

Pond 1: EXISTING 12" CULVERT
Peak Elev=717.13' Inflow=7.21 cfs 2.909 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0125 '/' Outflow=7.21 cfs 2.909 af

Pond 1P: WET POND 1
Peak Elev=720.16' Storage=40,916 cf Inflow=37.41 cfs 1.955 af
Outflow=3.15 cfs 1.903 af

Pond 2: EXISTING 24" HDPE
Peak Elev=727.39' Inflow=20.98 cfs 3.529 af
24.0" Round Culvert n=0.013 L=48.0' S=0.0021 '/' Outflow=20.98 cfs 3.529 af

Pond 2P: WET POND 2
Peak Elev=728.72' Storage=14,384 cf Inflow=7.82 cfs 0.710 af
Outflow=1.36 cfs 0.683 af

Pond 3P: WET POND 3
Peak Elev=728.52' Storage=9,827 cf Inflow=6.70 cfs 0.508 af
Outflow=1.51 cfs 0.471 af

Pond 4P: WET POND 4
Peak Elev=727.61' Storage=29,765 cf Inflow=29.30 cfs 1.522 af
Outflow=3.52 cfs 1.324 af

Link 1L: AREAS COMBINE
Inflow=20.98 cfs 3.529 af
Primary=20.98 cfs 3.529 af

Link 2L: AREAS COMBINE
Inflow=7.21 cfs 2.909 af
Primary=7.21 cfs 2.909 af

Total Runoff Area = 67.930 ac Runoff Volume = 7.193 af Average Runoff Depth = 1.27"
71.10% Pervious = 48.300 ac 28.90% Impervious = 19.630 ac

Summary for Subcatchment D-1: D-1

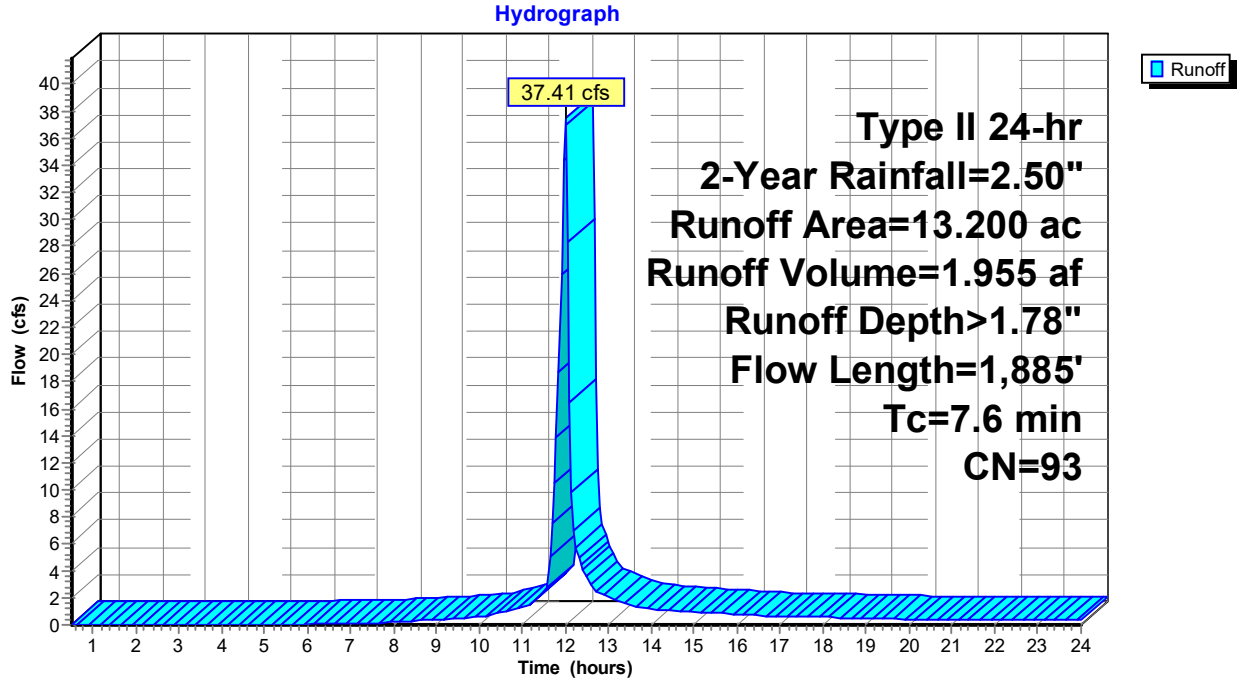
Runoff = 37.41 cfs @ 11.99 hrs, Volume= 1.955 af, Depth> 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
7.200	98	Paved roads w/curbs & sewers, HSG D
2.600	96	Gravel surface, HSG D
3.400	80	>75% Grass cover, Good, HSG D
13.200	93	Weighted Average
6.000		45.45% Pervious Area
7.200		54.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0135	1.04		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
1.0	56	0.0135	0.93		Sheet Flow, A-B CONCENTRATED Smooth surfaces n= 0.011 P2= 2.50"
5.0	1,729	0.0082	5.75	95.86	Parabolic Channel, B-C SWALE W=10.00' D=2.50' Area=16.7 sf Perim=11.5' n= 0.030 Earth, grassed & winding
7.6	1,885	Total			

Subcatchment D-1: D-1



Summary for Subcatchment D-2: D-2

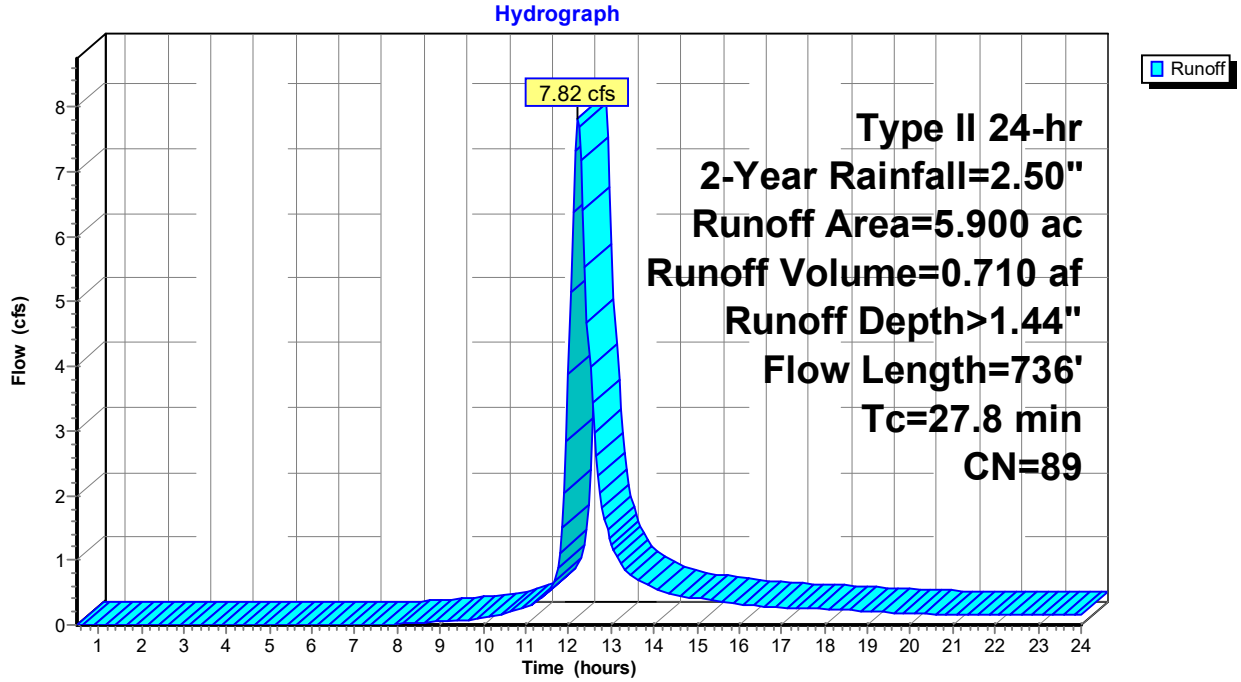
Runoff = 7.82 cfs @ 12.22 hrs, Volume= 0.710 af, Depth> 1.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
1.200	98	Paved roads w/curbs & sewers, HSG D
1.900	98	Unconnected roofs, HSG D
2.800	80	>75% Grass cover, Good, HSG D
5.900	89	Weighted Average
2.800		47.46% Pervious Area
3.100		52.54% Impervious Area
1.900		61.29% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.1259	0.22		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
19.3	322	0.0031	0.28		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.8	314	0.0050	6.42	160.47	Parabolic Channel, C-D BIO SWALE W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
27.8	736	Total			

Subcatchment D-2: D-2



Summary for Subcatchment D-3: D-3

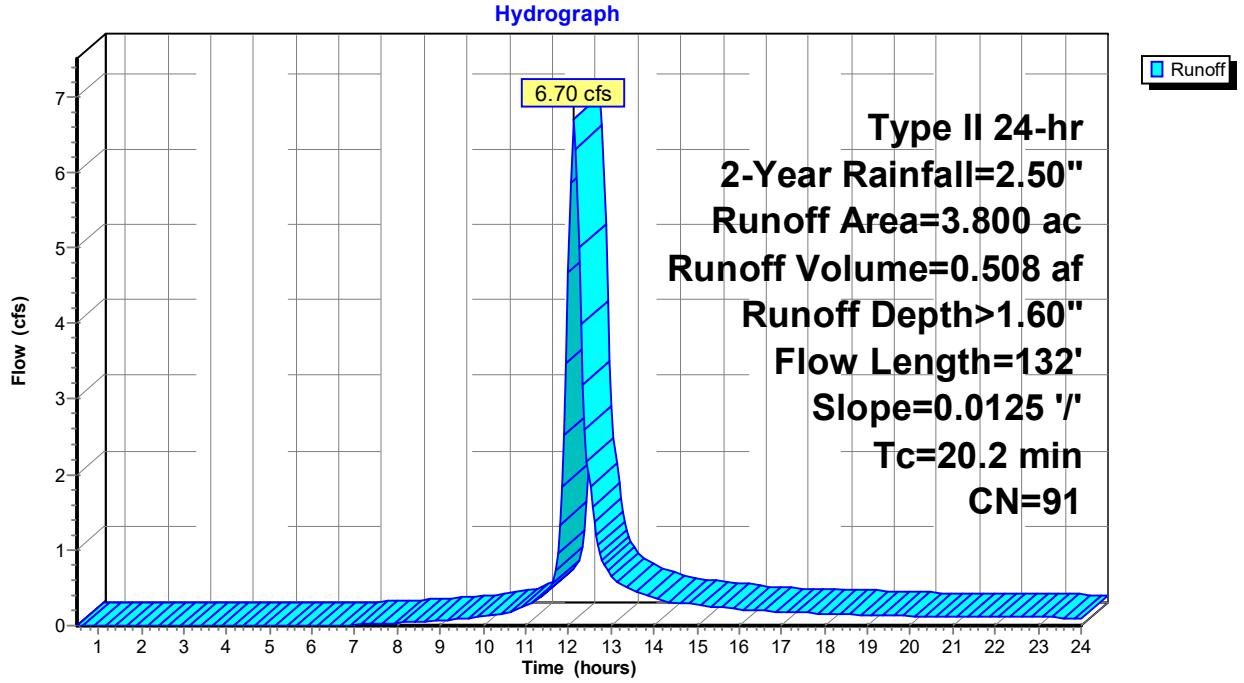
Runoff = 6.70 cfs @ 12.13 hrs, Volume= 0.508 af, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
0.800	98	Paved roads w/curbs & sewers, HSG D
1.500	98	Unconnected roofs, HSG D
1.500	80	>75% Grass cover, Good, HSG D
3.800	91	Weighted Average
1.500		39.47% Pervious Area
2.300		60.53% Impervious Area
1.500		65.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0125	0.09		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
0.7	32	0.0125	0.78		Shallow Concentrated Flow, B-C CONCENTRATED Short Grass Pasture Kv= 7.0 fps
20.2	132	Total			

Subcatchment D-3: D-3



Summary for Subcatchment D-4: D-4

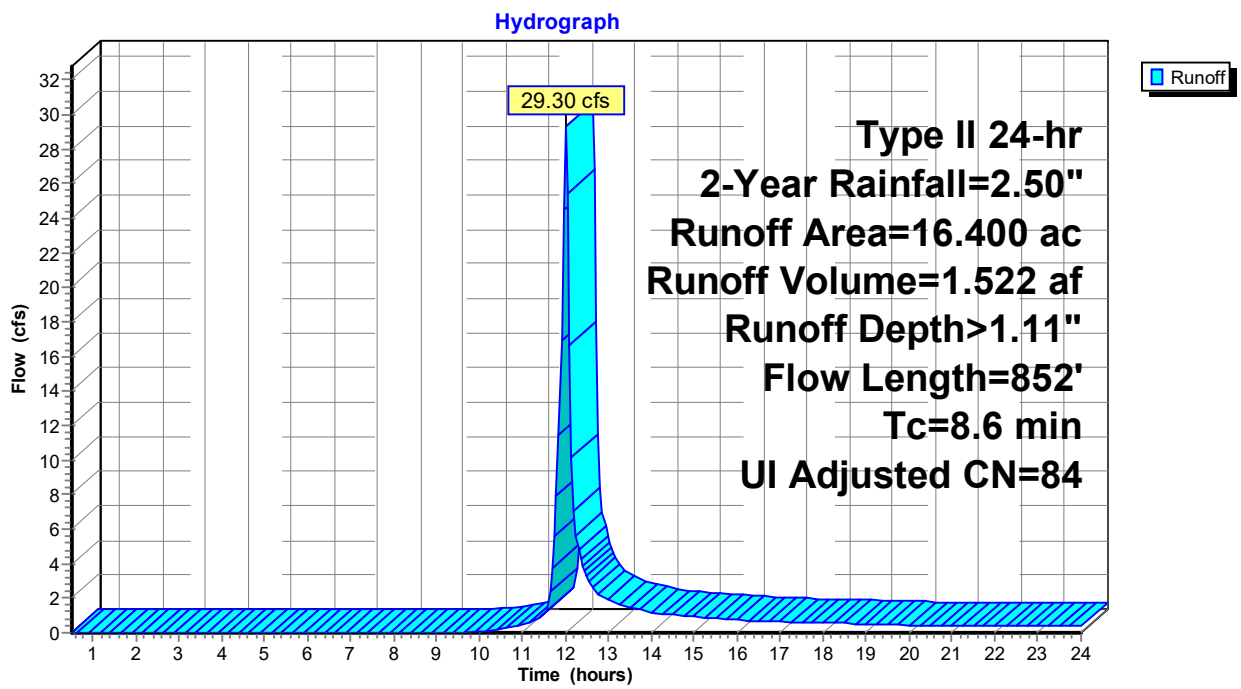
Runoff = 29.30 cfs @ 12.00 hrs, Volume= 1.522 af, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Adj	Description
3.200	98		Unconnected roofs, HSG D
0.800	98		Paved roads w/curbs & sewers, HSG D
12.400	82		Woods/grass comb., Fair, HSG D
16.400	86	84	Weighted Average, UI Adjusted
12.400			75.61% Pervious Area
4.000			24.39% Impervious Area
3.200			80.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	41	0.2317	0.23		Sheet Flow, A-B SHEET FLOW Grass: Dense n= 0.240 P2= 2.50"
5.6	811	0.0025	2.42	32.21	Parabolic Channel, B-C SWALE W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
8.6	852	Total			

Subcatchment D-4: D-4



Summary for Subcatchment D-5: D-5

Runoff = 16.06 cfs @ 12.32 hrs, Volume= 1.733 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

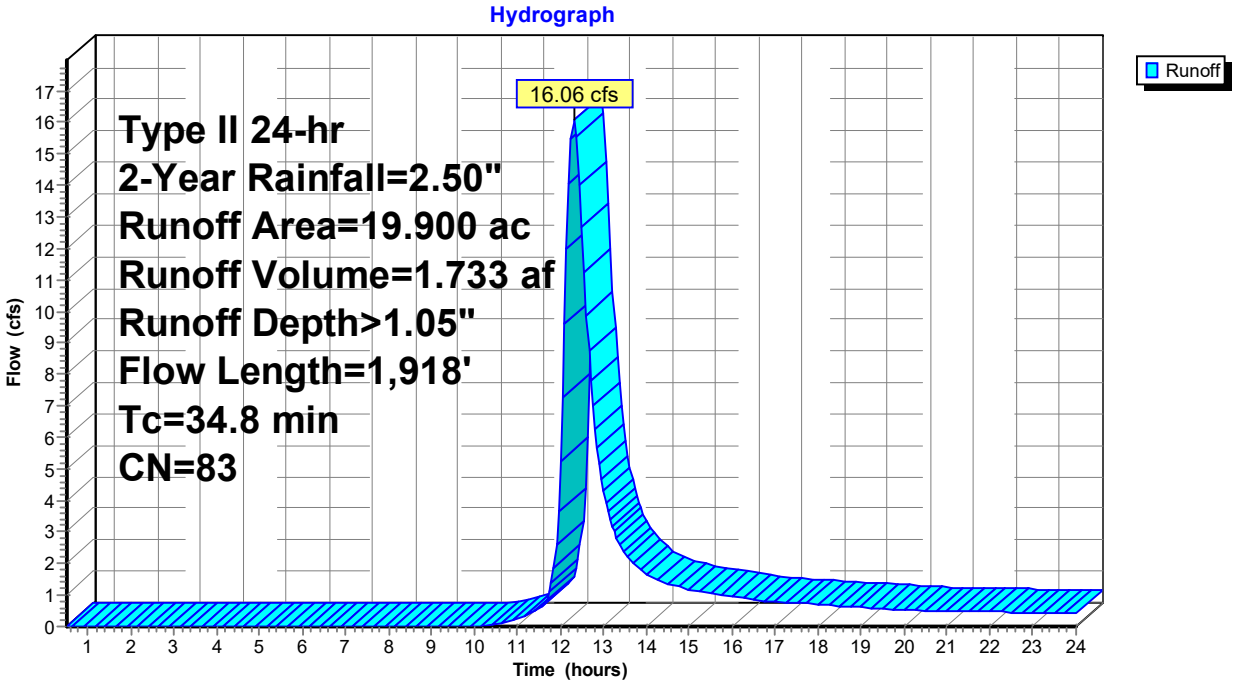
Area (ac)	CN	Description
2.200	98	Paved parking, HSG D
1.700	96	Gravel surface, HSG D
0.400	98	Unconnected roofs, HSG D
15.600	79	Woods/grass comb., Good, HSG D
19.900	83	Weighted Average
17.300		86.93% Pervious Area
2.600		13.07% Impervious Area
0.400		15.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0240	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
15.6	725	0.0240	0.77		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.6	142	0.0050	4.20	139.87	Parabolic Channel, C-D SWALE W=25.00' D=2.00' Area=33.3 sf Perim=25.4' n= 0.030 Earth, grassed & winding
0.4	100	0.0050	3.72	4.57	Pipe Channel, D-E PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.3	346	0.0117	4.53	77.03	Parabolic Channel, E-F DITCH W=17.00' D=1.50' Area=17.0 sf Perim=17.3' n= 0.035 Earth, dense weeds
0.1	55	0.0125	6.96	8.54	Pipe Channel, F-G PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	94	0.0066	5.28	211.05	Parabolic Channel, G-HDITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.0	20	0.0190	8.58	10.52	Pipe Channel, H-I PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	46	0.0067	3.96	52.73	Parabolic Channel, I-J DITCH W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
0.0	22	0.0168	8.06	9.90	Pipe Channel, J-K PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.5	88	0.0027	3.23	84.04	Parabolic Channel, K-L DITCH W=13.00' D=3.00' Area=26.0 sf Perim=14.7' n= 0.035 Earth, dense weeds
0.3	30	0.0083	1.78	2.19	Pipe Channel, L-M PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'

n= 0.035 Earth, dense weeds

0.5	150	0.0059	4.90	156.69	Parabolic Channel, M-N DITCH W=16.00' D=3.00' Area=32.0 sf Perim=17.4' n= 0.035 Earth, dense weeds
34.8	1,918	Total			

Subcatchment D-5: D-5



Summary for Subcatchment D-6: D-6

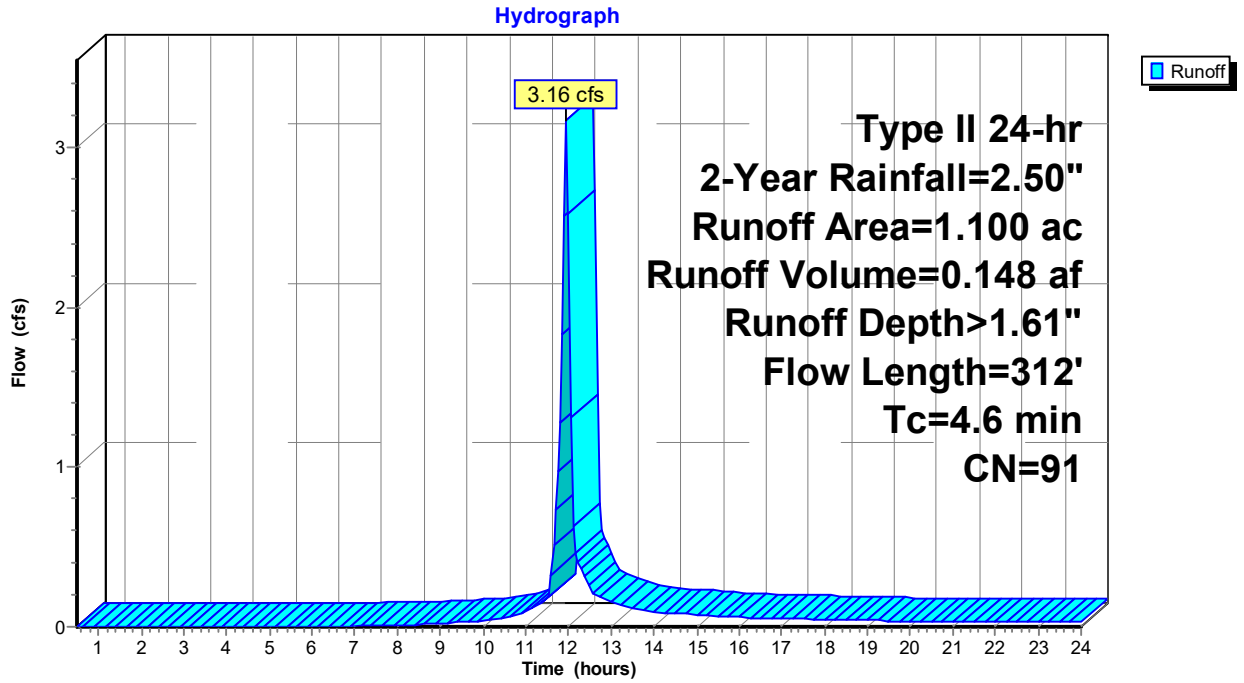
Runoff = 3.16 cfs @ 11.95 hrs, Volume= 0.148 af, Depth> 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
0.300	98	Paved parking, HSG D
0.400	96	Gravel surface, HSG D
0.400	80	>75% Grass cover, Good, HSG D
1.100	91	Weighted Average
0.800		72.73% Pervious Area
0.300		27.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0200	2.87		Shallow Concentrated Flow, B-C CONCENTRATED Paved Kv= 20.3 fps
3.0	182	0.0210	1.01		Shallow Concentrated Flow, C-D CONCENTRATED Short Grass Pasture Kv= 7.0 fps
4.6	312	Total			

Subcatchment D-6: D-6



Summary for Subcatchment D-7: D-7

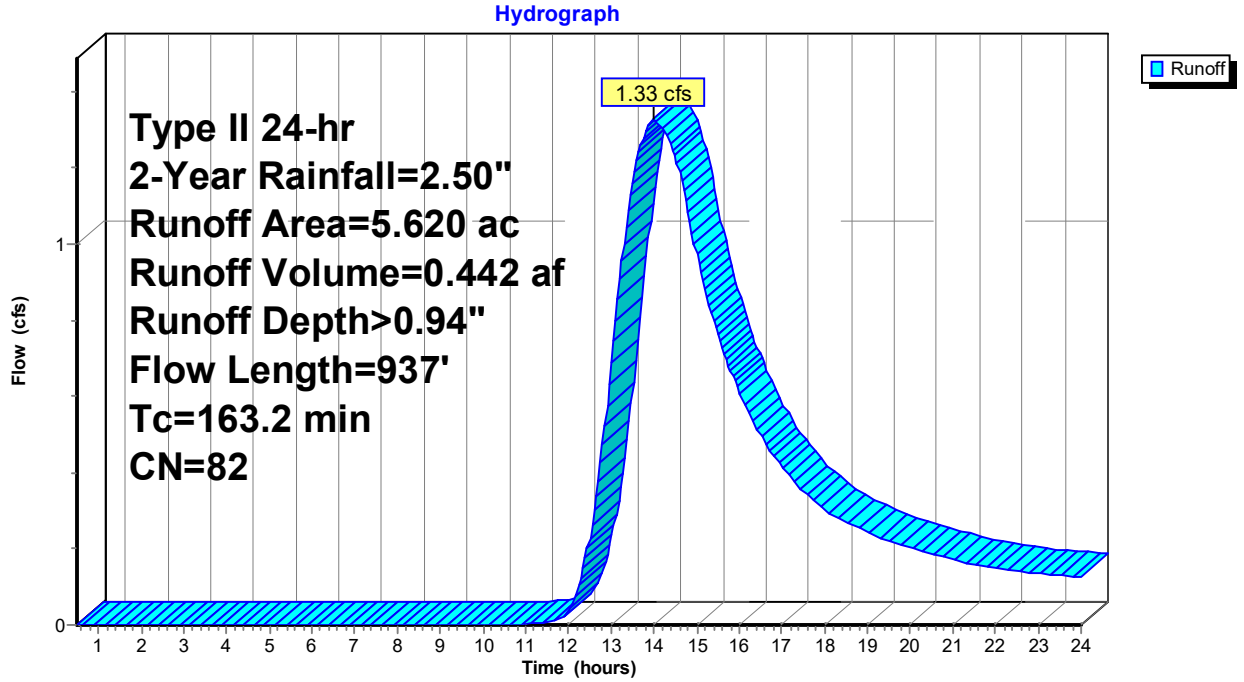
Runoff = 1.33 cfs @ 13.98 hrs, Volume= 0.442 af, Depth> 0.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
0.010	98	Paved parking, HSG D
5.600	82	Woods/grass comb., Fair, HSG D
0.010	98	Unconnected roofs, HSG D
5.620	82	Weighted Average
5.600		99.64% Pervious Area
0.020		0.36% Impervious Area
0.010		50.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
134.4	100	0.0001	0.01		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
28.5	745	0.0076	0.44		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.3	92	0.0261	6.06	30.30	Parabolic Channel, C-D DITCH W=5.00' D=1.50' Area=5.0 sf Perim=6.0' n= 0.035 Earth, dense weeds
163.2	937	Total			

Subcatchment D-7: D-7



Summary for Subcatchment D-8: D-8

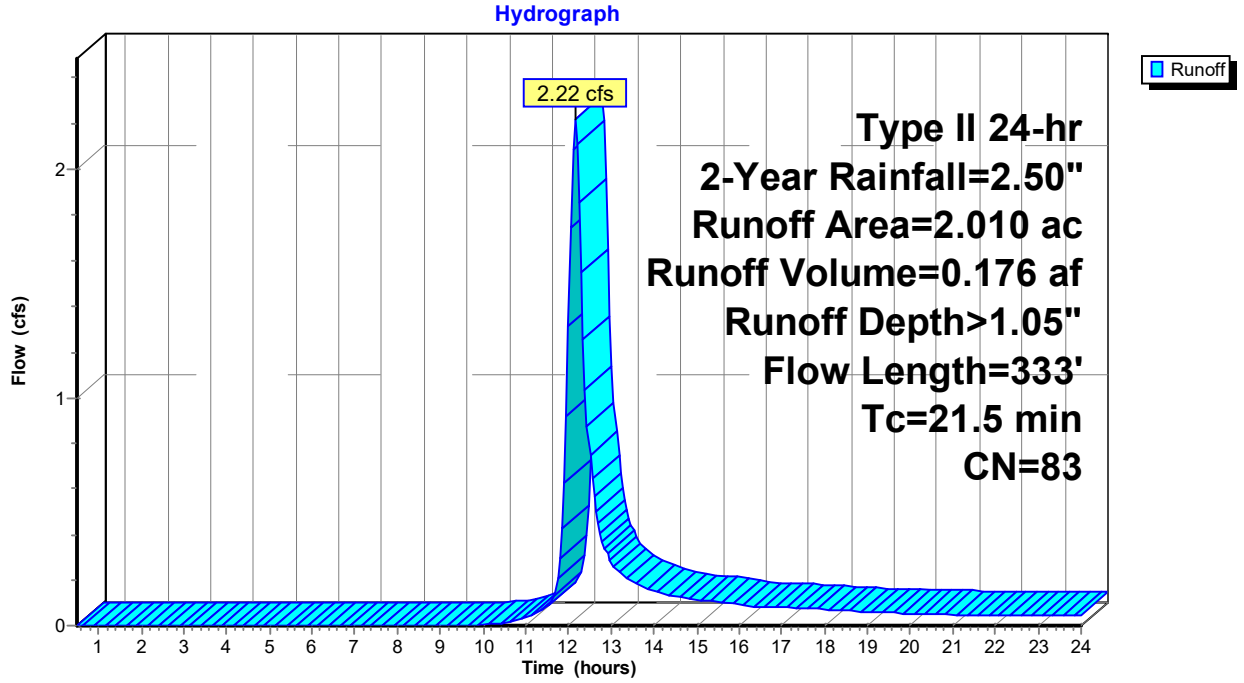
Runoff = 2.22 cfs @ 12.15 hrs, Volume= 0.176 af, Depth> 1.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-Year Rainfall=2.50"

Area (ac)	CN	Description
0.010	98	Unconnected roofs, HSG D
0.100	98	Paved parking, HSG D
1.900	82	Woods/grass comb., Fair, HSG D
2.010	83	Weighted Average
1.900		94.53% Pervious Area
0.110		5.47% Impervious Area
0.010		9.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0255	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
6.9	233	0.0127	0.56		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
21.5	333	Total			

Subcatchment D-8: D-8



Summary for Pond 1: EXISTING 12" CULVERT

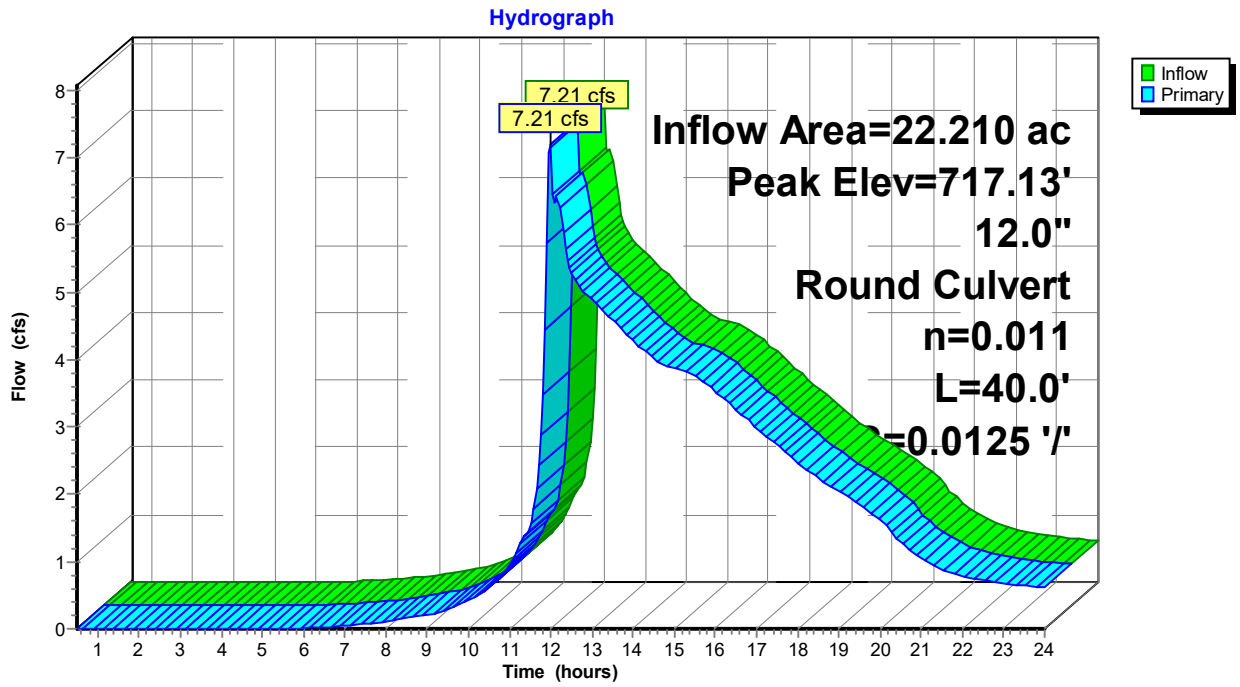
Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 1.57" for 2-Year event
Inflow = 7.21 cfs @ 11.98 hrs, Volume= 2.909 af
Outflow = 7.21 cfs @ 11.98 hrs, Volume= 2.909 af, Atten= 0%, Lag= 0.0 min
Primary = 7.21 cfs @ 11.98 hrs, Volume= 2.909 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 717.13' @ 11.98 hrs

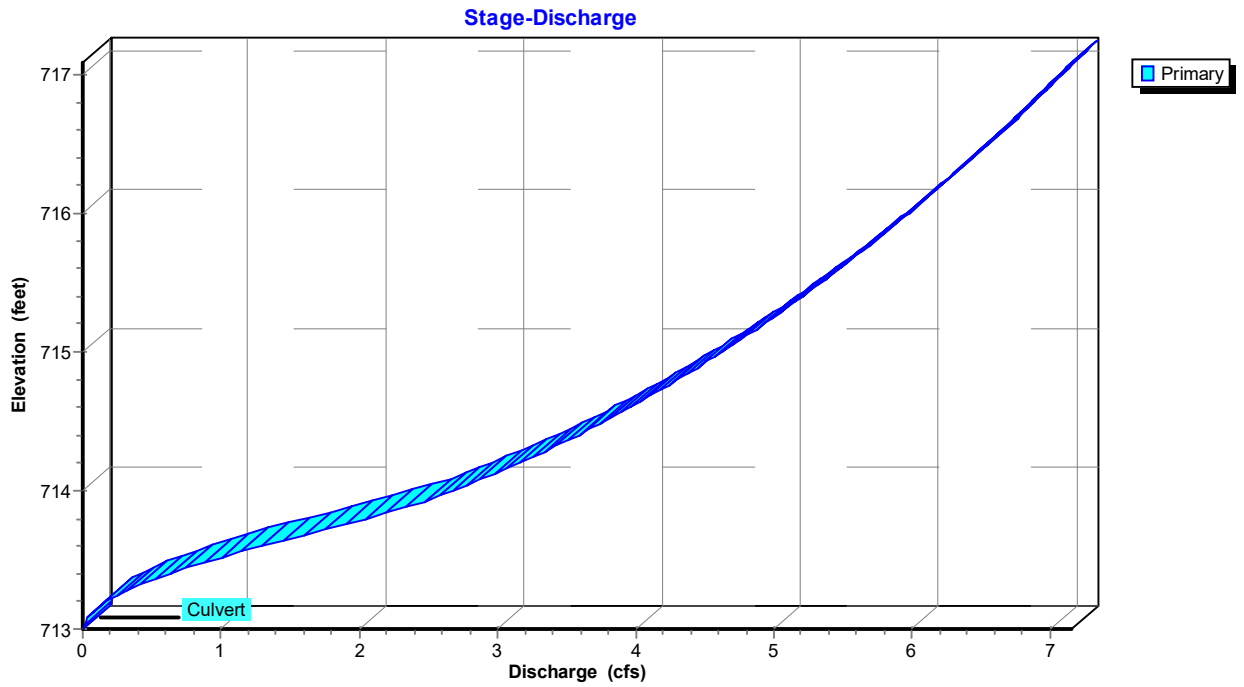
Device	Routing	Invert	Outlet Devices
#1	Primary	713.00'	12.0" Round Culvert L= 40.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 713.00' / 712.50' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=7.11 cfs @ 11.98 hrs HW=717.04' (Free Discharge)
└─1=Culvert (Inlet Controls 7.11 cfs @ 9.06 fps)

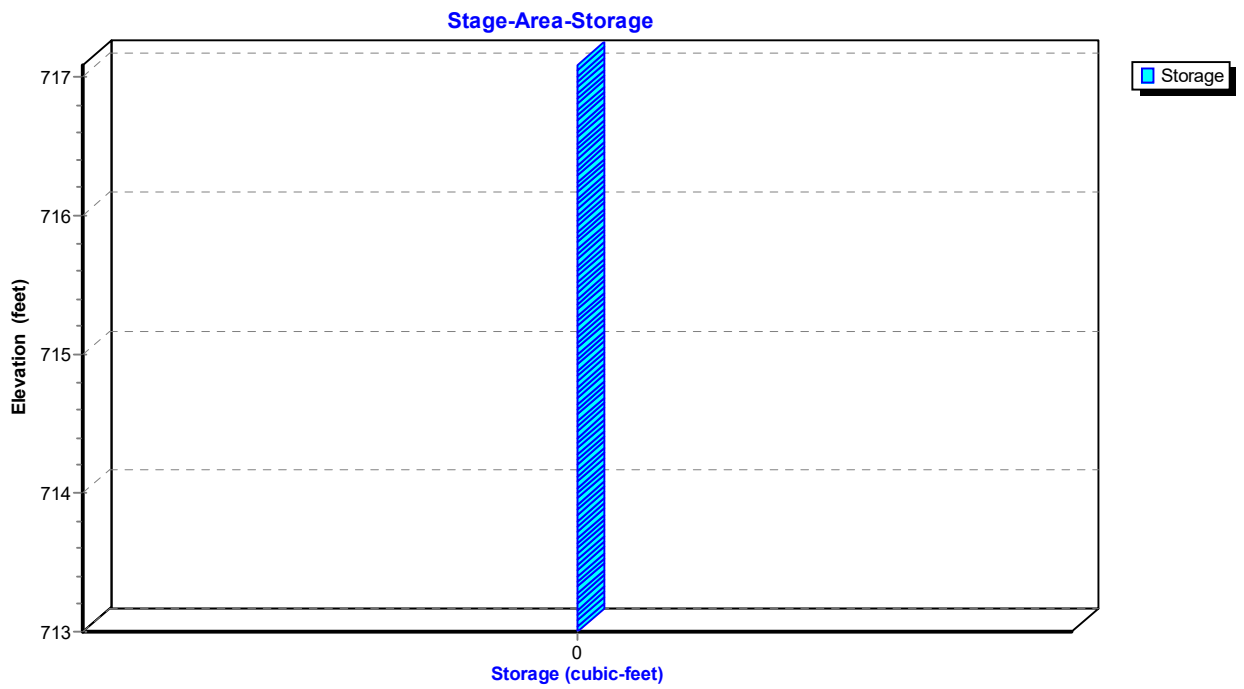
Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Summary for Pond 1P: WET POND 1

Inflow Area = 13.200 ac, 54.55% Impervious, Inflow Depth > 1.78" for 2-Year event
Inflow = 37.41 cfs @ 11.99 hrs, Volume= 1.955 af
Outflow = 3.15 cfs @ 12.54 hrs, Volume= 1.903 af, Atten= 92%, Lag= 33.3 min
Primary = 3.15 cfs @ 12.54 hrs, Volume= 1.903 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 720.16' @ 12.54 hrs Surf.Area= 37,577 sf Storage= 40,916 cf

Plug-Flow detention time= 147.7 min calculated for 1.899 af (97% of inflow)
Center-of-Mass det. time= 131.5 min (930.5 - 799.0)

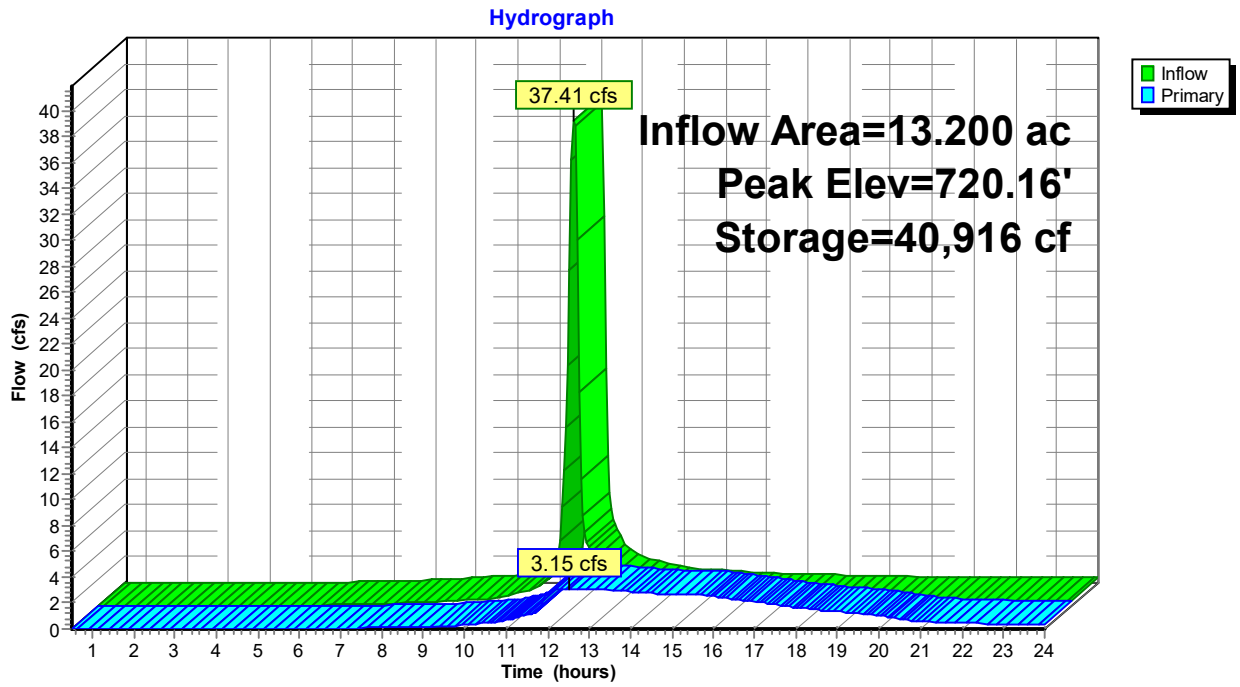
Volume	Invert	Avail.Storage	Storage Description
#1	719.00'	189,322 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
719.00	33,157	0	0
720.00	36,963	35,060	35,060
721.00	40,869	38,916	73,976
722.00	44,876	42,873	116,849
723.00	48,983	46,930	163,778
723.50	53,191	25,544	189,322

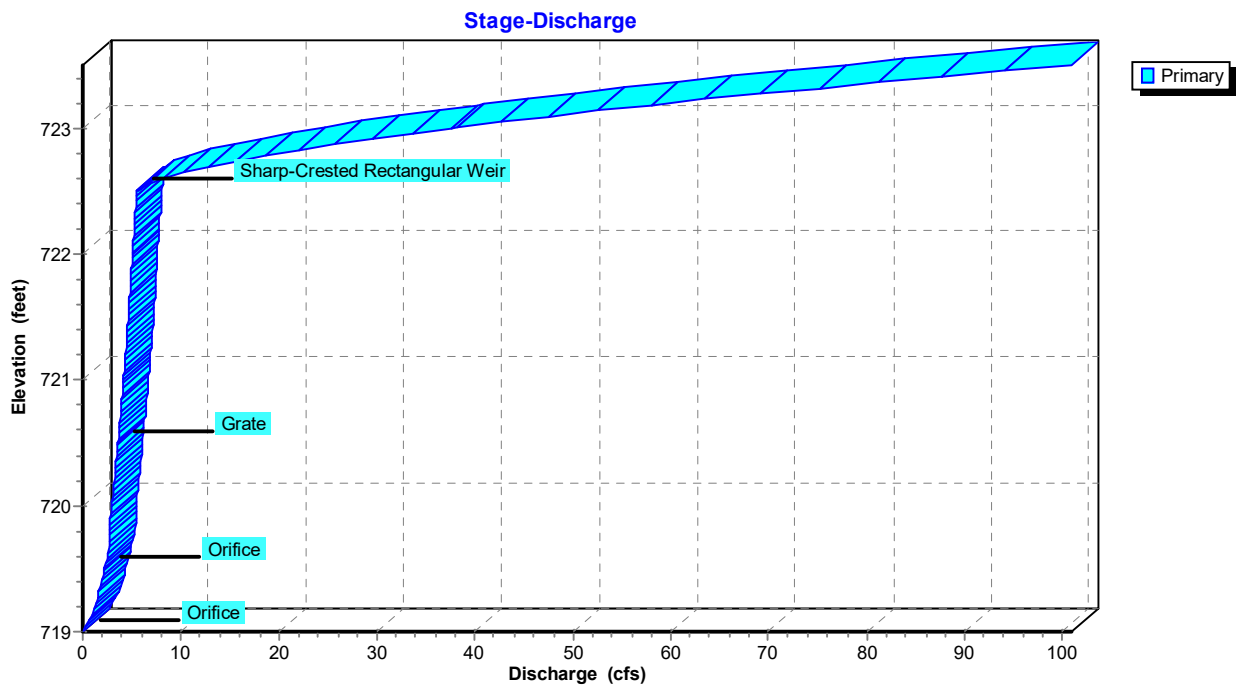
Device	Routing	Invert	Outlet Devices
#1	Primary	722.50'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	718.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 718.50' / 718.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	720.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	719.00'	6.0" Horiz. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#5	Device 2	719.50'	3.0" Vert. Orifice X 3.00 C= 0.600

Primary OutFlow Max=3.15 cfs @ 12.54 hrs HW=720.16' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 3.15 cfs @ 4.01 fps)
  - 3=Grate (Controls 0.00 cfs)
  - 4=Orifice (Passes < 4.07 cfs potential flow)
  - 5=Orifice (Passes < 0.52 cfs potential flow)

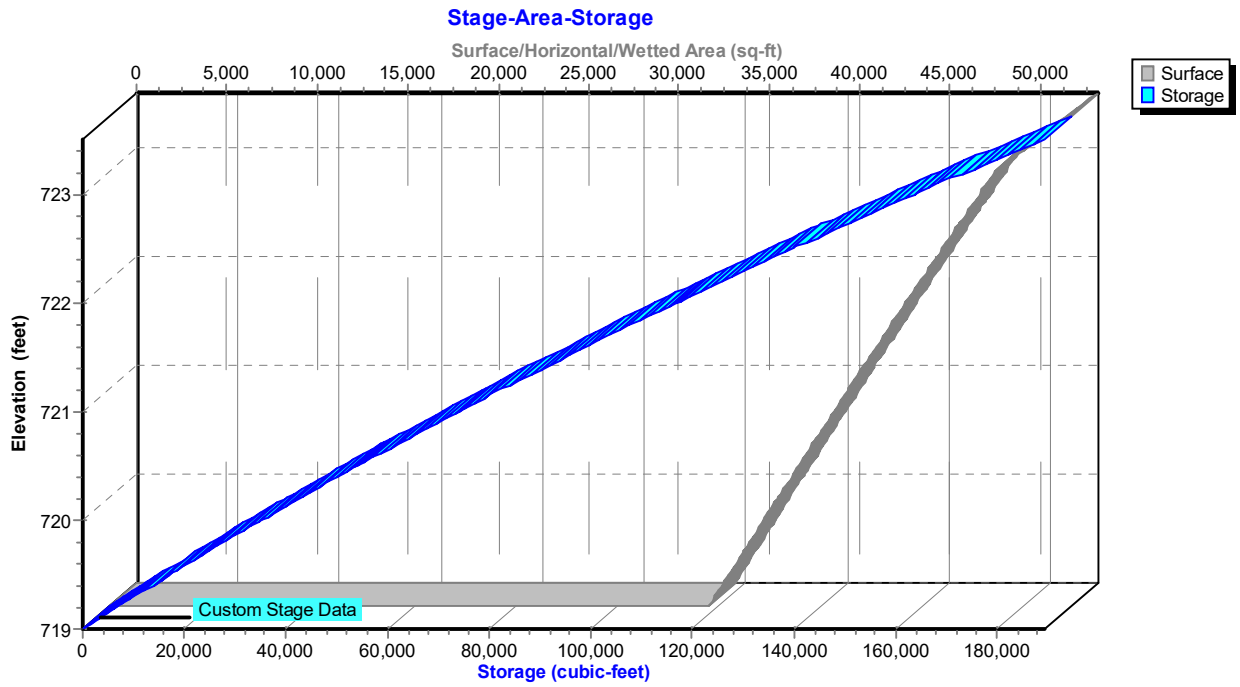
Pond 1P: WET POND 1



Pond 1P: WET POND 1



Pond 1P: WET POND 1



Summary for Pond 2: EXISTING 24" HDPE

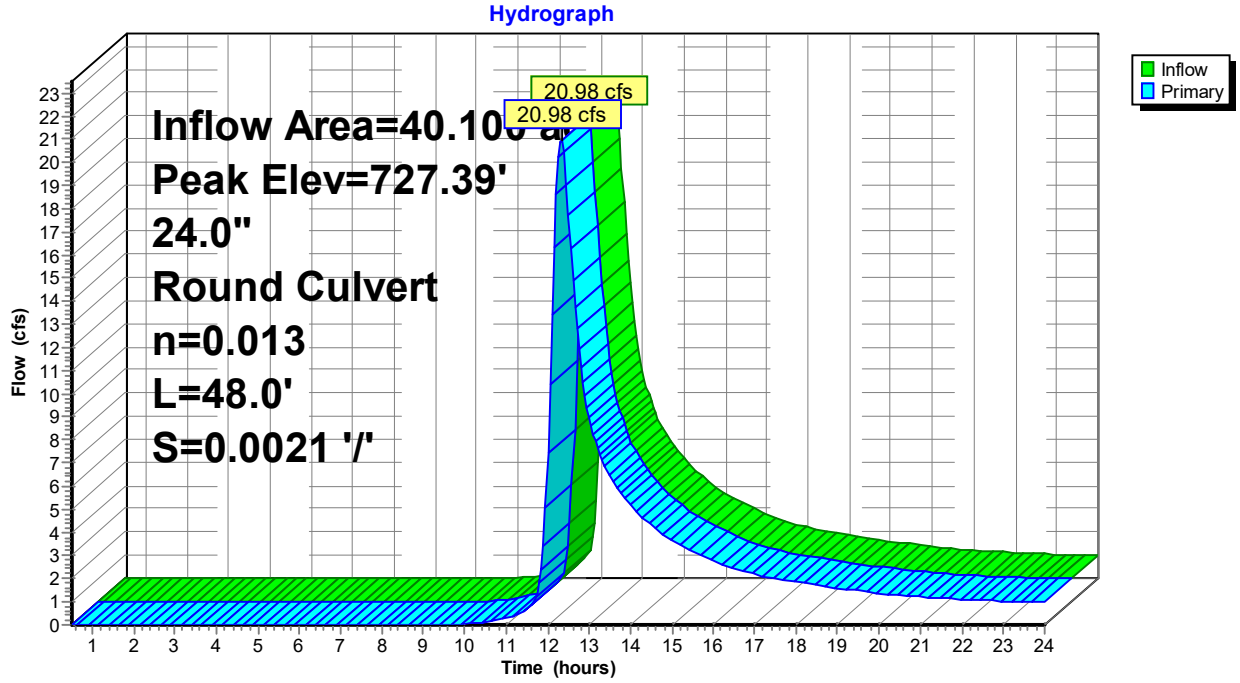
Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 1.06" for 2-Year event
Inflow = 20.98 cfs @ 12.32 hrs, Volume= 3.529 af
Outflow = 20.98 cfs @ 12.32 hrs, Volume= 3.529 af, Atten= 0%, Lag= 0.0 min
Primary = 20.98 cfs @ 12.32 hrs, Volume= 3.529 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 727.39' @ 12.32 hrs

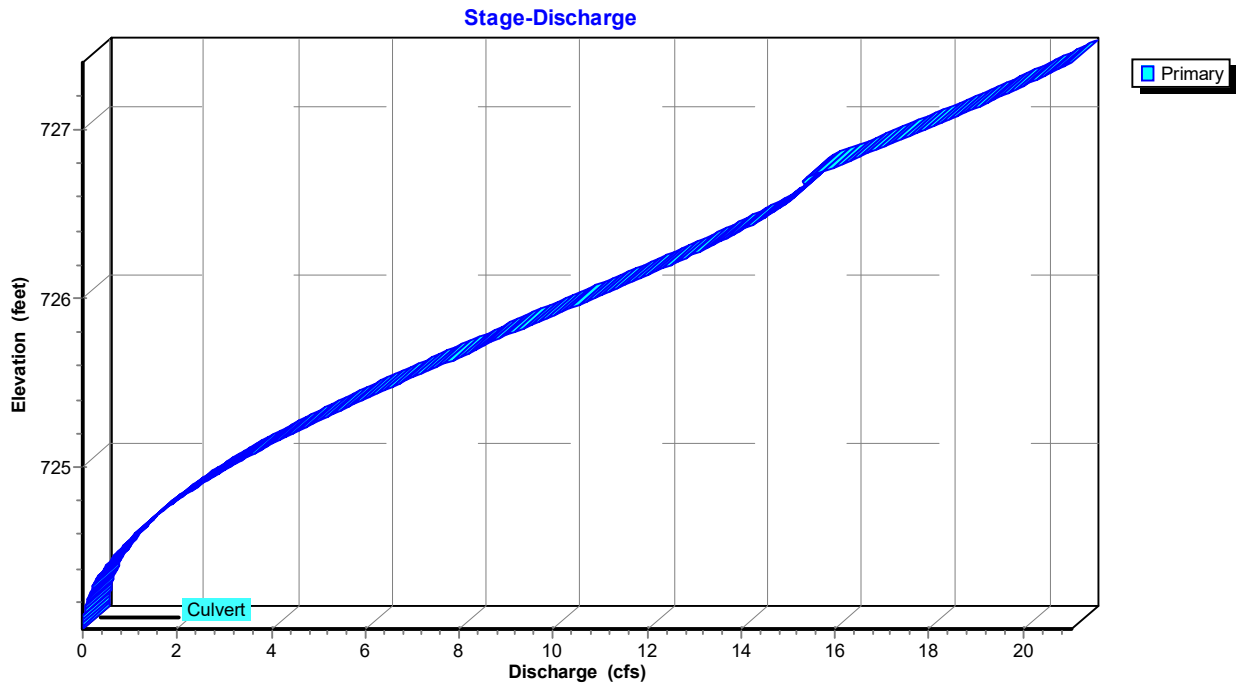
Device	Routing	Invert	Outlet Devices
#1	Primary	724.04'	24.0" Round Culvert L= 48.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 724.04' / 723.94' S= 0.0021 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=20.89 cfs @ 12.32 hrs HW=727.38' (Free Discharge)
└─1=Culvert (Barrel Controls 20.89 cfs @ 6.65 fps)

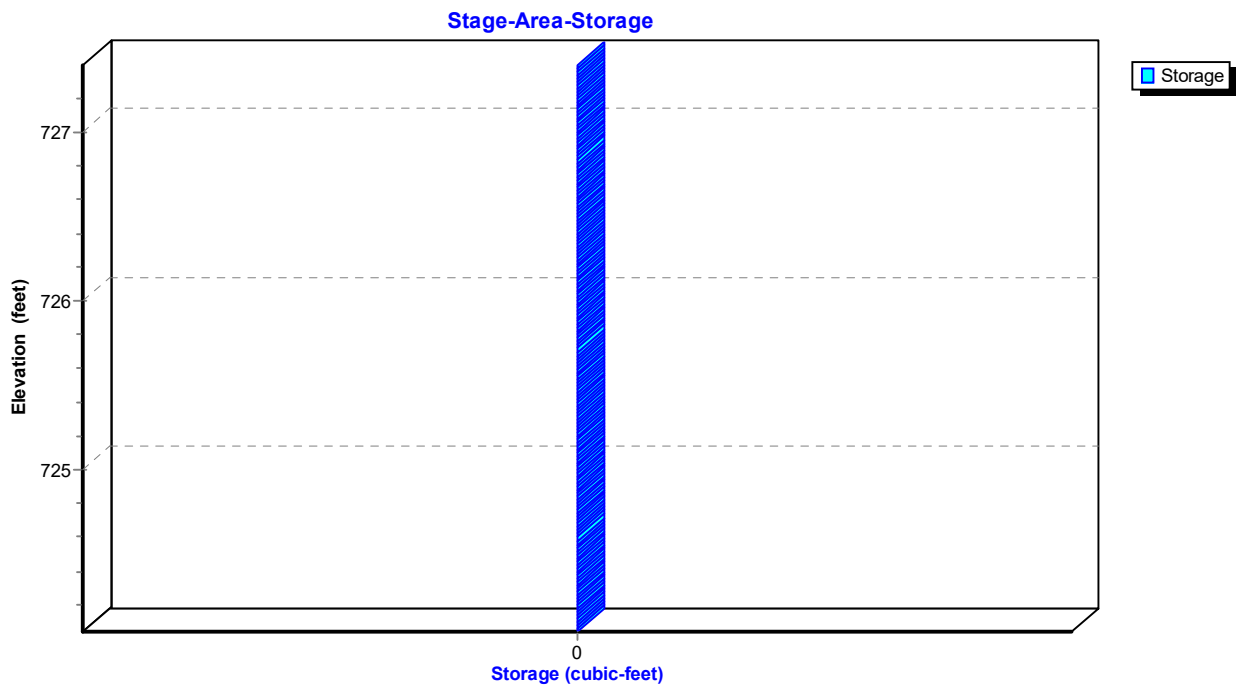
Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Summary for Pond 2P: WET POND 2

Inflow Area = 5.900 ac, 52.54% Impervious, Inflow Depth > 1.44" for 2-Year event
Inflow = 7.82 cfs @ 12.22 hrs, Volume= 0.710 af
Outflow = 1.36 cfs @ 12.95 hrs, Volume= 0.683 af, Atten= 83%, Lag= 44.0 min
Primary = 1.36 cfs @ 12.95 hrs, Volume= 0.683 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.72' @ 12.95 hrs Surf.Area= 21,578 sf Storage= 14,384 cf

Plug-Flow detention time= 152.1 min calculated for 0.683 af (96% of inflow)
Center-of-Mass det. time= 130.6 min (964.8 - 834.2)

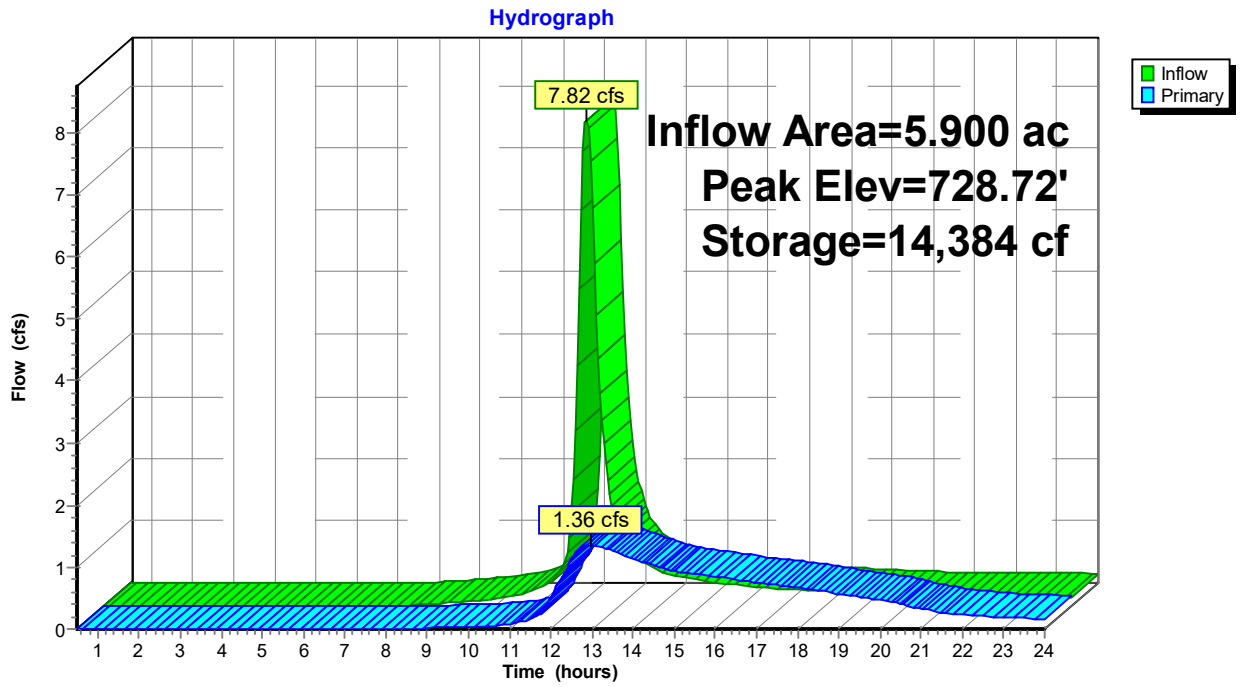
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	101,936 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,501	0	0
729.00	22,788	20,645	20,645
730.00	26,362	24,575	45,220
731.00	41,810	34,086	79,306
731.50	48,711	22,630	101,936

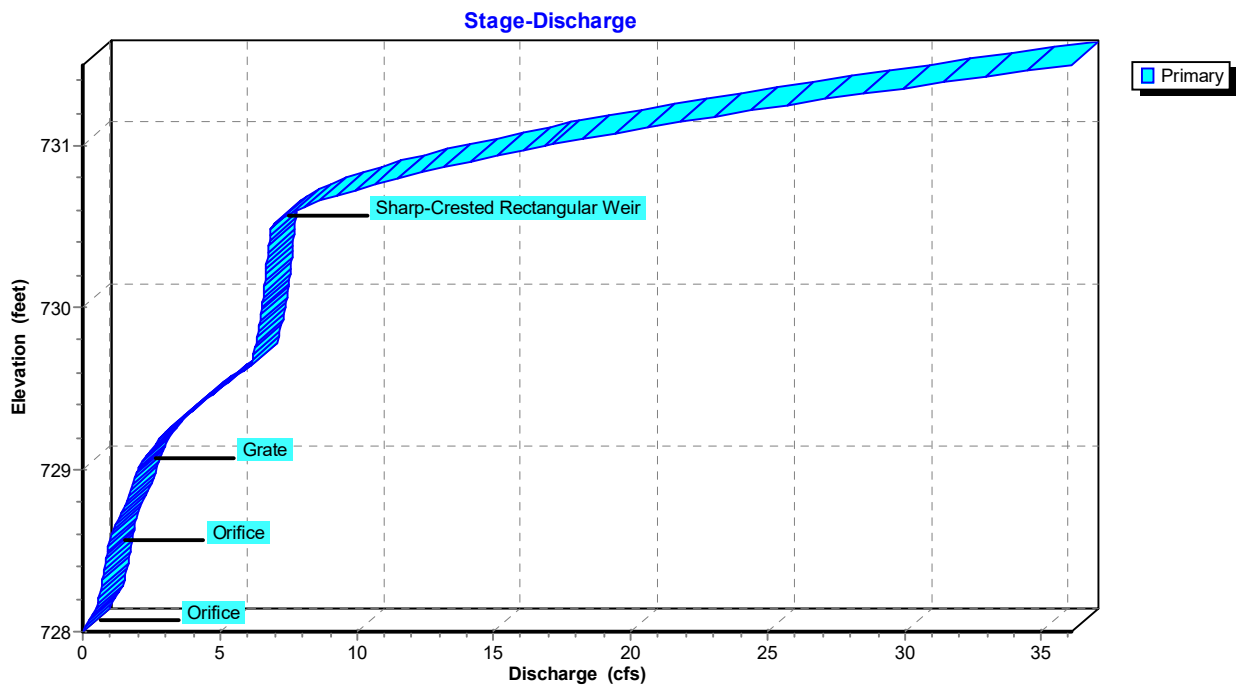
Device	Routing	Invert	Outlet Devices
#1	Primary	730.50'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 726.50' / 724.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	729.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.50'	4.0" Vert. Orifice X 3.00 C= 0.600
#5	Device 2	728.00'	4.0" Horiz. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.36 cfs @ 12.95 hrs HW=728.72' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 1.36 cfs of 4.96 cfs potential flow)
  - 3=Grate (Controls 0.00 cfs)
  - 4=Orifice (Orifice Controls 0.29 cfs @ 1.59 fps)
  - 5=Orifice (Orifice Controls 1.07 cfs @ 4.08 fps)

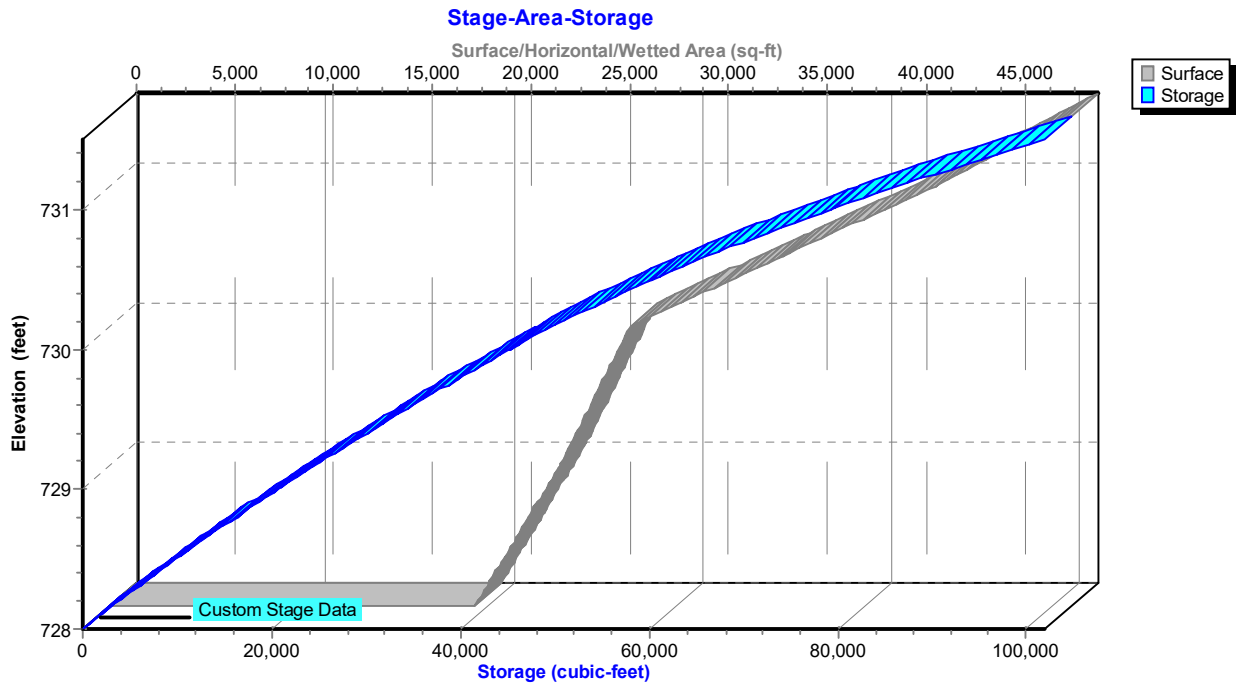
Pond 2P: WET POND 2



Pond 2P: WET POND 2



Pond 2P: WET POND 2



Summary for Pond 3P: WET POND 3

Inflow Area = 3.800 ac, 60.53% Impervious, Inflow Depth > 1.60" for 2-Year event
Inflow = 6.70 cfs @ 12.13 hrs, Volume= 0.508 af
Outflow = 1.51 cfs @ 12.57 hrs, Volume= 0.471 af, Atten= 77%, Lag= 26.4 min
Primary = 1.51 cfs @ 12.57 hrs, Volume= 0.471 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.52' @ 12.57 hrs Surf.Area= 19,894 sf Storage= 9,827 cf

Plug-Flow detention time= 122.5 min calculated for 0.471 af (93% of inflow)
Center-of-Mass det. time= 84.6 min (903.9 - 819.3)

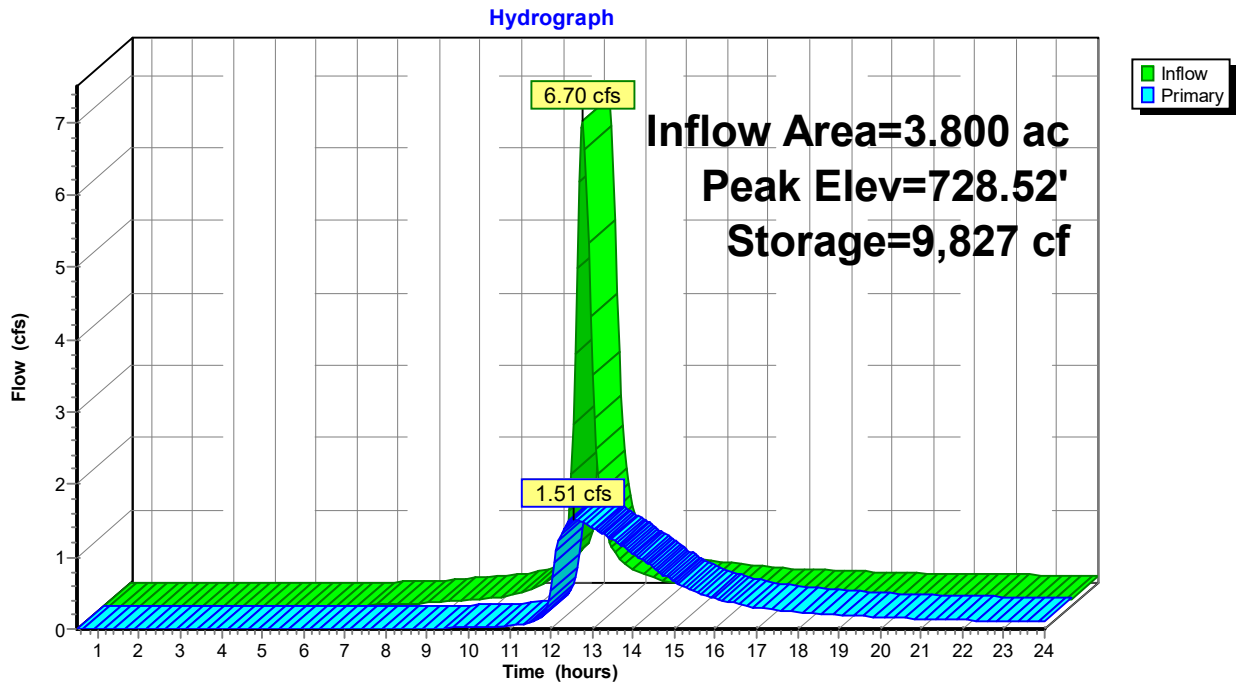
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	85,804 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,056	0	0
729.00	21,605	19,831	19,831
730.00	25,248	23,427	43,257
731.00	28,968	27,108	70,365
731.50	32,789	15,439	85,804

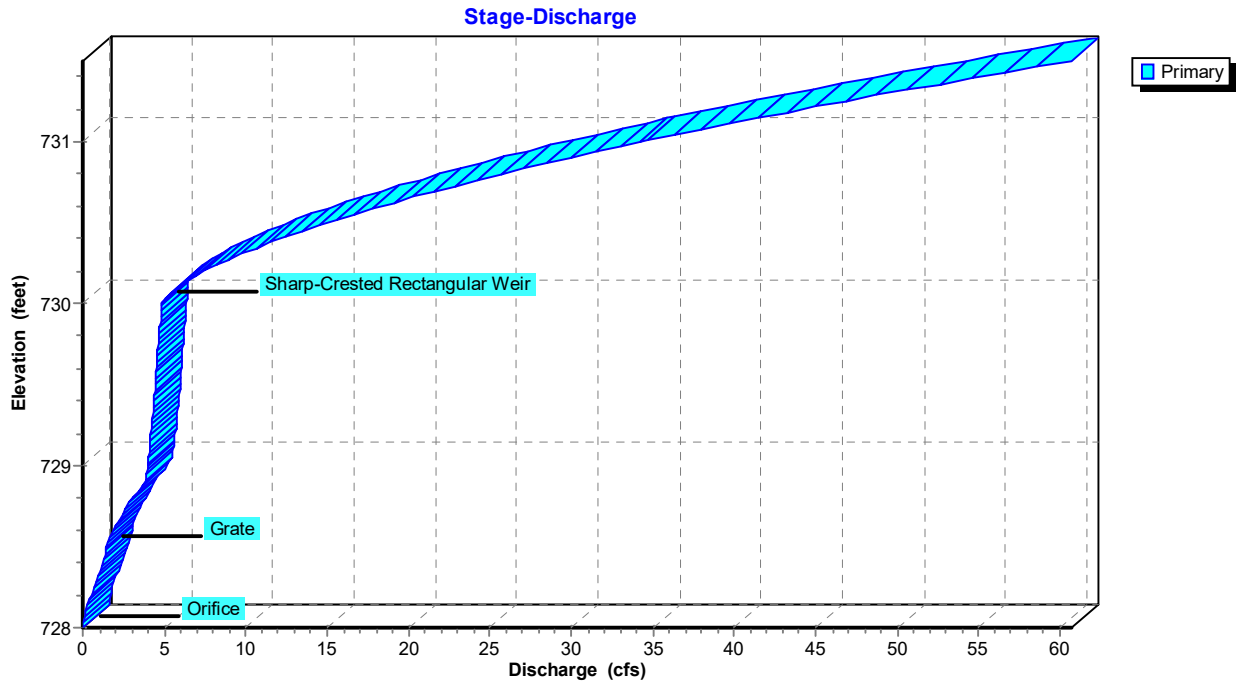
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 726.50' / 726.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.00'	4.0" Vert. Orifice X 6.00 C= 0.600

Primary OutFlow Max=1.51 cfs @ 12.57 hrs HW=728.52' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 1.51 cfs of 3.46 cfs potential flow)
  - 3=Grate (Orifice Controls 0.02 cfs @ 0.43 fps)
  - 4=Orifice (Orifice Controls 1.49 cfs @ 2.85 fps)

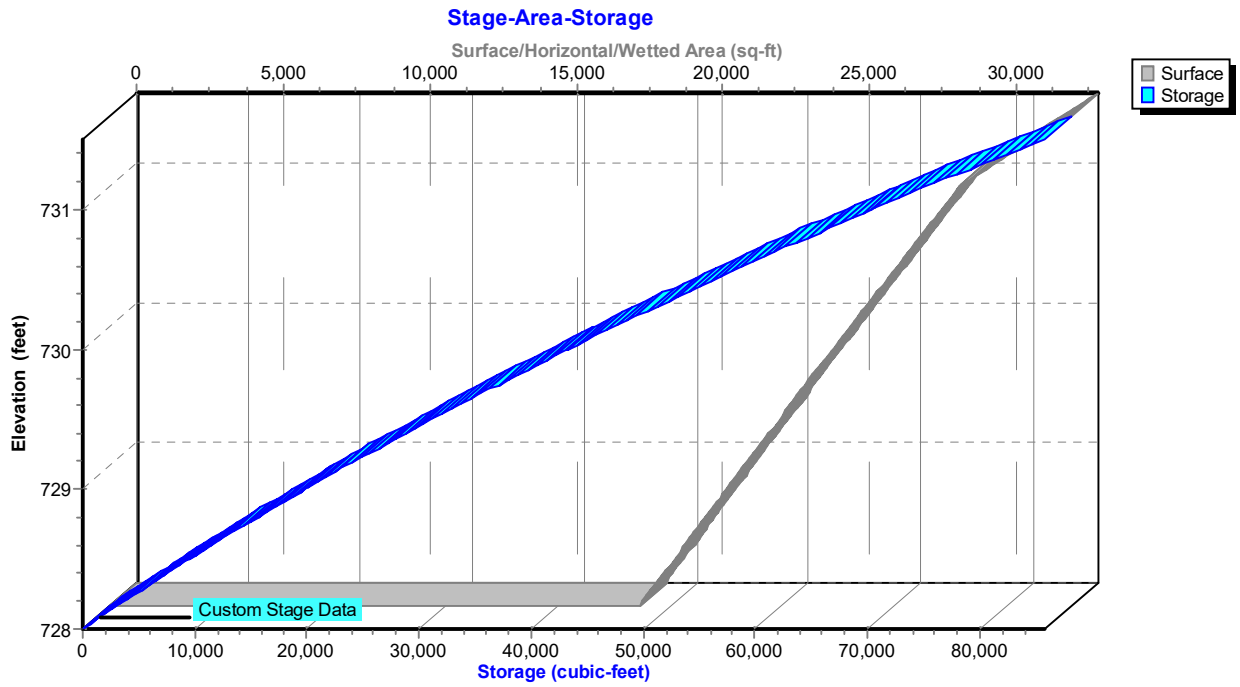
Pond 3P: WET POND 3



Pond 3P: WET POND 3



Pond 3P: WET POND 3



Summary for Pond 4P: WET POND 4

Inflow Area = 16.400 ac, 24.39% Impervious, Inflow Depth > 1.11" for 2-Year event
Inflow = 29.30 cfs @ 12.00 hrs, Volume= 1.522 af
Outflow = 3.52 cfs @ 12.46 hrs, Volume= 1.324 af, Atten= 88%, Lag= 27.3 min
Primary = 3.52 cfs @ 12.46 hrs, Volume= 1.324 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 727.61' @ 12.46 hrs Surf.Area= 50,085 sf Storage= 29,765 cf

Plug-Flow detention time= 165.9 min calculated for 1.321 af (87% of inflow)
Center-of-Mass det. time= 104.0 min (943.4 - 839.4)

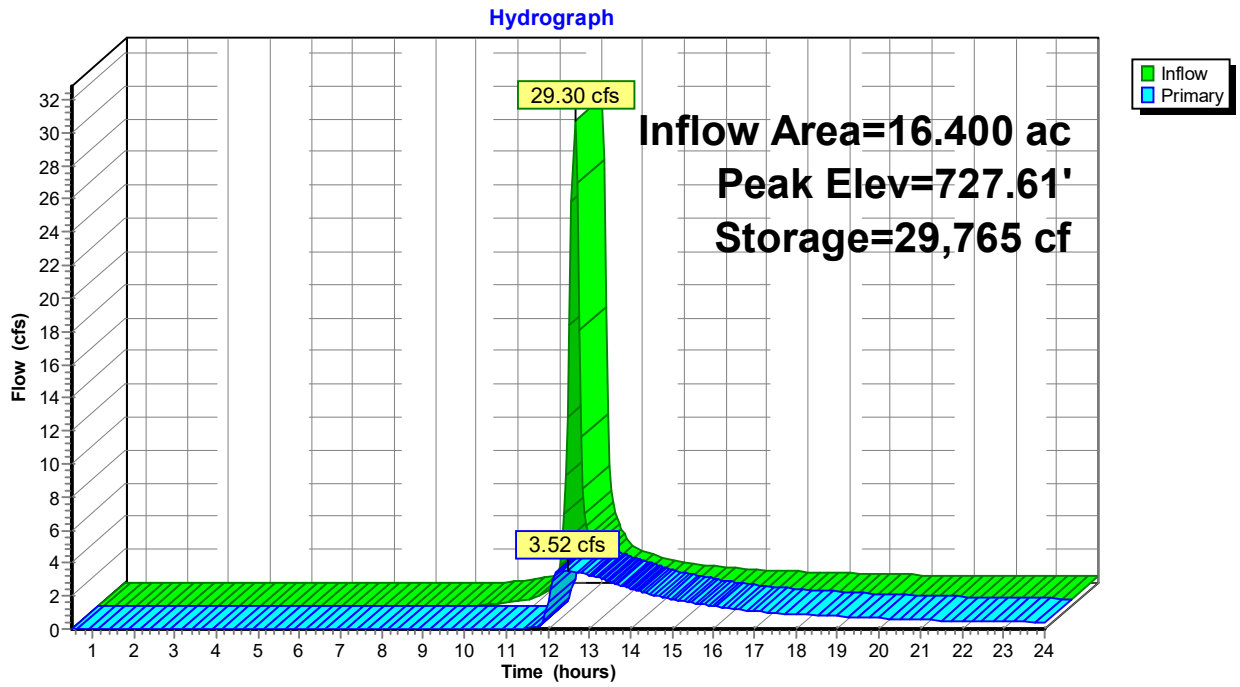
Volume	Invert	Avail.Storage	Storage Description
#1	727.00'	223,223 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
727.00	47,577	0	0
728.00	51,692	49,635	49,635
729.00	55,751	53,722	103,356
730.00	59,907	57,829	161,185
731.00	64,169	62,038	223,223

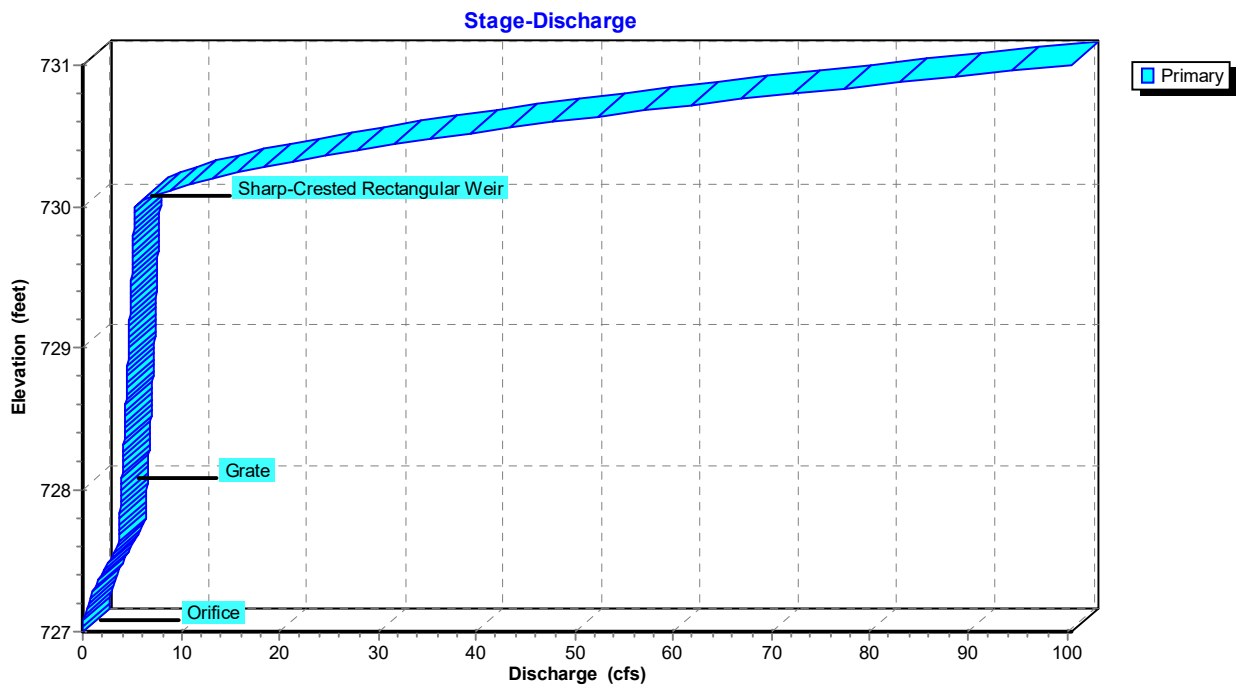
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	725.50'	12.0" Round Culvert L= 160.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.50' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	727.00'	8.0" Vert. Orifice X 4.00 C= 0.600

Primary OutFlow Max=3.56 cfs @ 12.46 hrs HW=727.61' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 3.56 cfs of 3.58 cfs potential flow)
  - 3=Grate (Controls 0.00 cfs)
  - 4=Orifice (Orifice Controls 3.56 cfs @ 2.66 fps)

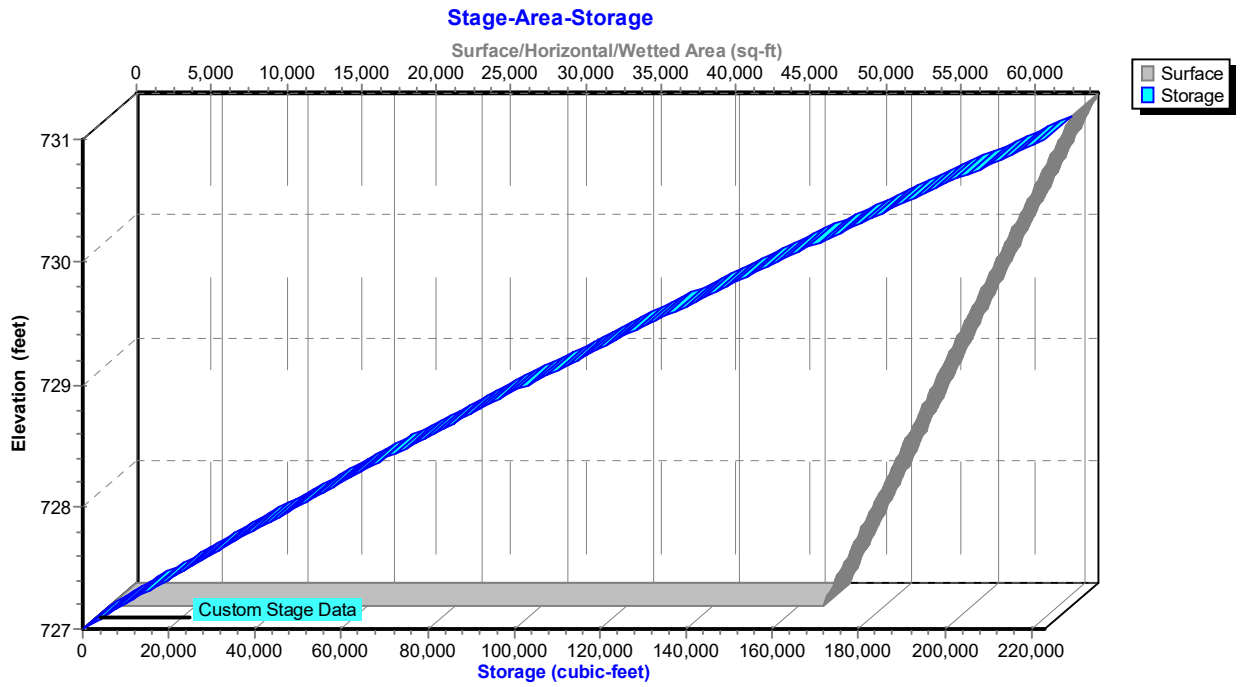
Pond 4P: WET POND 4



Pond 4P: WET POND 4



Pond 4P: WET POND 4

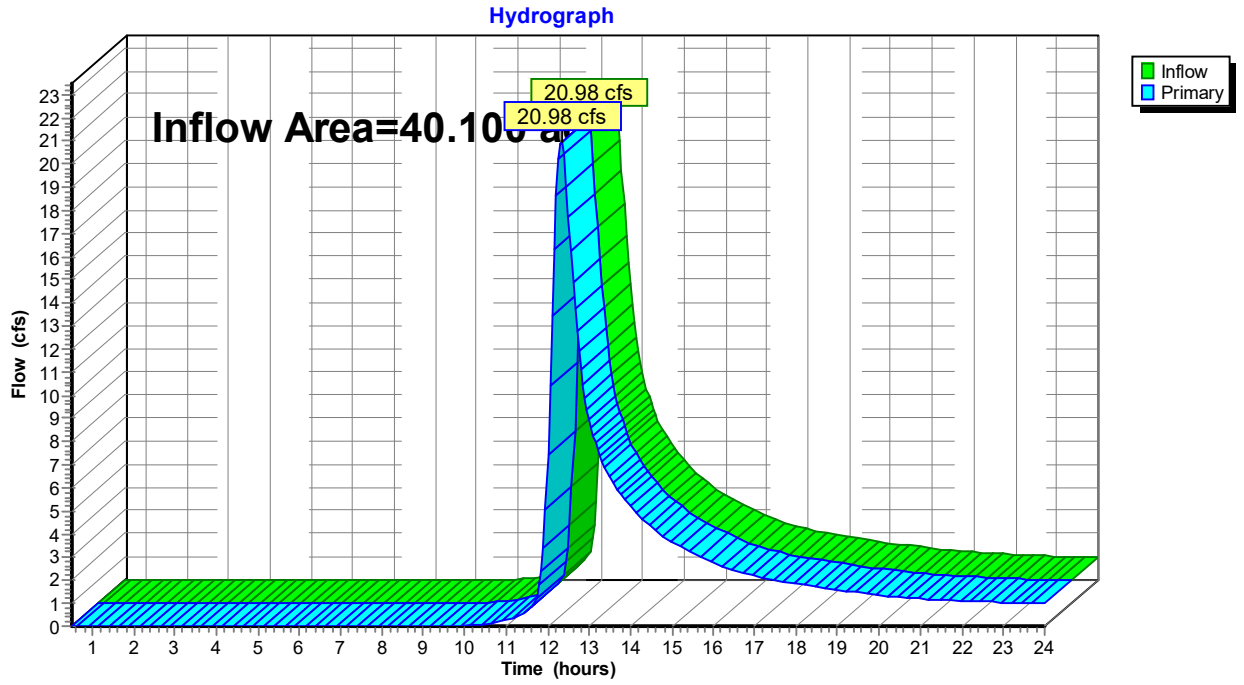


Summary for Link 1L: AREAS COMBINE

Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 1.06" for 2-Year event
Inflow = 20.98 cfs @ 12.32 hrs, Volume= 3.529 af
Primary = 20.98 cfs @ 12.32 hrs, Volume= 3.529 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 1L: AREAS COMBINE

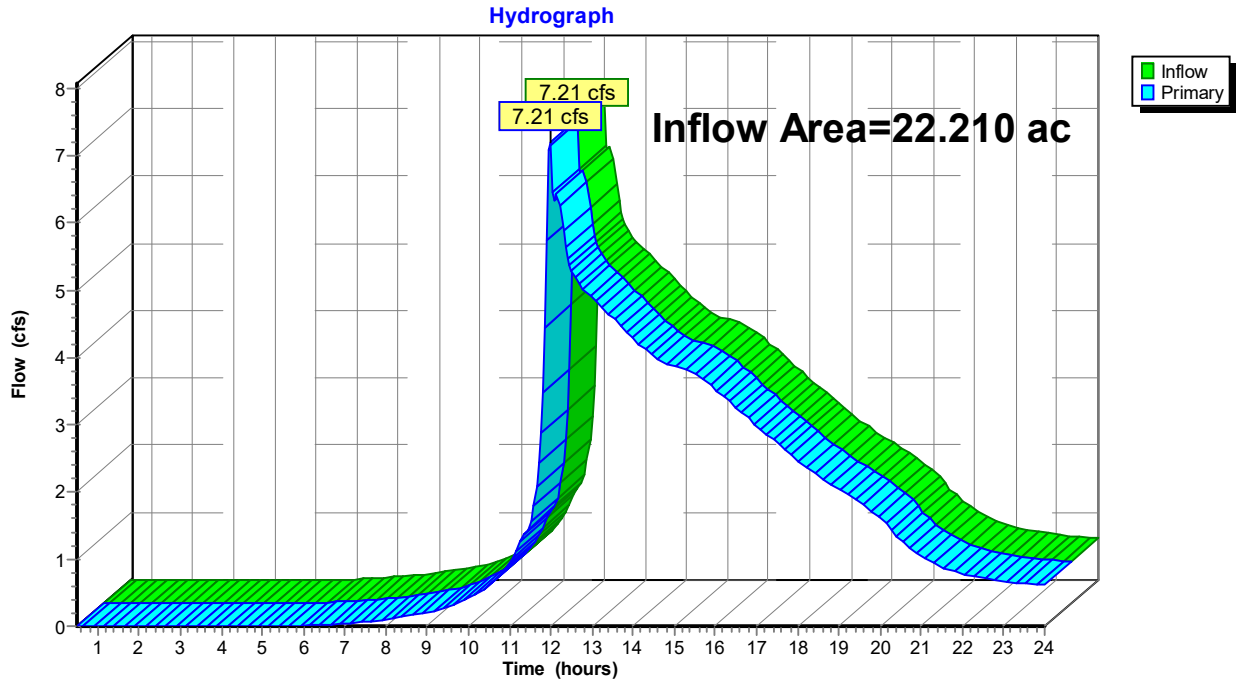


Summary for Link 2L: AREAS COMBINE

Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 1.57" for 2-Year event
Inflow = 7.21 cfs @ 11.98 hrs, Volume= 2.909 af
Primary = 7.21 cfs @ 11.98 hrs, Volume= 2.909 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 2L: AREAS COMBINE



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment D-1: D-1
Runoff Area=13.200 ac 54.55% Impervious Runoff Depth>3.02"
Flow Length=1,885' Tc=7.6 min CN=93 Runoff=61.58 cfs 3.324 af

Subcatchment D-2: D-2
Runoff Area=5.900 ac 52.54% Impervious Runoff Depth>2.62"
Flow Length=736' Tc=27.8 min CN=89 Runoff=14.06 cfs 1.288 af

Subcatchment D-3: D-3
Runoff Area=3.800 ac 60.53% Impervious Runoff Depth>2.81"
Flow Length=132' Slope=0.0125 '/' Tc=20.2 min CN=91 Runoff=11.56 cfs 0.891 af

Subcatchment D-4: D-4
Runoff Area=16.400 ac 24.39% Impervious Runoff Depth>2.19"
Flow Length=852' Tc=8.6 min UI Adjusted CN=84 Runoff=57.22 cfs 2.995 af

Subcatchment D-5: D-5
Runoff Area=19.900 ac 13.07% Impervious Runoff Depth>2.09"
Flow Length=1,918' Tc=34.8 min CN=83 Runoff=32.97 cfs 3.474 af

Subcatchment D-6: D-6
Runoff Area=1.100 ac 27.27% Impervious Runoff Depth>2.82"
Flow Length=312' Tc=4.6 min CN=91 Runoff=5.38 cfs 0.259 af

Subcatchment D-7: D-7
Runoff Area=5.620 ac 0.36% Impervious Runoff Depth>1.94"
Flow Length=937' Tc=163.2 min CN=82 Runoff=2.84 cfs 0.908 af

Subcatchment D-8: D-8
Runoff Area=2.010 ac 5.47% Impervious Runoff Depth>2.10"
Flow Length=333' Tc=21.5 min CN=83 Runoff=4.52 cfs 0.352 af

Pond 1: EXISTING 12" CULVERT
Peak Elev=722.65' Inflow=11.44 cfs 5.064 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0125 '/' Outflow=11.44 cfs 5.064 af

Pond 1P: WET POND 1
Peak Elev=720.98' Storage=73,007 cf Inflow=61.58 cfs 3.324 af
Outflow=4.11 cfs 3.212 af

Pond 2: EXISTING 24" HDPE
Peak Elev=732.08' Inflow=40.14 cfs 7.047 af
24.0" Round Culvert n=0.013 L=48.0' S=0.0021 '/' Outflow=40.14 cfs 7.047 af

Pond 2P: WET POND 2
Peak Elev=729.22' Storage=25,751 cf Inflow=14.06 cfs 1.288 af
Outflow=2.99 cfs 1.240 af

Pond 3P: WET POND 3
Peak Elev=728.84' Storage=16,424 cf Inflow=11.56 cfs 0.891 af
Outflow=3.34 cfs 0.845 af

Pond 4P: WET POND 4
Peak Elev=728.34' Storage=67,291 cf Inflow=57.22 cfs 2.995 af
Outflow=4.16 cfs 2.728 af

Link 1L: AREAS COMBINE
Inflow=40.14 cfs 7.047 af
Primary=40.14 cfs 7.047 af

Link 2L: AREAS COMBINE
Inflow=11.44 cfs 5.064 af
Primary=11.44 cfs 5.064 af

Total Runoff Area = 67.930 ac Runoff Volume = 13.492 af Average Runoff Depth = 2.38"
71.10% Pervious = 48.300 ac 28.90% Impervious = 19.630 ac

Summary for Subcatchment D-1: D-1

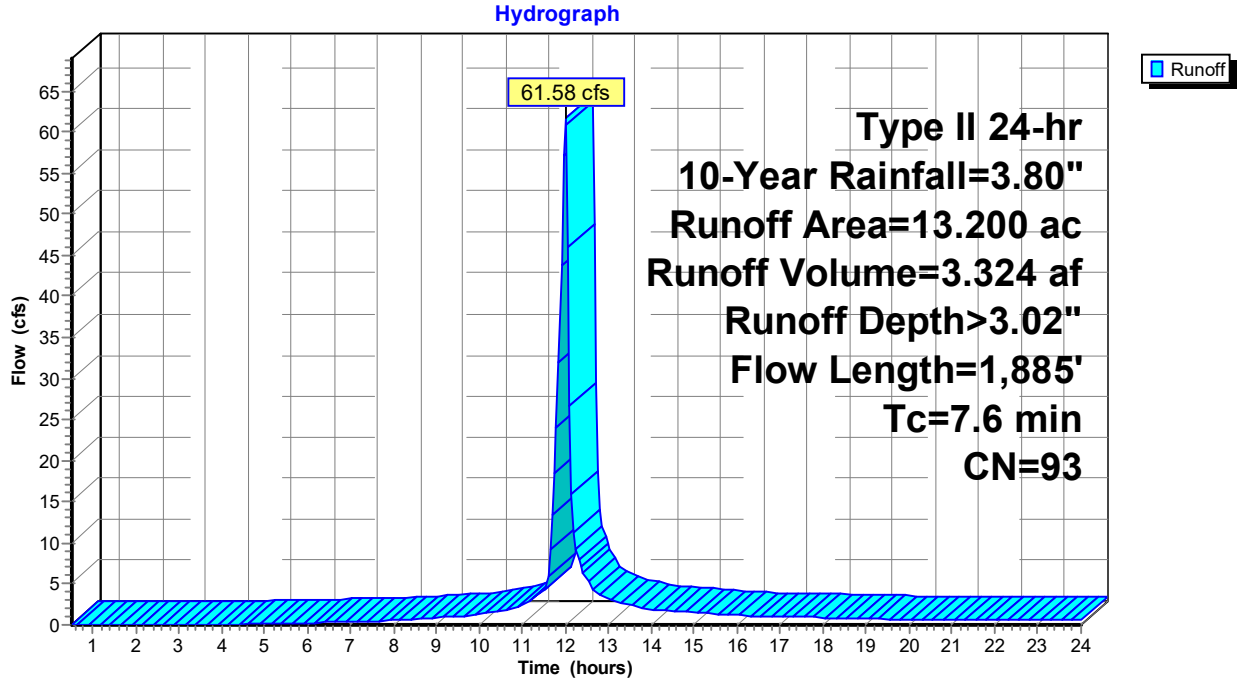
Runoff = 61.58 cfs @ 11.98 hrs, Volume= 3.324 af, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
7.200	98	Paved roads w/curbs & sewers, HSG D
2.600	96	Gravel surface, HSG D
3.400	80	>75% Grass cover, Good, HSG D
13.200	93	Weighted Average
6.000		45.45% Pervious Area
7.200		54.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0135	1.04		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
1.0	56	0.0135	0.93		Sheet Flow, A-B CONCENTRATED Smooth surfaces n= 0.011 P2= 2.50"
5.0	1,729	0.0082	5.75	95.86	Parabolic Channel, B-C SWALE W=10.00' D=2.50' Area=16.7 sf Perim=11.5' n= 0.030 Earth, grassed & winding
7.6	1,885	Total			

Subcatchment D-1: D-1



Summary for Subcatchment D-2: D-2

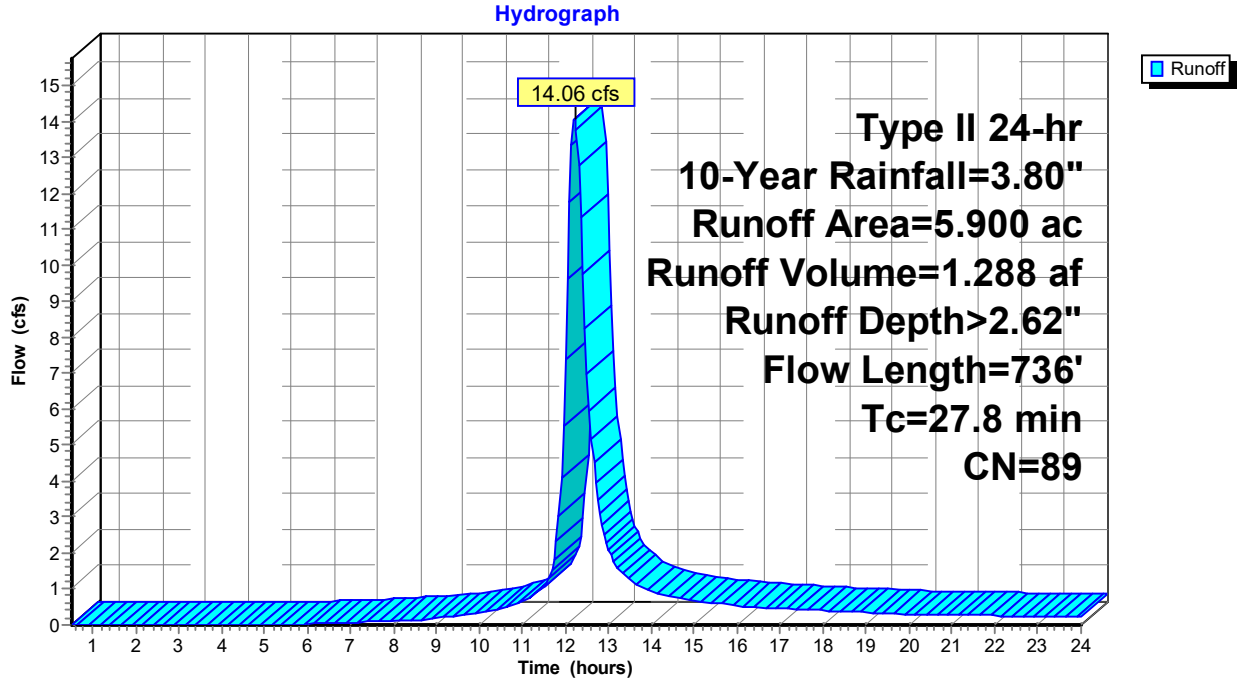
Runoff = 14.06 cfs @ 12.21 hrs, Volume= 1.288 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
1.200	98	Paved roads w/curbs & sewers, HSG D
1.900	98	Unconnected roofs, HSG D
2.800	80	>75% Grass cover, Good, HSG D
5.900	89	Weighted Average
2.800		47.46% Pervious Area
3.100		52.54% Impervious Area
1.900		61.29% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.1259	0.22		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
19.3	322	0.0031	0.28		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.8	314	0.0050	6.42	160.47	Parabolic Channel, C-D BIO SWALE W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
27.8	736	Total			

Subcatchment D-2: D-2



Summary for Subcatchment D-3: D-3

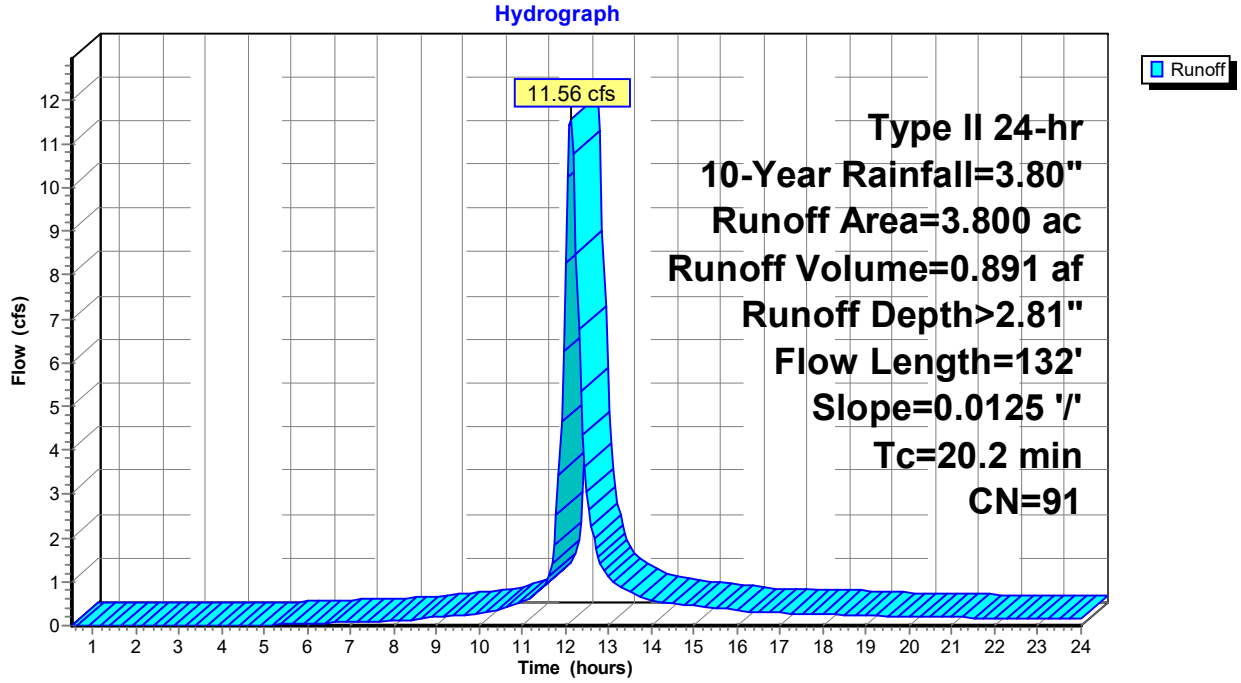
Runoff = 11.56 cfs @ 12.12 hrs, Volume= 0.891 af, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
0.800	98	Paved roads w/curbs & sewers, HSG D
1.500	98	Unconnected roofs, HSG D
1.500	80	>75% Grass cover, Good, HSG D
3.800	91	Weighted Average
1.500		39.47% Pervious Area
2.300		60.53% Impervious Area
1.500		65.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0125	0.09		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
0.7	32	0.0125	0.78		Shallow Concentrated Flow, B-C CONCENTRATED Short Grass Pasture Kv= 7.0 fps
20.2	132	Total			

Subcatchment D-3: D-3



Summary for Subcatchment D-4: D-4

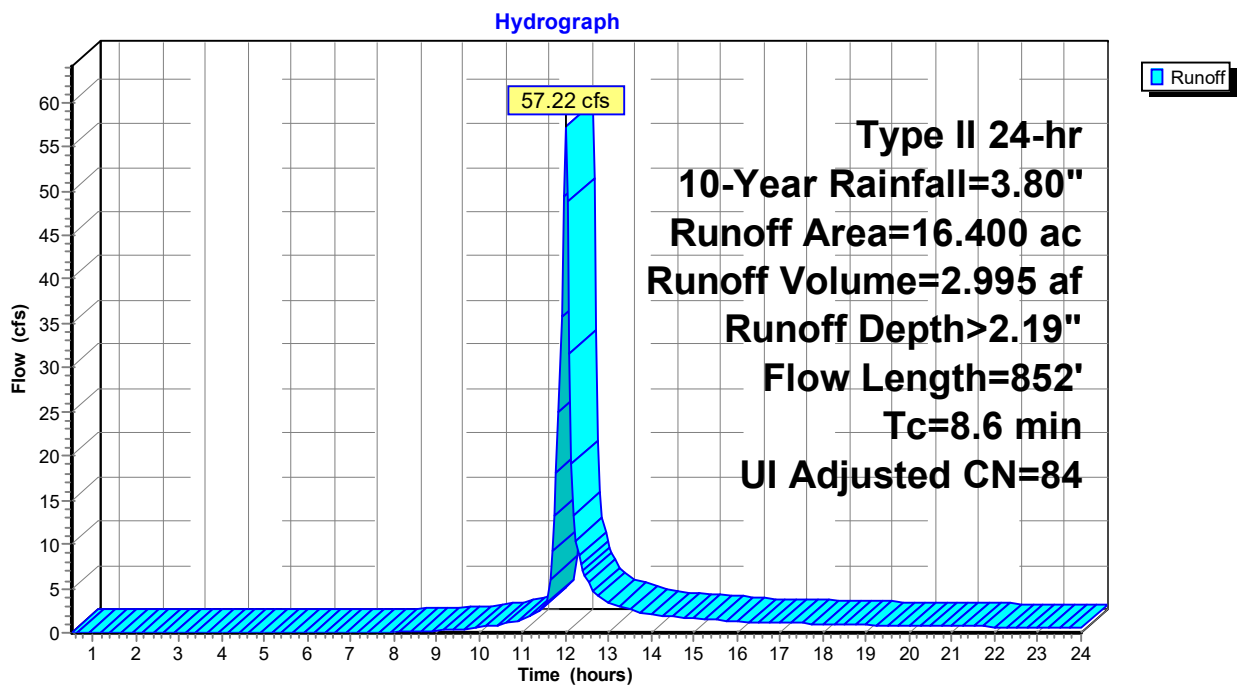
Runoff = 57.22 cfs @ 12.00 hrs, Volume= 2.995 af, Depth> 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Adj	Description
3.200	98		Unconnected roofs, HSG D
0.800	98		Paved roads w/curbs & sewers, HSG D
12.400	82		Woods/grass comb., Fair, HSG D
16.400	86	84	Weighted Average, UI Adjusted
12.400			75.61% Pervious Area
4.000			24.39% Impervious Area
3.200			80.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	41	0.2317	0.23		Sheet Flow, A-B SHEET FLOW Grass: Dense n= 0.240 P2= 2.50"
5.6	811	0.0025	2.42	32.21	Parabolic Channel, B-C SWALE W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
8.6	852	Total			

Subcatchment D-4: D-4



Summary for Subcatchment D-5: D-5

Runoff = 32.97 cfs @ 12.30 hrs, Volume= 3.474 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

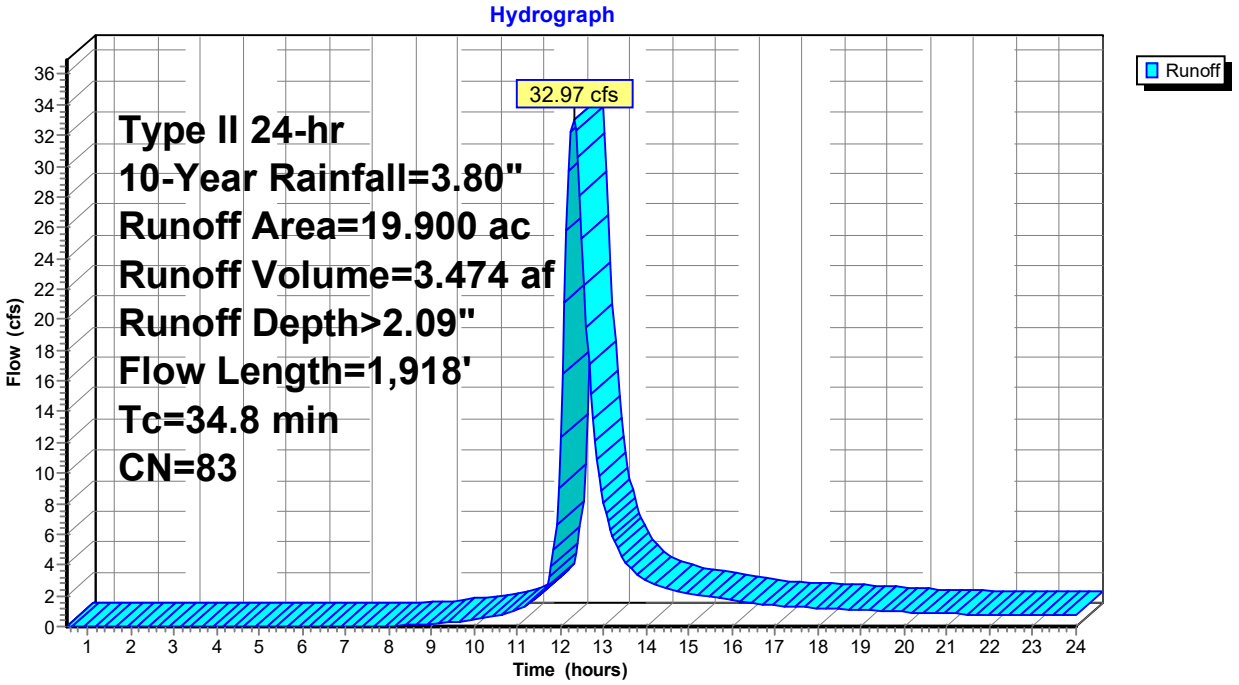
Area (ac)	CN	Description
2.200	98	Paved parking, HSG D
1.700	96	Gravel surface, HSG D
0.400	98	Unconnected roofs, HSG D
15.600	79	Woods/grass comb., Good, HSG D
19.900	83	Weighted Average
17.300		86.93% Pervious Area
2.600		13.07% Impervious Area
0.400		15.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0240	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
15.6	725	0.0240	0.77		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.6	142	0.0050	4.20	139.87	Parabolic Channel, C-D SWALE W=25.00' D=2.00' Area=33.3 sf Perim=25.4' n= 0.030 Earth, grassed & winding
0.4	100	0.0050	3.72	4.57	Pipe Channel, D-E PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.3	346	0.0117	4.53	77.03	Parabolic Channel, E-F DITCH W=17.00' D=1.50' Area=17.0 sf Perim=17.3' n= 0.035 Earth, dense weeds
0.1	55	0.0125	6.96	8.54	Pipe Channel, F-G PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	94	0.0066	5.28	211.05	Parabolic Channel, G-HDITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.0	20	0.0190	8.58	10.52	Pipe Channel, H-I PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	46	0.0067	3.96	52.73	Parabolic Channel, I-J DITCH W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
0.0	22	0.0168	8.06	9.90	Pipe Channel, J-K PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.5	88	0.0027	3.23	84.04	Parabolic Channel, K-L DITCH W=13.00' D=3.00' Area=26.0 sf Perim=14.7' n= 0.035 Earth, dense weeds
0.3	30	0.0083	1.78	2.19	Pipe Channel, L-M PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'

n= 0.035 Earth, dense weeds

0.5	150	0.0059	4.90	156.69	Parabolic Channel, M-N DITCH W=16.00' D=3.00' Area=32.0 sf Perim=17.4' n= 0.035 Earth, dense weeds
34.8	1,918	Total			

Subcatchment D-5: D-5



Summary for Subcatchment D-6: D-6

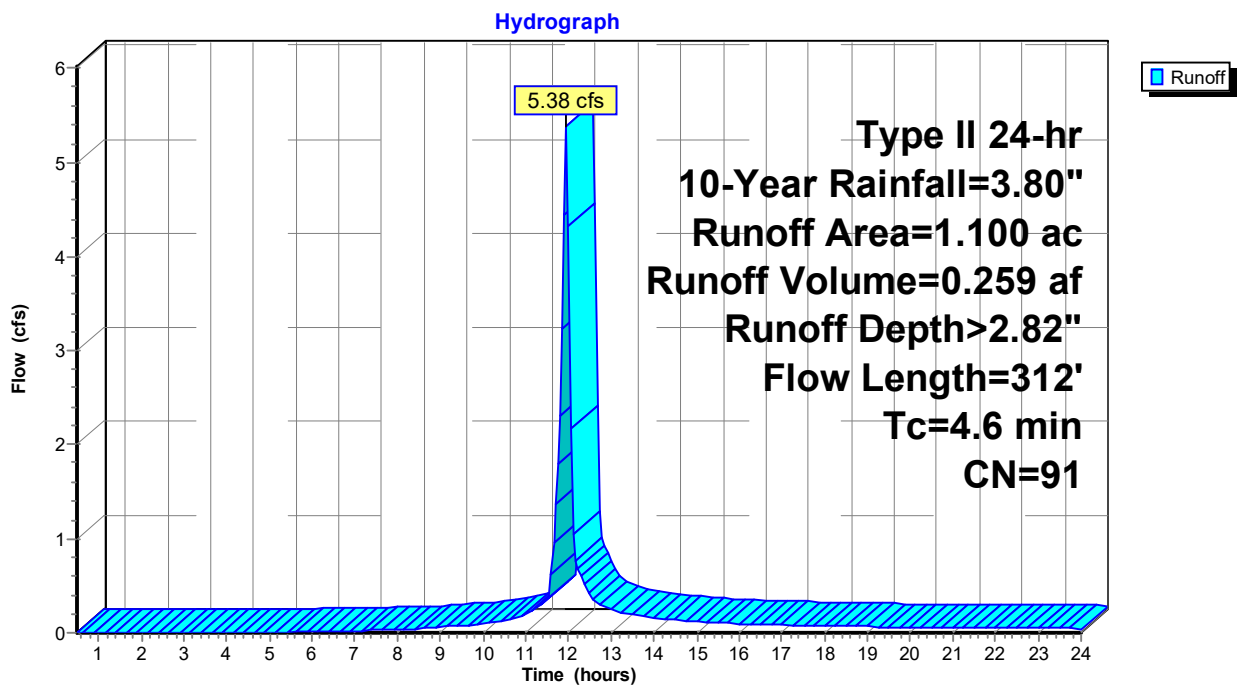
Runoff = 5.38 cfs @ 11.95 hrs, Volume= 0.259 af, Depth> 2.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
0.300	98	Paved parking, HSG D
0.400	96	Gravel surface, HSG D
0.400	80	>75% Grass cover, Good, HSG D
1.100	91	Weighted Average
0.800		72.73% Pervious Area
0.300		27.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0200	2.87		Shallow Concentrated Flow, B-C CONCENTRATED Paved Kv= 20.3 fps
3.0	182	0.0210	1.01		Shallow Concentrated Flow, C-D CONCENTRATED Short Grass Pasture Kv= 7.0 fps
4.6	312	Total			

Subcatchment D-6: D-6



Summary for Subcatchment D-7: D-7

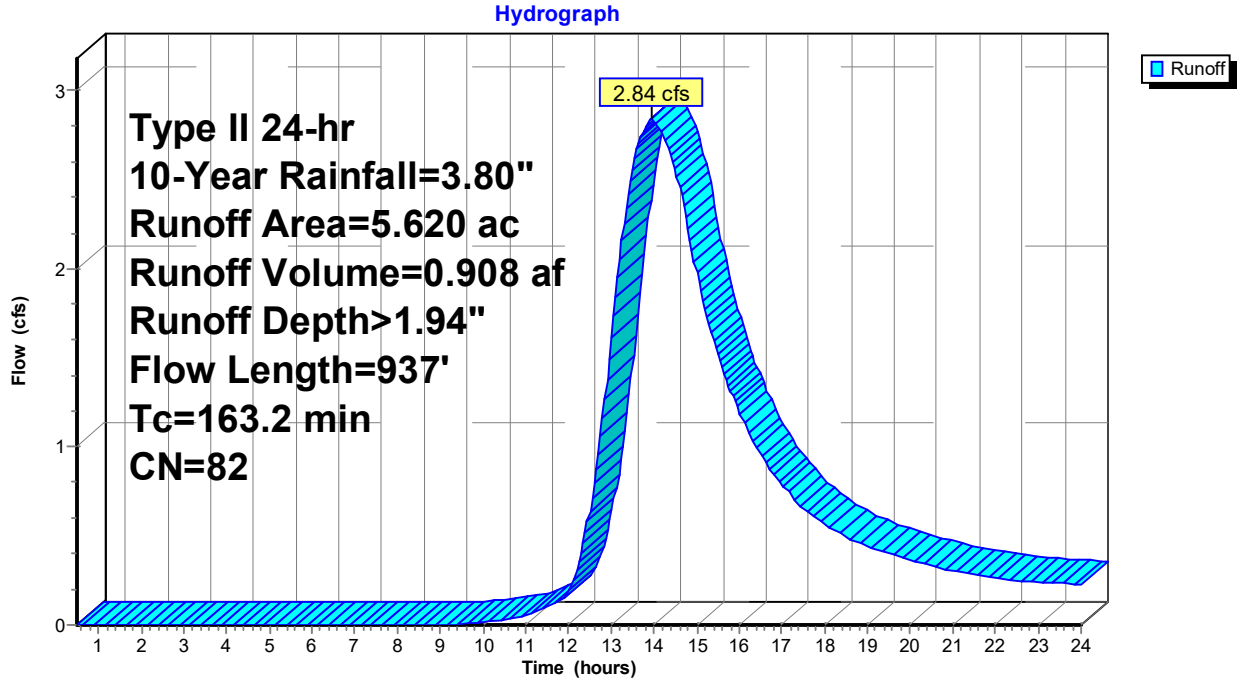
Runoff = 2.84 cfs @ 13.96 hrs, Volume= 0.908 af, Depth> 1.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
0.010	98	Paved parking, HSG D
5.600	82	Woods/grass comb., Fair, HSG D
0.010	98	Unconnected roofs, HSG D
5.620	82	Weighted Average
5.600		99.64% Pervious Area
0.020		0.36% Impervious Area
0.010		50.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
134.4	100	0.0001	0.01		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
28.5	745	0.0076	0.44		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.3	92	0.0261	6.06	30.30	Parabolic Channel, C-D DITCH W=5.00' D=1.50' Area=5.0 sf Perim=6.0' n= 0.035 Earth, dense weeds
163.2	937	Total			

Subcatchment D-7: D-7



Summary for Subcatchment D-8: D-8

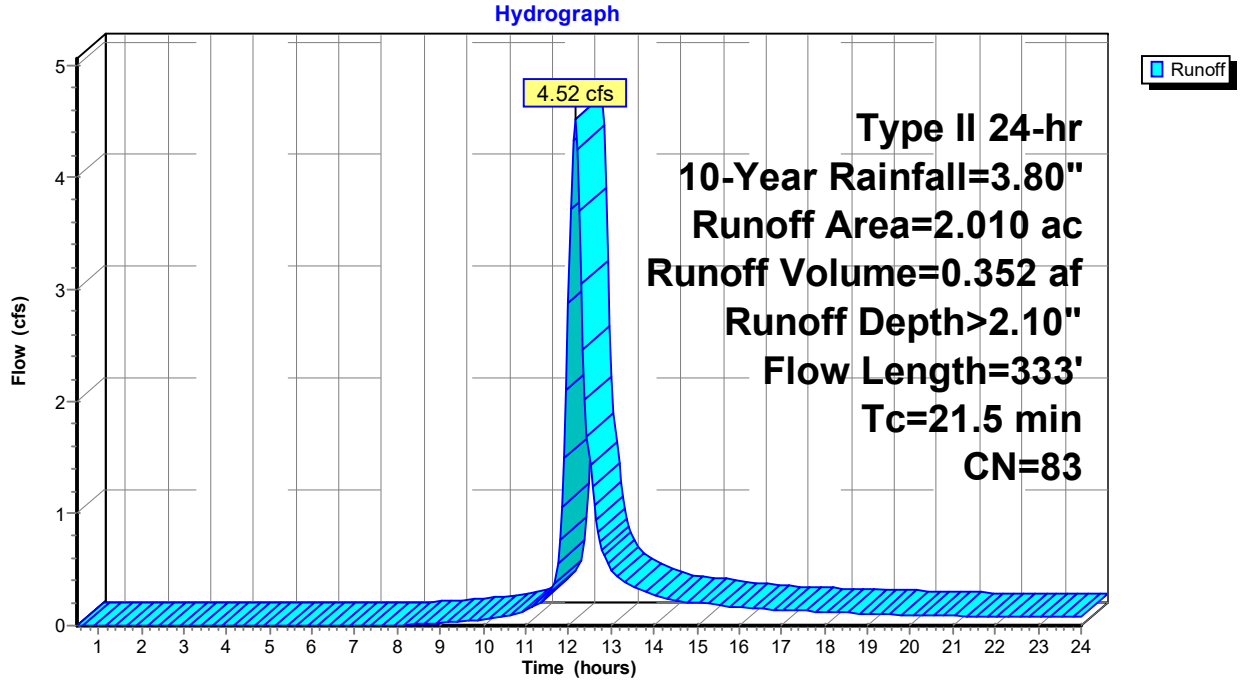
Runoff = 4.52 cfs @ 12.15 hrs, Volume= 0.352 af, Depth> 2.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-Year Rainfall=3.80"

Area (ac)	CN	Description
0.010	98	Unconnected roofs, HSG D
0.100	98	Paved parking, HSG D
1.900	82	Woods/grass comb., Fair, HSG D
2.010	83	Weighted Average
1.900		94.53% Pervious Area
0.110		5.47% Impervious Area
0.010		9.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0255	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
6.9	233	0.0127	0.56		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
21.5	333	Total			

Subcatchment D-8: D-8



Summary for Pond 1: EXISTING 12" CULVERT

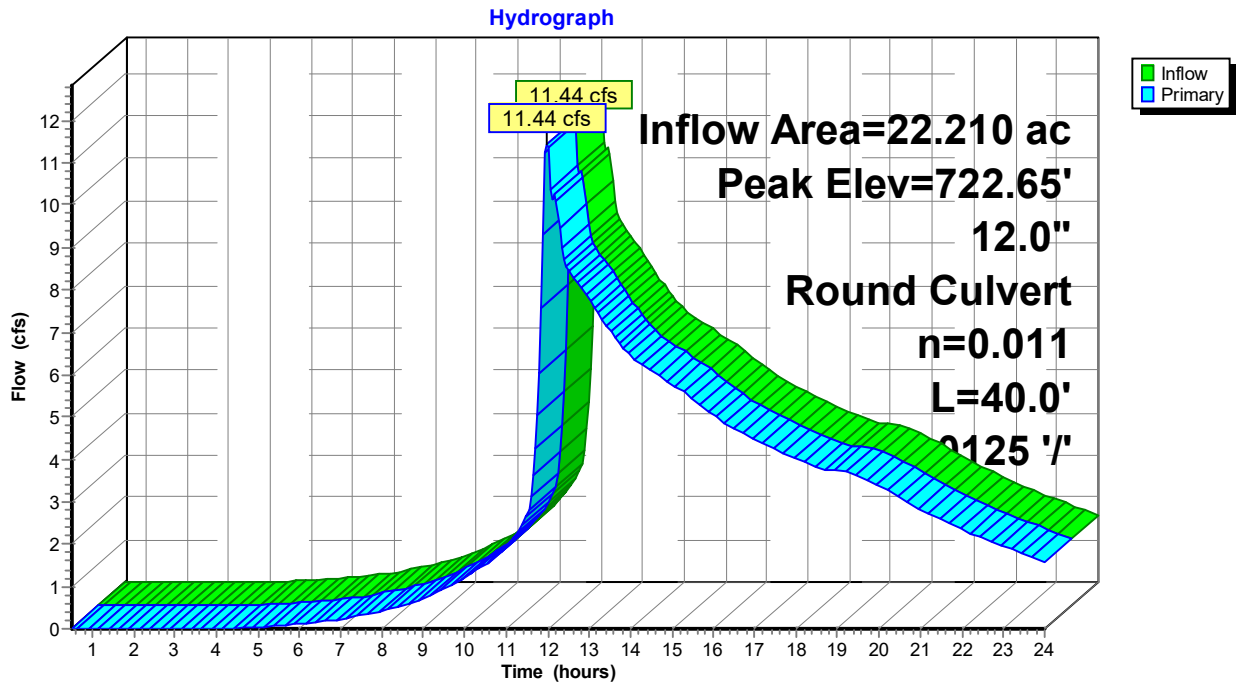
Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 2.74" for 10-Year event
Inflow = 11.44 cfs @ 11.98 hrs, Volume= 5.064 af
Outflow = 11.44 cfs @ 11.98 hrs, Volume= 5.064 af, Atten= 0%, Lag= 0.0 min
Primary = 11.44 cfs @ 11.98 hrs, Volume= 5.064 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 722.65' @ 11.98 hrs

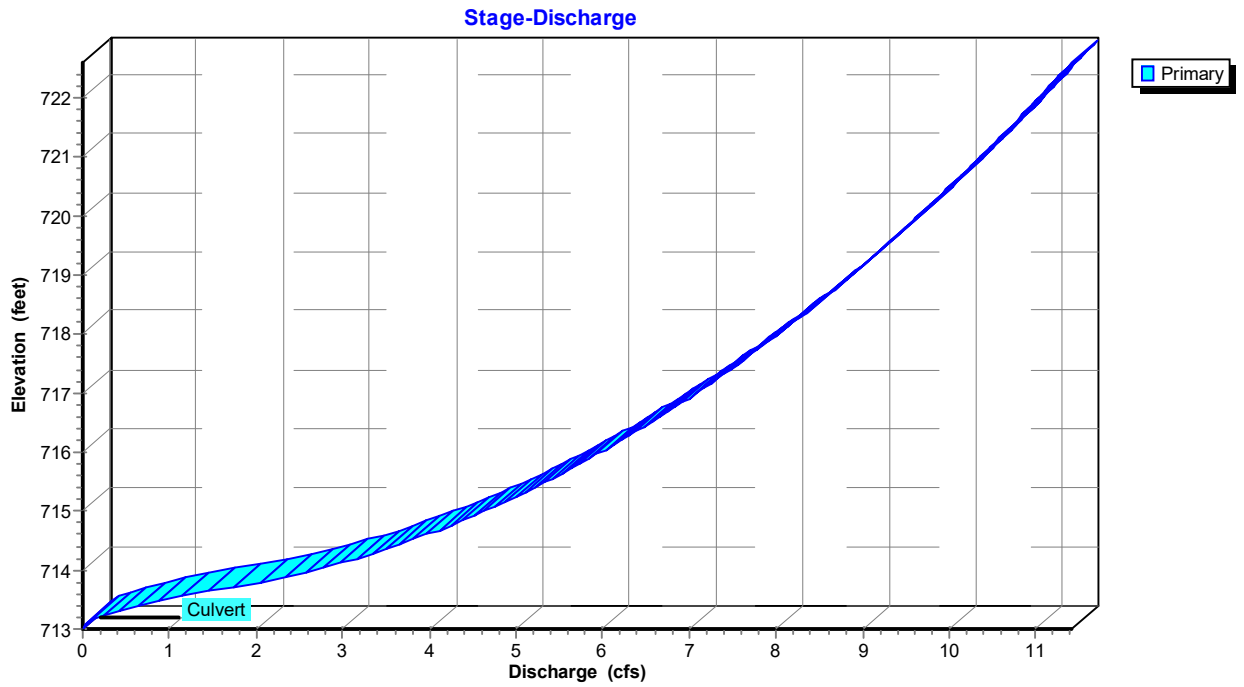
Device	Routing	Invert	Outlet Devices
#1	Primary	713.00'	12.0" Round Culvert L= 40.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 713.00' / 712.50' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=11.31 cfs @ 11.98 hrs HW=722.45' (Free Discharge)
└─1=Culvert (Inlet Controls 11.31 cfs @ 14.41 fps)

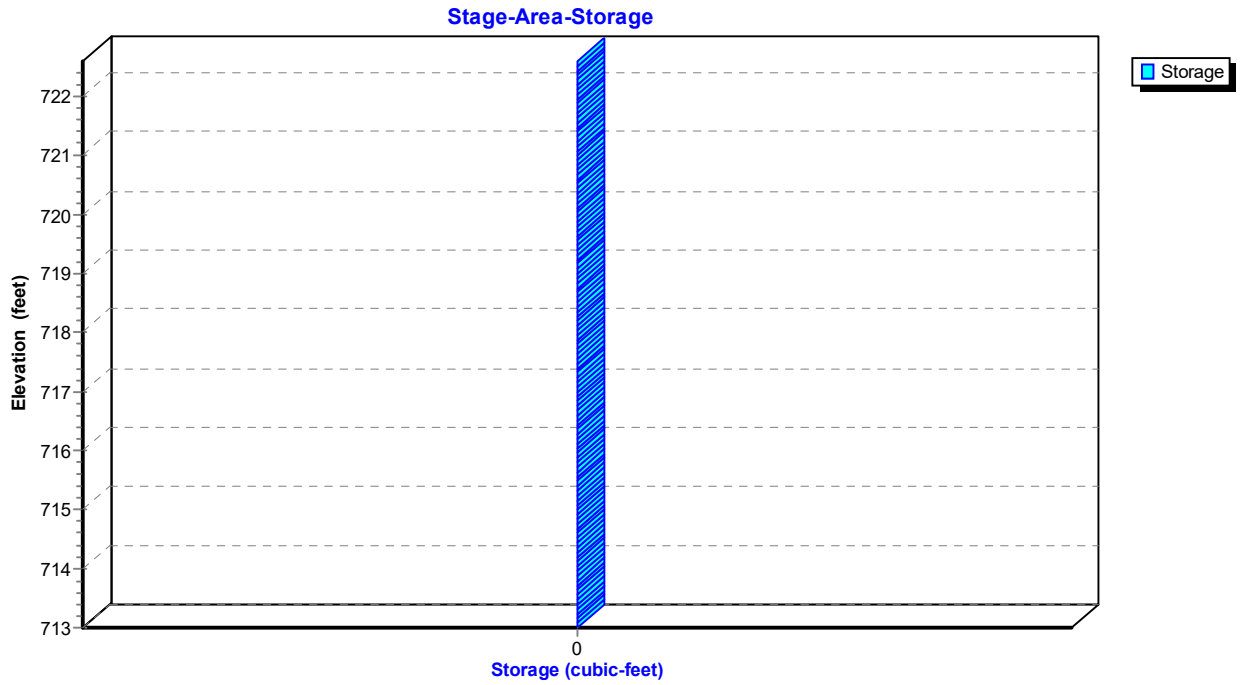
Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Summary for Pond 1P: WET POND 1

Inflow Area = 13.200 ac, 54.55% Impervious, Inflow Depth > 3.02" for 10-Year event
Inflow = 61.58 cfs @ 11.98 hrs, Volume= 3.324 af
Outflow = 4.11 cfs @ 12.67 hrs, Volume= 3.212 af, Atten= 93%, Lag= 41.4 min
Primary = 4.11 cfs @ 12.67 hrs, Volume= 3.212 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 720.98' @ 12.67 hrs Surf.Area= 40,776 sf Storage= 73,007 cf

Plug-Flow detention time= 200.9 min calculated for 3.205 af (96% of inflow)
Center-of-Mass det. time= 180.5 min (964.8 - 784.3)

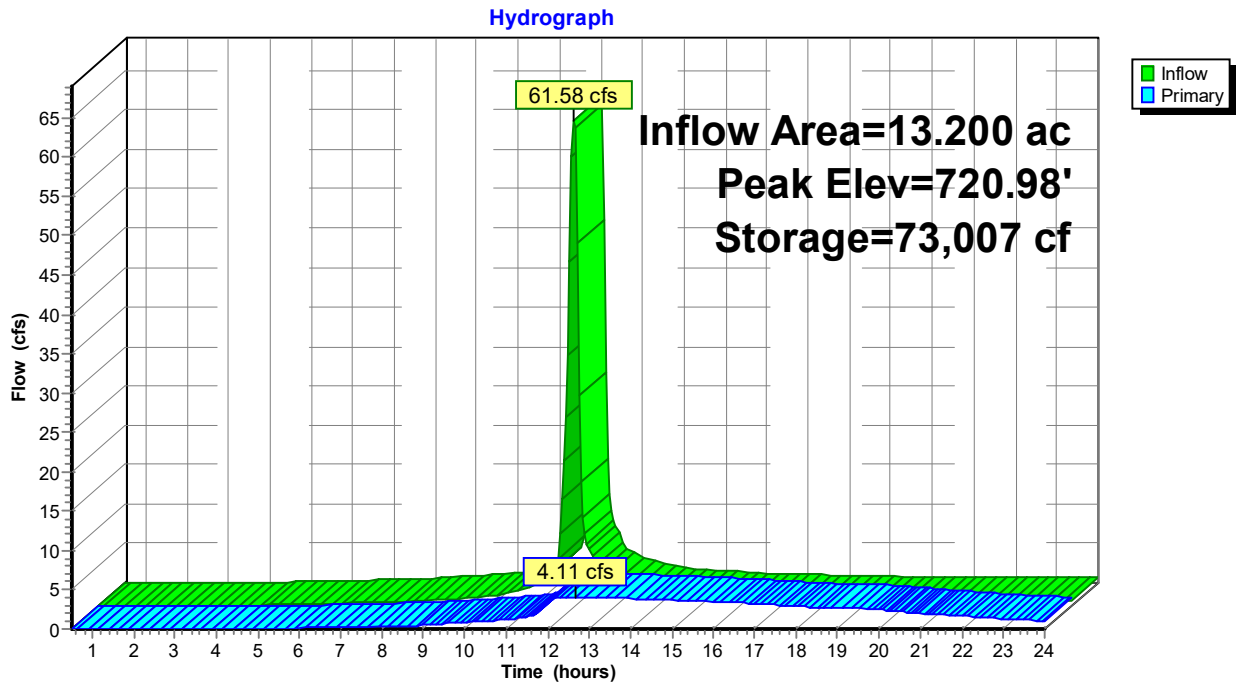
Volume	Invert	Avail.Storage	Storage Description
#1	719.00'	189,322 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
719.00	33,157	0	0
720.00	36,963	35,060	35,060
721.00	40,869	38,916	73,976
722.00	44,876	42,873	116,849
723.00	48,983	46,930	163,778
723.50	53,191	25,544	189,322

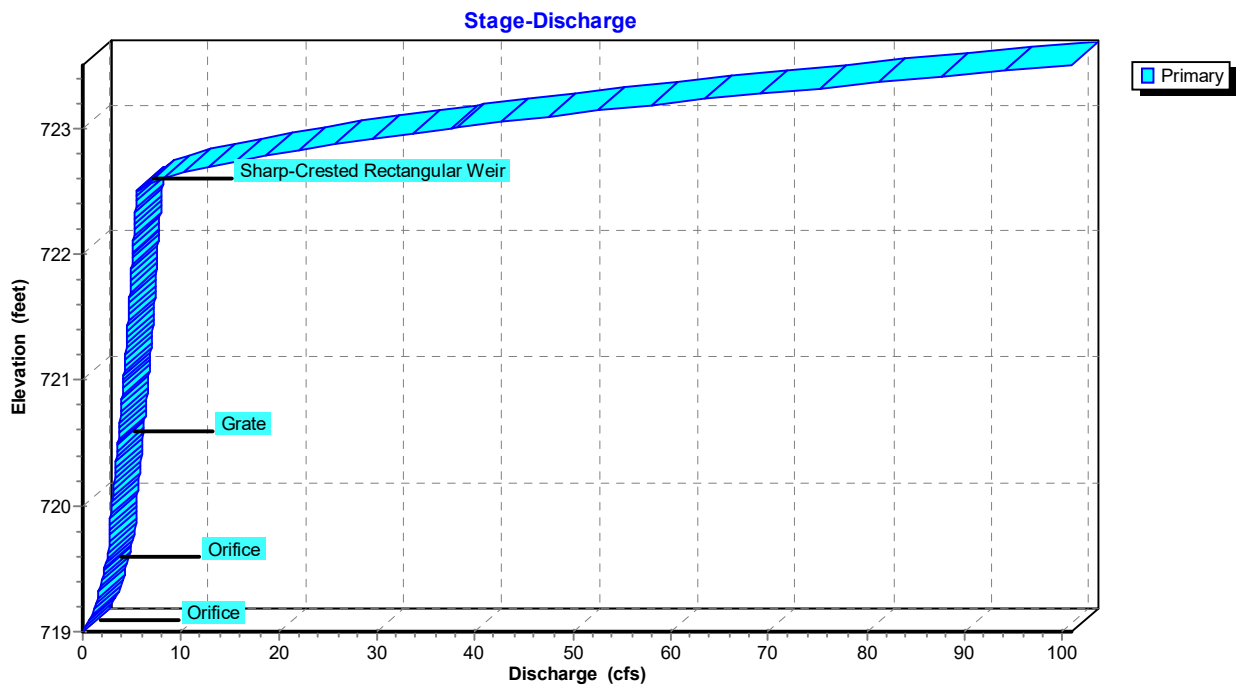
Device	Routing	Invert	Outlet Devices
#1	Primary	722.50'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	718.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 718.50' / 718.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	720.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	719.00'	6.0" Horiz. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#5	Device 2	719.50'	3.0" Vert. Orifice X 3.00 C= 0.600

Primary OutFlow Max=4.11 cfs @ 12.67 hrs HW=720.98' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 4.11 cfs @ 5.24 fps)
  - 3=Grate (Passes < 2.11 cfs potential flow)
  - 4=Orifice (Passes < 5.32 cfs potential flow)
  - 5=Orifice (Passes < 0.82 cfs potential flow)

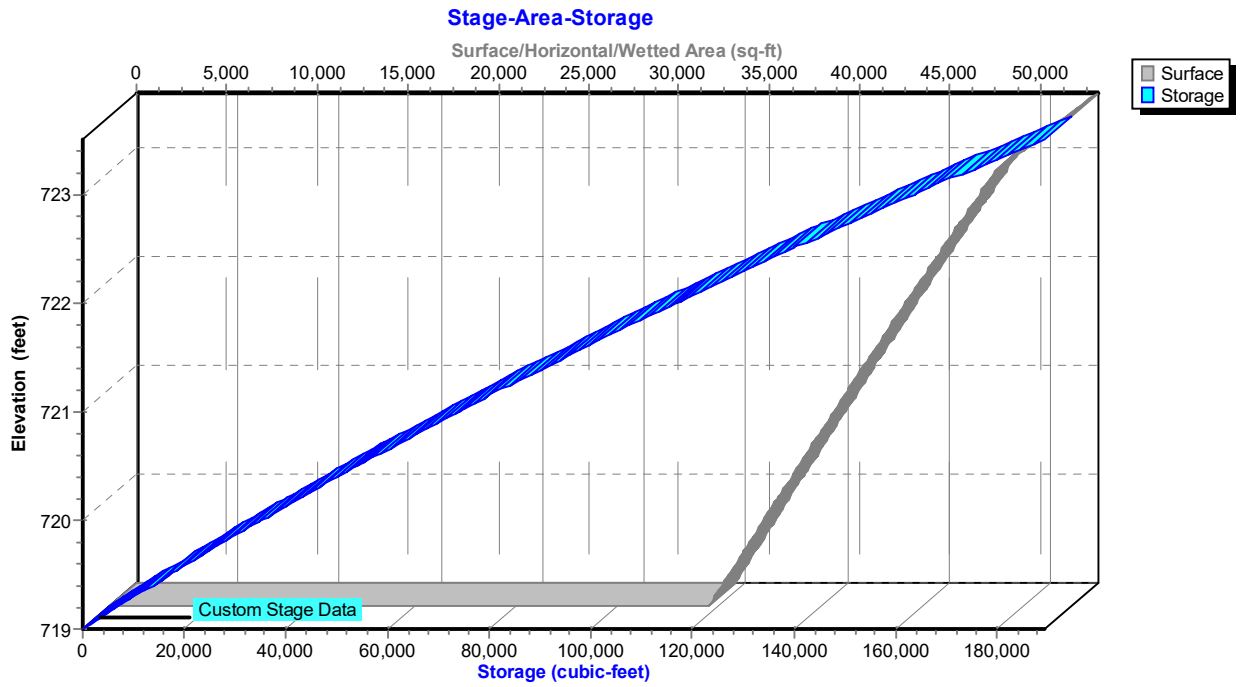
Pond 1P: WET POND 1



Pond 1P: WET POND 1



Pond 1P: WET POND 1



Summary for Pond 2: EXISTING 24" HDPE

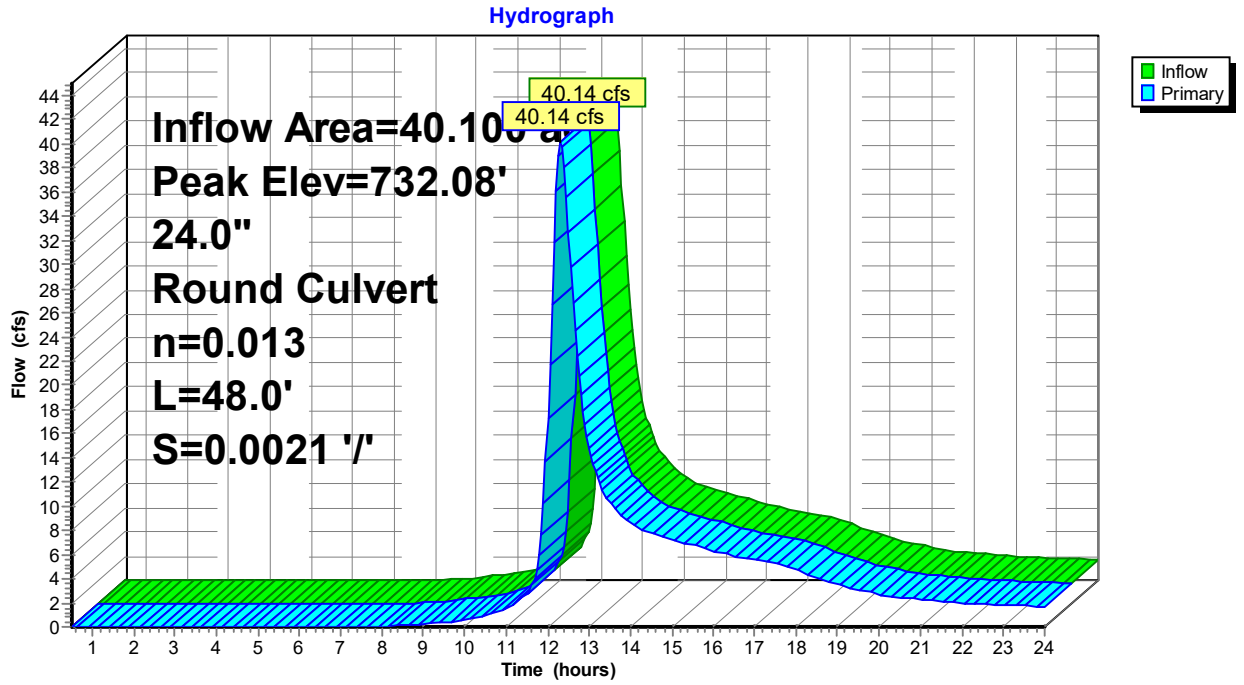
Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 2.11" for 10-Year event
Inflow = 40.14 cfs @ 12.31 hrs, Volume= 7.047 af
Outflow = 40.14 cfs @ 12.31 hrs, Volume= 7.047 af, Atten= 0%, Lag= 0.0 min
Primary = 40.14 cfs @ 12.31 hrs, Volume= 7.047 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 732.08' @ 12.31 hrs

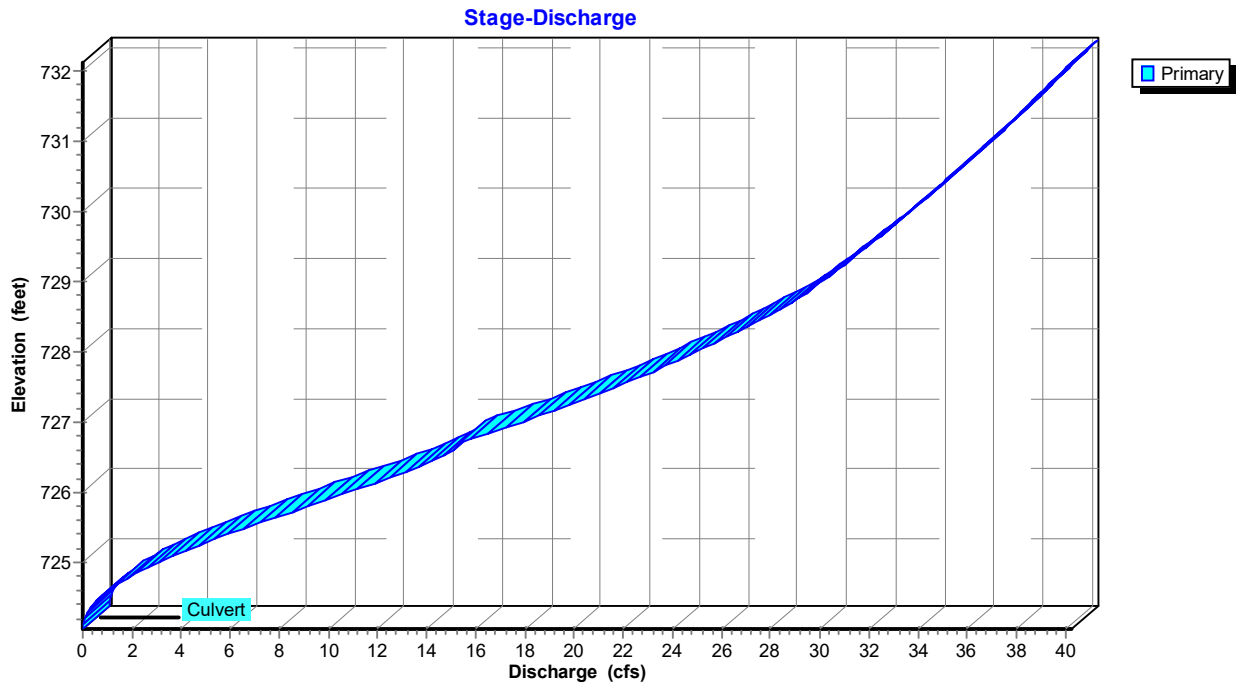
Device	Routing	Invert	Outlet Devices
#1	Primary	724.04'	24.0" Round Culvert L= 48.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 724.04' / 723.94' S= 0.0021 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=40.02 cfs @ 12.31 hrs HW=732.04' (Free Discharge)
└1=Culvert (Inlet Controls 40.02 cfs @ 12.74 fps)

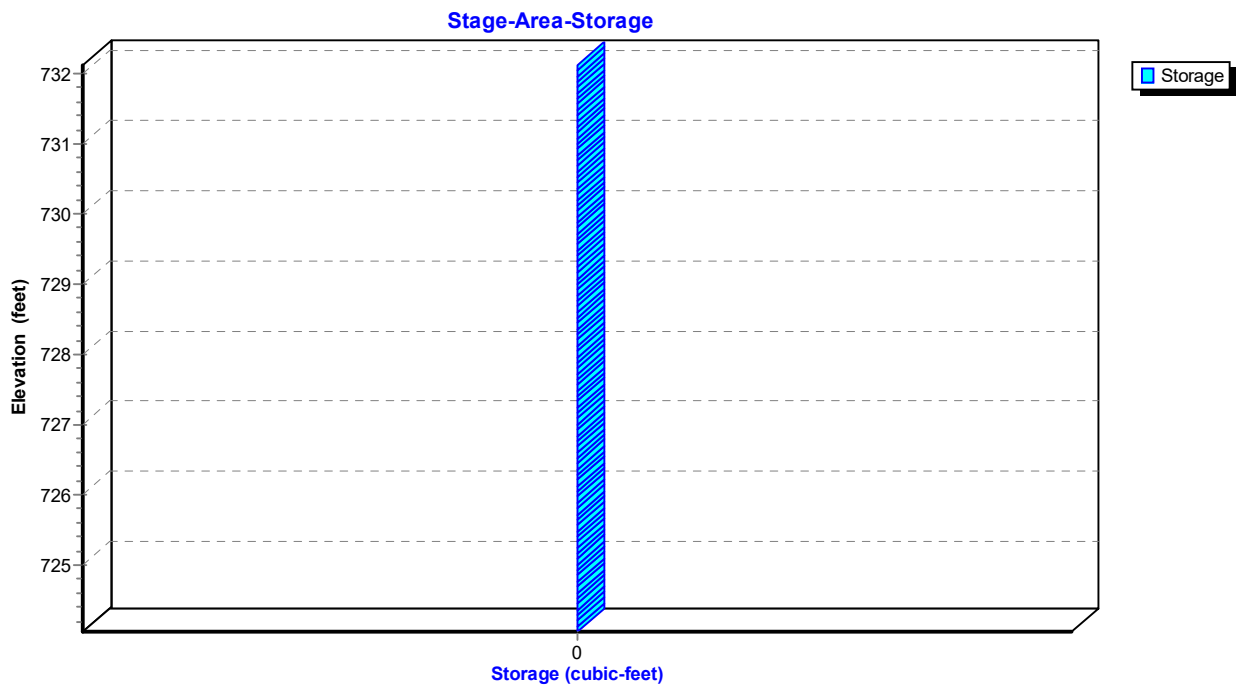
Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Summary for Pond 2P: WET POND 2

Inflow Area = 5.900 ac, 52.54% Impervious, Inflow Depth > 2.62" for 10-Year event
Inflow = 14.06 cfs @ 12.21 hrs, Volume= 1.288 af
Outflow = 2.99 cfs @ 12.82 hrs, Volume= 1.240 af, Atten= 79%, Lag= 36.4 min
Primary = 2.99 cfs @ 12.82 hrs, Volume= 1.240 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 729.22' @ 12.82 hrs Surf.Area= 23,575 sf Storage= 25,751 cf

Plug-Flow detention time= 153.4 min calculated for 1.240 af (96% of inflow)
Center-of-Mass det. time= 132.1 min (949.7 - 817.6)

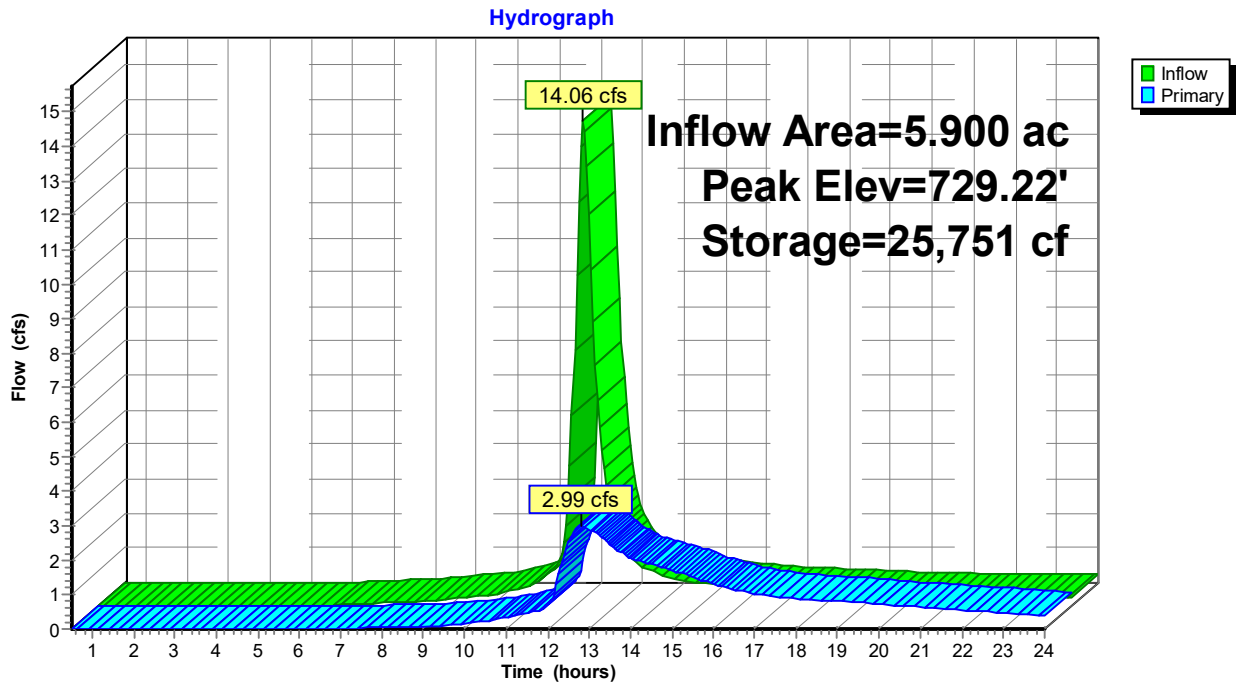
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	101,936 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,501	0	0
729.00	22,788	20,645	20,645
730.00	26,362	24,575	45,220
731.00	41,810	34,086	79,306
731.50	48,711	22,630	101,936

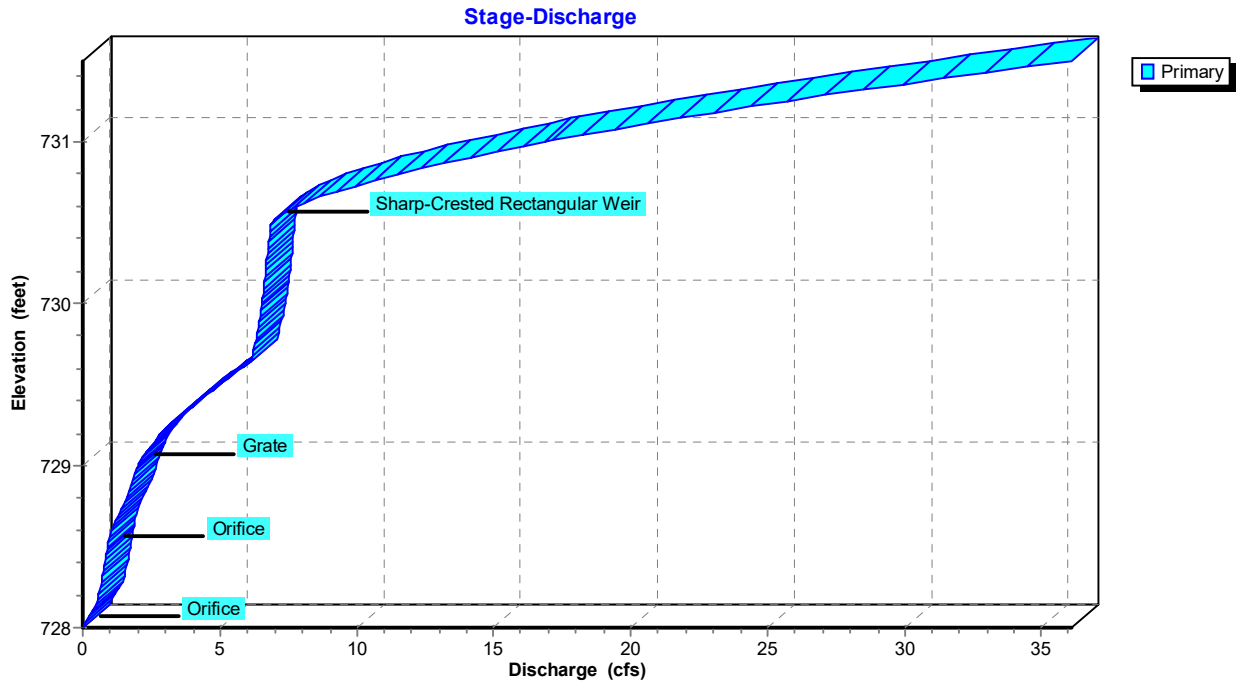
Device	Routing	Invert	Outlet Devices
#1	Primary	730.50'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 726.50' / 724.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	729.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.50'	4.0" Vert. Orifice X 3.00 C= 0.600
#5	Device 2	728.00'	4.0" Horiz. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.99 cfs @ 12.82 hrs HW=729.22' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 2.99 cfs of 5.63 cfs potential flow)
  - 3=Grate (Orifice Controls 0.66 cfs @ 1.51 fps)
  - 4=Orifice (Orifice Controls 0.94 cfs @ 3.58 fps)
  - 5=Orifice (Orifice Controls 1.39 cfs @ 5.32 fps)

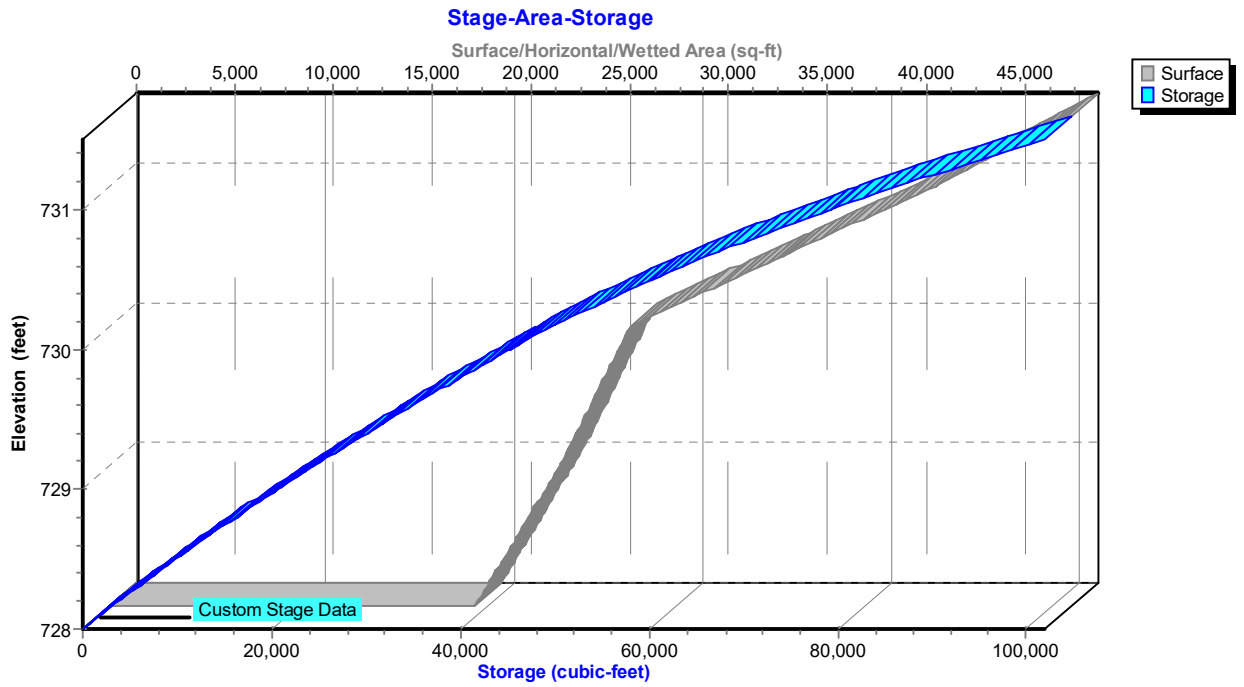
Pond 2P: WET POND 2



Pond 2P: WET POND 2



Pond 2P: WET POND 2



Summary for Pond 3P: WET POND 3

Inflow Area = 3.800 ac, 60.53% Impervious, Inflow Depth > 2.81" for 10-Year event
Inflow = 11.56 cfs @ 12.12 hrs, Volume= 0.891 af
Outflow = 3.34 cfs @ 12.47 hrs, Volume= 0.845 af, Atten= 71%, Lag= 21.2 min
Primary = 3.34 cfs @ 12.47 hrs, Volume= 0.845 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.84' @ 12.47 hrs Surf.Area= 21,038 sf Storage= 16,424 cf

Plug-Flow detention time= 108.8 min calculated for 0.845 af (95% of inflow)
Center-of-Mass det. time= 79.7 min (883.3 - 803.6)

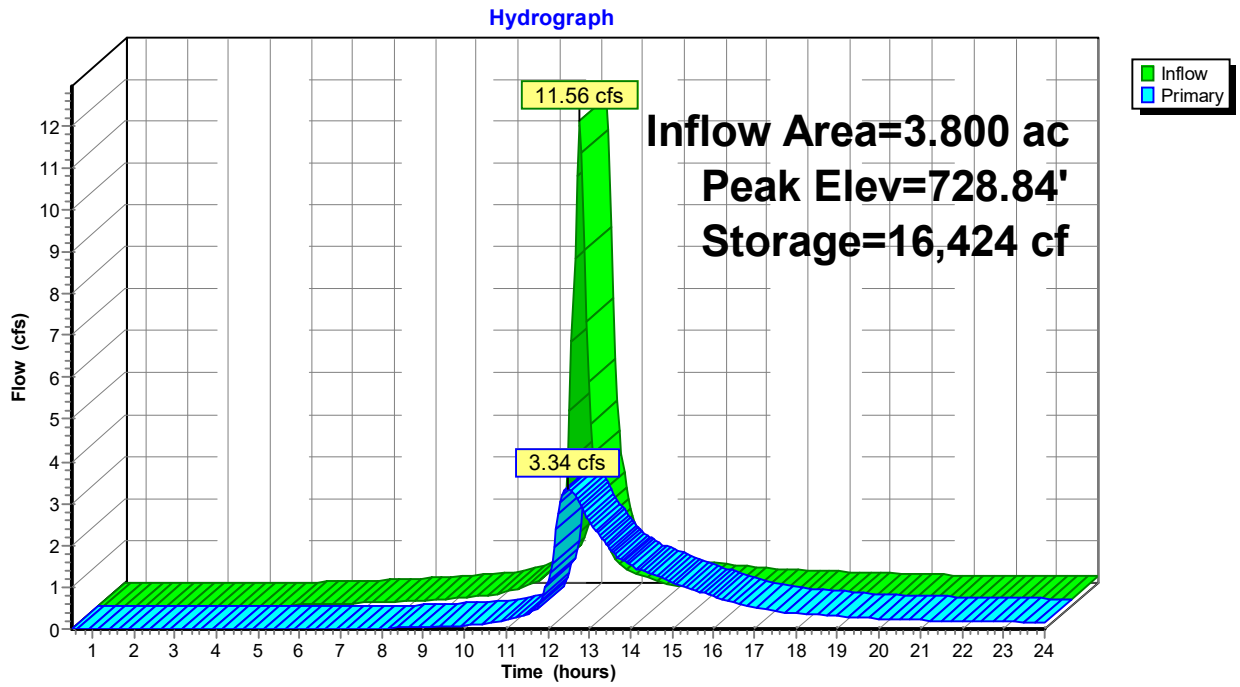
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	85,804 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,056	0	0
729.00	21,605	19,831	19,831
730.00	25,248	23,427	43,257
731.00	28,968	27,108	70,365
731.50	32,789	15,439	85,804

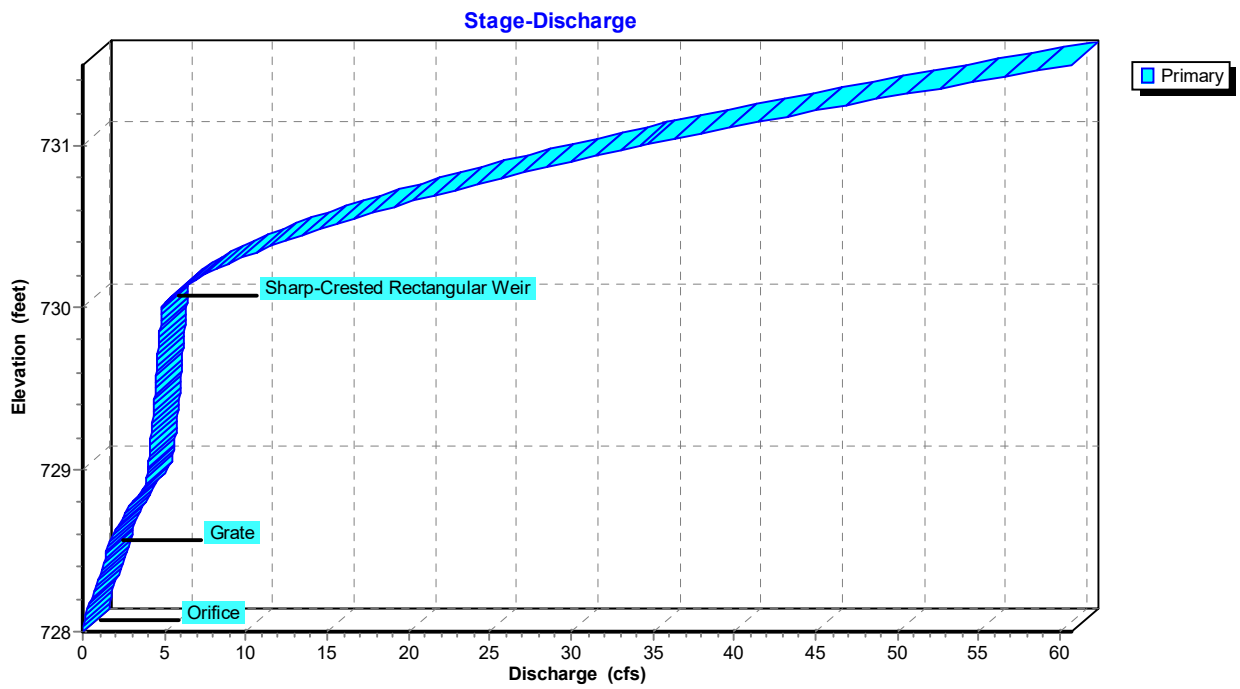
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 726.50' / 726.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.00'	4.0" Vert. Orifice X 6.00 C= 0.600

Primary OutFlow Max=3.34 cfs @ 12.47 hrs HW=728.84' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 3.34 cfs of 3.81 cfs potential flow)
  - 3=Grate (Orifice Controls 1.27 cfs @ 1.87 fps)
  - 4=Orifice (Orifice Controls 2.07 cfs @ 3.95 fps)

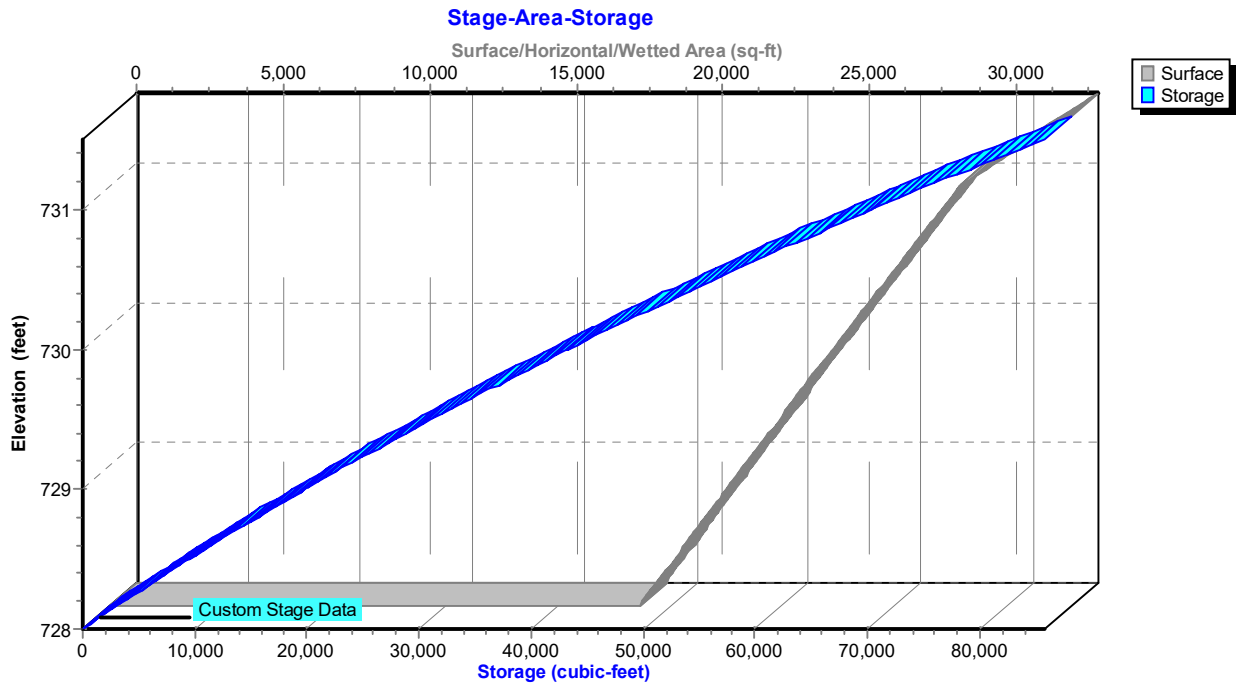
Pond 3P: WET POND 3



Pond 3P: WET POND 3



Pond 3P: WET POND 3



Summary for Pond 4P: WET POND 4

Inflow Area = 16.400 ac, 24.39% Impervious, Inflow Depth > 2.19" for 10-Year event
Inflow = 57.22 cfs @ 12.00 hrs, Volume= 2.995 af
Outflow = 4.16 cfs @ 12.75 hrs, Volume= 2.728 af, Atten= 93%, Lag= 44.8 min
Primary = 4.16 cfs @ 12.75 hrs, Volume= 2.728 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.34' @ 12.75 hrs Surf.Area= 53,060 sf Storage= 67,291 cf

Plug-Flow detention time= 198.4 min calculated for 2.728 af (91% of inflow)
Center-of-Mass det. time= 152.2 min (972.3 - 820.1)

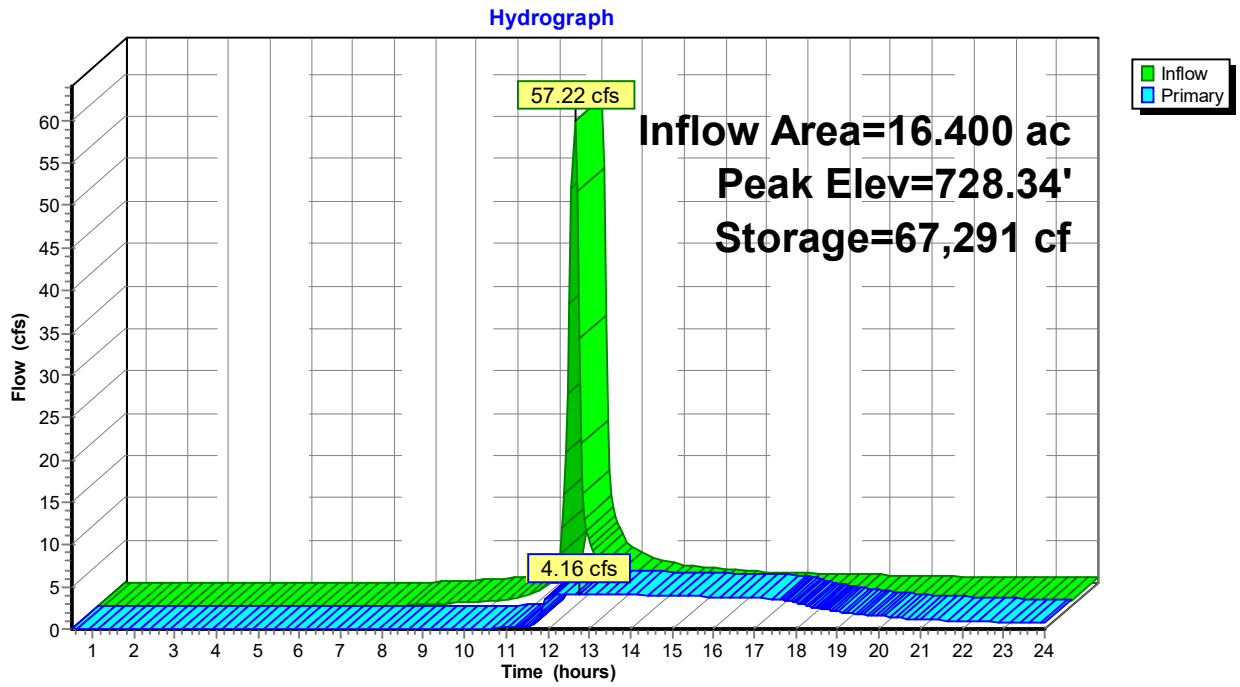
Volume	Invert	Avail.Storage	Storage Description
#1	727.00'	223,223 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
727.00	47,577	0	0
728.00	51,692	49,635	49,635
729.00	55,751	53,722	103,356
730.00	59,907	57,829	161,185
731.00	64,169	62,038	223,223

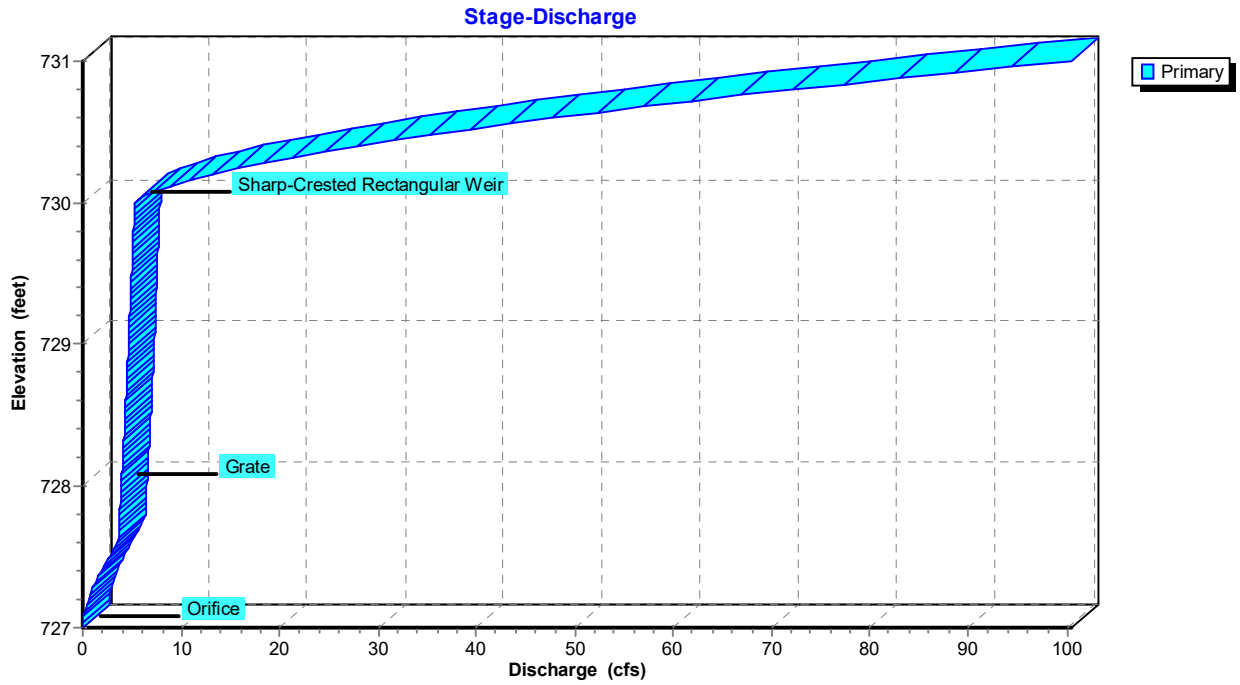
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	725.50'	12.0" Round Culvert L= 160.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.50' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	727.00'	8.0" Vert. Orifice X 4.00 C= 0.600

Primary OutFlow Max=4.16 cfs @ 12.75 hrs HW=728.34' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 4.16 cfs @ 5.29 fps)
  - 3=Grate (Passes < 1.26 cfs potential flow)
  - 4=Orifice (Passes < 6.74 cfs potential flow)

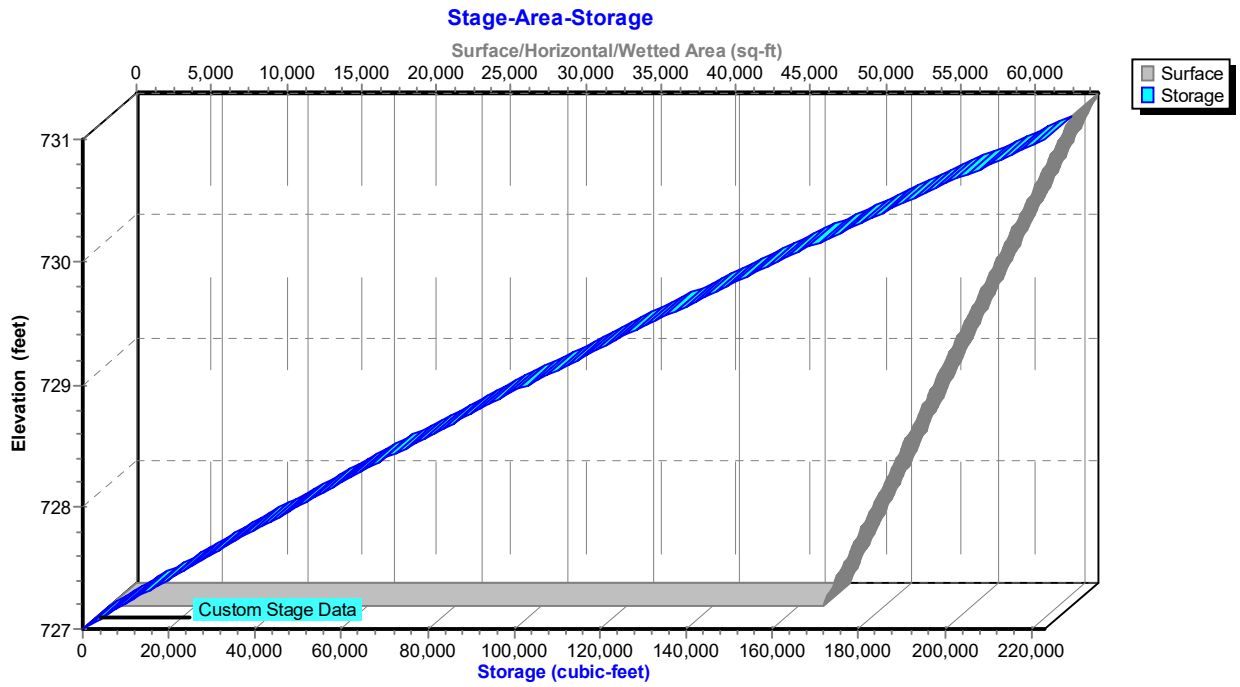
Pond 4P: WET POND 4



Pond 4P: WET POND 4



Pond 4P: WET POND 4

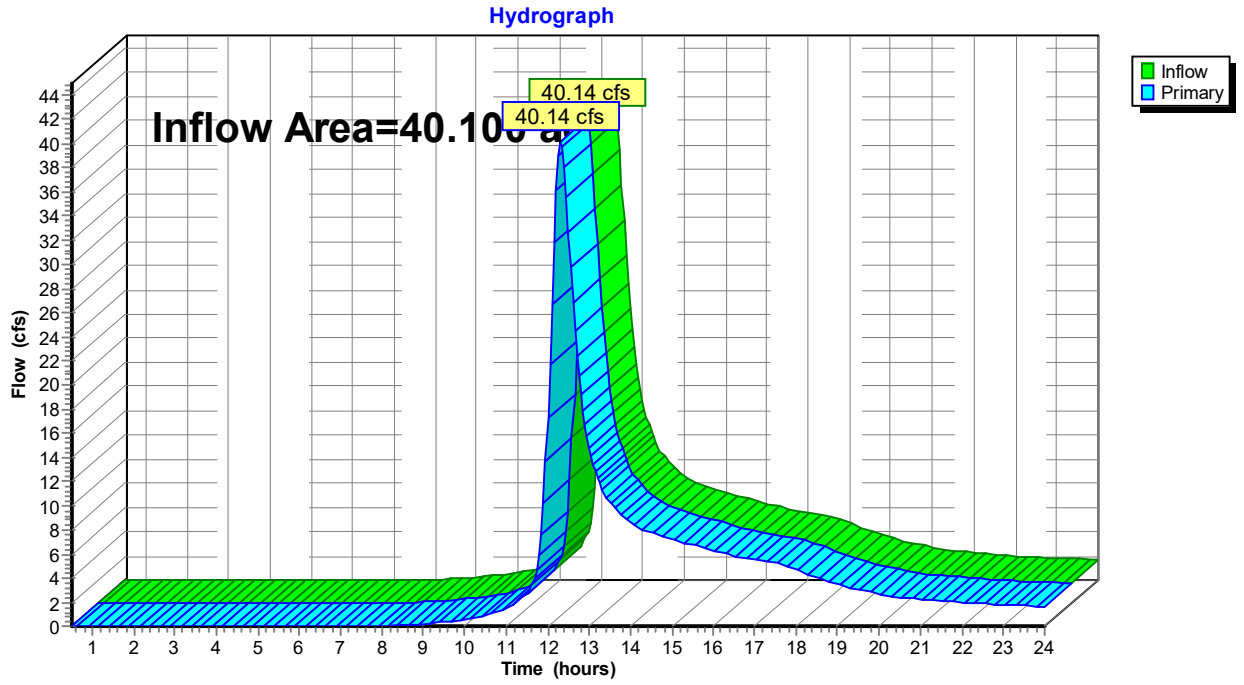


Summary for Link 1L: AREAS COMBINE

Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 2.11" for 10-Year event
Inflow = 40.14 cfs @ 12.31 hrs, Volume= 7.047 af
Primary = 40.14 cfs @ 12.31 hrs, Volume= 7.047 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 1L: AREAS COMBINE

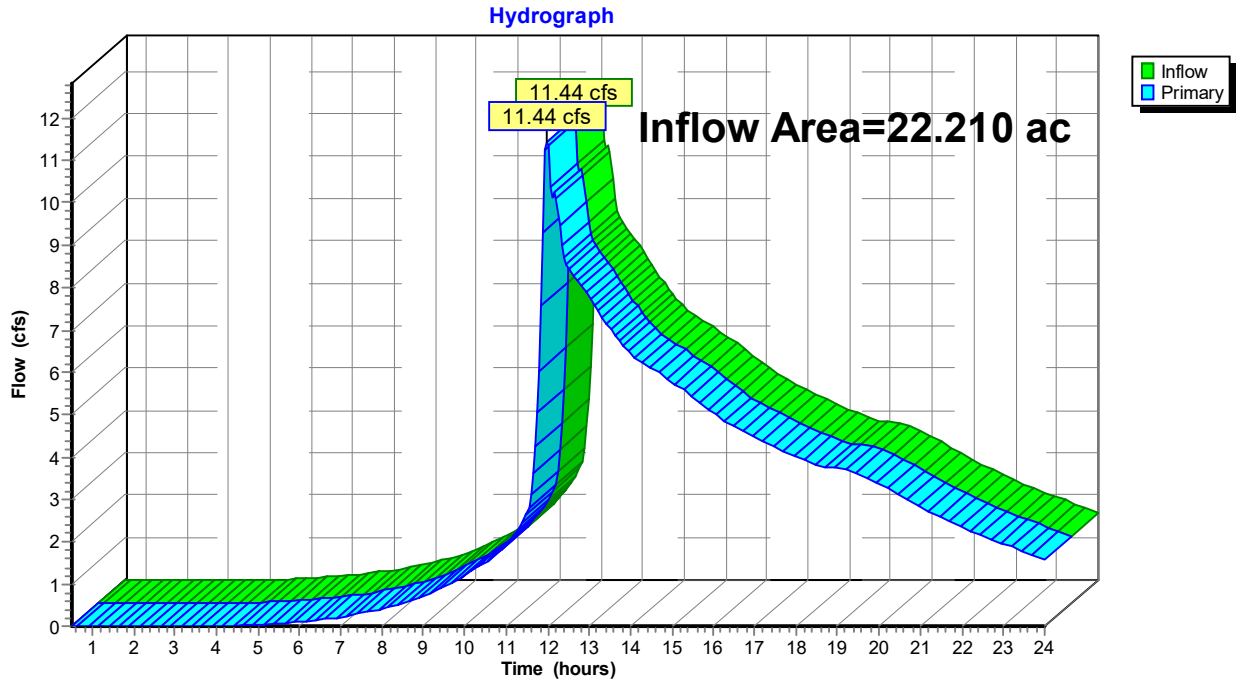


Summary for Link 2L: AREAS COMBINE

Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 2.74" for 10-Year event
Inflow = 11.44 cfs @ 11.98 hrs, Volume= 5.064 af
Primary = 11.44 cfs @ 11.98 hrs, Volume= 5.064 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 2L: AREAS COMBINE



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment D-1: D-1 — Runoff Area=13.200 ac 54.55% Impervious Runoff Depth>3.61"
Flow Length=1,885' Tc=7.6 min CN=93 Runoff=72.65 cfs 3.966 af

Subcatchment D-2: D-2 — Runoff Area=5.900 ac 52.54% Impervious Runoff Depth>3.18"
Flow Length=736' Tc=27.8 min CN=89 Runoff=16.97 cfs 1.564 af

Subcatchment D-3: D-3 — Runoff Area=3.800 ac 60.53% Impervious Runoff Depth>3.39"
Flow Length=132' Slope=0.0125 '/' Tc=20.2 min CN=91 Runoff=13.80 cfs 1.073 af

Subcatchment D-4: D-4 — Runoff Area=16.400 ac 24.39% Impervious Runoff Depth>2.72"
Flow Length=852' Tc=8.6 min UI Adjusted CN=84 Runoff=70.57 cfs 3.720 af

Subcatchment D-5: D-5 — Runoff Area=19.900 ac 13.07% Impervious Runoff Depth>2.61"
Flow Length=1,918' Tc=34.8 min CN=83 Runoff=41.20 cfs 4.336 af

Subcatchment D-6: D-6 — Runoff Area=1.100 ac 27.27% Impervious Runoff Depth>3.40"
Flow Length=312' Tc=4.6 min CN=91 Runoff=6.39 cfs 0.312 af

Subcatchment D-7: D-7 — Runoff Area=5.620 ac 0.36% Impervious Runoff Depth>2.44"
Flow Length=937' Tc=163.2 min CN=82 Runoff=3.58 cfs 1.141 af

Subcatchment D-8: D-8 — Runoff Area=2.010 ac 5.47% Impervious Runoff Depth>2.62"
Flow Length=333' Tc=21.5 min CN=83 Runoff=5.63 cfs 0.439 af

Pond 1: EXISTING 12" CULVERT — Peak Elev=726.16' Inflow=13.46 cfs 6.004 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0125 '/' Outflow=13.46 cfs 6.004 af

Pond 1P: WET POND 1 — Peak Elev=721.35' Storage=88,559 cf Inflow=72.65 cfs 3.966 af
Outflow=4.49 cfs 3.754 af

Pond 2: EXISTING 24" HDPE — Peak Elev=735.73' Inflow=49.45 cfs 8.765 af
24.0" Round Culvert n=0.013 L=48.0' S=0.0021 '/' Outflow=49.45 cfs 8.765 af

Pond 2P: WET POND 2 — Peak Elev=729.41' Storage=30,356 cf Inflow=16.97 cfs 1.564 af
Outflow=4.29 cfs 1.499 af

Pond 3P: WET POND 3 — Peak Elev=728.98' Storage=19,378 cf Inflow=13.80 cfs 1.073 af
Outflow=3.95 cfs 1.023 af

Pond 4P: WET POND 4 — Peak Elev=728.70' Storage=86,706 cf Inflow=70.57 cfs 3.720 af
Outflow=4.41 cfs 3.406 af

Link 1L: AREAS COMBINE — Inflow=49.45 cfs 8.765 af
Primary=49.45 cfs 8.765 af

Link 2L: AREAS COMBINE — Inflow=13.46 cfs 6.004 af
Primary=13.46 cfs 6.004 af

Total Runoff Area = 67.930 ac Runoff Volume = 16.551 af Average Runoff Depth = 2.92"
71.10% Pervious = 48.300 ac 28.90% Impervious = 19.630 ac

Summary for Subcatchment D-1: D-1

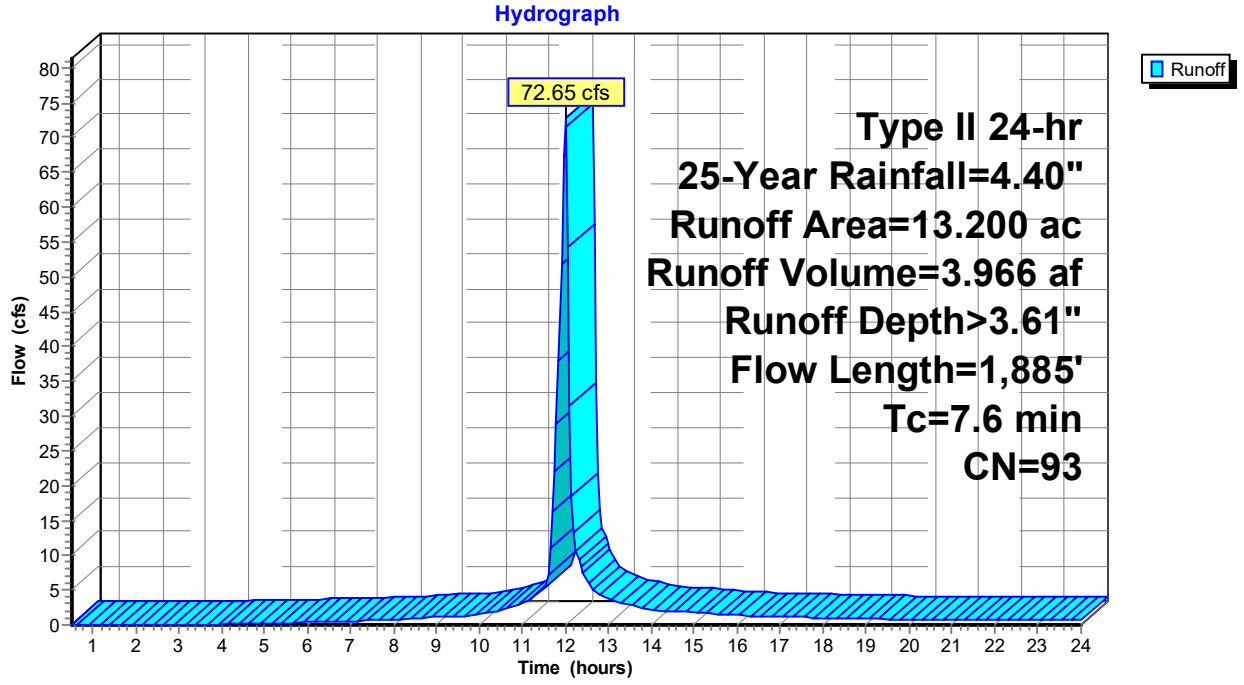
Runoff = 72.65 cfs @ 11.98 hrs, Volume= 3.966 af, Depth> 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
7.200	98	Paved roads w/curbs & sewers, HSG D
2.600	96	Gravel surface, HSG D
3.400	80	>75% Grass cover, Good, HSG D
13.200	93	Weighted Average
6.000		45.45% Pervious Area
7.200		54.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0135	1.04		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
1.0	56	0.0135	0.93		Sheet Flow, A-B CONCENTRATED Smooth surfaces n= 0.011 P2= 2.50"
5.0	1,729	0.0082	5.75	95.86	Parabolic Channel, B-C SWALE W=10.00' D=2.50' Area=16.7 sf Perim=11.5' n= 0.030 Earth, grassed & winding
7.6	1,885	Total			

Subcatchment D-1: D-1



Summary for Subcatchment D-2: D-2

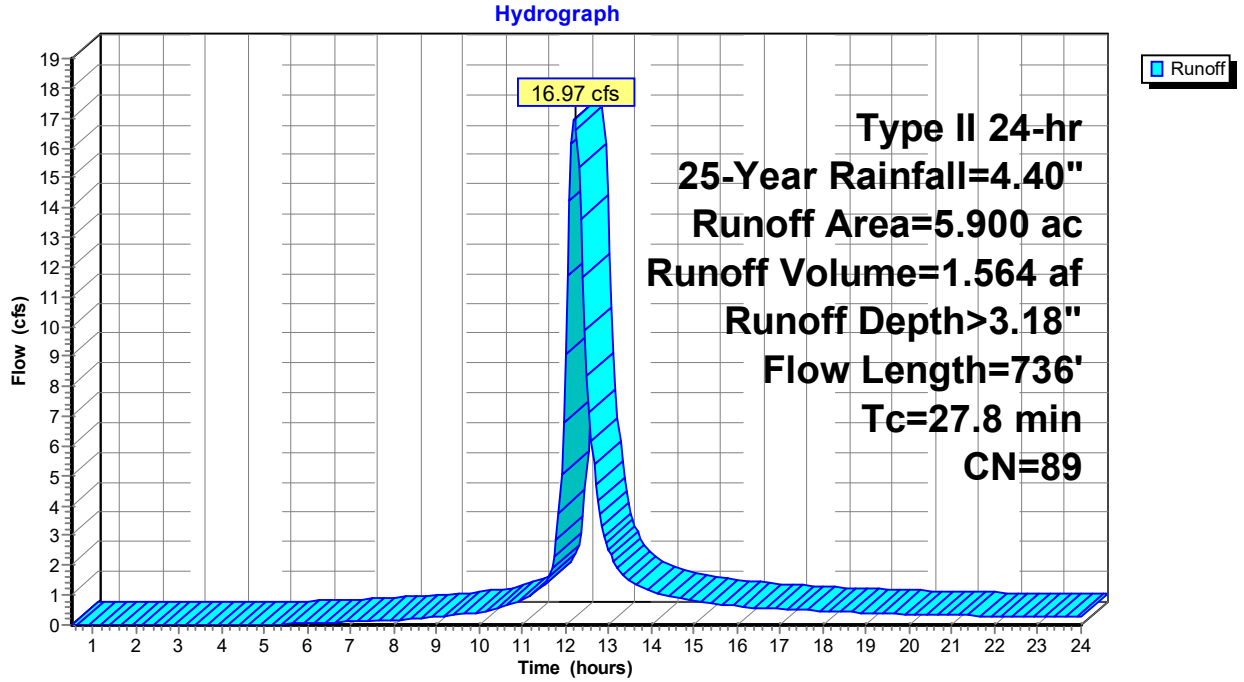
Runoff = 16.97 cfs @ 12.21 hrs, Volume= 1.564 af, Depth> 3.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
1.200	98	Paved roads w/curbs & sewers, HSG D
1.900	98	Unconnected roofs, HSG D
2.800	80	>75% Grass cover, Good, HSG D
5.900	89	Weighted Average
2.800		47.46% Pervious Area
3.100		52.54% Impervious Area
1.900		61.29% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.1259	0.22		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
19.3	322	0.0031	0.28		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.8	314	0.0050	6.42	160.47	Parabolic Channel, C-D BIO SWALE W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
27.8	736	Total			

Subcatchment D-2: D-2



Summary for Subcatchment D-3: D-3

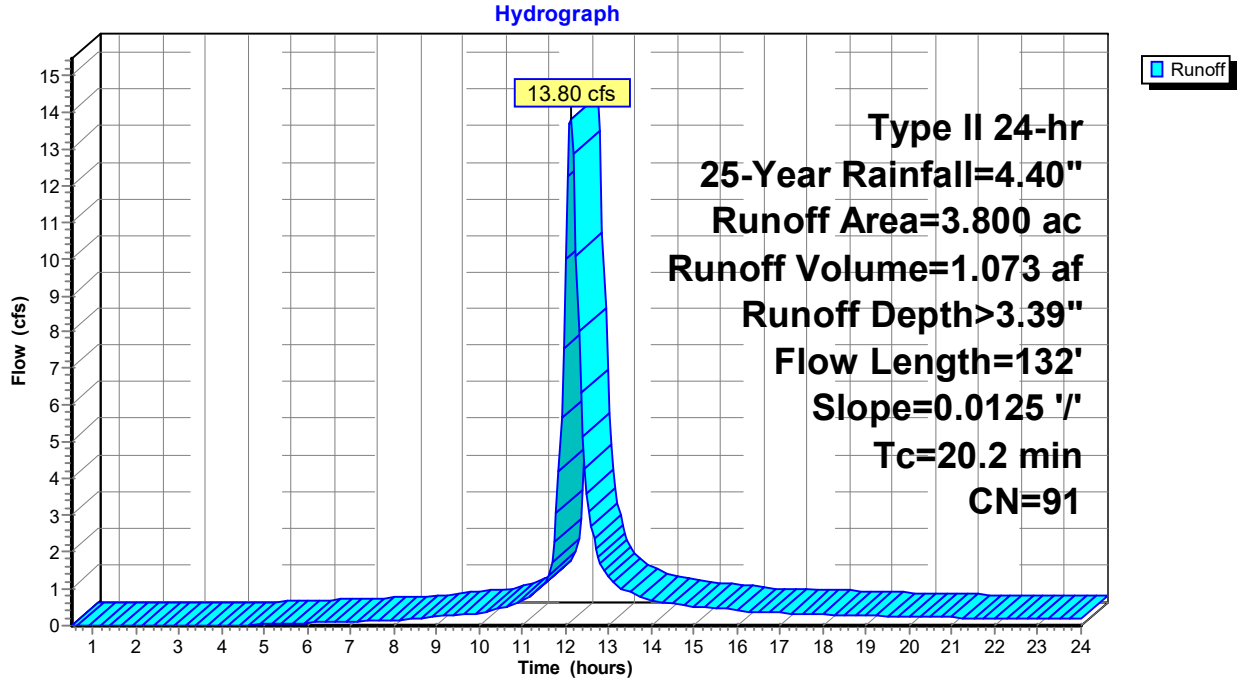
Runoff = 13.80 cfs @ 12.12 hrs, Volume= 1.073 af, Depth> 3.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
0.800	98	Paved roads w/curbs & sewers, HSG D
1.500	98	Unconnected roofs, HSG D
1.500	80	>75% Grass cover, Good, HSG D
3.800	91	Weighted Average
1.500		39.47% Pervious Area
2.300		60.53% Impervious Area
1.500		65.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0125	0.09		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
0.7	32	0.0125	0.78		Shallow Concentrated Flow, B-C CONCENTRATED Short Grass Pasture Kv= 7.0 fps
20.2	132	Total			

Subcatchment D-3: D-3



Summary for Subcatchment D-4: D-4

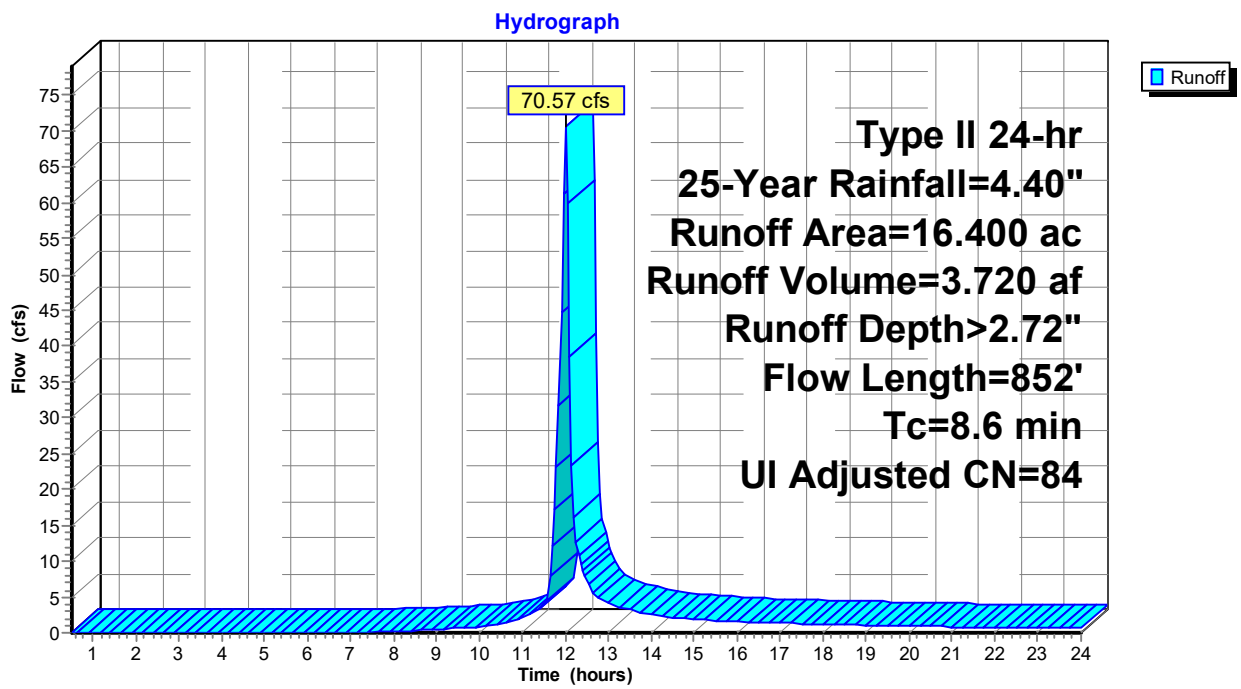
Runoff = 70.57 cfs @ 12.00 hrs, Volume= 3.720 af, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Adj	Description
3.200	98		Unconnected roofs, HSG D
0.800	98		Paved roads w/curbs & sewers, HSG D
12.400	82		Woods/grass comb., Fair, HSG D
16.400	86	84	Weighted Average, UI Adjusted
12.400			75.61% Pervious Area
4.000			24.39% Impervious Area
3.200			80.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	41	0.2317	0.23		Sheet Flow, A-B SHEET FLOW Grass: Dense n= 0.240 P2= 2.50"
5.6	811	0.0025	2.42	32.21	Parabolic Channel, B-C SWALE W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
8.6	852	Total			

Subcatchment D-4: D-4



Summary for Subcatchment D-5: D-5

Runoff = 41.20 cfs @ 12.30 hrs, Volume= 4.336 af, Depth> 2.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

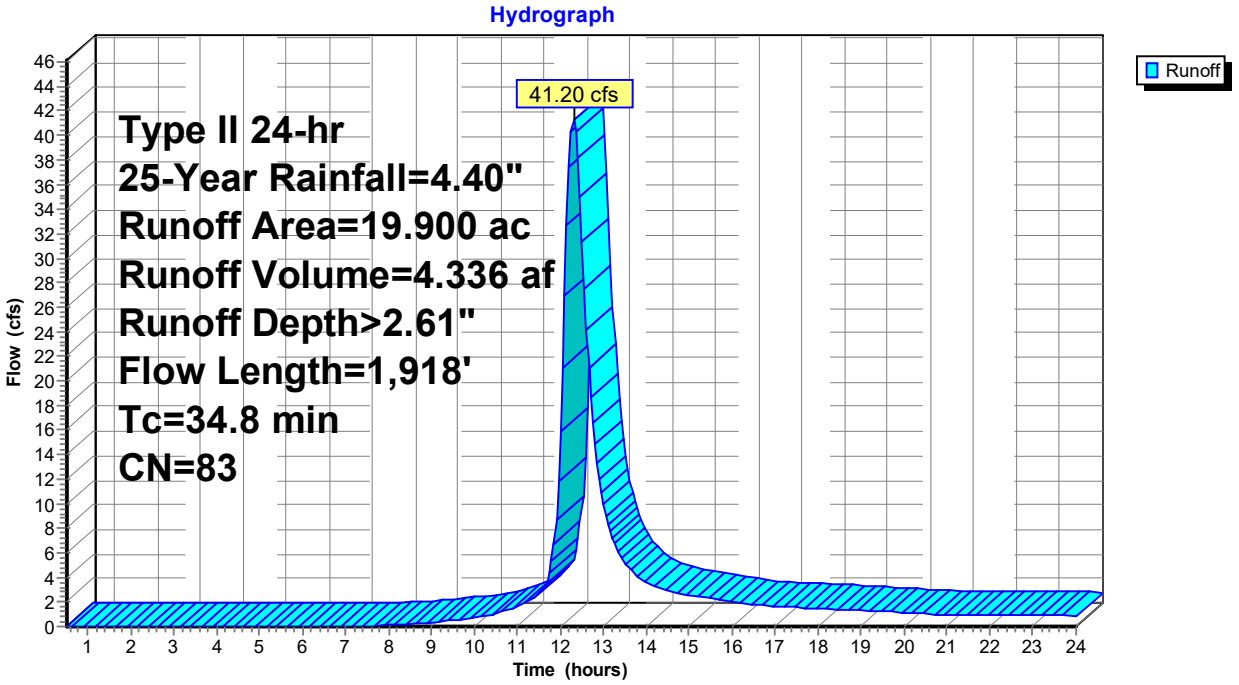
Area (ac)	CN	Description
2.200	98	Paved parking, HSG D
1.700	96	Gravel surface, HSG D
0.400	98	Unconnected roofs, HSG D
15.600	79	Woods/grass comb., Good, HSG D
19.900	83	Weighted Average
17.300		86.93% Pervious Area
2.600		13.07% Impervious Area
0.400		15.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0240	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
15.6	725	0.0240	0.77		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.6	142	0.0050	4.20	139.87	Parabolic Channel, C-D SWALE W=25.00' D=2.00' Area=33.3 sf Perim=25.4' n= 0.030 Earth, grassed & winding
0.4	100	0.0050	3.72	4.57	Pipe Channel, D-E PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.3	346	0.0117	4.53	77.03	Parabolic Channel, E-F DITCH W=17.00' D=1.50' Area=17.0 sf Perim=17.3' n= 0.035 Earth, dense weeds
0.1	55	0.0125	6.96	8.54	Pipe Channel, F-G PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	94	0.0066	5.28	211.05	Parabolic Channel, G-HDITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.0	20	0.0190	8.58	10.52	Pipe Channel, H-I PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	46	0.0067	3.96	52.73	Parabolic Channel, I-J DITCH W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
0.0	22	0.0168	8.06	9.90	Pipe Channel, J-K PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.5	88	0.0027	3.23	84.04	Parabolic Channel, K-L DITCH W=13.00' D=3.00' Area=26.0 sf Perim=14.7' n= 0.035 Earth, dense weeds
0.3	30	0.0083	1.78	2.19	Pipe Channel, L-M PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'

n= 0.035 Earth, dense weeds

0.5	150	0.0059	4.90	156.69	Parabolic Channel, M-N DITCH W=16.00' D=3.00' Area=32.0 sf Perim=17.4' n= 0.035 Earth, dense weeds
34.8	1,918	Total			

Subcatchment D-5: D-5



Summary for Subcatchment D-6: D-6

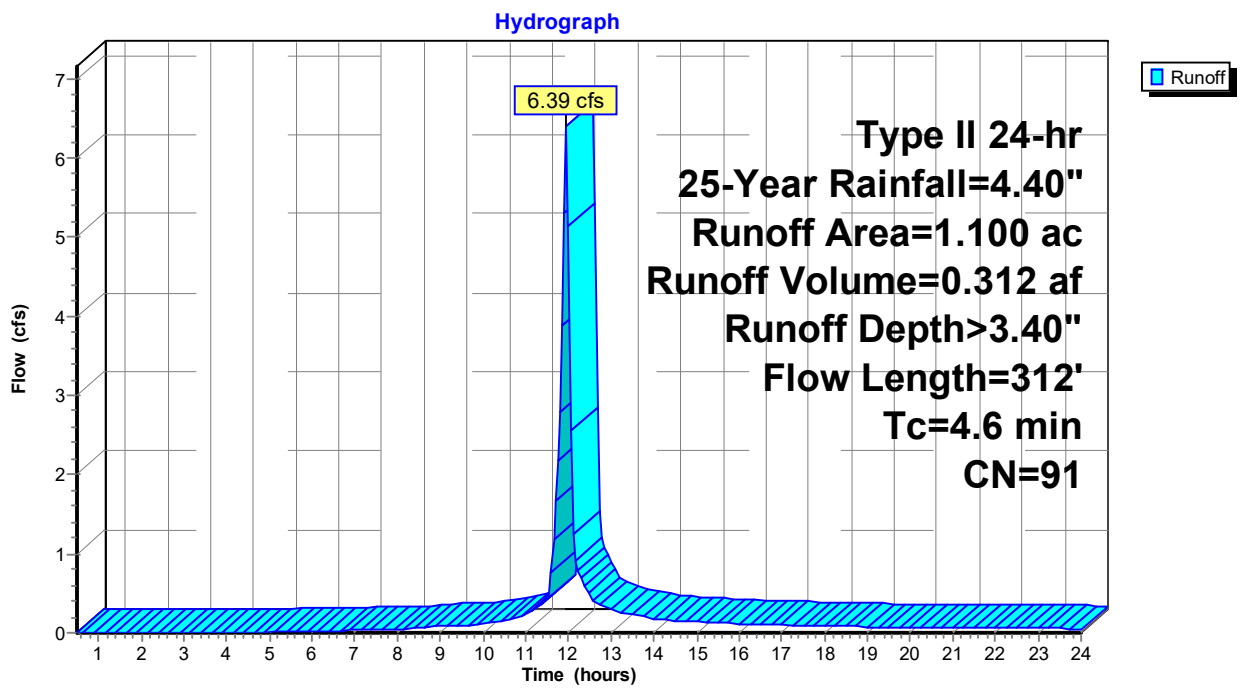
Runoff = 6.39 cfs @ 11.95 hrs, Volume= 0.312 af, Depth> 3.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
0.300	98	Paved parking, HSG D
0.400	96	Gravel surface, HSG D
0.400	80	>75% Grass cover, Good, HSG D
1.100	91	Weighted Average
0.800		72.73% Pervious Area
0.300		27.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0200	2.87		Shallow Concentrated Flow, B-C CONCENTRATED Paved Kv= 20.3 fps
3.0	182	0.0210	1.01		Shallow Concentrated Flow, C-D CONCENTRATED Short Grass Pasture Kv= 7.0 fps
4.6	312	Total			

Subcatchment D-6: D-6



Summary for Subcatchment D-7: D-7

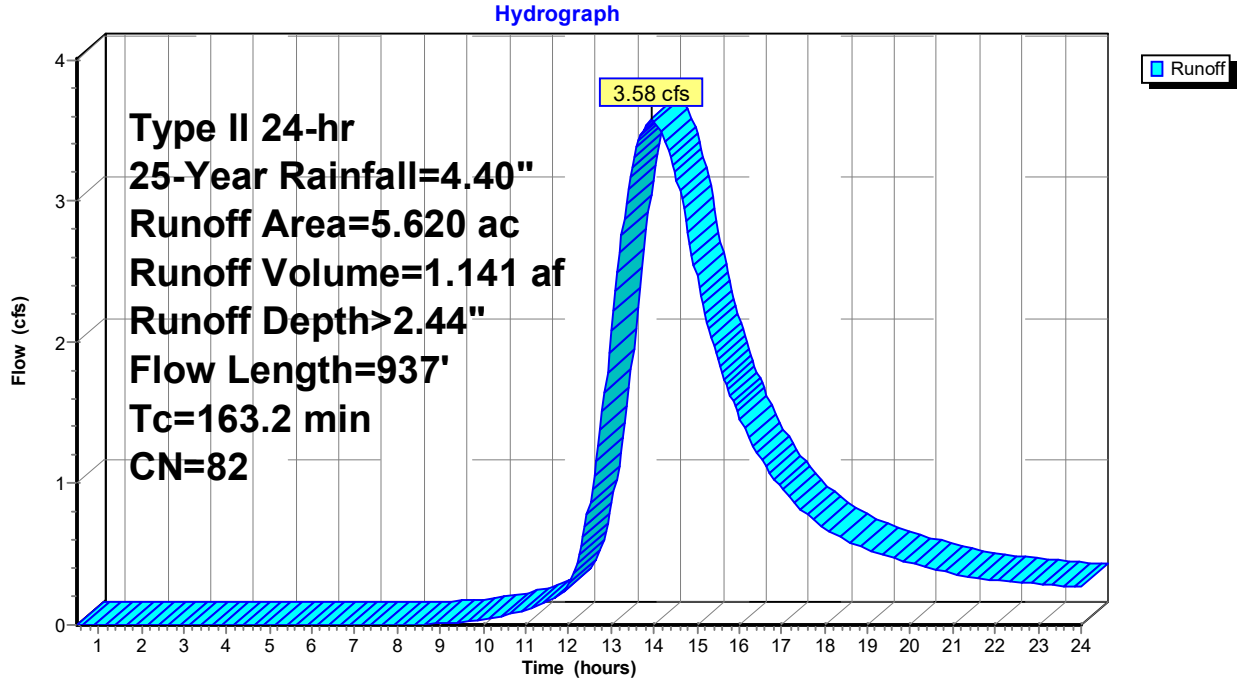
Runoff = 3.58 cfs @ 13.96 hrs, Volume= 1.141 af, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
0.010	98	Paved parking, HSG D
5.600	82	Woods/grass comb., Fair, HSG D
0.010	98	Unconnected roofs, HSG D
5.620	82	Weighted Average
5.600		99.64% Pervious Area
0.020		0.36% Impervious Area
0.010		50.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
134.4	100	0.0001	0.01		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
28.5	745	0.0076	0.44		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.3	92	0.0261	6.06	30.30	Parabolic Channel, C-D DITCH W=5.00' D=1.50' Area=5.0 sf Perim=6.0' n= 0.035 Earth, dense weeds
163.2	937	Total			

Subcatchment D-7: D-7



Summary for Subcatchment D-8: D-8

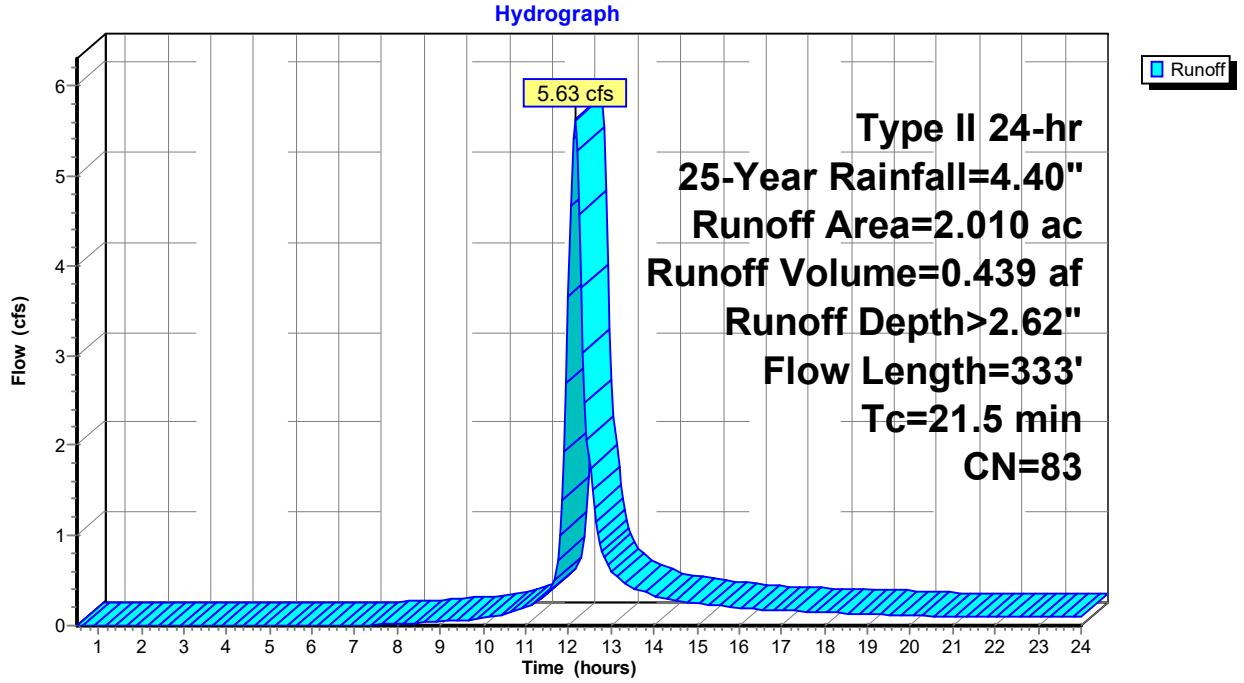
Runoff = 5.63 cfs @ 12.14 hrs, Volume= 0.439 af, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-Year Rainfall=4.40"

Area (ac)	CN	Description
0.010	98	Unconnected roofs, HSG D
0.100	98	Paved parking, HSG D
1.900	82	Woods/grass comb., Fair, HSG D
2.010	83	Weighted Average
1.900		94.53% Pervious Area
0.110		5.47% Impervious Area
0.010		9.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0255	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
6.9	233	0.0127	0.56		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
21.5	333	Total			

Subcatchment D-8: D-8



Summary for Pond 1: EXISTING 12" CULVERT

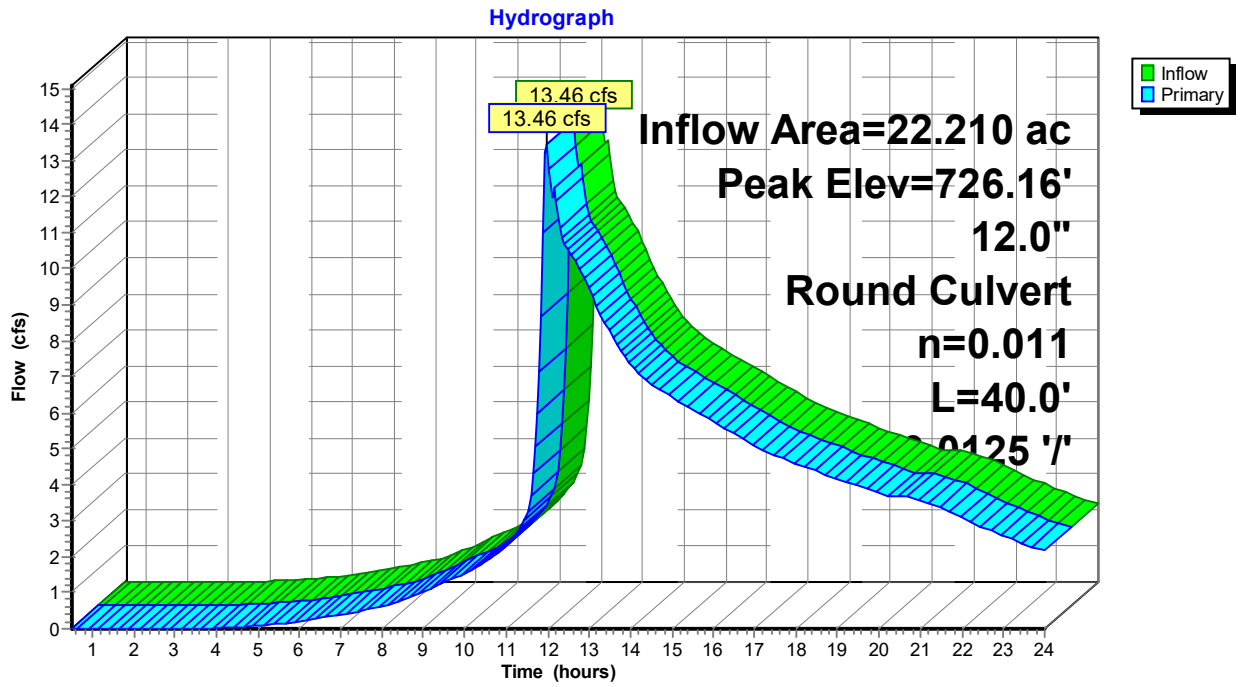
Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 3.24" for 25-Year event
Inflow = 13.46 cfs @ 11.98 hrs, Volume= 6.004 af
Outflow = 13.46 cfs @ 11.98 hrs, Volume= 6.004 af, Atten= 0%, Lag= 0.0 min
Primary = 13.46 cfs @ 11.98 hrs, Volume= 6.004 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 726.16' @ 11.98 hrs

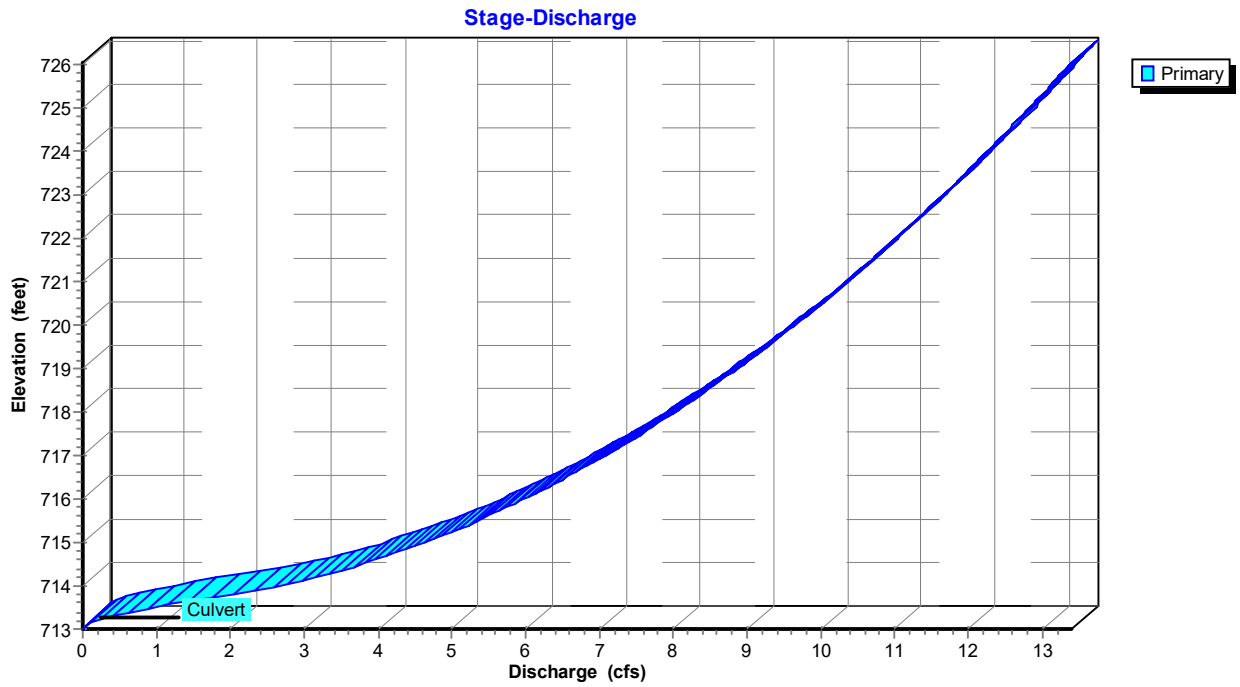
Device	Routing	Invert	Outlet Devices
#1	Primary	713.00'	12.0" Round Culvert L= 40.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 713.00' / 712.50' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=13.31 cfs @ 11.98 hrs HW=725.88' (Free Discharge)
└─1=Culvert (Inlet Controls 13.31 cfs @ 16.94 fps)

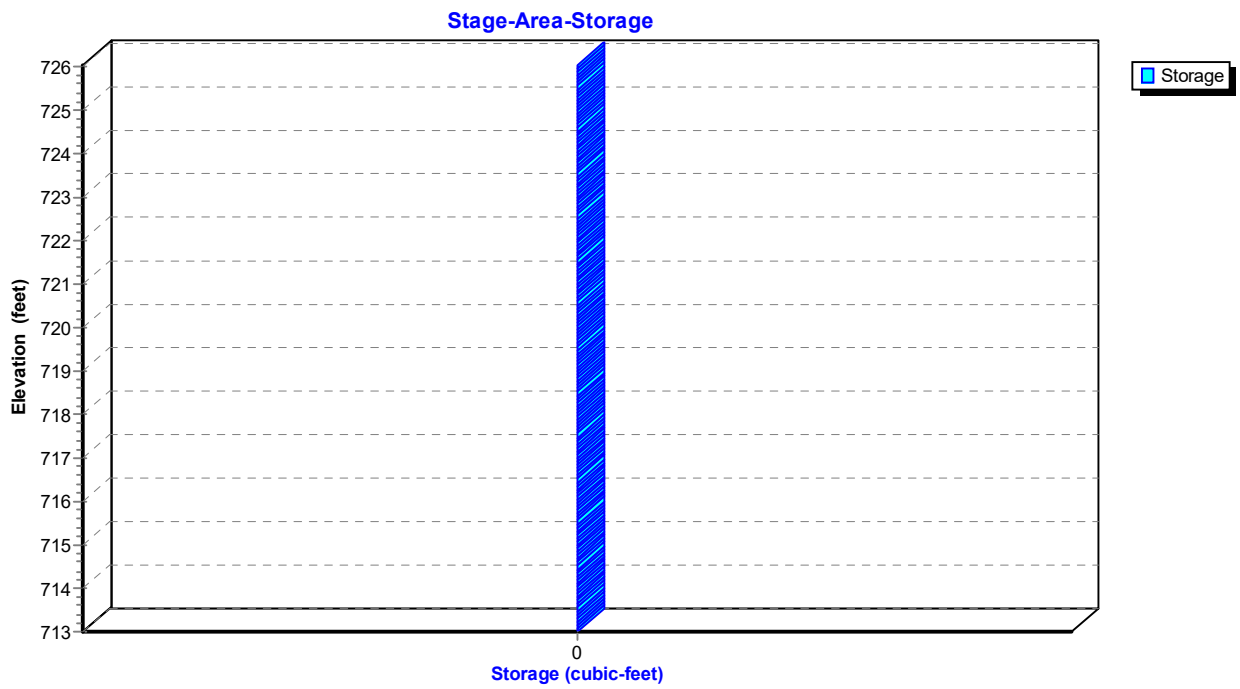
Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Summary for Pond 1P: WET POND 1

Inflow Area = 13.200 ac, 54.55% Impervious, Inflow Depth > 3.61" for 25-Year event
Inflow = 72.65 cfs @ 11.98 hrs, Volume= 3.966 af
Outflow = 4.49 cfs @ 12.76 hrs, Volume= 3.754 af, Atten= 94%, Lag= 46.8 min
Primary = 4.49 cfs @ 12.76 hrs, Volume= 3.754 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 721.35' @ 12.76 hrs Surf.Area= 42,275 sf Storage= 88,559 cf

Plug-Flow detention time= 223.1 min calculated for 3.746 af (94% of inflow)
Center-of-Mass det. time= 192.2 min (971.7 - 779.5)

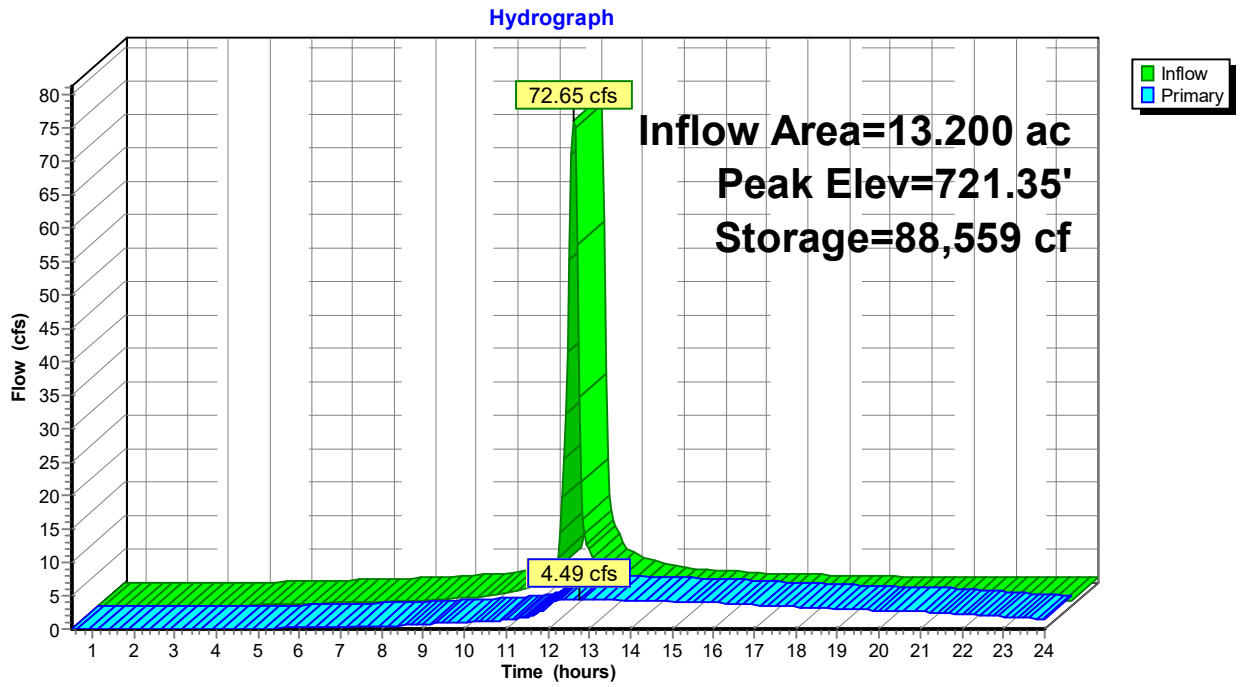
Volume	Invert	Avail.Storage	Storage Description
#1	719.00'	189,322 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
719.00	33,157	0	0
720.00	36,963	35,060	35,060
721.00	40,869	38,916	73,976
722.00	44,876	42,873	116,849
723.00	48,983	46,930	163,778
723.50	53,191	25,544	189,322

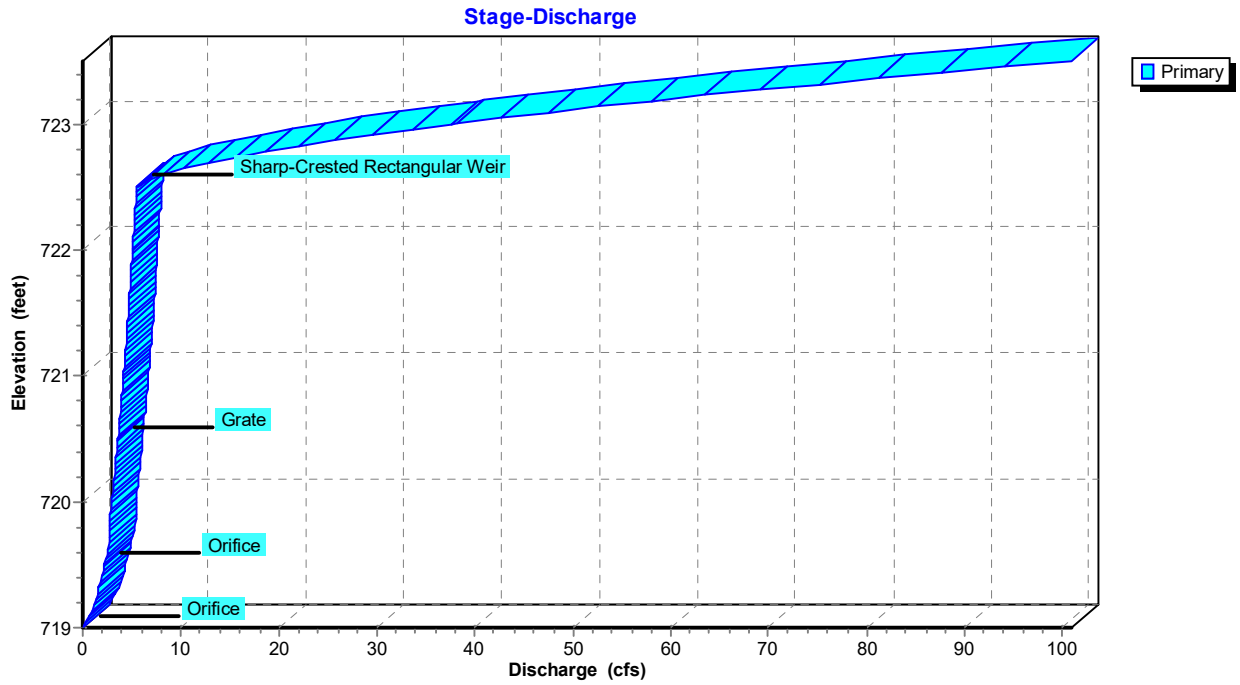
Device	Routing	Invert	Outlet Devices
#1	Primary	722.50'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	718.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 718.50' / 718.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	720.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	719.00'	6.0" Horiz. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#5	Device 2	719.50'	3.0" Vert. Orifice X 3.00 C= 0.600

Primary OutFlow Max=4.49 cfs @ 12.76 hrs HW=721.35' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 4.49 cfs @ 5.71 fps)
  - 3=Grate (Passes < 5.04 cfs potential flow)
  - 4=Orifice (Passes < 5.80 cfs potential flow)
  - 5=Orifice (Passes < 0.93 cfs potential flow)

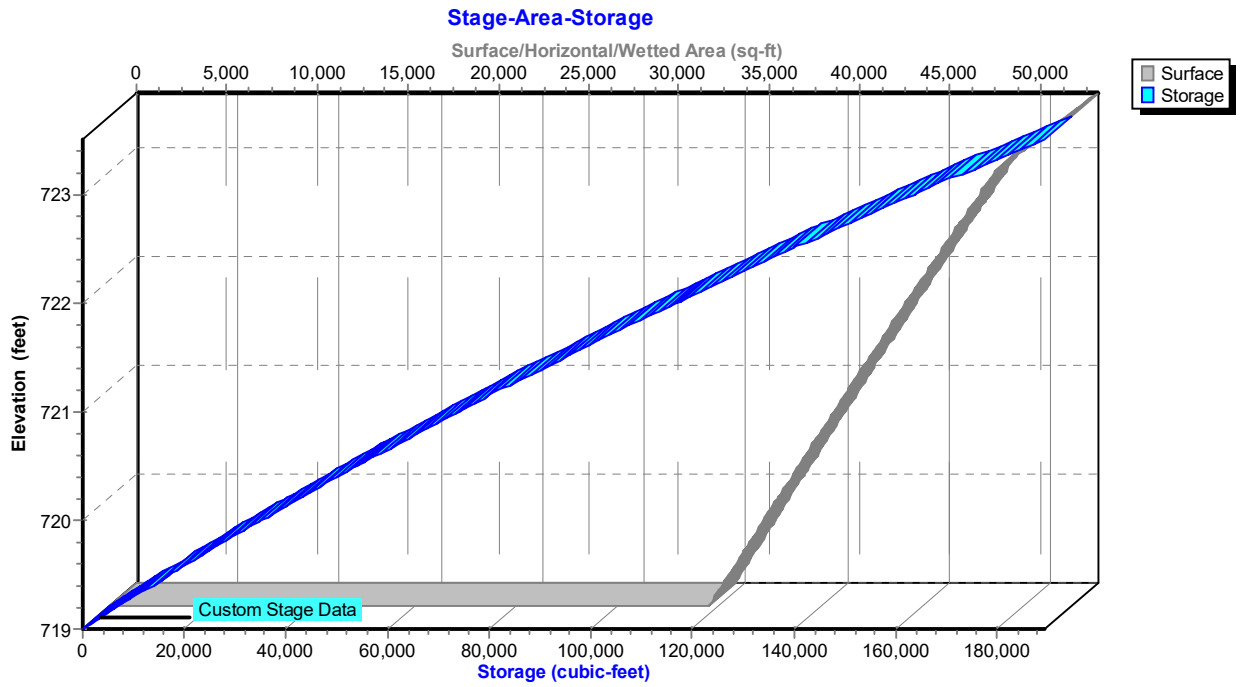
Pond 1P: WET POND 1



Pond 1P: WET POND 1



Pond 1P: WET POND 1



Summary for Pond 2: EXISTING 24" HDPE

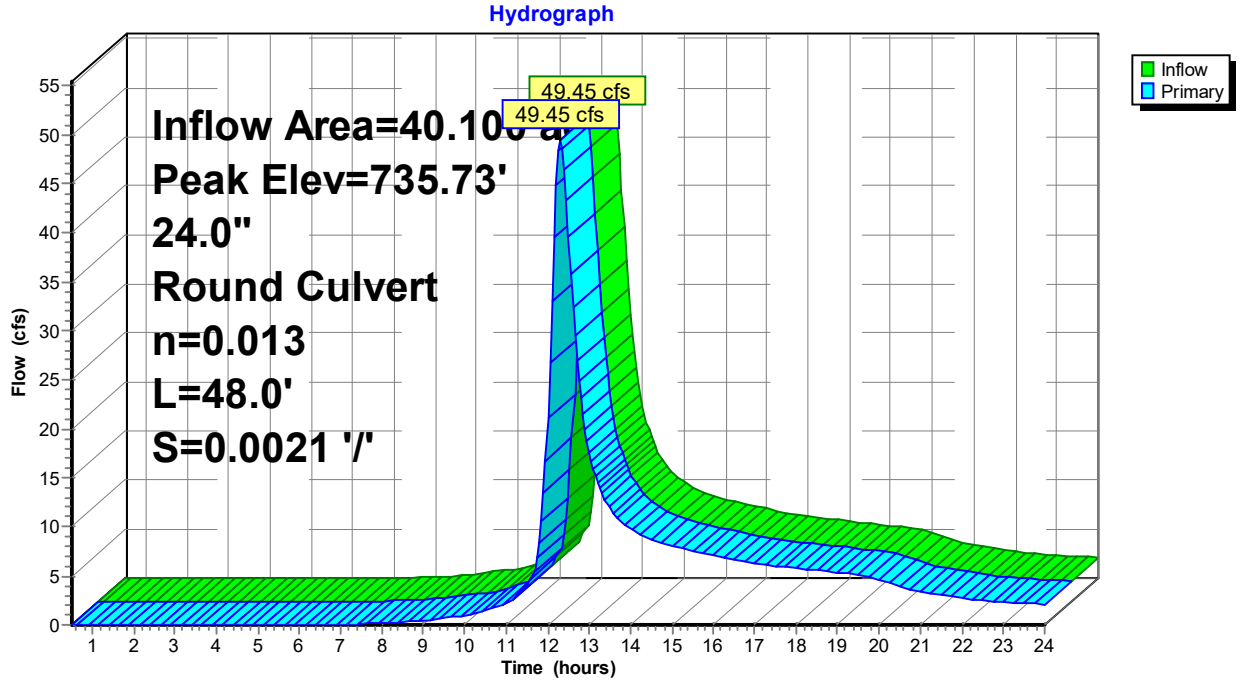
Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 2.62" for 25-Year event
Inflow = 49.45 cfs @ 12.30 hrs, Volume= 8.765 af
Outflow = 49.45 cfs @ 12.30 hrs, Volume= 8.765 af, Atten= 0%, Lag= 0.0 min
Primary = 49.45 cfs @ 12.30 hrs, Volume= 8.765 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 735.73' @ 12.30 hrs

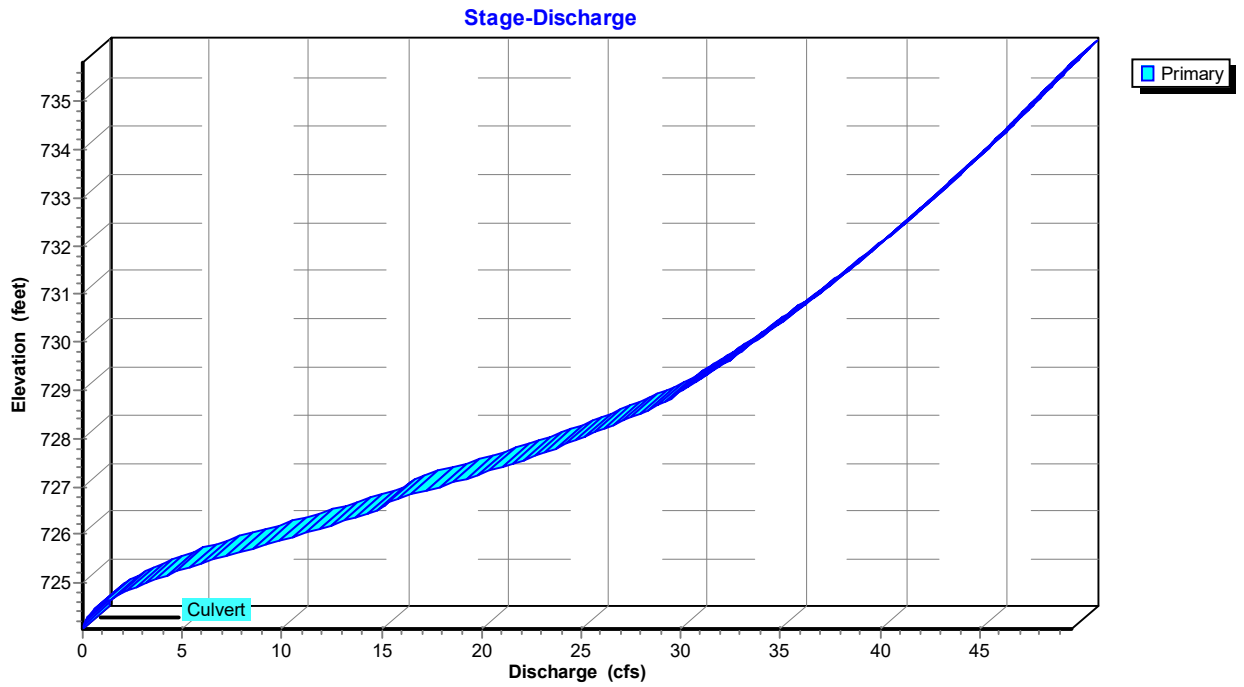
Device	Routing	Invert	Outlet Devices
#1	Primary	724.04'	24.0" Round Culvert L= 48.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 724.04' / 723.94' S= 0.0021 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=49.38 cfs @ 12.30 hrs HW=735.70' (Free Discharge)
└1=Culvert (Inlet Controls 49.38 cfs @ 15.72 fps)

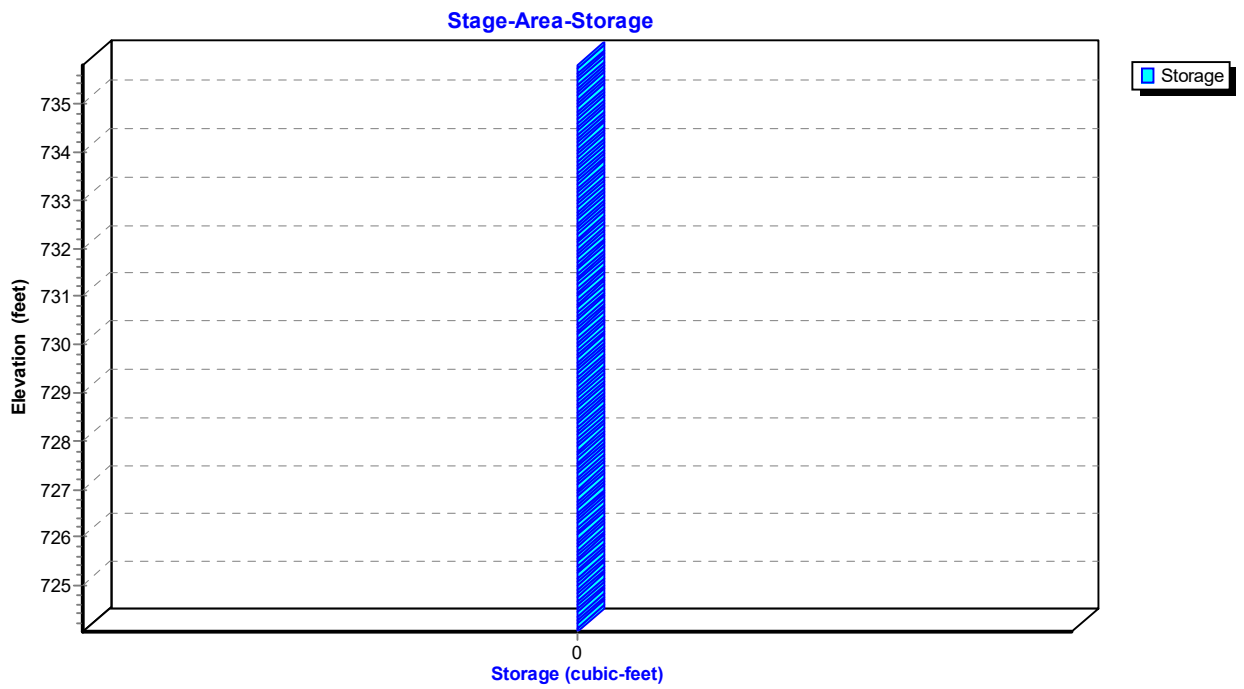
Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Summary for Pond 2P: WET POND 2

Inflow Area = 5.900 ac, 52.54% Impervious, Inflow Depth > 3.18" for 25-Year event
Inflow = 16.97 cfs @ 12.21 hrs, Volume= 1.564 af
Outflow = 4.29 cfs @ 12.74 hrs, Volume= 1.499 af, Atten= 75%, Lag= 31.8 min
Primary = 4.29 cfs @ 12.74 hrs, Volume= 1.499 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 729.41' @ 12.74 hrs Surf.Area= 24,263 sf Storage= 30,356 cf

Plug-Flow detention time= 146.5 min calculated for 1.499 af (96% of inflow)
Center-of-Mass det. time= 122.7 min (935.0 - 812.2)

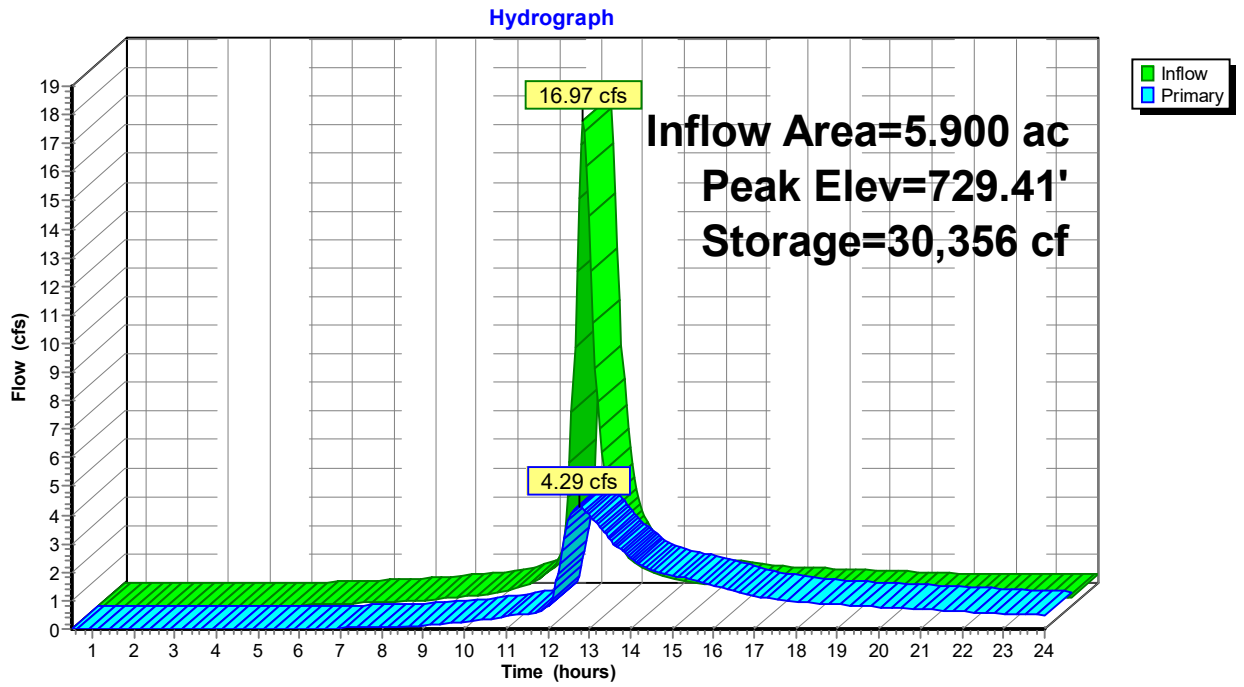
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	101,936 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,501	0	0
729.00	22,788	20,645	20,645
730.00	26,362	24,575	45,220
731.00	41,810	34,086	79,306
731.50	48,711	22,630	101,936

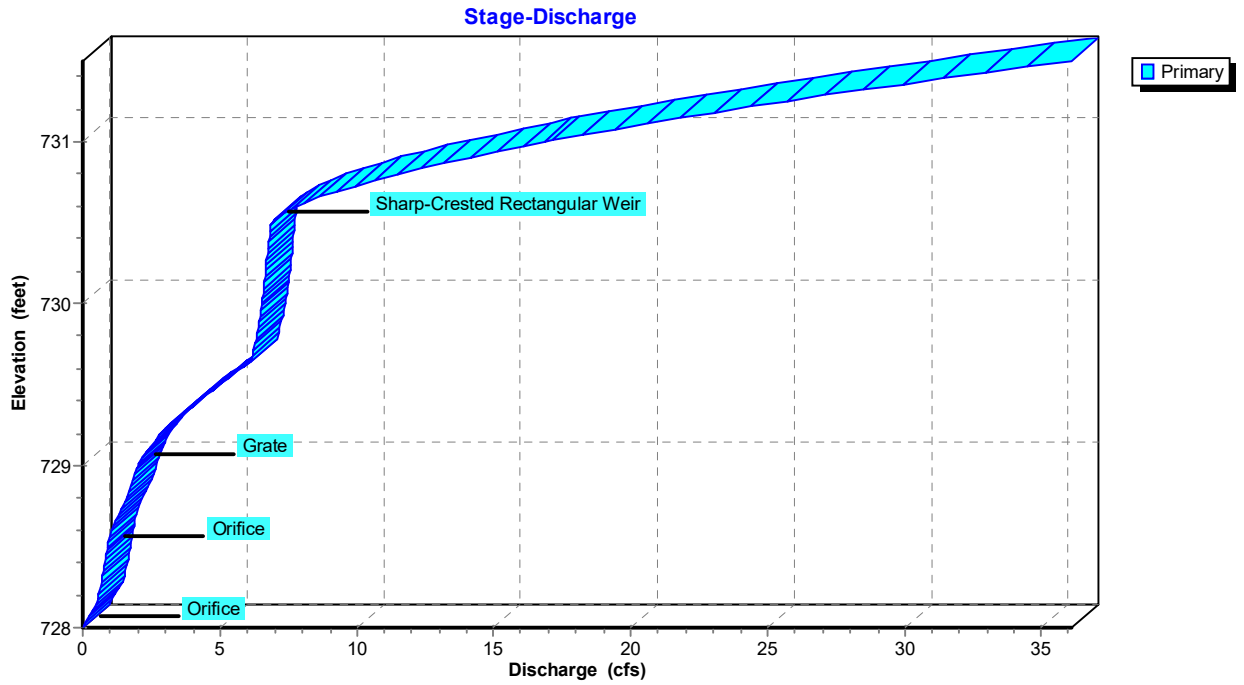
Device	Routing	Invert	Outlet Devices
#1	Primary	730.50'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 726.50' / 724.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	729.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.50'	4.0" Vert. Orifice X 3.00 C= 0.600
#5	Device 2	728.00'	4.0" Horiz. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.29 cfs @ 12.74 hrs HW=729.41' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Passes 4.29 cfs of 5.87 cfs potential flow)
  - 3=Grate (Orifice Controls 1.70 cfs @ 2.06 fps)
  - 4=Orifice (Orifice Controls 1.09 cfs @ 4.16 fps)
  - 5=Orifice (Orifice Controls 1.50 cfs @ 5.72 fps)

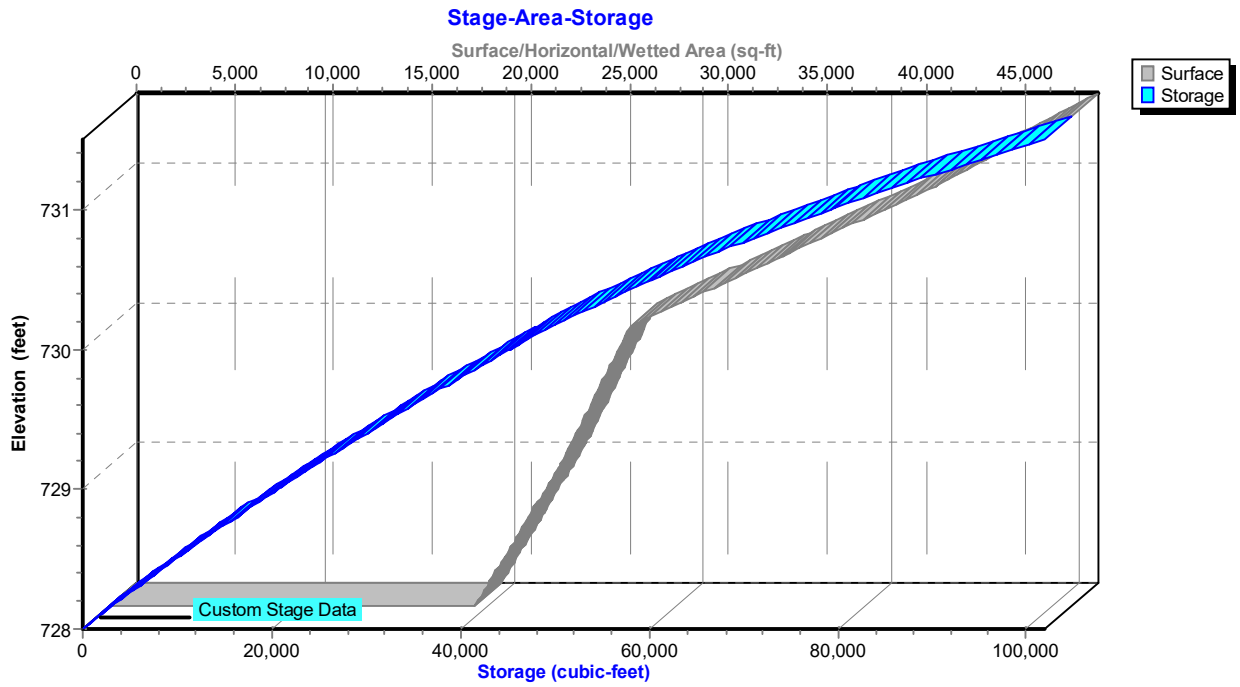
Pond 2P: WET POND 2



Pond 2P: WET POND 2



Pond 2P: WET POND 2



Summary for Pond 3P: WET POND 3

Inflow Area = 3.800 ac, 60.53% Impervious, Inflow Depth > 3.39" for 25-Year event
Inflow = 13.80 cfs @ 12.12 hrs, Volume= 1.073 af
Outflow = 3.95 cfs @ 12.48 hrs, Volume= 1.023 af, Atten= 71%, Lag= 21.2 min
Primary = 3.95 cfs @ 12.48 hrs, Volume= 1.023 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.98' @ 12.48 hrs Surf.Area= 21,531 sf Storage= 19,378 cf

Plug-Flow detention time= 104.1 min calculated for 1.023 af (95% of inflow)
Center-of-Mass det. time= 77.5 min (875.9 - 798.5)

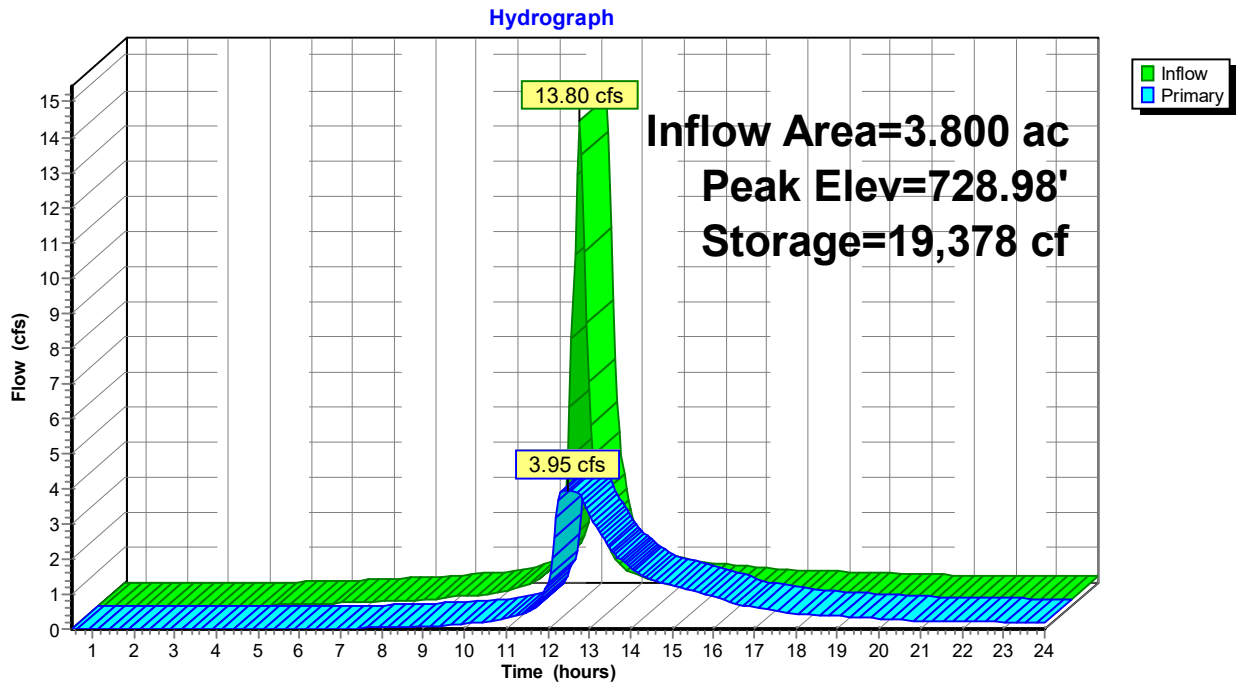
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	85,804 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,056	0	0
729.00	21,605	19,831	19,831
730.00	25,248	23,427	43,257
731.00	28,968	27,108	70,365
731.50	32,789	15,439	85,804

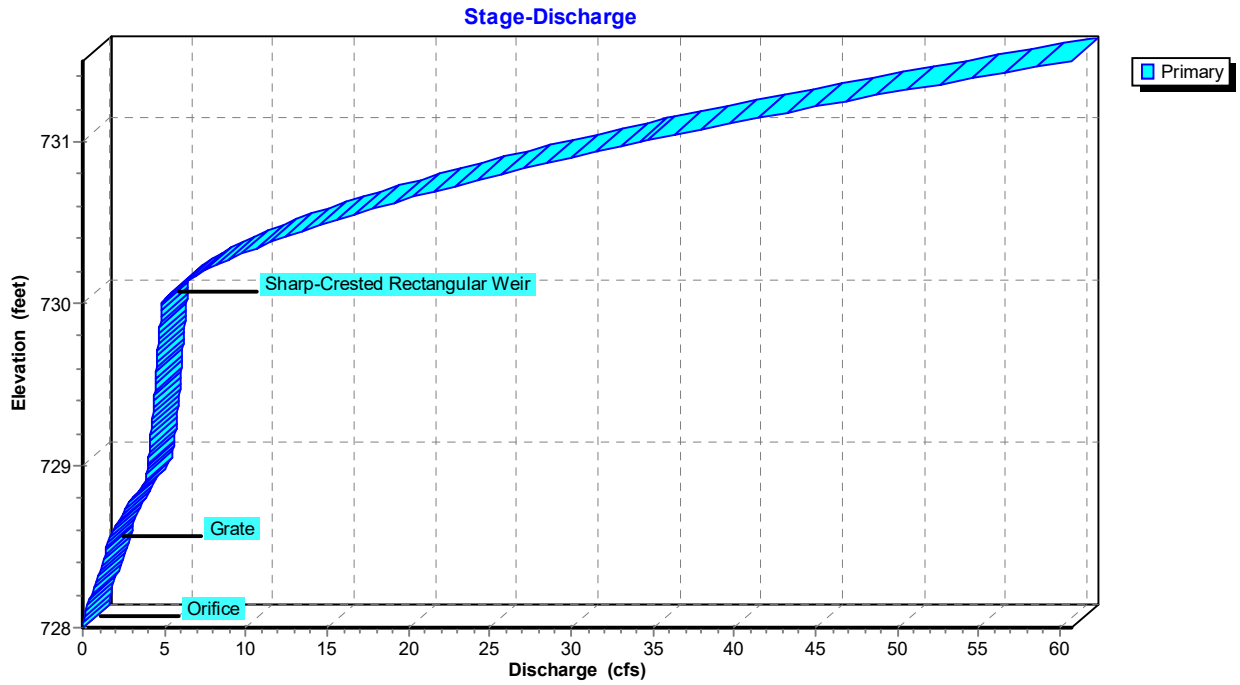
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 726.50' / 726.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.00'	4.0" Vert. Orifice X 6.00 C= 0.600

Primary OutFlow Max=3.95 cfs @ 12.48 hrs HW=728.98' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 3.95 cfs @ 5.03 fps)
  - 3=Grate (Passes < 2.12 cfs potential flow)
  - 4=Orifice (Passes < 2.27 cfs potential flow)

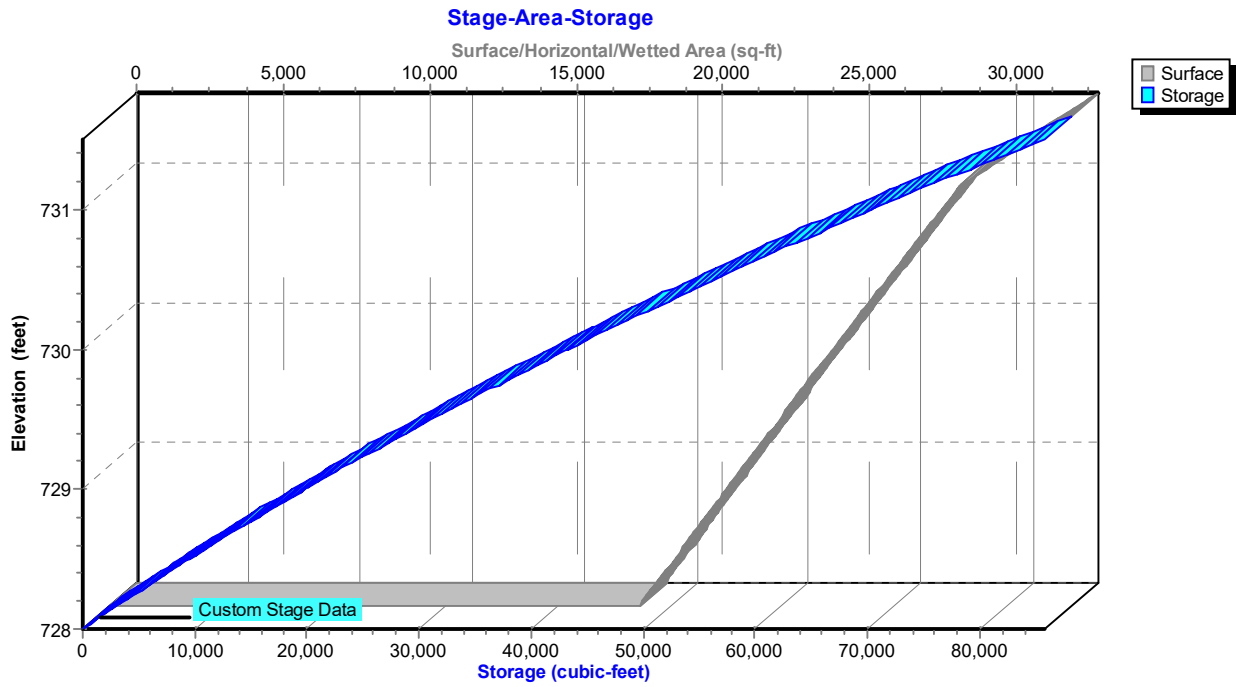
Pond 3P: WET POND 3



Pond 3P: WET POND 3



Pond 3P: WET POND 3



Summary for Pond 4P: WET POND 4

Inflow Area = 16.400 ac, 24.39% Impervious, Inflow Depth > 2.72" for 25-Year event
Inflow = 70.57 cfs @ 12.00 hrs, Volume= 3.720 af
Outflow = 4.41 cfs @ 12.93 hrs, Volume= 3.406 af, Atten= 94%, Lag= 55.8 min
Primary = 4.41 cfs @ 12.93 hrs, Volume= 3.406 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 728.70' @ 12.93 hrs Surf.Area= 54,525 sf Storage= 86,706 cf

Plug-Flow detention time= 229.8 min calculated for 3.406 af (92% of inflow)
Center-of-Mass det. time= 185.6 min (999.6 - 814.0)

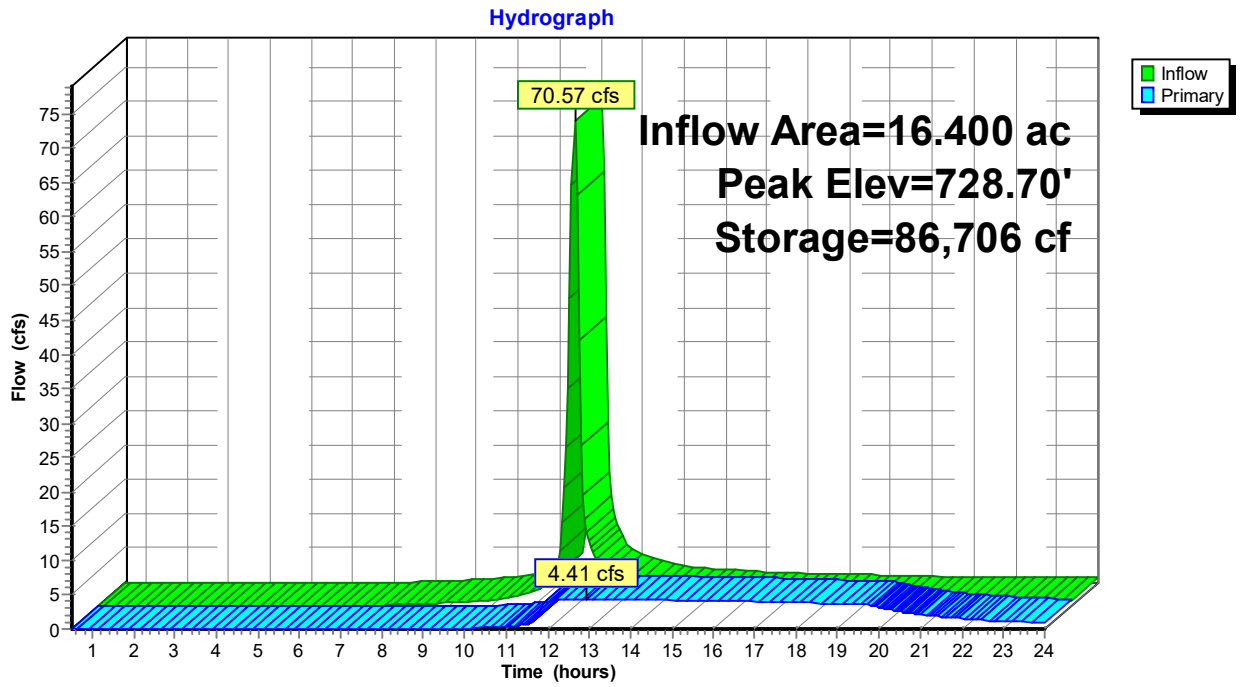
Volume	Invert	Avail.Storage	Storage Description
#1	727.00'	223,223 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
727.00	47,577	0	0
728.00	51,692	49,635	49,635
729.00	55,751	53,722	103,356
730.00	59,907	57,829	161,185
731.00	64,169	62,038	223,223

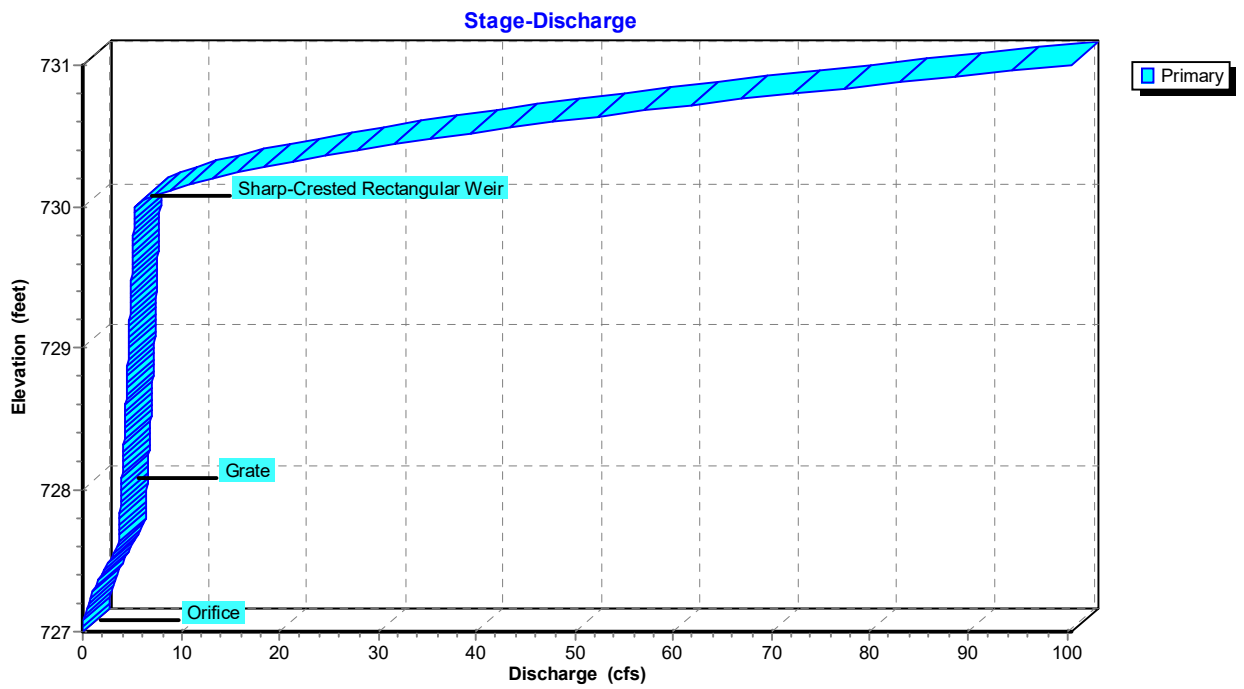
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	725.50'	12.0" Round Culvert L= 160.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.50' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	727.00'	8.0" Vert. Orifice X 4.00 C= 0.600

Primary OutFlow Max=4.41 cfs @ 12.93 hrs HW=728.70' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 4.41 cfs @ 5.62 fps)
  - 3=Grate (Passes < 3.74 cfs potential flow)
  - 4=Orifice (Passes < 7.85 cfs potential flow)

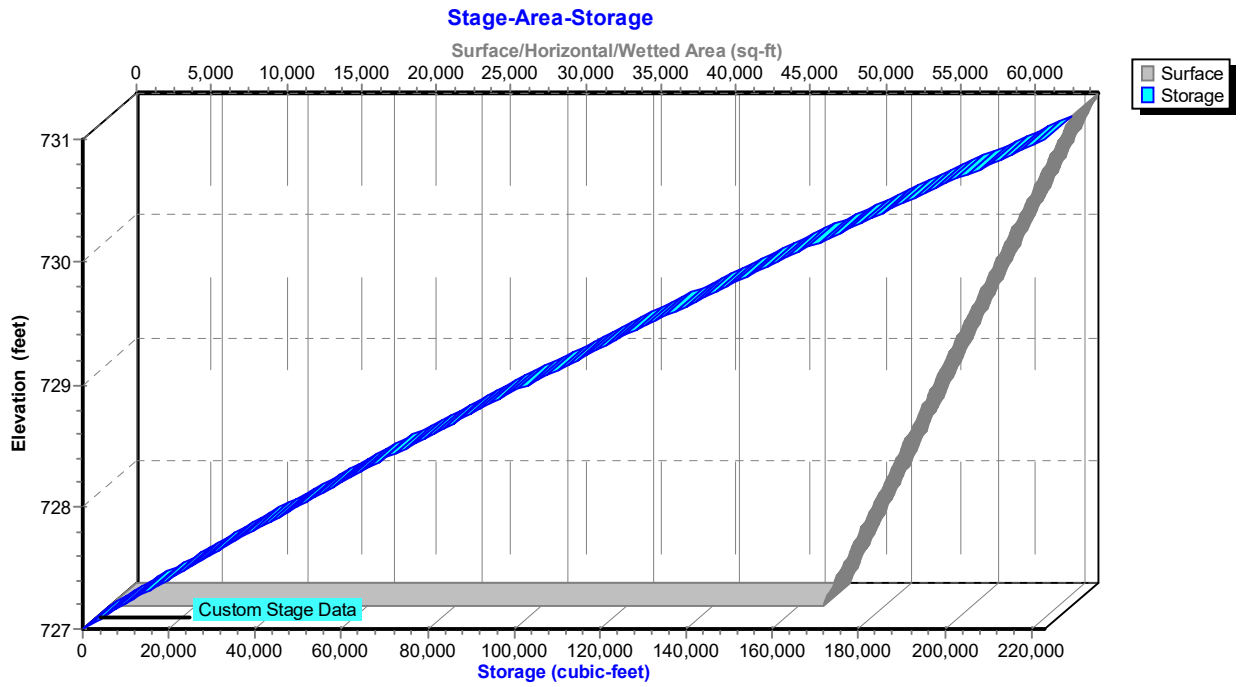
Pond 4P: WET POND 4



Pond 4P: WET POND 4



Pond 4P: WET POND 4

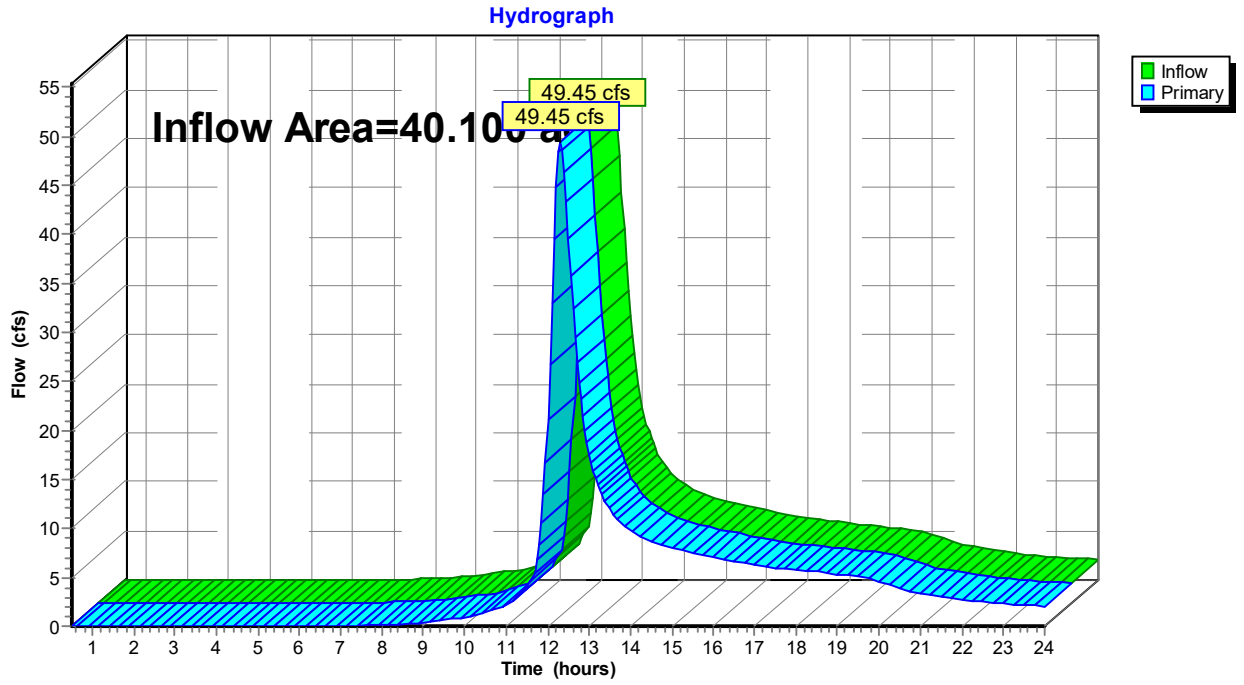


Summary for Link 1L: AREAS COMBINE

Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 2.62" for 25-Year event
Inflow = 49.45 cfs @ 12.30 hrs, Volume= 8.765 af
Primary = 49.45 cfs @ 12.30 hrs, Volume= 8.765 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 1L: AREAS COMBINE

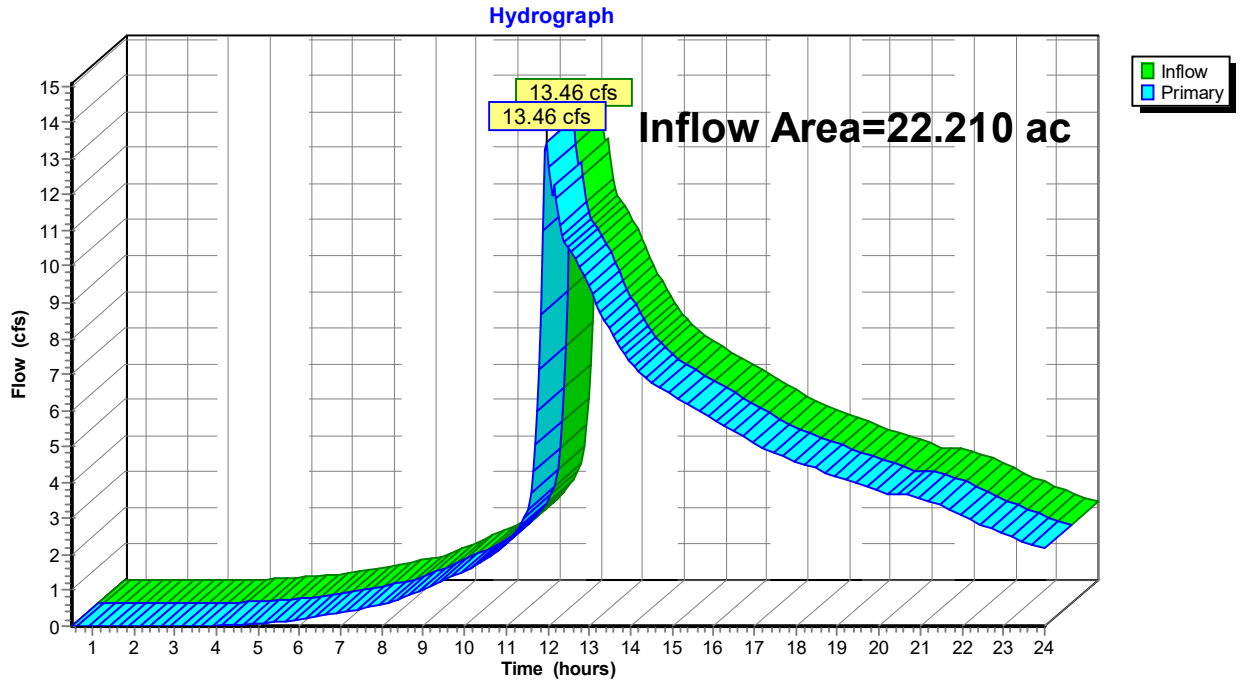


Summary for Link 2L: AREAS COMBINE

Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 3.24" for 25-Year event
Inflow = 13.46 cfs @ 11.98 hrs, Volume= 6.004 af
Primary = 13.46 cfs @ 11.98 hrs, Volume= 6.004 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 2L: AREAS COMBINE



Time span=0.50-24.00 hrs, dt=0.05 hrs, 471 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment D-1: D-1 — Runoff Area=13.200 ac 54.55% Impervious Runoff Depth>4.39"
Flow Length=1,885' Tc=7.6 min CN=93 Runoff=87.31 cfs 4.828 af

Subcatchment D-2: D-2 — Runoff Area=5.900 ac 52.54% Impervious Runoff Depth>3.94"
Flow Length=736' Tc=27.8 min CN=89 Runoff=20.85 cfs 1.938 af

Subcatchment D-3: D-3 — Runoff Area=3.800 ac 60.53% Impervious Runoff Depth>4.16"
Flow Length=132' Slope=0.0125 '/' Tc=20.2 min CN=91 Runoff=16.77 cfs 1.317 af

Subcatchment D-4: D-4 — Runoff Area=16.400 ac 24.39% Impervious Runoff Depth>3.45"
Flow Length=852' Tc=8.6 min UI Adjusted CN=84 Runoff=88.54 cfs 4.713 af

Subcatchment D-5: D-5 — Runoff Area=19.900 ac 13.07% Impervious Runoff Depth>3.33"
Flow Length=1,918' Tc=34.8 min CN=83 Runoff=52.37 cfs 5.520 af

Subcatchment D-6: D-6 — Runoff Area=1.100 ac 27.27% Impervious Runoff Depth>4.17"
Flow Length=312' Tc=4.6 min CN=91 Runoff=7.74 cfs 0.383 af

Subcatchment D-7: D-7 — Runoff Area=5.620 ac 0.36% Impervious Runoff Depth>3.12"
Flow Length=937' Tc=163.2 min CN=82 Runoff=4.60 cfs 1.461 af

Subcatchment D-8: D-8 — Runoff Area=2.010 ac 5.47% Impervious Runoff Depth>3.34"
Flow Length=333' Tc=21.5 min CN=83 Runoff=7.14 cfs 0.559 af

Pond 1: EXISTING 12" CULVERT — Peak Elev=731.67' Inflow=16.13 cfs 7.201 af
12.0" Round Culvert n=0.011 L=40.0' S=0.0125 '/' Outflow=16.13 cfs 7.201 af

Pond 1P: WET POND 1 — Peak Elev=721.84' Storage=109,887 cf Inflow=87.31 cfs 4.828 af
Outflow=4.93 cfs 4.411 af

Pond 2: EXISTING 24" HDPE — Peak Elev=741.35' Inflow=61.10 cfs 11.043 af
24.0" Round Culvert n=0.013 L=48.0' S=0.0021 '/' Outflow=61.10 cfs 11.043 af

Pond 2P: WET POND 2 — Peak Elev=729.65' Storage=36,239 cf Inflow=20.85 cfs 1.938 af
Outflow=6.16 cfs 1.848 af

Pond 3P: WET POND 3 — Peak Elev=729.19' Storage=24,011 cf Inflow=16.77 cfs 1.317 af
Outflow=4.16 cfs 1.263 af

Pond 4P: WET POND 4 — Peak Elev=729.18' Storage=113,633 cf Inflow=88.54 cfs 4.713 af
Outflow=4.74 cfs 4.260 af

Link 1L: AREAS COMBINE — Inflow=61.10 cfs 11.043 af
Primary=61.10 cfs 11.043 af

Link 2L: AREAS COMBINE — Inflow=16.13 cfs 7.201 af
Primary=16.13 cfs 7.201 af

Total Runoff Area = 67.930 ac Runoff Volume = 20.719 af Average Runoff Depth = 3.66"
71.10% Pervious = 48.300 ac 28.90% Impervious = 19.630 ac

Summary for Subcatchment D-1: D-1

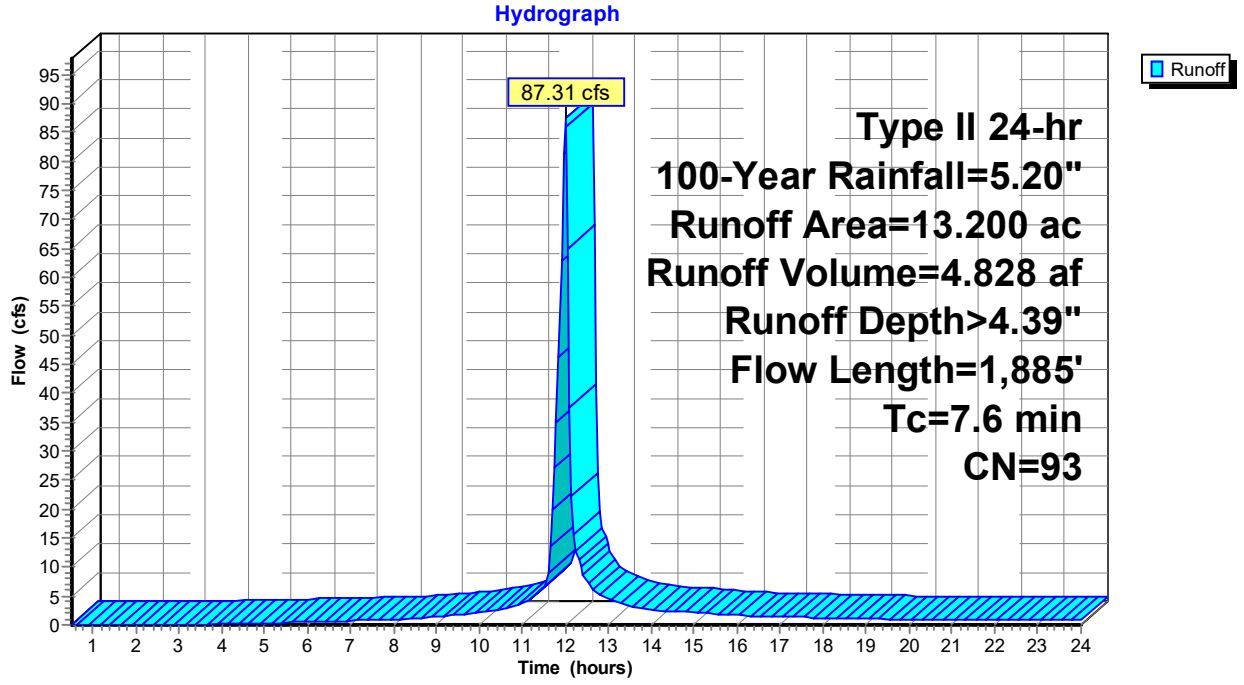
Runoff = 87.31 cfs @ 11.98 hrs, Volume= 4.828 af, Depth> 4.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
7.200	98	Paved roads w/curbs & sewers, HSG D
2.600	96	Gravel surface, HSG D
3.400	80	>75% Grass cover, Good, HSG D
13.200	93	Weighted Average
6.000		45.45% Pervious Area
7.200		54.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	100	0.0135	1.04		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
1.0	56	0.0135	0.93		Sheet Flow, A-B CONCENTRATED Smooth surfaces n= 0.011 P2= 2.50"
5.0	1,729	0.0082	5.75	95.86	Parabolic Channel, B-C SWALE W=10.00' D=2.50' Area=16.7 sf Perim=11.5' n= 0.030 Earth, grassed & winding
7.6	1,885	Total			

Subcatchment D-1: D-1



Summary for Subcatchment D-2: D-2

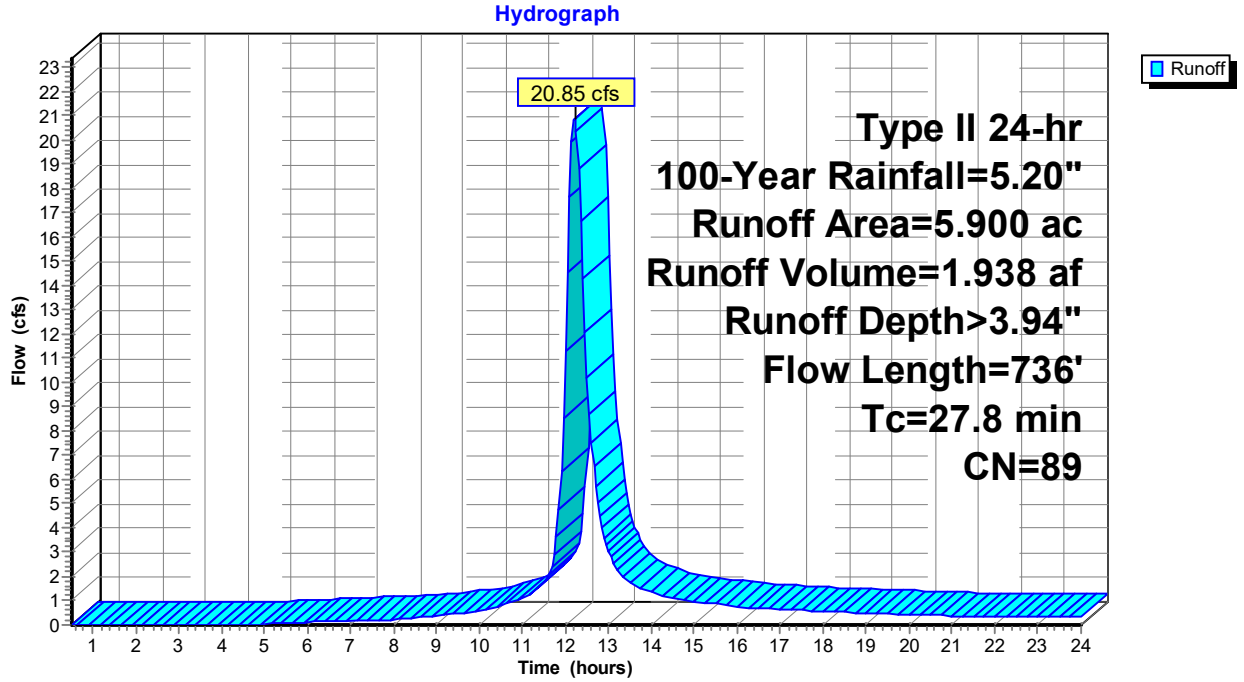
Runoff = 20.85 cfs @ 12.21 hrs, Volume= 1.938 af, Depth> 3.94"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
1.200	98	Paved roads w/curbs & sewers, HSG D
1.900	98	Unconnected roofs, HSG D
2.800	80	>75% Grass cover, Good, HSG D
5.900	89	Weighted Average
2.800		47.46% Pervious Area
3.100		52.54% Impervious Area
1.900		61.29% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.7	100	0.1259	0.22		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
19.3	322	0.0031	0.28		Shallow Concentrated Flow, B-C SHALLOW Woodland Kv= 5.0 fps
0.8	314	0.0050	6.42	160.47	Parabolic Channel, C-D BIO SWALE W=15.00' D=2.50' Area=25.0 sf Perim=16.0' n= 0.022 Earth, clean & straight
27.8	736	Total			

Subcatchment D-2: D-2



Summary for Subcatchment D-3: D-3

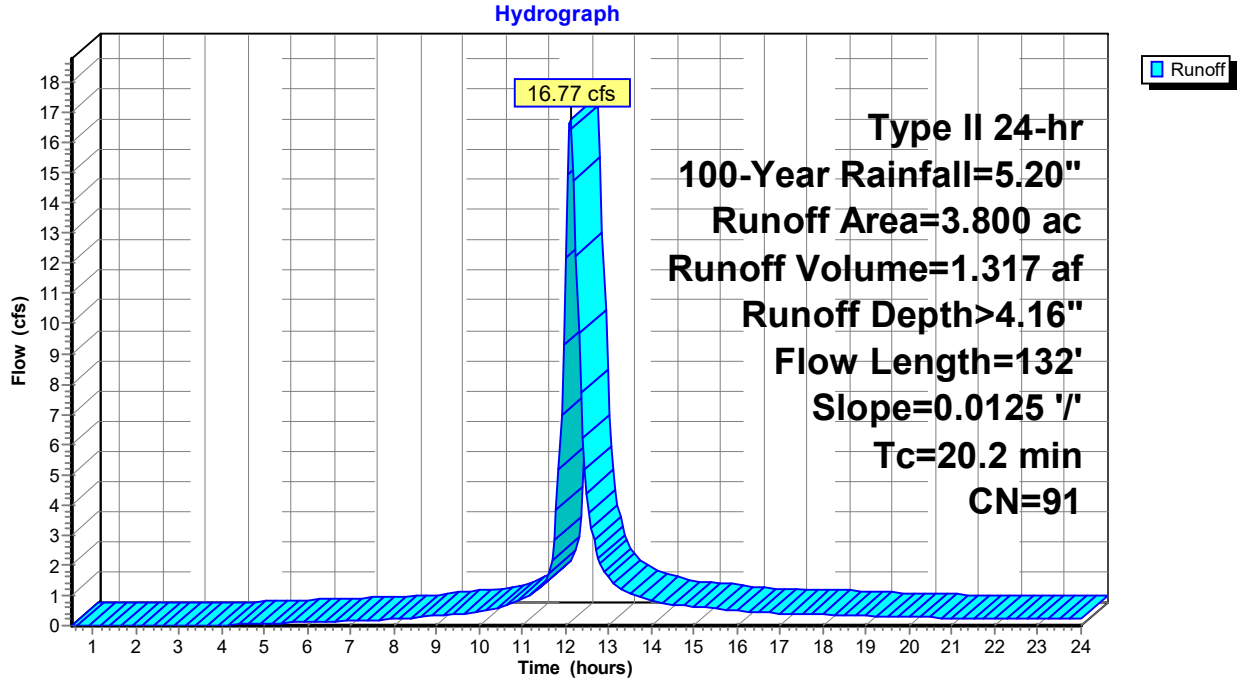
Runoff = 16.77 cfs @ 12.12 hrs, Volume= 1.317 af, Depth> 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
0.800	98	Paved roads w/curbs & sewers, HSG D
1.500	98	Unconnected roofs, HSG D
1.500	80	>75% Grass cover, Good, HSG D
3.800	91	Weighted Average
1.500		39.47% Pervious Area
2.300		60.53% Impervious Area
1.500		65.22% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
19.5	100	0.0125	0.09		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
0.7	32	0.0125	0.78		Shallow Concentrated Flow, B-C CONCENTRATED Short Grass Pasture Kv= 7.0 fps
20.2	132	Total			

Subcatchment D-3: D-3



Summary for Subcatchment D-4: D-4

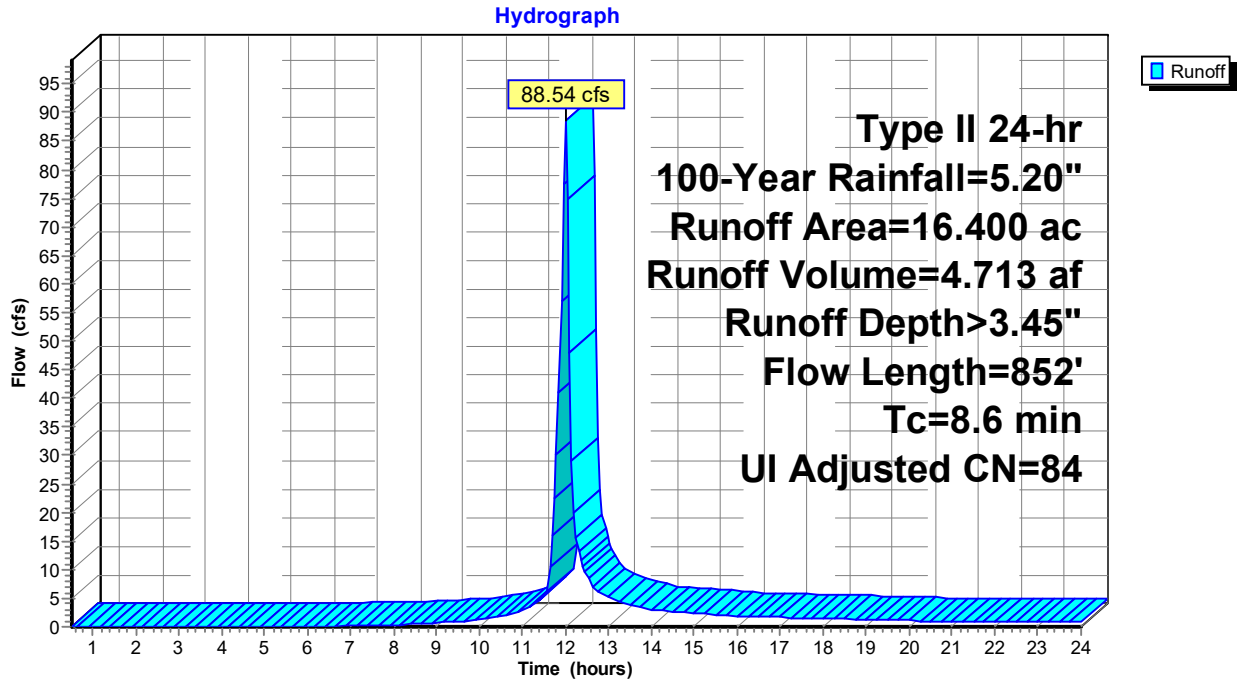
Runoff = 88.54 cfs @ 12.00 hrs, Volume= 4.713 af, Depth> 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Adj	Description
3.200	98		Unconnected roofs, HSG D
0.800	98		Paved roads w/curbs & sewers, HSG D
12.400	82		Woods/grass comb., Fair, HSG D
16.400	86	84	Weighted Average, UI Adjusted
12.400			75.61% Pervious Area
4.000			24.39% Impervious Area
3.200			80.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.0	41	0.2317	0.23		Sheet Flow, A-B SHEET FLOW Grass: Dense n= 0.240 P2= 2.50"
5.6	811	0.0025	2.42	32.21	Parabolic Channel, B-C SWALE W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
8.6	852	Total			

Subcatchment D-4: D-4



Summary for Subcatchment D-5: D-5

Runoff = 52.37 cfs @ 12.30 hrs, Volume= 5.520 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

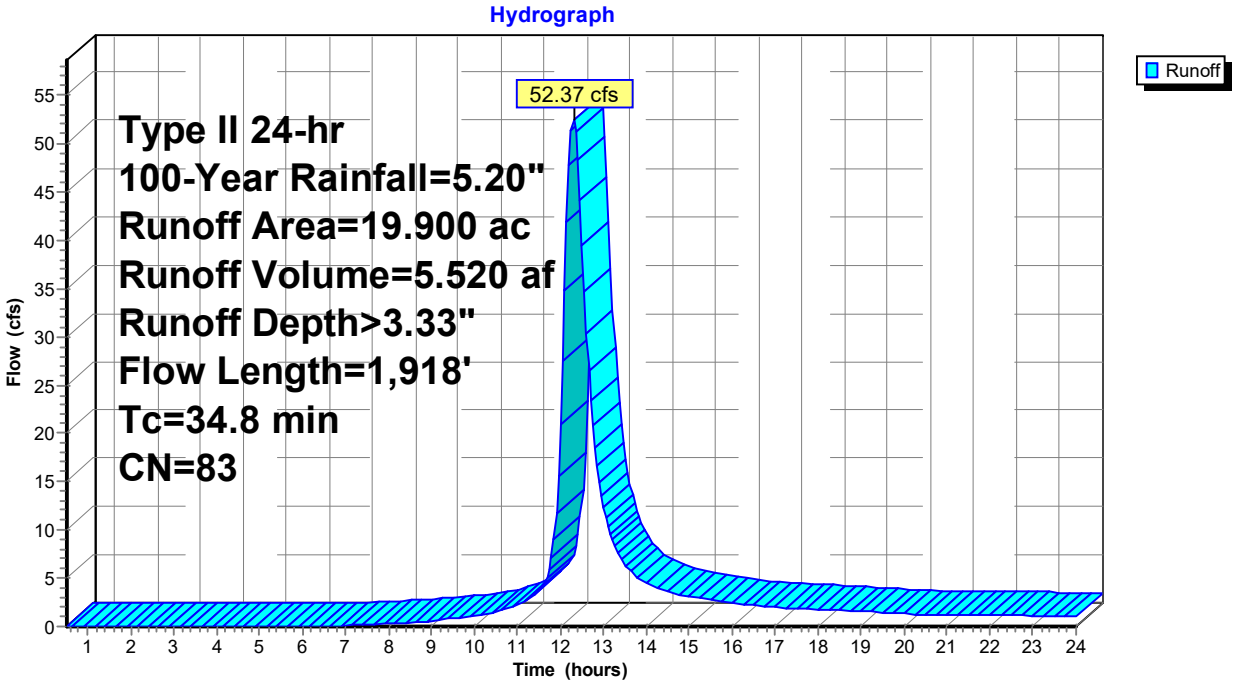
Area (ac)	CN	Description
2.200	98	Paved parking, HSG D
1.700	96	Gravel surface, HSG D
0.400	98	Unconnected roofs, HSG D
15.600	79	Woods/grass comb., Good, HSG D
19.900	83	Weighted Average
17.300		86.93% Pervious Area
2.600		13.07% Impervious Area
0.400		15.38% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0240	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
15.6	725	0.0240	0.77		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.6	142	0.0050	4.20	139.87	Parabolic Channel, C-D SWALE W=25.00' D=2.00' Area=33.3 sf Perim=25.4' n= 0.030 Earth, grassed & winding
0.4	100	0.0050	3.72	4.57	Pipe Channel, D-E PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013 Corrugated PE, smooth interior
1.3	346	0.0117	4.53	77.03	Parabolic Channel, E-F DITCH W=17.00' D=1.50' Area=17.0 sf Perim=17.3' n= 0.035 Earth, dense weeds
0.1	55	0.0125	6.96	8.54	Pipe Channel, F-G PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.3	94	0.0066	5.28	211.05	Parabolic Channel, G-HDITCH W=20.00' D=3.00' Area=40.0 sf Perim=21.1' n= 0.035 Earth, dense weeds
0.0	20	0.0190	8.58	10.52	Pipe Channel, H-I PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.2	46	0.0067	3.96	52.73	Parabolic Channel, I-J DITCH W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 Earth, dense weeds
0.0	22	0.0168	8.06	9.90	Pipe Channel, J-K PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.011 Concrete pipe, straight & clean
0.5	88	0.0027	3.23	84.04	Parabolic Channel, K-L DITCH W=13.00' D=3.00' Area=26.0 sf Perim=14.7' n= 0.035 Earth, dense weeds
0.3	30	0.0083	1.78	2.19	Pipe Channel, L-M PIPE 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31'

n= 0.035 Earth, dense weeds

0.5	150	0.0059	4.90	156.69	Parabolic Channel, M-N DITCH W=16.00' D=3.00' Area=32.0 sf Perim=17.4' n= 0.035 Earth, dense weeds
34.8	1,918	Total			

Subcatchment D-5: D-5



Summary for Subcatchment D-6: D-6

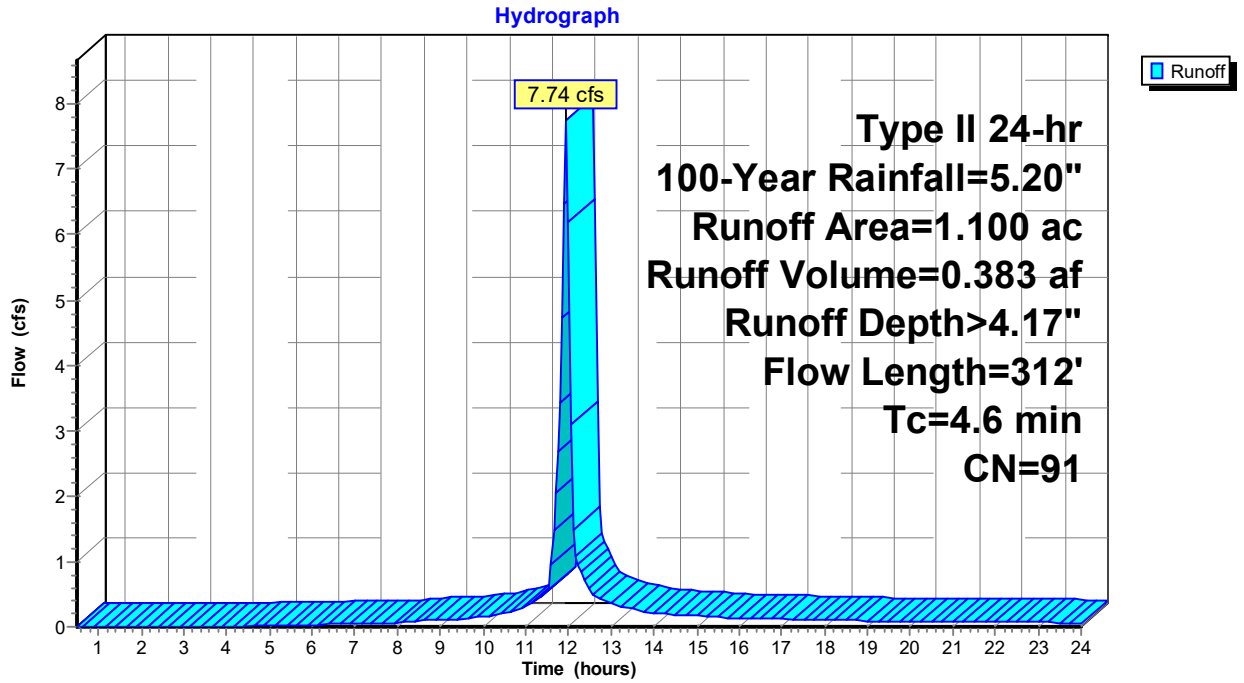
Runoff = 7.74 cfs @ 11.95 hrs, Volume= 0.383 af, Depth> 4.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
0.300	98	Paved parking, HSG D
0.400	96	Gravel surface, HSG D
0.400	80	>75% Grass cover, Good, HSG D
1.100	91	Weighted Average
0.800		72.73% Pervious Area
0.300		27.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.22		Sheet Flow, A-B SHEET Smooth surfaces n= 0.011 P2= 2.50"
0.2	30	0.0200	2.87		Shallow Concentrated Flow, B-C CONCENTRATED Paved Kv= 20.3 fps
3.0	182	0.0210	1.01		Shallow Concentrated Flow, C-D CONCENTRATED Short Grass Pasture Kv= 7.0 fps
4.6	312	Total			

Subcatchment D-6: D-6



Summary for Subcatchment D-7: D-7

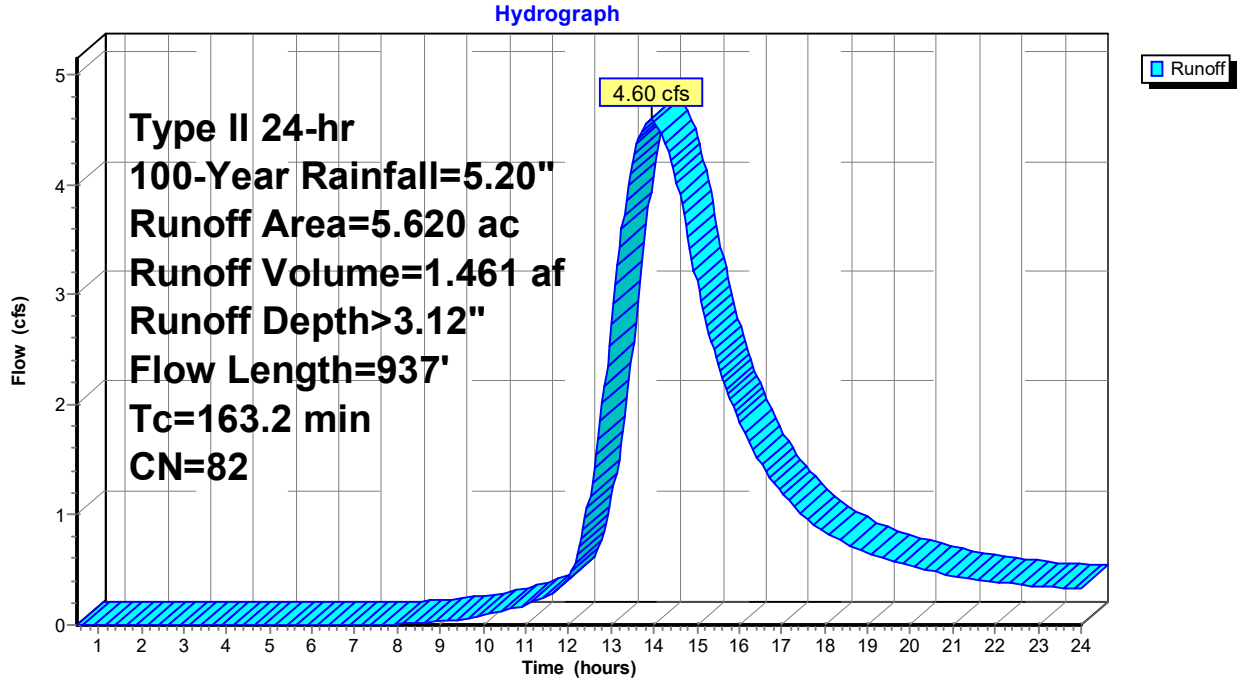
Runoff = 4.60 cfs @ 13.95 hrs, Volume= 1.461 af, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
0.010	98	Paved parking, HSG D
5.600	82	Woods/grass comb., Fair, HSG D
0.010	98	Unconnected roofs, HSG D
5.620	82	Weighted Average
5.600		99.64% Pervious Area
0.020		0.36% Impervious Area
0.010		50.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
134.4	100	0.0001	0.01		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
28.5	745	0.0076	0.44		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
0.3	92	0.0261	6.06	30.30	Parabolic Channel, C-D DITCH W=5.00' D=1.50' Area=5.0 sf Perim=6.0' n= 0.035 Earth, dense weeds
163.2	937	Total			

Subcatchment D-7: D-7



Summary for Subcatchment D-8: D-8

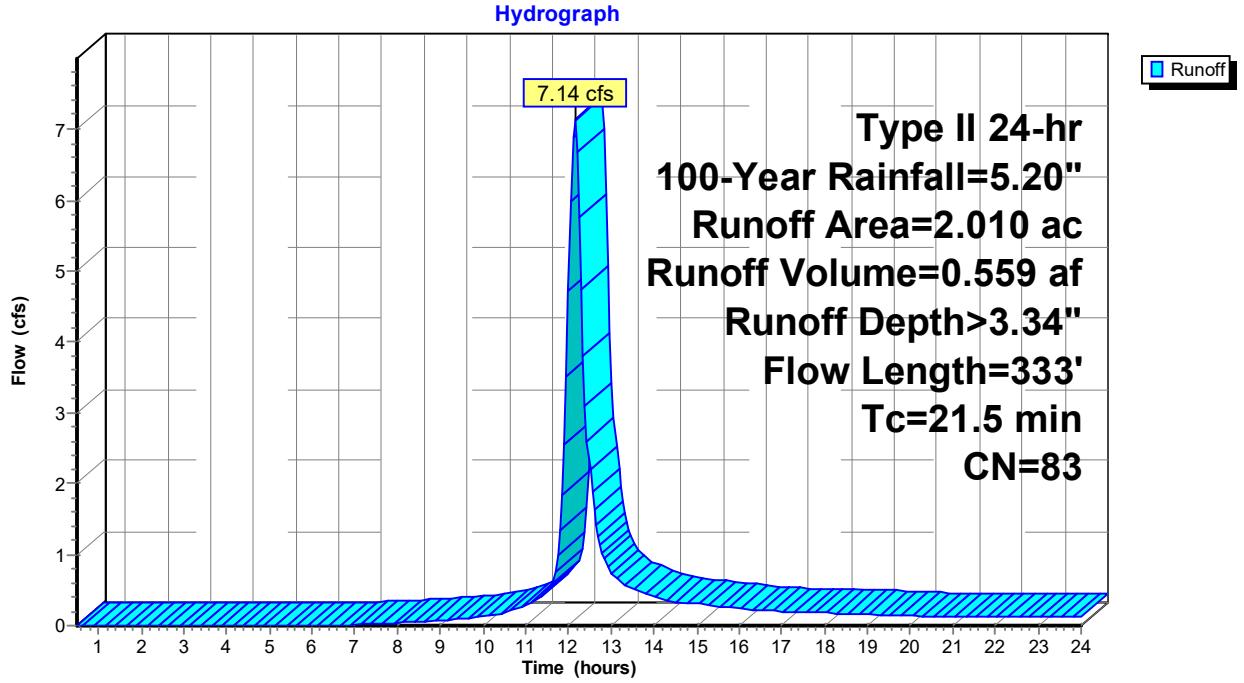
Runoff = 7.14 cfs @ 12.14 hrs, Volume= 0.559 af, Depth> 3.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-Year Rainfall=5.20"

Area (ac)	CN	Description
0.010	98	Unconnected roofs, HSG D
0.100	98	Paved parking, HSG D
1.900	82	Woods/grass comb., Fair, HSG D
2.010	83	Weighted Average
1.900		94.53% Pervious Area
0.110		5.47% Impervious Area
0.010		9.09% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.6	100	0.0255	0.11		Sheet Flow, A-B SHEET Grass: Dense n= 0.240 P2= 2.50"
6.9	233	0.0127	0.56		Shallow Concentrated Flow, B-C CONCENTRATED Woodland Kv= 5.0 fps
21.5	333	Total			

Subcatchment D-8: D-8



Summary for Pond 1: EXISTING 12" CULVERT

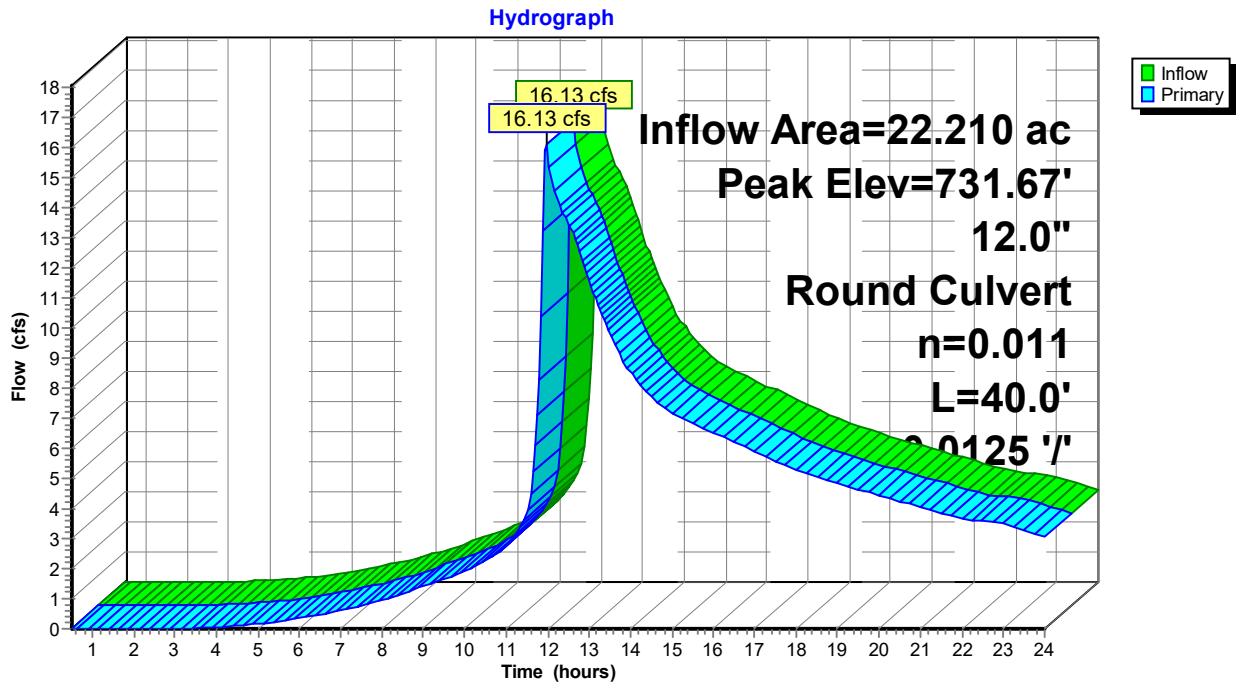
Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 3.89" for 100-Year event
Inflow = 16.13 cfs @ 11.98 hrs, Volume= 7.201 af
Outflow = 16.13 cfs @ 11.98 hrs, Volume= 7.201 af, Atten= 0%, Lag= 0.0 min
Primary = 16.13 cfs @ 11.98 hrs, Volume= 7.201 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 731.67' @ 11.98 hrs

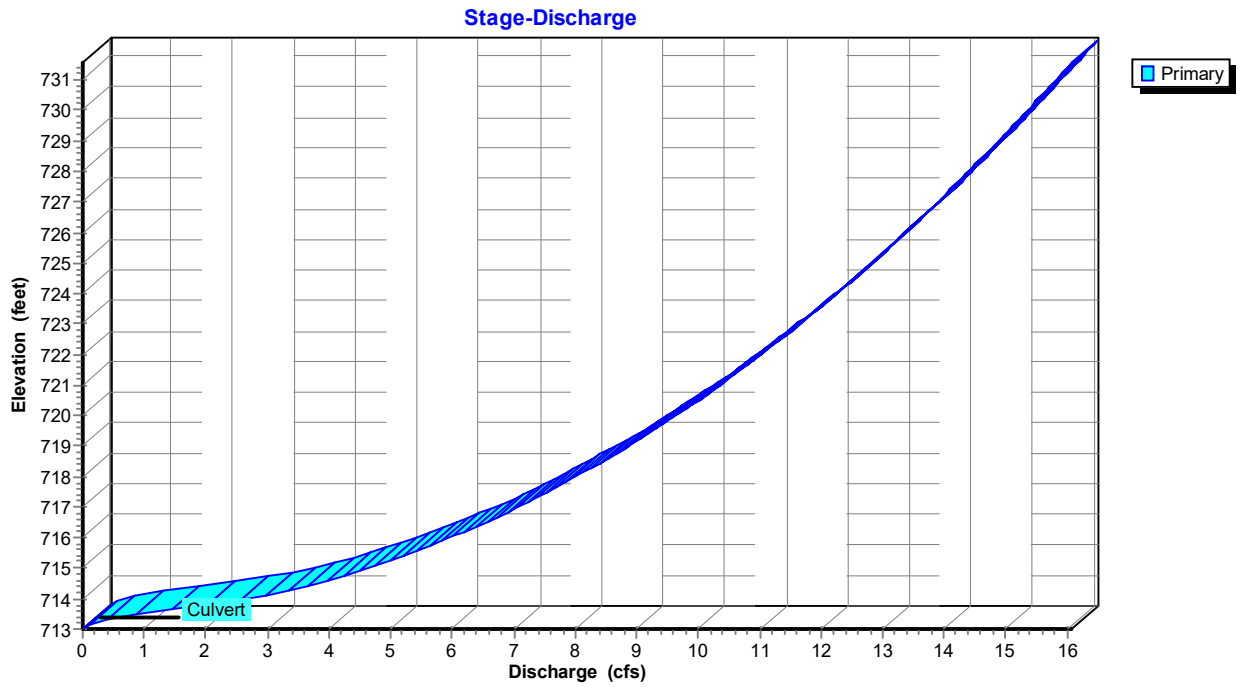
Device	Routing	Invert	Outlet Devices
#1	Primary	713.00'	12.0" Round Culvert L= 40.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 713.00' / 712.50' S= 0.0125 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=15.95 cfs @ 11.98 hrs HW=731.30' (Free Discharge)
└─1=Culvert (Inlet Controls 15.95 cfs @ 20.31 fps)

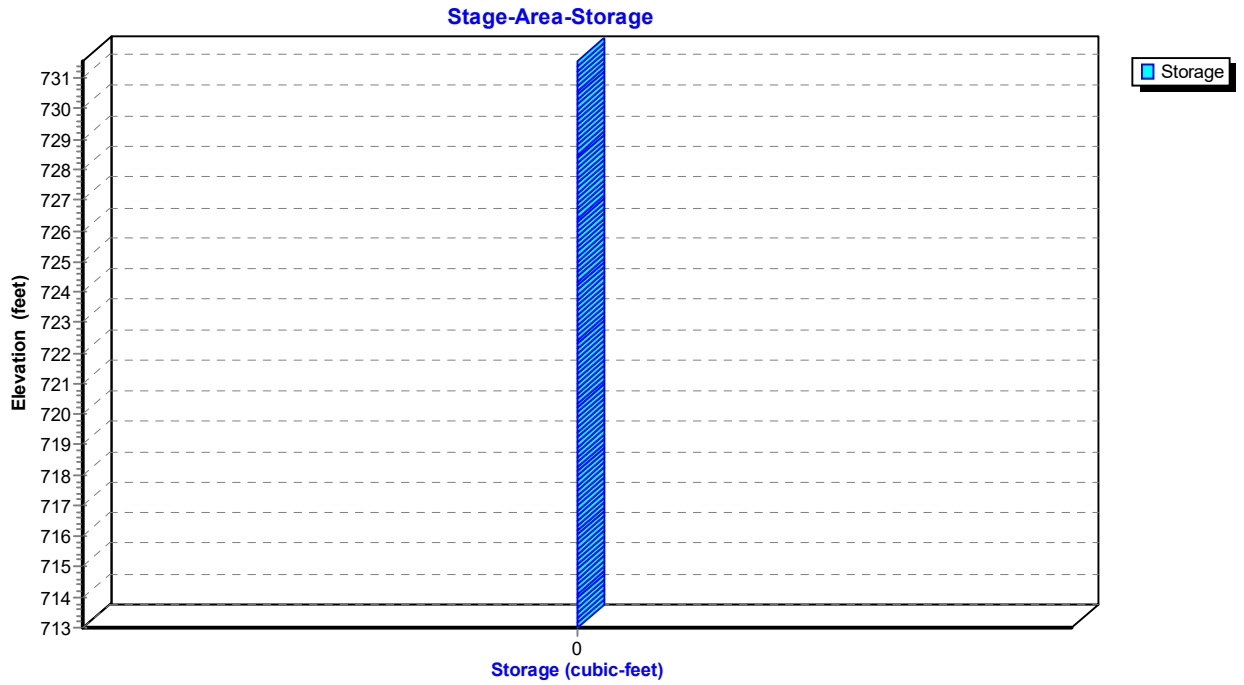
Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Pond 1: EXISTING 12" CULVERT



Summary for Pond 1P: WET POND 1

Inflow Area = 13.200 ac, 54.55% Impervious, Inflow Depth > 4.39" for 100-Year event
Inflow = 87.31 cfs @ 11.98 hrs, Volume= 4.828 af
Outflow = 4.93 cfs @ 12.88 hrs, Volume= 4.411 af, Atten= 94%, Lag= 53.8 min
Primary = 4.93 cfs @ 12.88 hrs, Volume= 4.411 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 721.84' @ 12.88 hrs Surf.Area= 44,250 sf Storage= 109,887 cf

Plug-Flow detention time= 247.1 min calculated for 4.402 af (91% of inflow)
Center-of-Mass det. time= 201.6 min (975.9 - 774.4)

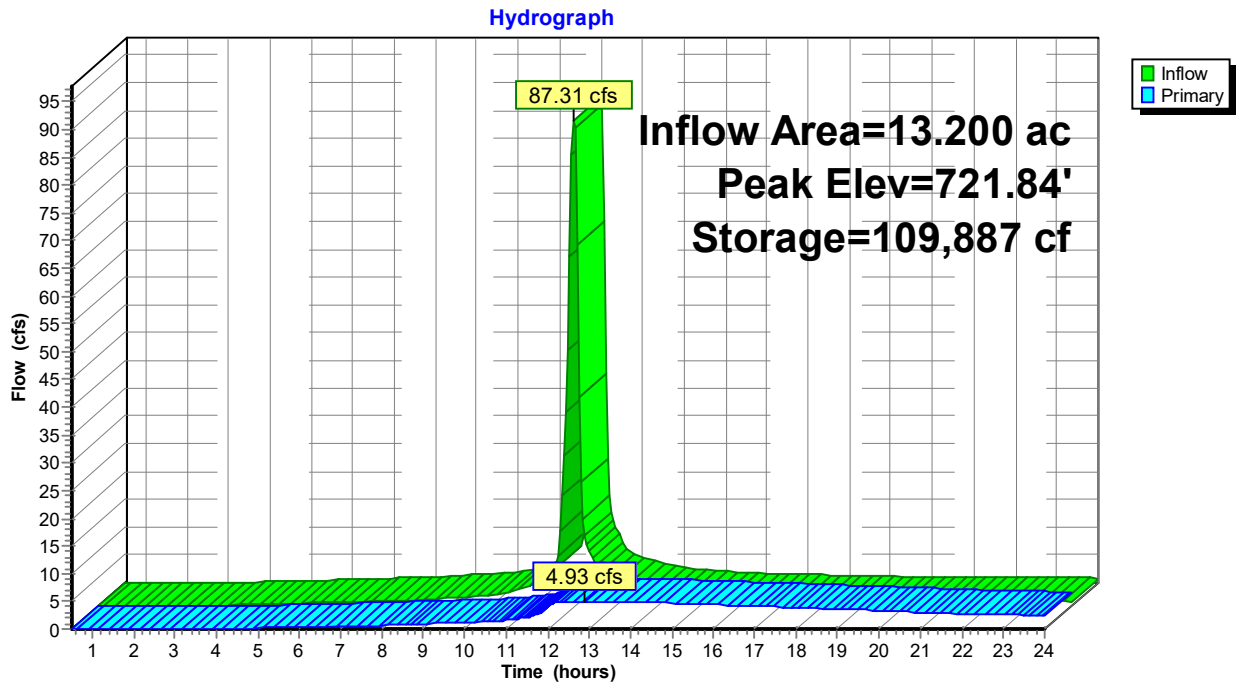
Volume	Invert	Avail.Storage	Storage Description
#1	719.00'	189,322 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
719.00	33,157	0	0
720.00	36,963	35,060	35,060
721.00	40,869	38,916	73,976
722.00	44,876	42,873	116,849
723.00	48,983	46,930	163,778
723.50	53,191	25,544	189,322

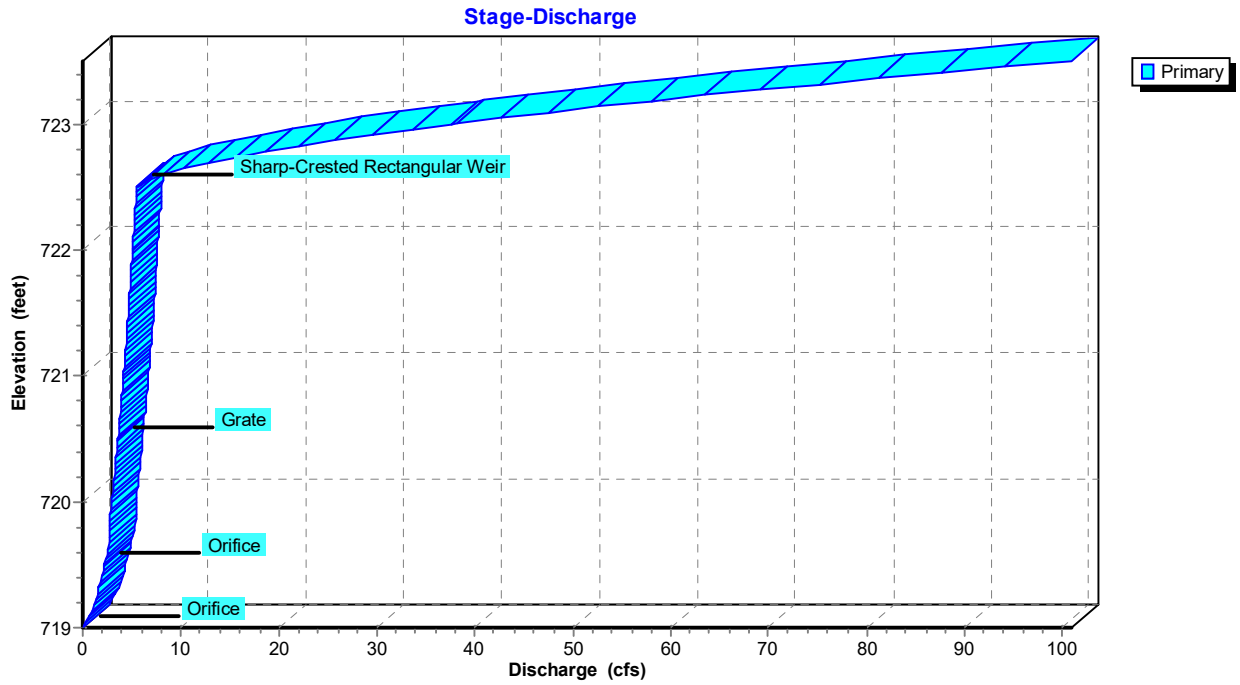
Device	Routing	Invert	Outlet Devices
#1	Primary	722.50'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	718.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 718.50' / 718.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	720.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	719.00'	6.0" Horiz. Orifice X 4.00 C= 0.600 Limited to weir flow at low heads
#5	Device 2	719.50'	3.0" Vert. Orifice X 3.00 C= 0.600

Primary OutFlow Max=4.93 cfs @ 12.88 hrs HW=721.84' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 4.93 cfs @ 6.28 fps)
  - 3=Grate (Passes < 10.00 cfs potential flow)
  - 4=Orifice (Passes < 6.38 cfs potential flow)
  - 5=Orifice (Passes < 1.06 cfs potential flow)

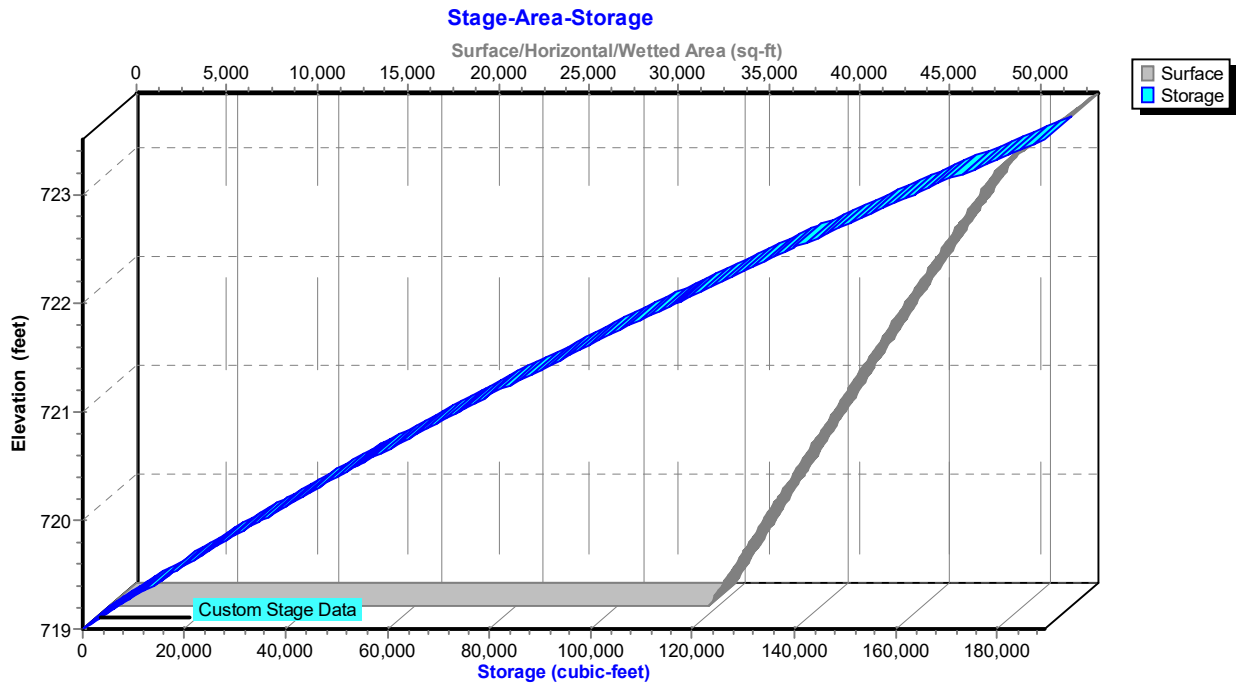
Pond 1P: WET POND 1



Pond 1P: WET POND 1



Pond 1P: WET POND 1



Summary for Pond 2: EXISTING 24" HDPE

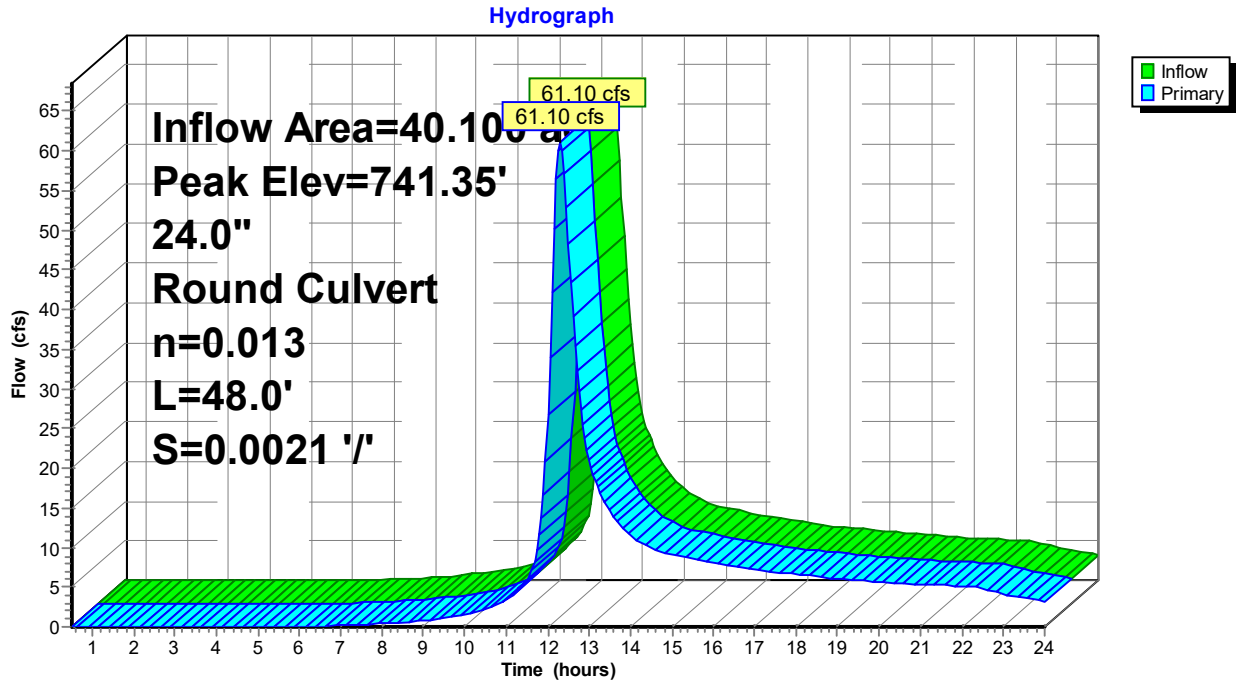
Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 3.30" for 100-Year event
Inflow = 61.10 cfs @ 12.30 hrs, Volume= 11.043 af
Outflow = 61.10 cfs @ 12.30 hrs, Volume= 11.043 af, Atten= 0%, Lag= 0.0 min
Primary = 61.10 cfs @ 12.30 hrs, Volume= 11.043 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 741.35' @ 12.30 hrs

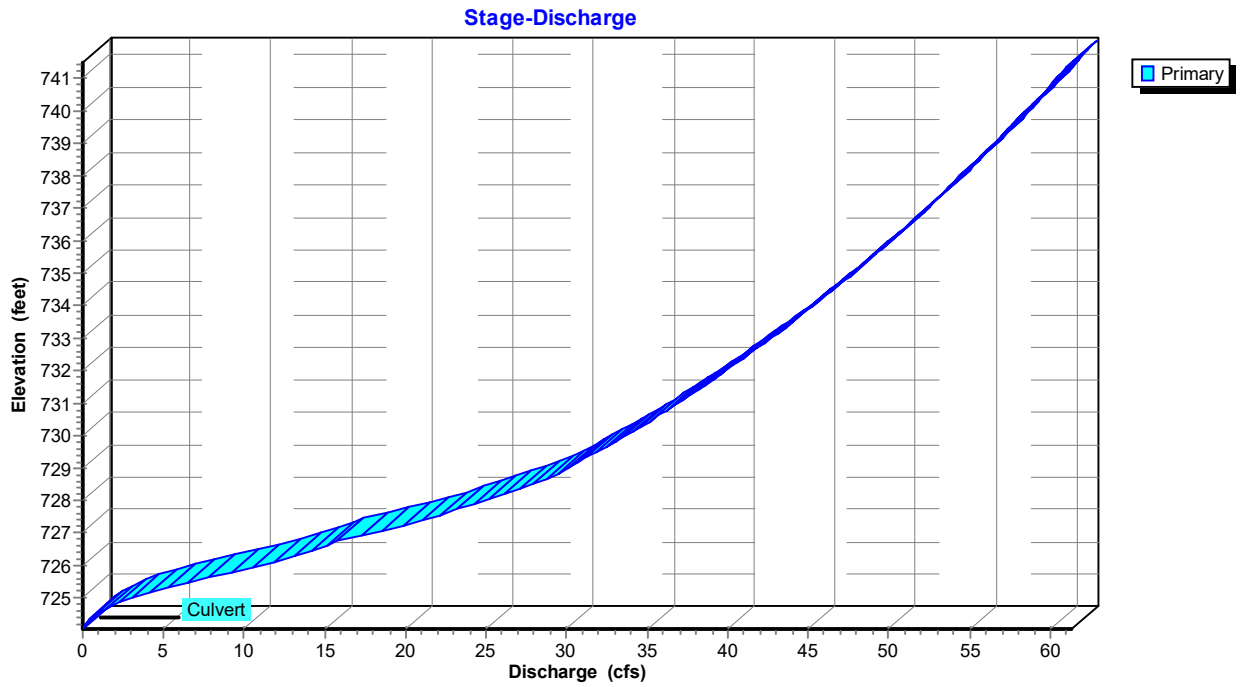
Device	Routing	Invert	Outlet Devices
#1	Primary	724.04'	24.0" Round Culvert L= 48.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 724.04' / 723.94' S= 0.0021 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=61.07 cfs @ 12.30 hrs HW=741.34' (Free Discharge)
└─1=Culvert (Inlet Controls 61.07 cfs @ 19.44 fps)

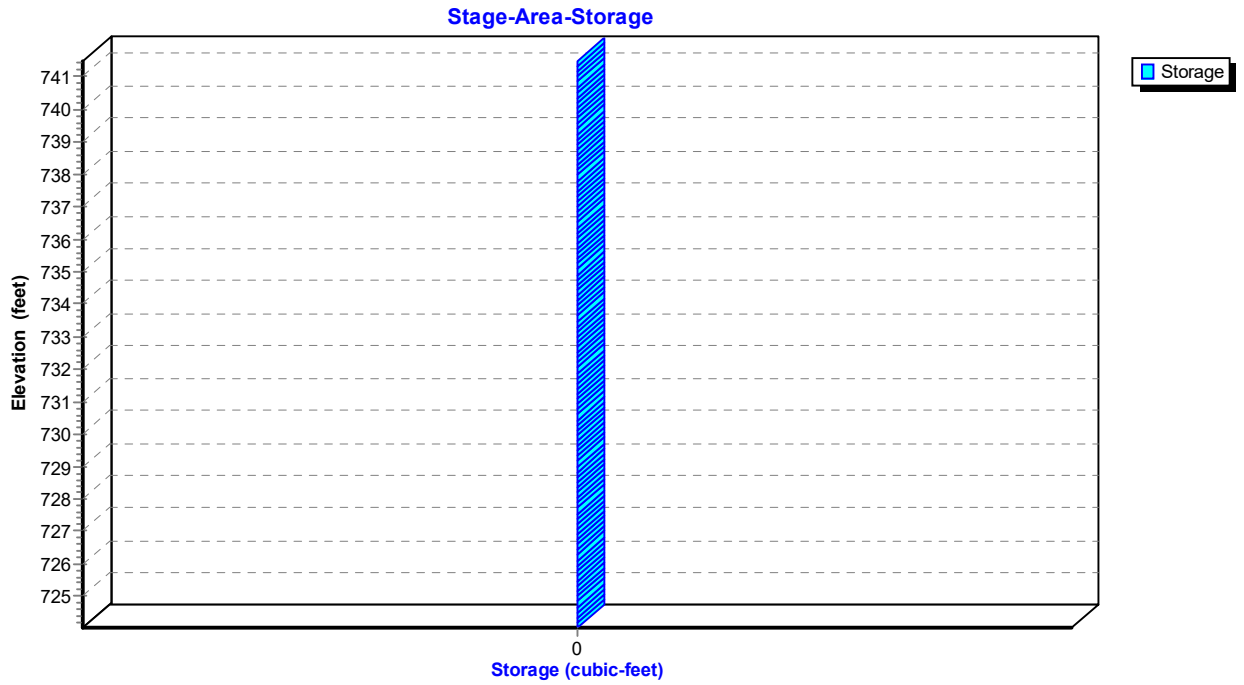
Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Pond 2: EXISTING 24" HDPE



Summary for Pond 2P: WET POND 2

Inflow Area = 5.900 ac, 52.54% Impervious, Inflow Depth > 3.94" for 100-Year event
Inflow = 20.85 cfs @ 12.21 hrs, Volume= 1.938 af
Outflow = 6.16 cfs @ 12.67 hrs, Volume= 1.848 af, Atten= 70%, Lag= 28.0 min
Primary = 6.16 cfs @ 12.67 hrs, Volume= 1.848 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 729.65' @ 12.67 hrs Surf.Area= 25,115 sf Storage= 36,239 cf

Plug-Flow detention time= 136.8 min calculated for 1.844 af (95% of inflow)
Center-of-Mass det. time= 110.6 min (917.0 - 806.4)

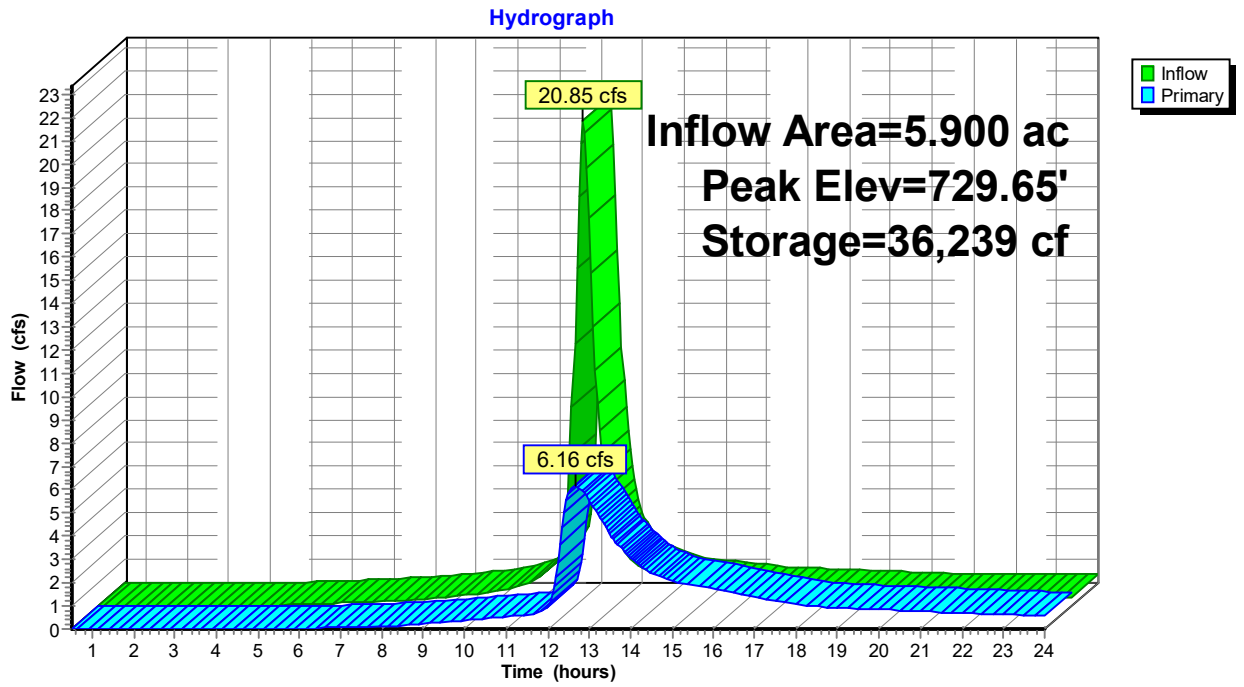
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	101,936 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,501	0	0
729.00	22,788	20,645	20,645
730.00	26,362	24,575	45,220
731.00	41,810	34,086	79,306
731.50	48,711	22,630	101,936

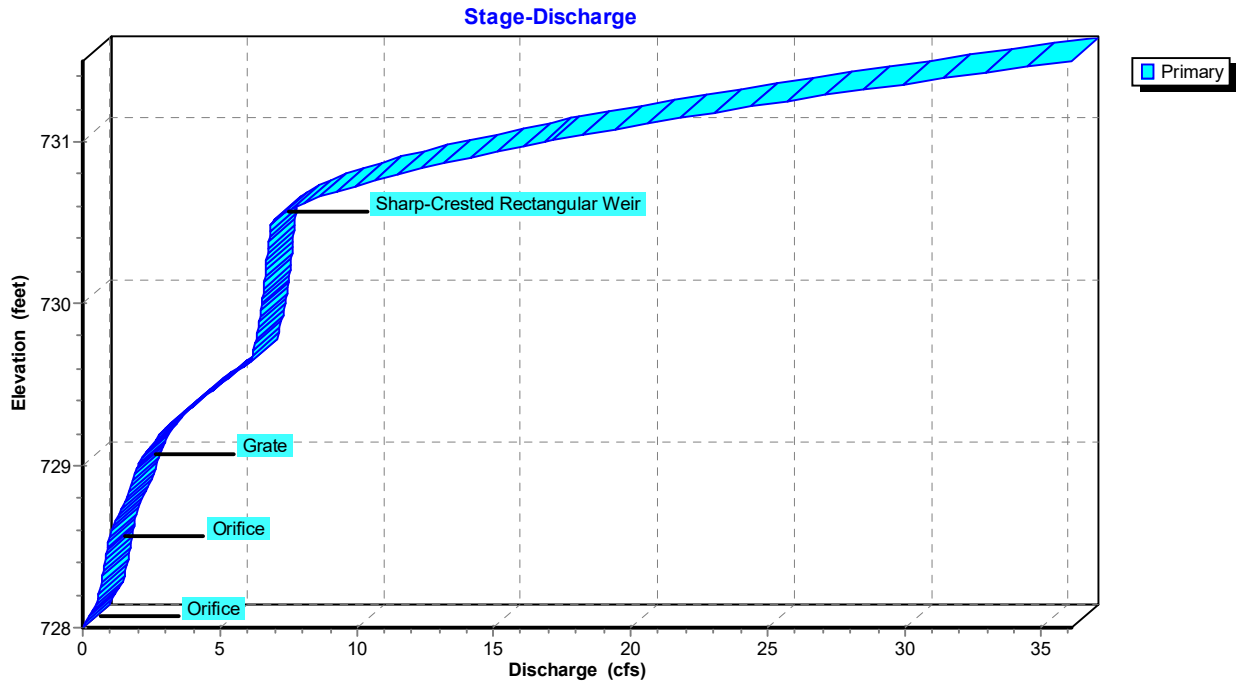
Device	Routing	Invert	Outlet Devices
#1	Primary	730.50'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 726.50' / 724.00' S= 0.0250 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	729.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.50'	4.0" Vert. Orifice X 3.00 C= 0.600
#5	Device 2	728.00'	4.0" Horiz. Orifice X 3.00 C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.16 cfs @ 12.67 hrs HW=729.65' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Inlet Controls 6.16 cfs @ 7.84 fps)
  - 3=Grate (Passes < 3.37 cfs potential flow)
  - 4=Orifice (Passes < 1.25 cfs potential flow)
  - 5=Orifice (Passes < 1.62 cfs potential flow)

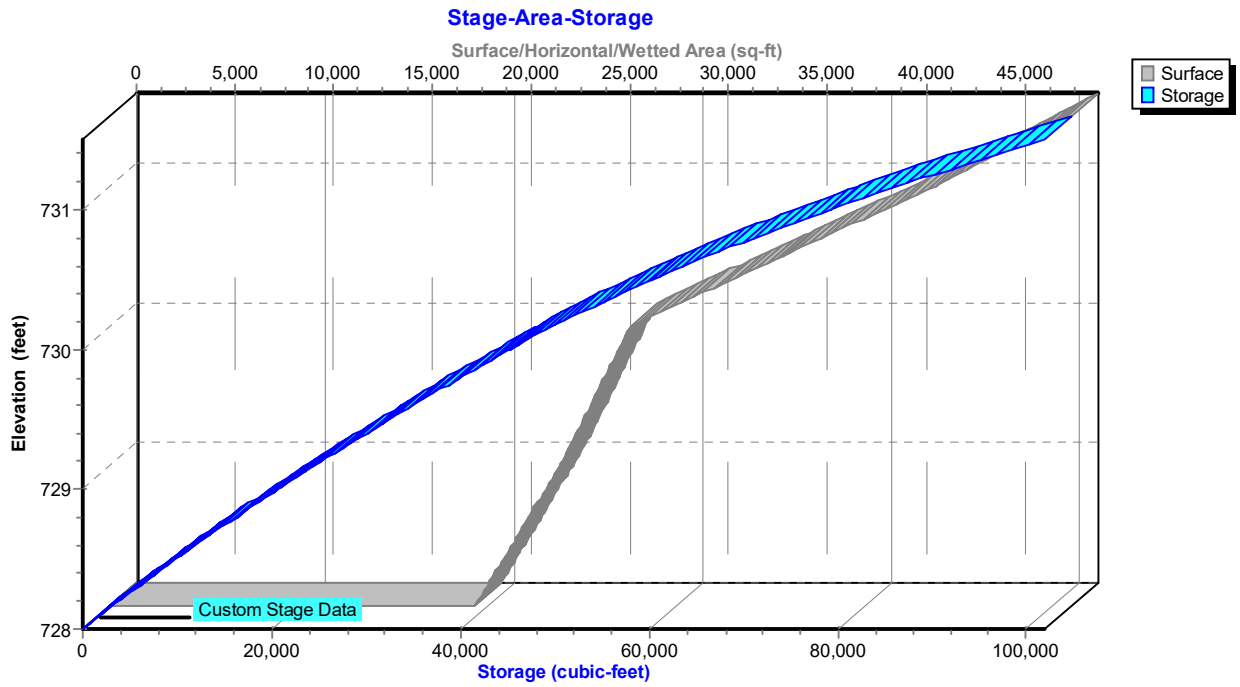
Pond 2P: WET POND 2



Pond 2P: WET POND 2



Pond 2P: WET POND 2



Summary for Pond 3P: WET POND 3

Inflow Area = 3.800 ac, 60.53% Impervious, Inflow Depth > 4.16" for 100-Year event
Inflow = 16.77 cfs @ 12.12 hrs, Volume= 1.317 af
Outflow = 4.16 cfs @ 12.52 hrs, Volume= 1.263 af, Atten= 75%, Lag= 23.8 min
Primary = 4.16 cfs @ 12.52 hrs, Volume= 1.263 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 729.19' @ 12.52 hrs Surf.Area= 22,299 sf Storage= 24,011 cf

Plug-Flow detention time= 102.7 min calculated for 1.263 af (96% of inflow)
Center-of-Mass det. time= 78.4 min (871.3 - 792.9)

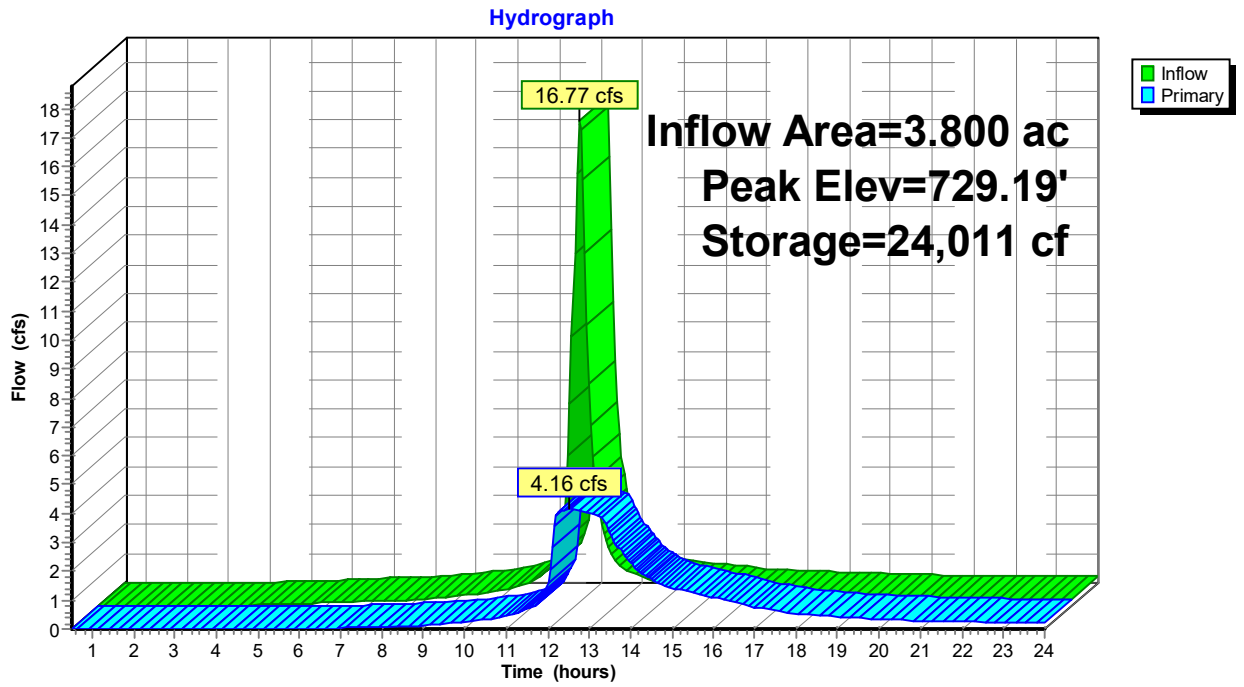
Volume	Invert	Avail.Storage	Storage Description
#1	728.00'	85,804 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
728.00	18,056	0	0
729.00	21,605	19,831	19,831
730.00	25,248	23,427	43,257
731.00	28,968	27,108	70,365
731.50	32,789	15,439	85,804

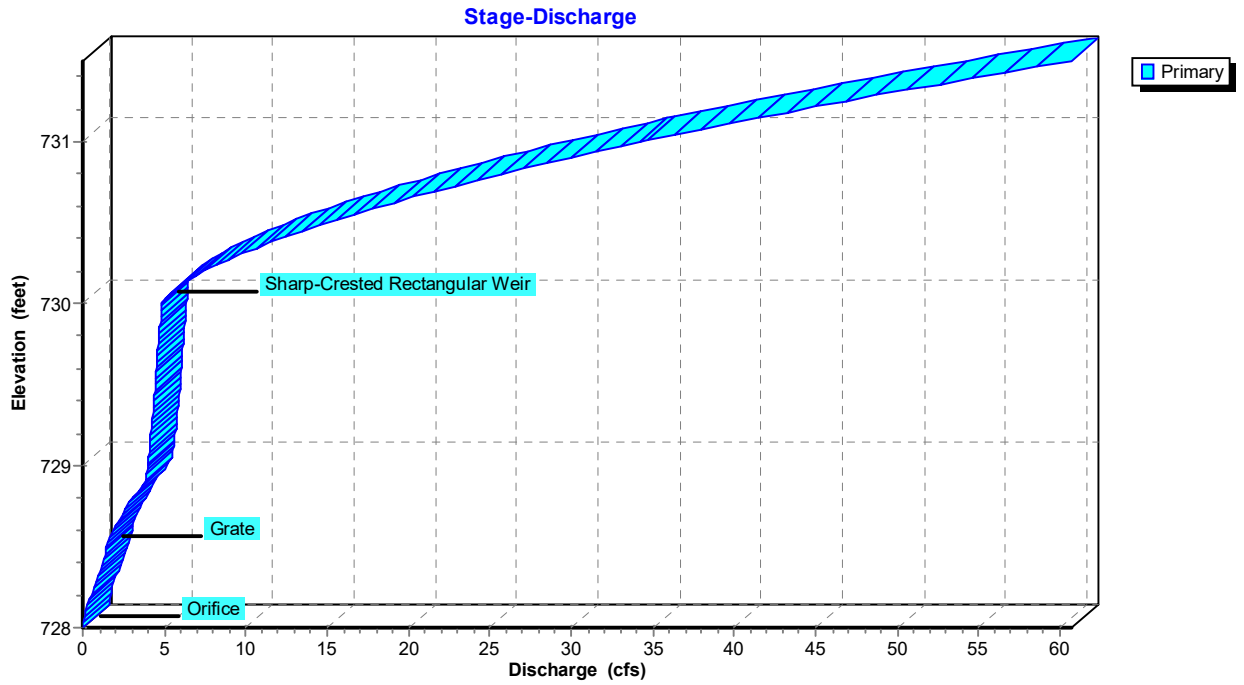
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	726.50'	12.0" Round Culvert L= 100.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 726.50' / 726.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.50'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	728.00'	4.0" Vert. Orifice X 6.00 C= 0.600

Primary OutFlow Max=4.15 cfs @ 12.52 hrs HW=729.19' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 4.15 cfs @ 5.29 fps)
  - 3=Grate (Passes < 3.68 cfs potential flow)
  - 4=Orifice (Passes < 2.55 cfs potential flow)

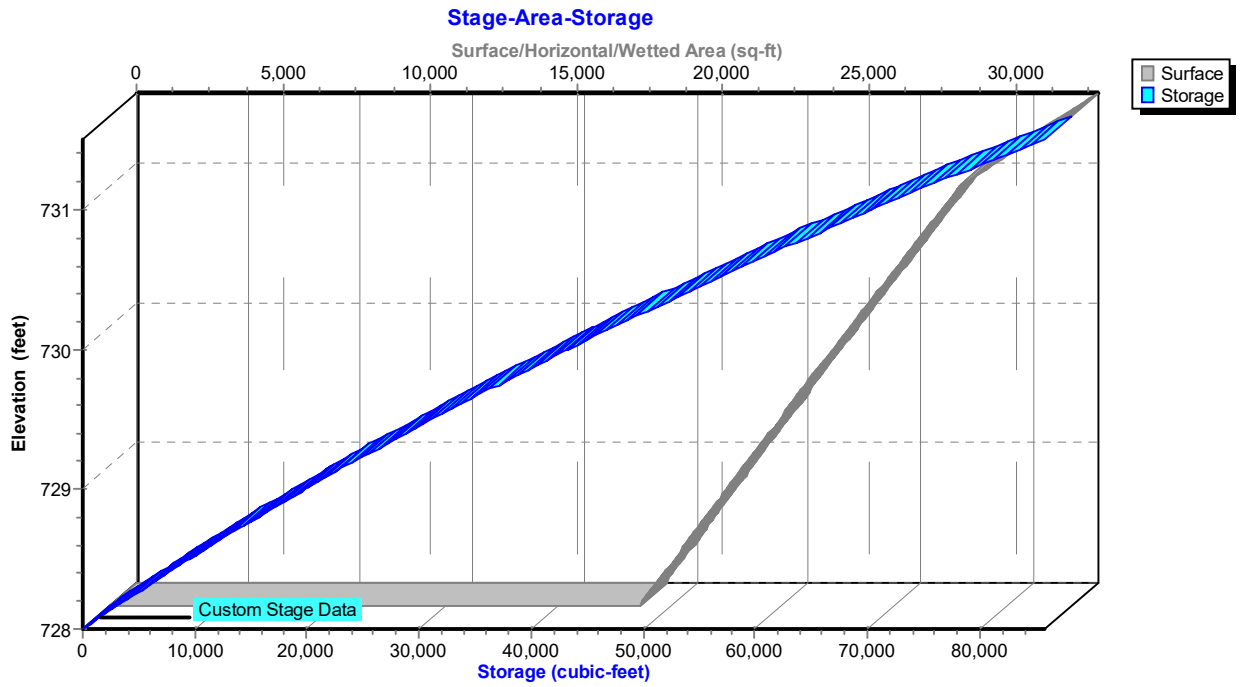
Pond 3P: WET POND 3



Pond 3P: WET POND 3



Pond 3P: WET POND 3



Summary for Pond 4P: WET POND 4

Inflow Area = 16.400 ac, 24.39% Impervious, Inflow Depth > 3.45" for 100-Year event
Inflow = 88.54 cfs @ 12.00 hrs, Volume= 4.713 af
Outflow = 4.74 cfs @ 13.11 hrs, Volume= 4.260 af, Atten= 95%, Lag= 66.9 min
Primary = 4.74 cfs @ 13.11 hrs, Volume= 4.260 af

Routing by Stor-Ind method, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs
Peak Elev= 729.18' @ 13.11 hrs Surf.Area= 56,512 sf Storage= 113,633 cf

Plug-Flow detention time= 273.1 min calculated for 4.251 af (90% of inflow)
Center-of-Mass det. time= 224.3 min (1,031.6 - 807.3)

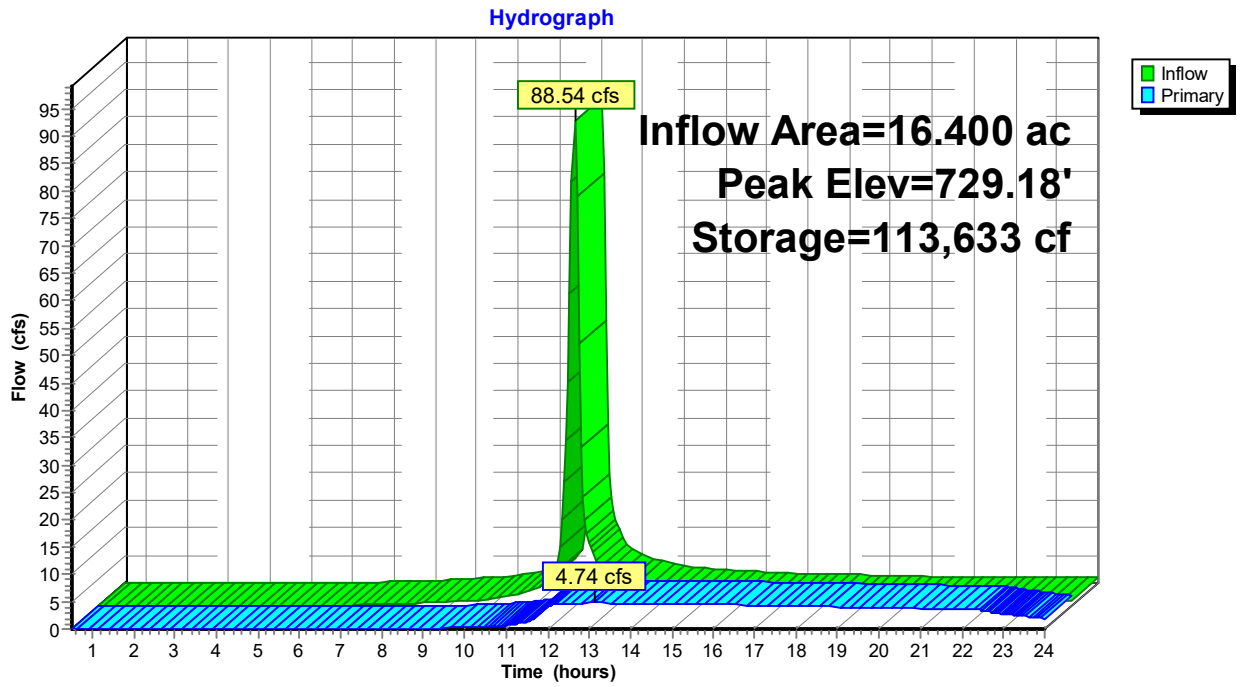
Volume	Invert	Avail.Storage	Storage Description
#1	727.00'	223,223 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
727.00	47,577	0	0
728.00	51,692	49,635	49,635
729.00	55,751	53,722	103,356
730.00	59,907	57,829	161,185
731.00	64,169	62,038	223,223

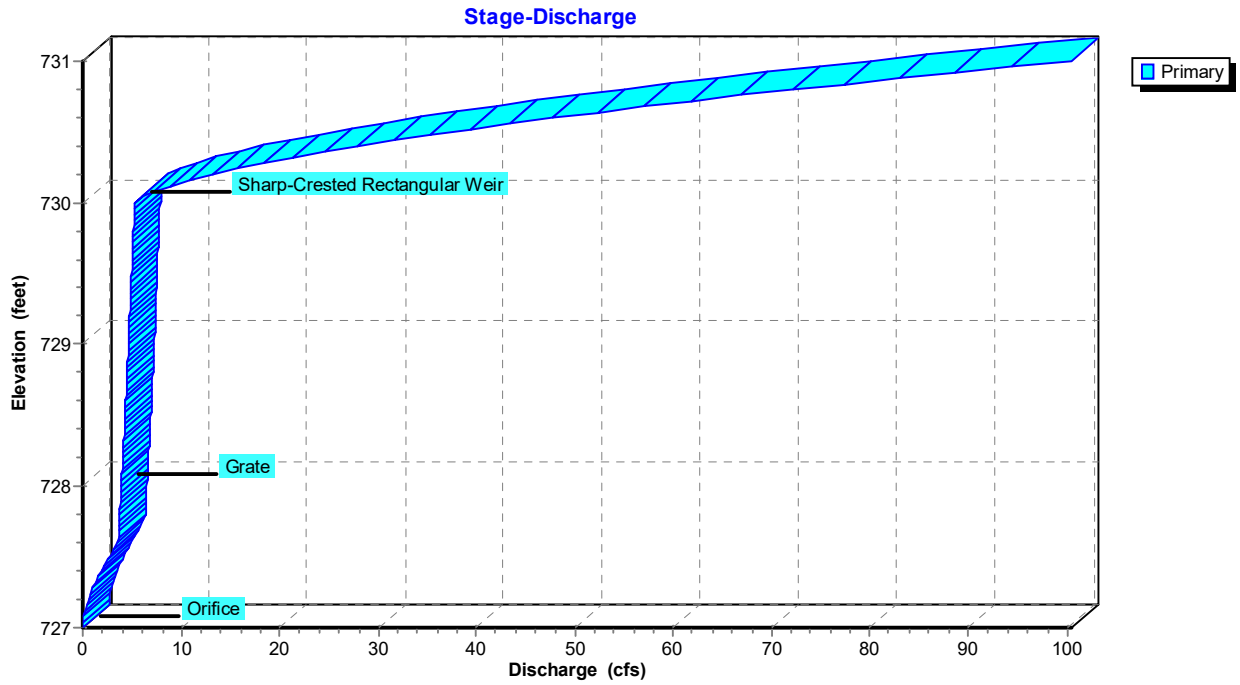
Device	Routing	Invert	Outlet Devices
#1	Primary	730.00'	26.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 1.0' Crest Height
#2	Primary	725.50'	12.0" Round Culvert L= 160.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 725.50' / 724.50' S= 0.0063 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	728.00'	24.0" W x 24.0" H Vert. Grate C= 0.600
#4	Device 2	727.00'	8.0" Vert. Orifice X 4.00 C= 0.600

Primary OutFlow Max=4.74 cfs @ 13.11 hrs HW=729.18' (Free Discharge)
- 1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 2=Culvert (Barrel Controls 4.74 cfs @ 6.03 fps)
  - 3=Grate (Passes < 8.26 cfs potential flow)
  - 4=Orifice (Passes < 9.14 cfs potential flow)

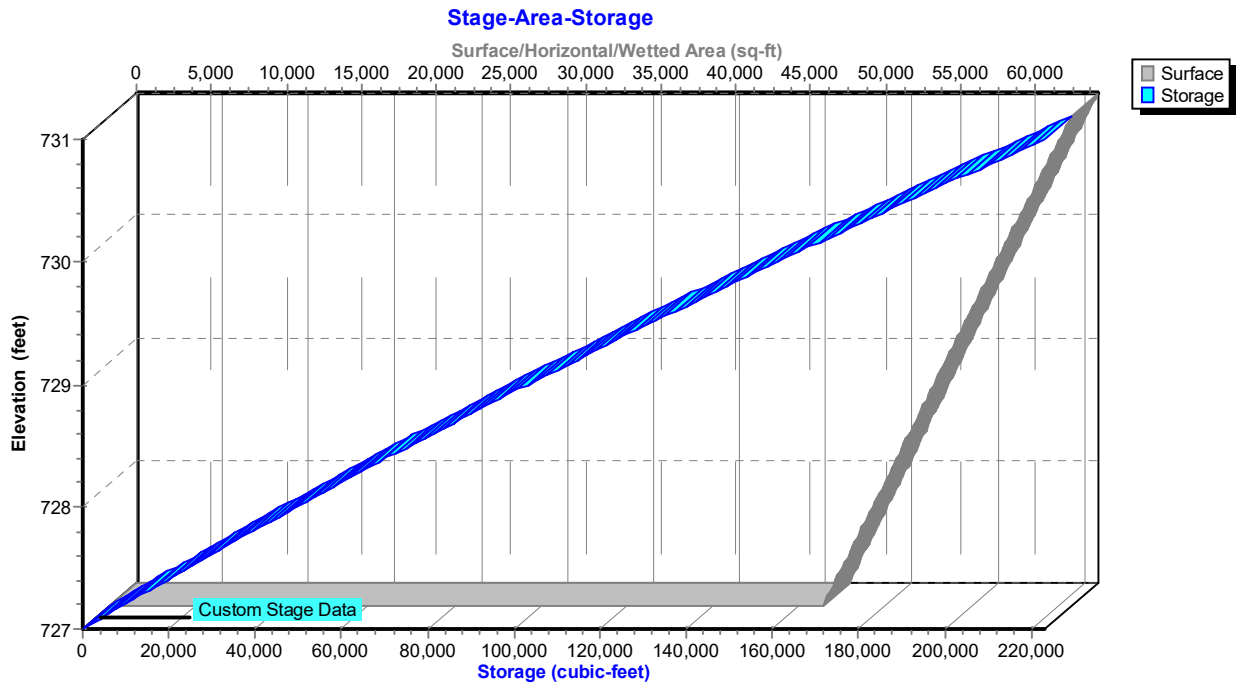
Pond 4P: WET POND 4



Pond 4P: WET POND 4



Pond 4P: WET POND 4

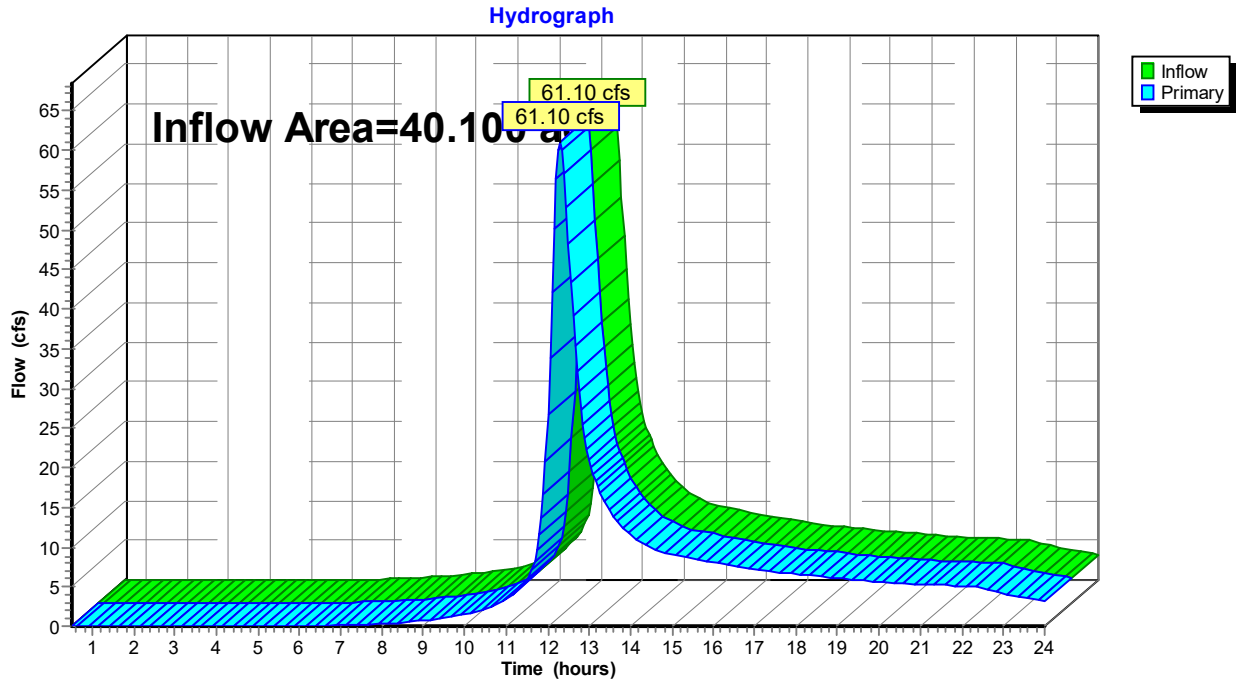


Summary for Link 1L: AREAS COMBINE

Inflow Area = 40.100 ac, 22.19% Impervious, Inflow Depth > 3.30" for 100-Year event
Inflow = 61.10 cfs @ 12.30 hrs, Volume= 11.043 af
Primary = 61.10 cfs @ 12.30 hrs, Volume= 11.043 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 1L: AREAS COMBINE

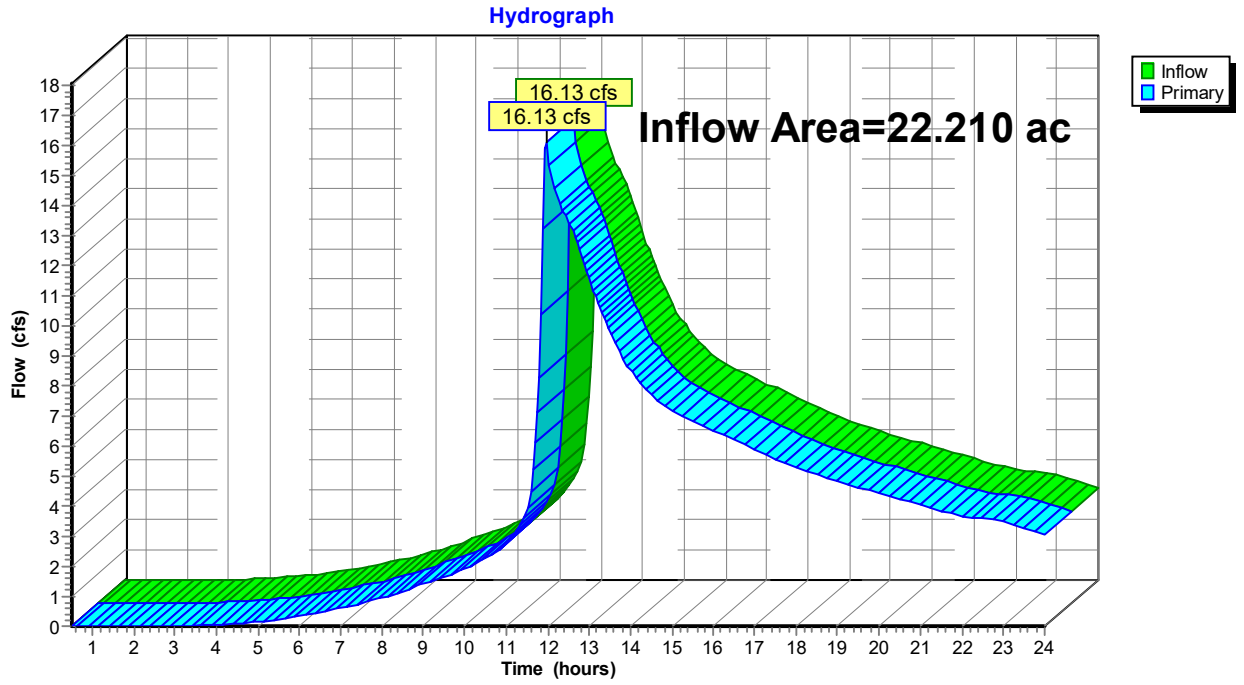


Summary for Link 2L: AREAS COMBINE

Inflow Area = 22.210 ac, 48.22% Impervious, Inflow Depth > 3.89" for 100-Year event
Inflow = 16.13 cfs @ 11.98 hrs, Volume= 7.201 af
Primary = 16.13 cfs @ 11.98 hrs, Volume= 7.201 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.50-24.00 hrs, dt= 0.05 hrs

Link 2L: AREAS COMBINE



STORMWATER MANAGEMENT
PLANNING AND PRACTICE SELECTION WORKSHEET

PROJECT: SENECA DEPOT DATE: 10/25/2017

Watershed Drainage Area DA: 39.3

Impervious Area (Acres) AI: 18.3

90% Rain: (P)= 1

PLANNING

1. Plan to preserve, avoid and minimize (underline all concepts utilized):

* Preserve undisturbed, natural buffer, and critical environment areas
* Employ open space, conservation, and clustering site design techniques
* Avoid developing in environmentally sensitive areas: floodplain, steep slopes, habitat, ecosystems, bedrock, wetlands, shorelines, shallow groundwater, impervious soils, unstable soils

WATER QUALITY VOLUME (before runoff reduction)

2. Calculate water quality volume (WQv): WQv = (P * A * Rv)/12

Watershed DA (acres)=	39.3
Impervious area (AI) =	18.3
Rv=	0.469

Original WQv (Ac-Ft)=	1.536

3. Minimum RRv requirements (when 100% WQv reduction cannot be achieved)

RRv = (P) * (.95) * (S) * (AI) / 12

With S = 0.55 for A soils; 0.40 for B soils; 0.30 for C soils; 0.20 for D soils OR Weighted HSG average in DA

S = 0.2 (site is type D soils)

Minimum required RRv (Ac-Ft) =	0.307

AREA REDUCTION PRACTICES

4. Incorporate area reduction practices (*complete for all applicable practices):*

* Conservation of natural areas (min. 10,000 sq. ft.):	Contributing AI (acres) =	Area (Ac.) =	
* Riparian buffers/filter strips (max length: 150ft):	Contributing AI (acres) =	Area (Ac.) =	
* Tree Planting/tree preservation (Max 100 s.f./tree	Contributing AI (acres) =	Area (Ac.) =	

Total Area Reduction.....	0
Total Impervious Area Reduction.....	0

5. Subtract total area reduction from DA:

Remaining drainage area: (#2 area - #4 area).....	39.3
Remaining impervious area: (#2 AI - #4 AI).....	18.3

6. Incorporate impervious area disconnection:

Total disconnected impervious area (now considered pervious for RV calcs.) Area (Ac.) = 0

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217 Lake Avenue
Rochester, New York 14608

STORMWATER MANAGEMENT
PLANNING AND PRACTICE SELECTION WORKSHEET

7. Recalculate WQv for site area remaining after area reductions and impervious disconnections:

Remaining DA (acres) = 39.3 Remaining AI (acres)= 18.3 Rv= 0.469

Reduced WQv (Ac-ft).....	1.54
Min Runoff Reduction Volume (Ac-ft).....	0.29

SOURCE CONTROL WQv TREATMENT PRACTICES

(From attached worksheet)

8a. Subtotal DA tributary to Source Control treatment practices (Acres).....	17.14
8b. Subtotal AI tributary to Source Control treatment practices (Acres).....	12.81
8c. Subtotal Source Control WQv Treatment Volume (Ac-Ft).....	1.032
8d. Subtotal Runoff Reduction Volume (RRv) (Ac-Ft).....	0.413

TOTAL RUNOFF REDUCTION VOLUME (RRv)

9. Total RRv provided (Ac-Ft)..... 0.413

10. Is RRv ≥ original WQv ? Yes:___X__ No:_____ If Yes, skip to #12

11. Is RRv ≥ minimum RRv? Yes:__X__ No:_____

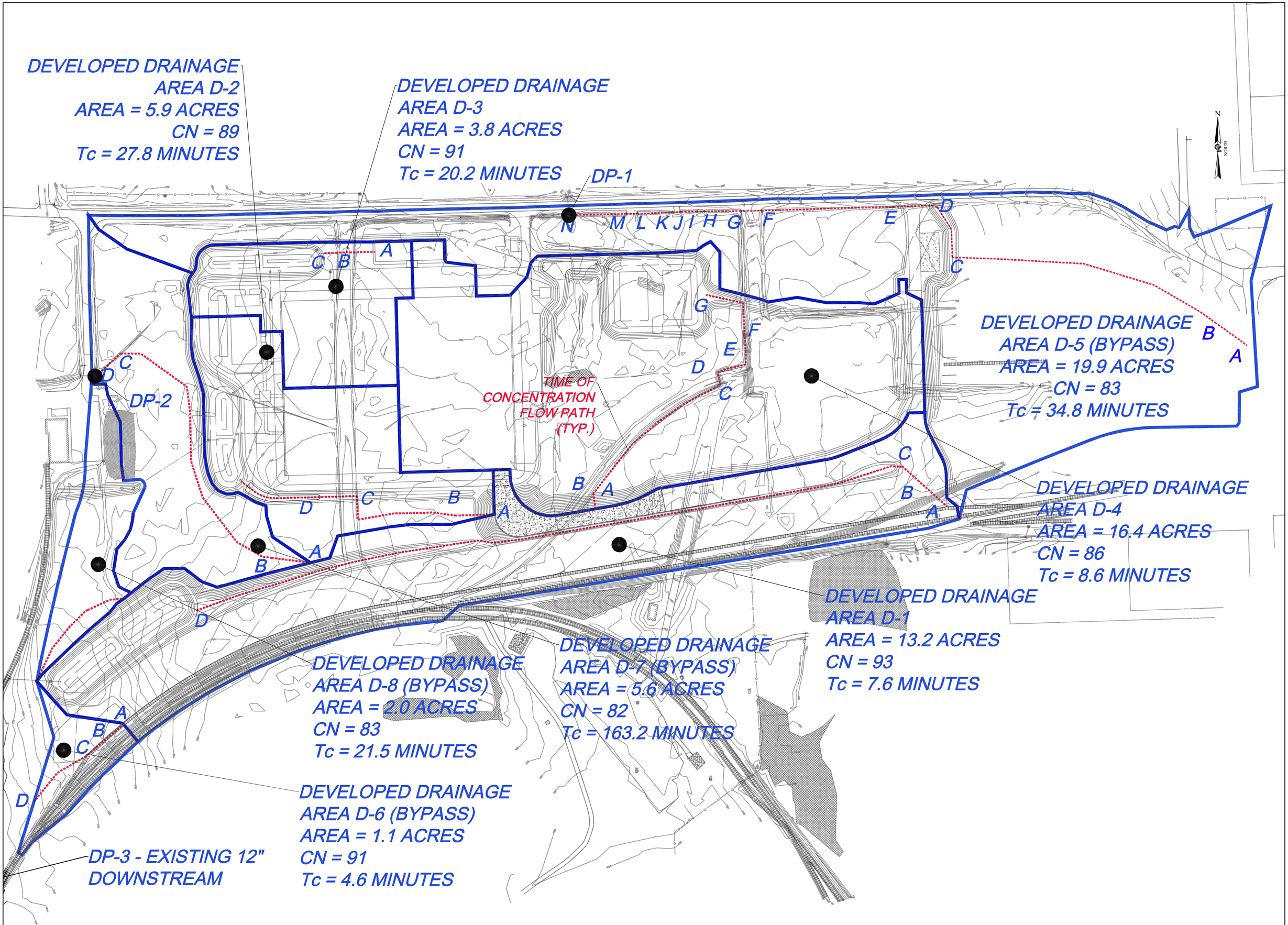
12. Total drainage area treated with runoff reduction/source control practices (Acres) 17.14

(Area reduction (from #4) + total DA tributary to source control (#8a.)

STANDARD WQv TREATMENT

13. Provide treatment for any remaining untreated watershed DA with standard practices:

Remaining untreated DA = (Watershed DA(#2)) - (Treated DA(#12))(Acres).....	22.16
Remaining impervious area = Total AI (#2)) - Treated AI (#4 + #6 + #8).....	0.00
Rv for Standard Practice.....	0.000
WQv required in a Standard Practice (Ac-Ft)	0.00



EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF, OR CLOSELY PARALLEL TO, OR UNDER, THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES. THE CONTRACTOR SHALL ALSO NOTIFY UNDERGROUND UTILITY LOCATION SERVICE AT LEAST 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)
1 inch = 80 ft. 34" x 44"
1 inch = 160 ft. 17" x 22"

NO.	DATE	REVISION	BY	CHKD.	APVLS.

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STATE OF NEW YORK
MARK R. COSTICH
No. 065971
Licensed Professional Engineer

PROJECT ENGINEER: M.O.R.
DRAWN BY: C.J.M.
BOUNDARY: - - -
TOPOBASE: D.T.H.
DATE: 10/30/2017
SCALE: 1"=80'

Costich Engineering

- Civil Engineering
- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

TITLE OF PROJECT: CIRCULAR enerG FACILITY

TITLE OF DRAWING: DEVELOPED DRAINAGE AREA MAP

LOCATION OF PROJECT: TAX PARCEL NO 08.00-01-03.5
PART OF MILITARY LOTS 67 AND 75, TOWN OF ROMULUS,
COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR enerG LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG # 3320
DE101
SHEET 1 OF 1

PROJECT NAME: *Seneca Depot* **PROJECT NUMBER:** *C3320*
CALCULATED BY: *CJM* **CHK'D BY:** *MOR* **DATE:** 10/24/2017

11. SOURCE CONTROL WQv TREATMENT PRACTICES WORKSHEET - (complete for all applicable practices and soil types).

Standard Practices (used as source control)				**Allowable Runoff Reduction Volume (RRv)**
Infiltration (A soils only) (maximum 1-20 acre DA) DA tributary to practice: xxxx acre(s)	AI = **xxxx** acre(s)	RV = **xxxx**	WQv = **xxxx** (ac-ft)	90% of WQv = **xxxx** ac-ft (A soils only)
Bioretention DA tributary to practice: 17.2 acre(s)	AI = **13.0** acre(s)	RV = 0.73	WQv = 1.047 (ac-ft)	80% of WQv = **xxxx** ac-ft (A/B soils only OR 40% of WQv = .419 ac-ft (C/D soils)
Dry Swale (maximum 5-acre DA) DA tributary to practice: xxxxx acre(s)	AI = **xxxx** acre(s)	RV = **xxxxx**	WQv = **xxxx** (ac-ft)	40% of WQv = **xxxx** ac-ft (A/B soils only OR 20% of WQv = **xxxx** ac-ft C/D soils

Green Infrastructure Practices				
Vegetated open swale (maximum 5-acre DA DA tributary to practice: xxxx acre(s)	AI = **xxxx** acre(s)	RV = **xxxx**	WQv = **xxxx** (ac-ft)	20% of WQv = **xxxx** ac-ft (A/B soils only OR 10% of WQv = **xxxx** ac-ft (C/D soils)
Green Roof Roof area = xxxx acre(s)		RV = 0.95	WQv = **xxxx** (ac-ft)	100% of WQv = **xxxx** ac-ft
Rain Garden (maximum 1,000 square foot roof) Roof area = xxxx acre(s)		RV = 0.95	WQv = **xxxx** (ac-ft)	100% of WQv = **xxxx** ac-ft
Stormwater planters (maximum 15,000-s.f. DA DA tributary to practice: xxxx acre(s)	AI = **xxxx** acre(s)	RV = **xxxx**	WQv = **xxxx** (ac-ft)	100% of WQv = **xxxx** ac-ft
Cisterns/ rain barrels Roof area = xxxx acre(s)		RV = 0.95	WQv = **xxxx** (ac-ft)	100% of WQv = **xxxx** ac-ft
Porous pavement (A/B soils only) DA tributary to practice: xxxx acre(s)	AI = **xxxx** acre(s)	RV = **xxxx**	WQv = **xxxx** (ac-ft)	100% of WQv = **xxxx** ac-ft (A/B soils only)
11a. Subtotal DA tributary to Source Control WQv practices = 17.2 (acres) **11b. Subtotal Source Control WQv Treatment Volume = 1.047 (ac-ft)** **11c. Subtotal Runoff Reduction Volume (RRv): 0.419**				**Subtotal (Rv) RRv = 0.419 (ac-ft)**

Filter Bed Sizing Work Sheet

Project Name: Seneca Depot Project Number: C3320

Calculated by: CJM Checked by: MOR Date: 10/24/2017

DETERMINE REQUIRED SIZE OF BIO RETENTION FILTER AREA:

Per NYSSWDM: $AF = (WQv)(df) \div [(K)(hf + df)(tf)]$

Where: AF = Required surface area of filter bed (ft^2)

WQv = 0.307 ac-ft = 13,373 ft^3

df = Filter bed depth (ft.) = 2.5ft

K = Coeff. Of permeability of filter media = 0.5 ft/ day

hf = Avg. height of water above filter = 0.5 ft

tf = Filter bed drain time = 2 days

AF = (13,373 ft^3)(2.5ft) ÷ [(0.5ft/day)(0.5+2.5ft)(2days)]

Required area = 11,145 ft^2

Provided filter area = 12,400 ft^2

PROJECT NAME: *Seneca Depot* **PROJECT NUMBER:** *C3320*
CALCULATED BY: *CJM* **CHK'D BY:** *MOR* **DATE:** 10/25/2017

Notes: Developed Conditions (39.3+/- acreas)
Soil Types: Type D Soils

Water Quality Volume:

WQ_v: $\frac{[(P)(R_v)(A)]}{12}$

A= 39.3 acres
P= 1
I = 46.6 percent of impervious surface (expressed as a percentage)
R_v^*= 0.4694
* R_v= 0.05 + 0.009(I)

WQ_v: $\frac{18.447}{12}$

WQv: 1.537

Wet Pond 1

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	S Volume	WQ_v : Provided	108418.8	ft^3
713.5	6268	0	0	0		2.489	ac-ft
719	33157	5.5	108418.8	108418.8			

Wet Pond 2

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	S Volume	WQ_v : Provided	56190.8	ft^3
722.5	1932	0	0	0		1.290	ac-ft
728	18501	5.5	56190.8	56190.8			

Wet Pond 3

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	S Volume	WQ_v : Provided	44307.0	ft^3
723.5	1636	0	0	0		1.017	ac-ft
728	18056	4.5	44307.0	44307.0			

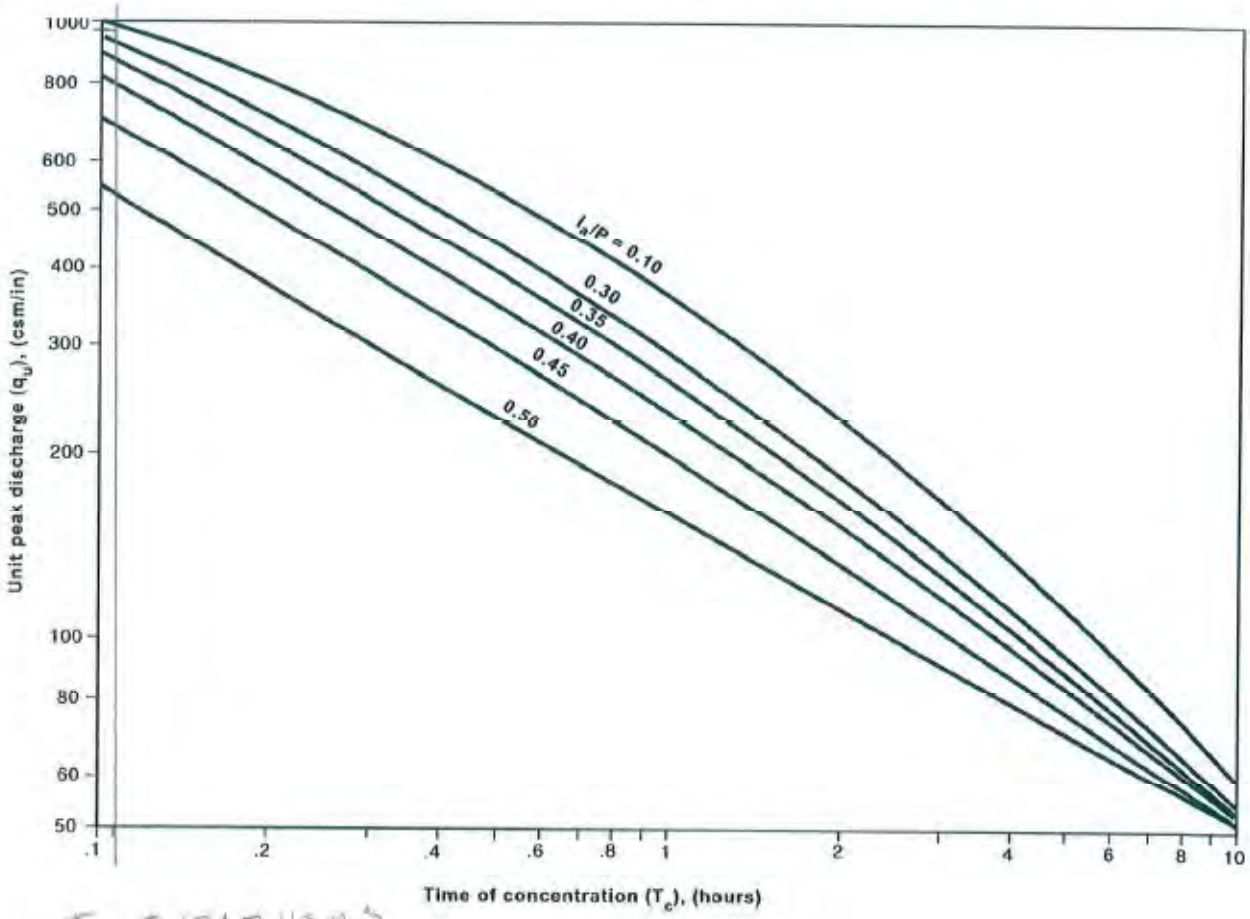
Wet Pond 4

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	S Volume	WQ_v : Provided	182209.5	ft^3
721.5	18681	0	0	0		4.183	ac-ft
727	47577	5.5	182209.5	182209.5			

Total WQv Provided = 8.979 ac-ft.

SENECA DEPOT
GP 3320
WET POND 1

Exhibit 4-II Unit peal discharge (q_u) for NRCS (SCS) type II rainfall distribution

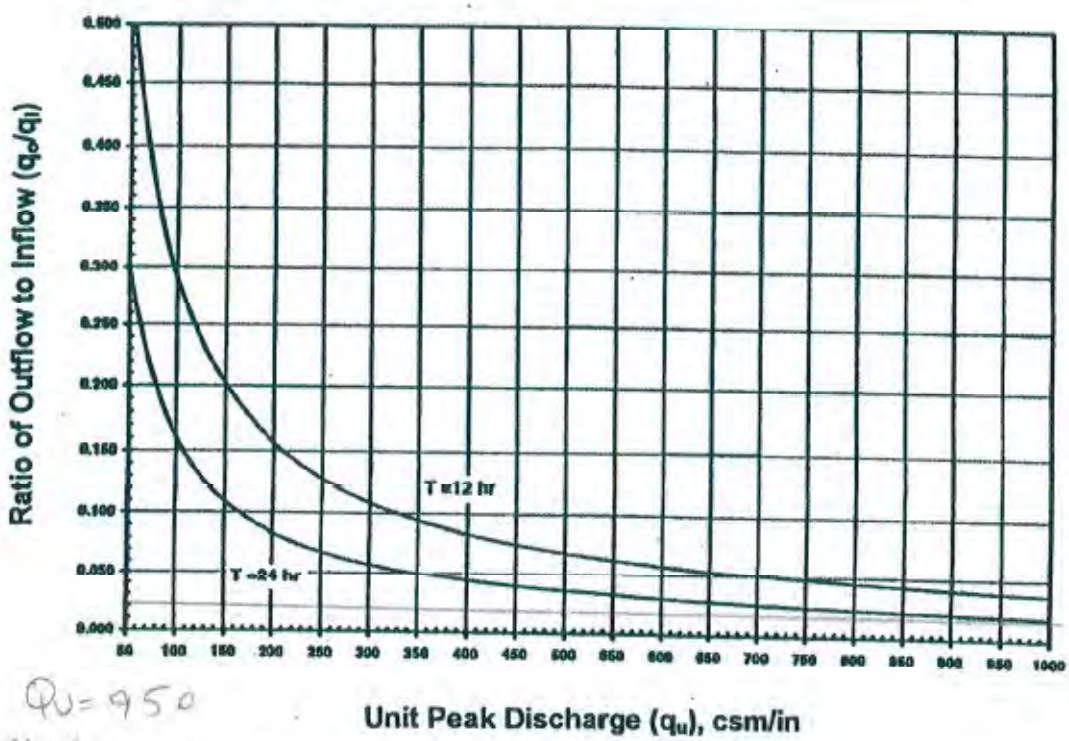


Tc = 0.1267 HOURS
Ia/p = 0.151
Qu = 950

SENECA DEPOT
C3320
WCP POND 1

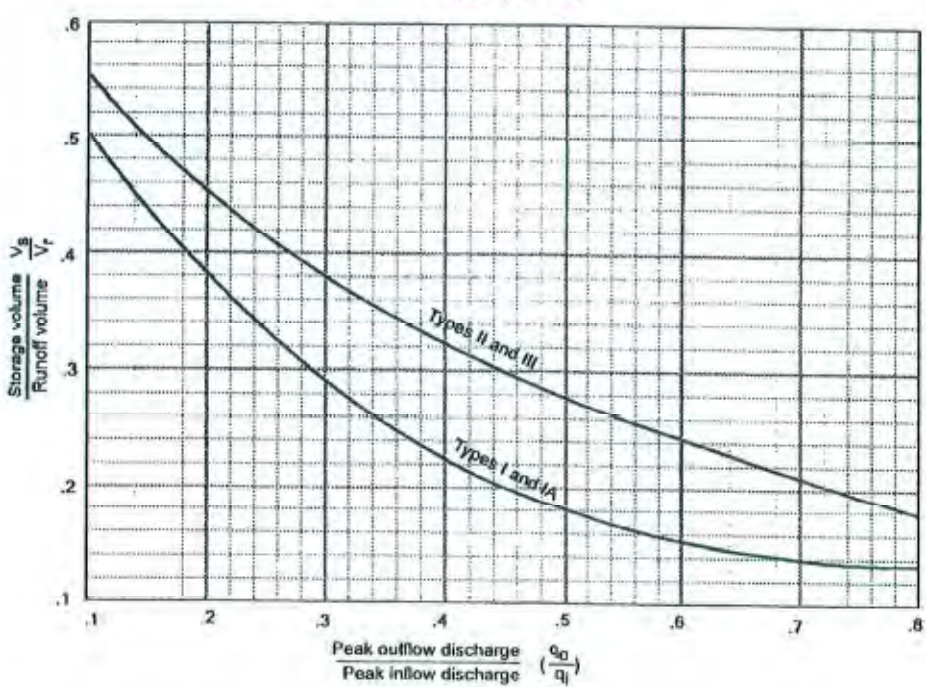
While the TR-55 short-cut method reports to incorporate multiple stage structures, experience has shown that an additional 10-15% storage is required when multiple levels of extended detention are provided.

Figure B.1 Detention Time vs. Discharge Ratios (Source: MDE, 2000)



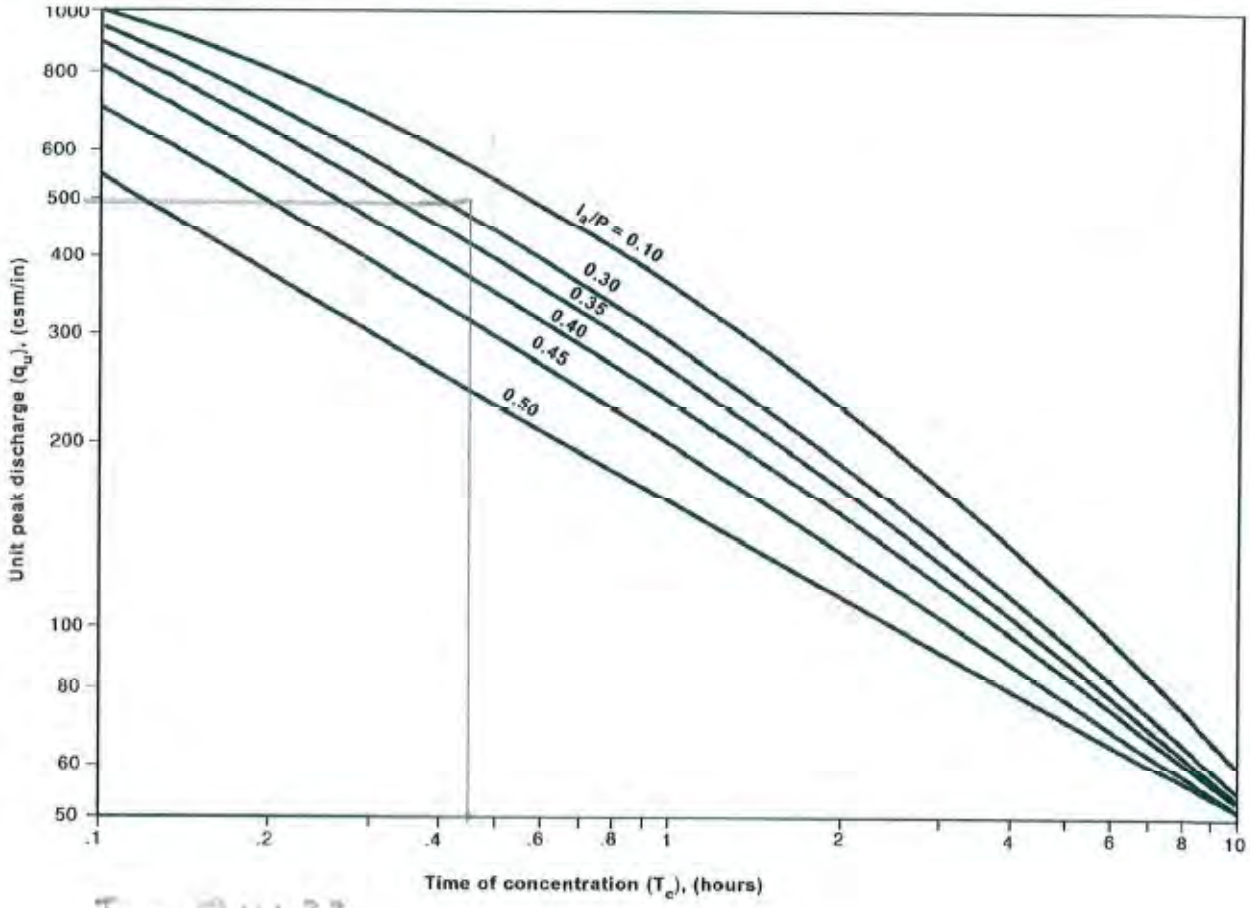
QU = 950
QU/QI = 0.020

Figure B.2 Approximate Detention Basin Routing For Rainfall Types I, IA, II, and III (Source: NRCS, 1986)



SENECA DEPOT
QE# C3360
WET POND 2

Exhibit 4-II Unit peal discharge (q_u) for NRCS (SCS) type II rainfall distribution

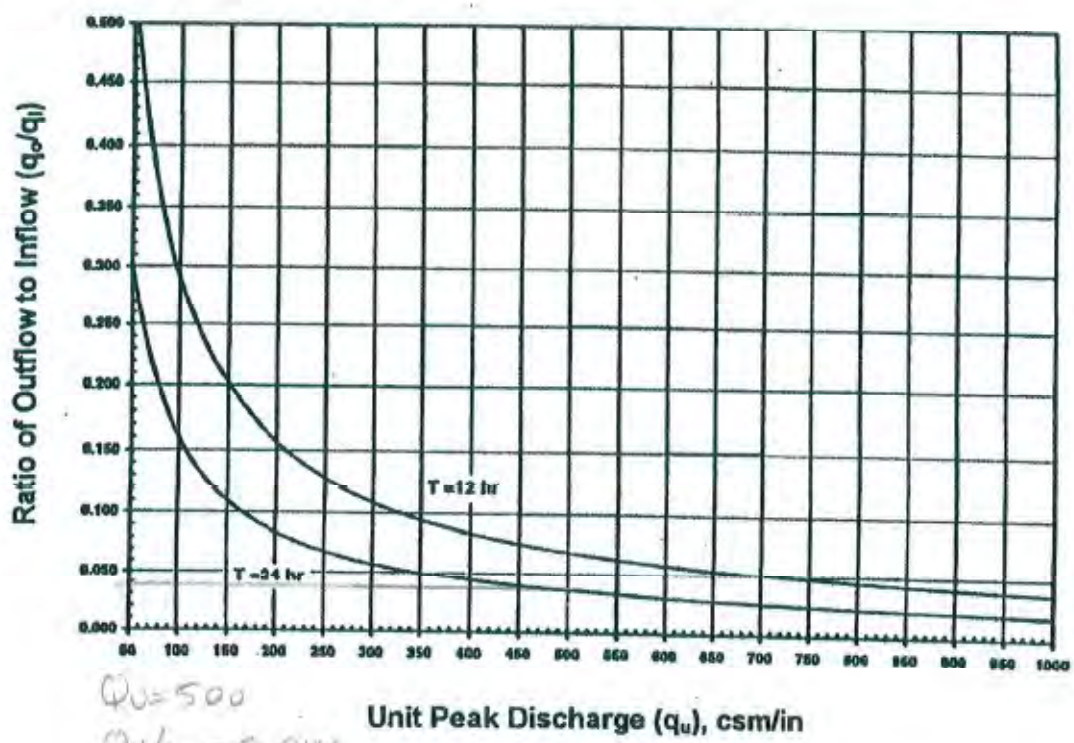


Tc = 0.4633
Ia/P = 0.247
Qu = 500

SENECA DEPOT
EW C5330
WET POND 2

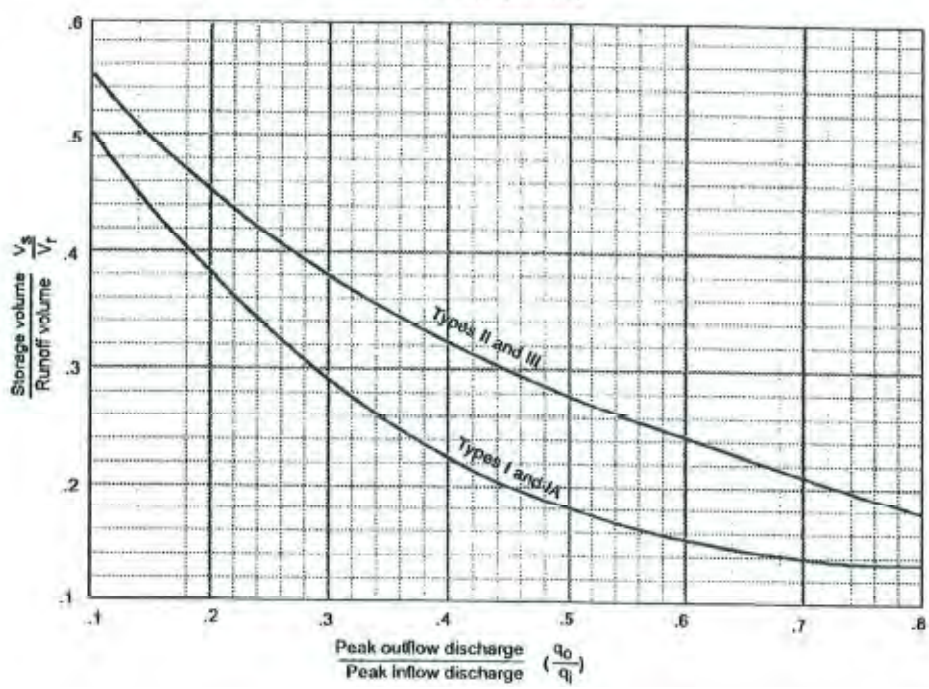
While the TR-55 short-cut method reports to incorporate multiple stage structures, experience has shown that an additional 10-15% storage is required when multiple levels of extended detention are provided.

Figure B.1 Detention Time vs. Discharge Ratios (Source: MDE, 2000)



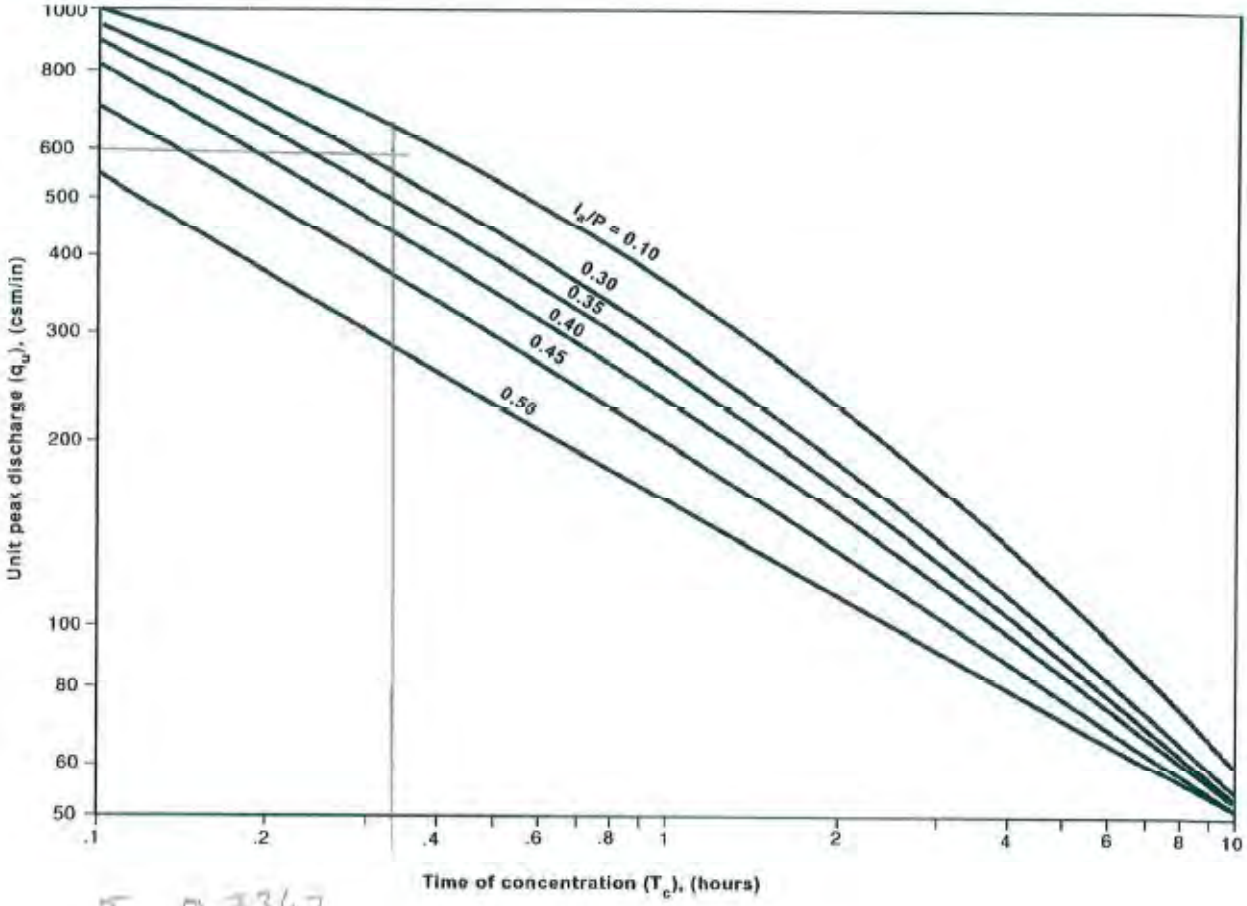
Qu=500
Qu/QT=0.040

Figure B.2 Approximate Detention Basin Routing For Rainfall Types I, IA, II, and III (Source: NRCS, 1986)



SENECA DEPOT
EX# C3320
WETPOND 3

Exhibit 4-II Unit peal discharge (q_u) for NRCS (SCS) type II rainfall distribution

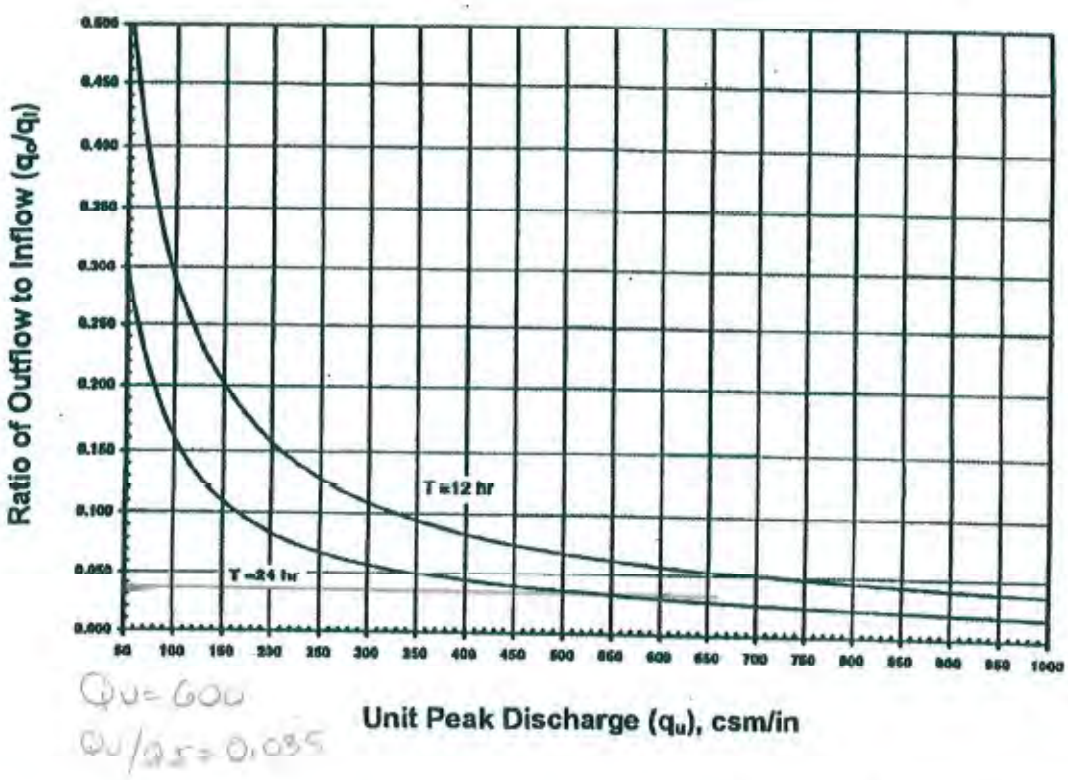


Tc = 0.3367
Ia/P = 0.198
Qu = 600

SENECA DEPOT
2 C2320
WET POND 3

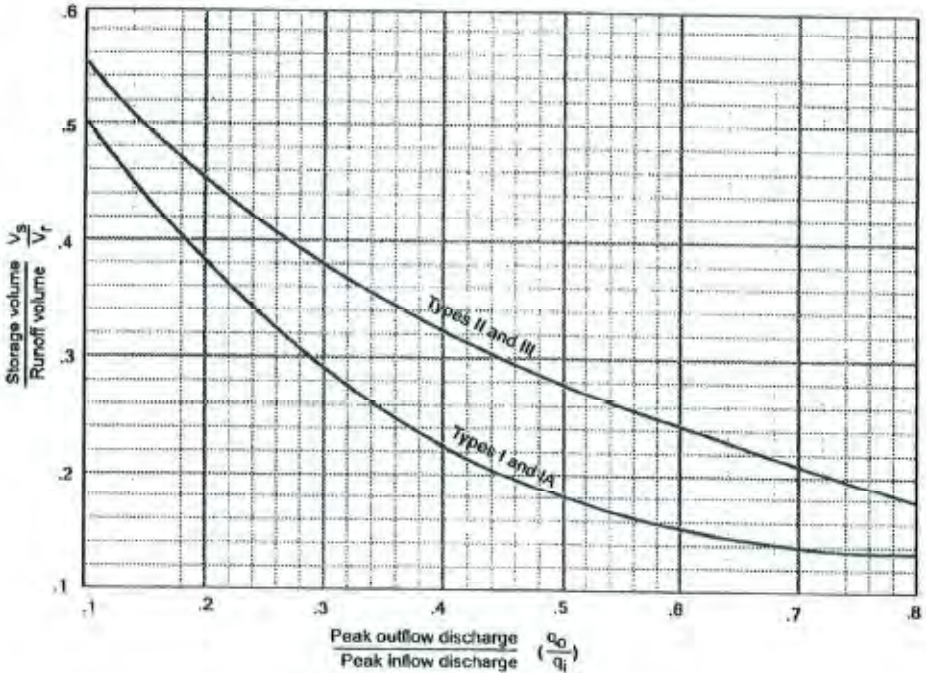
While the TR-55 short-cut method reports to incorporate multiple stage structures, experience has shown that an additional 10-15% storage is required when multiple levels of extended detention are provided.

Figure B.1 Detention Time vs. Discharge Ratios (Source: MDE, 2000)



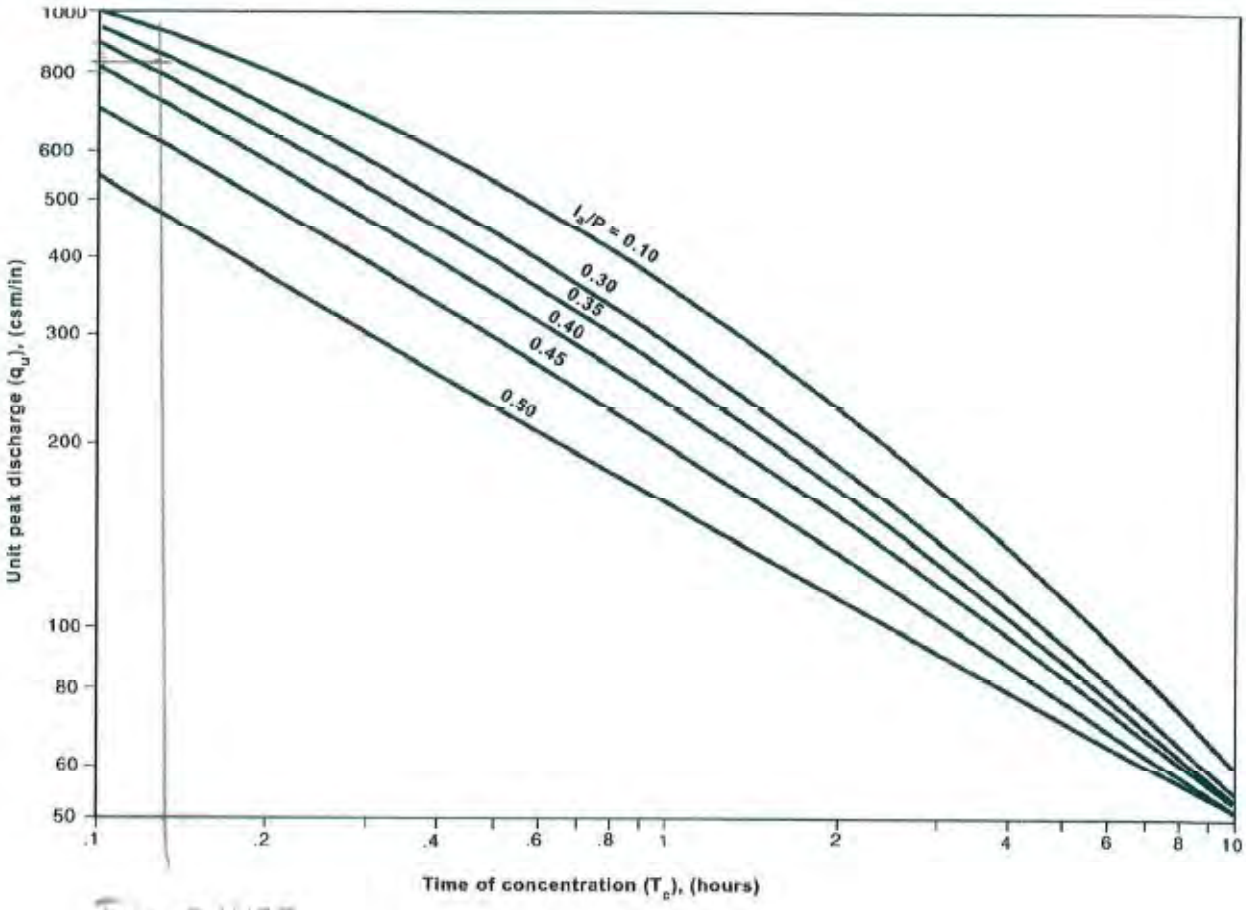
Qu = 600
Qu/Qs = 0.085

Figure B.2 Approximate Detention Basin Routing For Rainfall Types I, IA, II, and III (Source: NRCS, 1986)



SENECA DEPOT
EA# C3320
WET POND #4

Exhibit 4-II Unit peal discharge (q_u) for NRCS (SCS) type II rainfall distribution

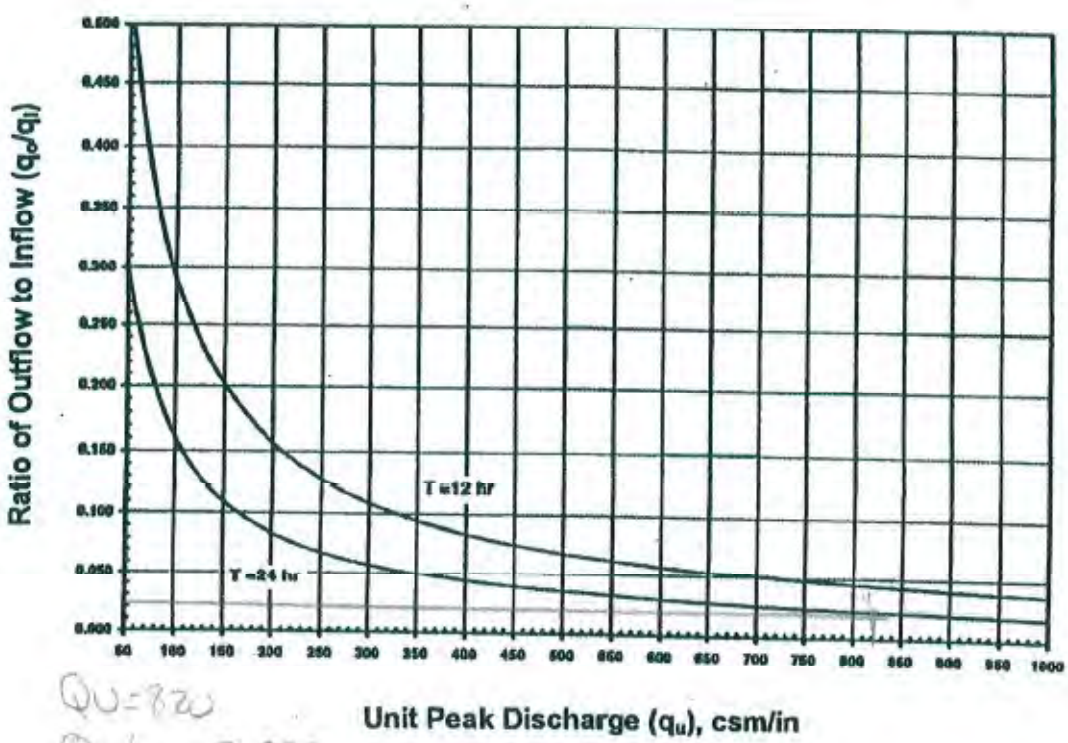


Tc = 0.1433
Ia/p = 0.326
Qu = 820

SENECA DEPOT

While the TR-55 short-cut method reports to incorporate multiple stage structures, experience has shown that an additional 10-15% storage is required when multiple levels of extended detention are provided.

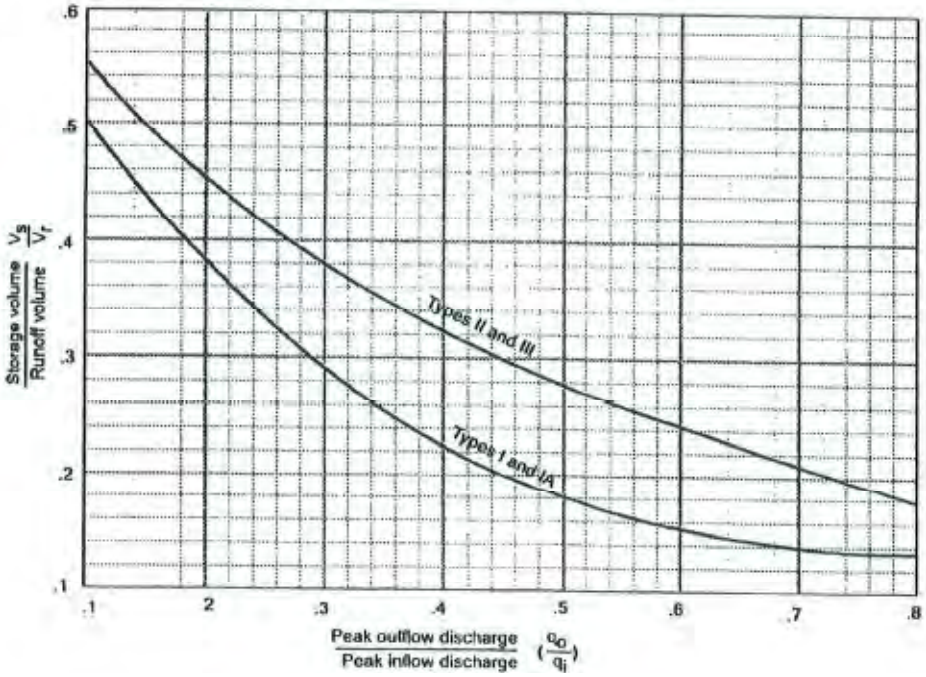
Figure B.1 Detention Time vs. Discharge Ratios (Source: MDE, 2000)



QU=820

QU/QI=0.020

Figure B.2 Approximate Detention Basin Routing For Rainfall Types I, IA, II, and III (Source: NRCS, 1986)



PROJECT NAME: *Seneca Depot* **PROJECT NUMBER:** *C3320*
CALCULATED BY: *CJM* **CHK'D BY:** *MOR* **DATE:** 10/25/2017

Notes: Developed Conditions (39.3+/- acreas)
Soil Types: Type D soils

Wet Pond 1 Channel Protection Volume:

CP_v: $\frac{(V_r)(V_s/V_r)(A)]}{12}$

CP_v: $\frac{19.051}{12}$

CP_v req'd: 1.588 ac-ft

69156.81 ft^3

A=	13.22		
I_a=	0.151	(I_a=200/CN-2)	CN= 93
P=	1		
V_r=	2.200	(1-yr cumulative runoff from HydroCAD)	
I_a/P=	0.151		
q_u=	950	(Exhibit 4-II in TR-55 manual)	
q_o/q_i=	0.02	(Fig. B-1 from NYSSMDM)	
V_s/V_r=	$0.683-1.43(qo/qi)+1.64(qo/qi)^2-0.804(qo/qi)^3$		
V_s/V_r=	0.655		

Wet Pond 1

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	S Volume
720.5	38904	0	0	0
722.5	44876	2	83780.0	83780.0

CP_v provided: **83780.0 ft^3**
1.923 ac-ft

Wet Pond 2 Channel Protection Volume:

CP_v: $\frac{(V_r)(V_s/V_r)(A)]}{12}$

CP_v: $\frac{8.170}{12}$

CP_v req'd: 0.681 ac-ft

29657.46 ft^3

A=	5.91		
I_a=	0.247	(I_a=200/CN-2)	CN= 89
P=	1		
V_r=	2.200	(1-yr cumulative runoff from HydroCAD)	
I_a/P=	0.247		
q_u=	500	(Exhibit 4-II in TR-55 manual)	
q_o/q_i=	0.04	(Fig. B-1 from NYSSMDM)	
V_s/V_r=	$0.683-1.43(qo/qi)+1.64(qo/qi)^2-0.804(qo/qi)^3$		
V_s/V_r=	0.628		

Wet Pond 2

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	S Volume
729	22788	0	0	0
730.5	28225	1.5	38259.8	38259.8

CP_v provided: **38259.8 ft^3**
0.878 ac-ft

PROJECT NAME: *Seneca Depot* **PROJECT NUMBER:** *C3320*
CALCULATED BY: *CJM* **CHK'D BY:** *MOR* **DATE:** 10/25/2017

Notes: Developed Conditions (39.3+/- acreas)
Soil Types: Type D soils

Wet Pond 3 Channel Protection Volume:

CP_v: $\frac{(V_r)(V_s/V_r)(A)]}{12}$

CP_v: $\frac{5.280}{12}$

CP_v req'd: 0.440 ac-ft

19166.52 ft^3

A=	3.78		
I_a=	0.151	(I_a=200/CN-2)	CN= 93
P=	1		
V_r=	2.200	(1-yr cumulative runoff from HydroCAD)	
I_a/P=	0.151		
q_u=	600	(Exhibit 4-II in TR-55 manual)	
q_o/q_i=	0.035	(Fig. B-1 from NYSSMDM)	
V_s/V_r=	$0.683-1.43(qo/qi)+1.64(qo/qi)^2-0.804(qo/qi)^3$		
V_s/V_r=	0.635		

Wet Pond 3

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	Σ Volume
728.5	19979	0	0	0
730	25248	1.5	33920.3	33920.3

CP_v provided: **33920.3 ft^3** / **0.779 ac-ft**

Wet Pond 4 Channel Protection Volume:

CP_v: $\frac{(V_r)(V_s/V_r)(A)]}{12}$

CP_v: $\frac{22.380}{12}$

CP_v req'd: 1.865 ac-ft

81240.94 ft^3

A=	15.53		
I_a=	0.326	(I_a=200/CN-2)	CN= 86
P=	1		
V_r=	2.200	(1-yr cumulative runoff from HydroCAD)	
I_a/P=	0.326		
q_u=	820	(Exhibit 4-II in TR-55 manual)	
q_o/q_i=	0.02	(Fig. B-1 from NYSSMDM)	
V_s/V_r=	$0.683-1.43(qo/qi)+1.64(qo/qi)^2-0.804(qo/qi)^3$		
V_s/V_r=	0.655		

Wet Pond 4

Elevation	Area (ft^2)	Depth (ft)	Volume (ft^3)	Σ Volume
728	51692	0	0	0
729.5	57670	1.5	82021.5	82021.5

CP_v provided: **82021.5 ft^3** / **1.883 ac-ft**

Total CPv Required = 4.574 ac-ft
Total CPv Provided = 5.876 ac-ft

INFT POND 1
SENECA DEPOT

Cipoletti (Trapezoidal) Weir Calculator	Discharge, Head, and Weir Length Calculations. Equations and Installation Guidelines.

Solve for: Click to Calculate Initial Values

Length

Discharge, Q: 87.45 ft3/s (cfs)

Head, h: 1 ft

Length, L: 25.972676 ft

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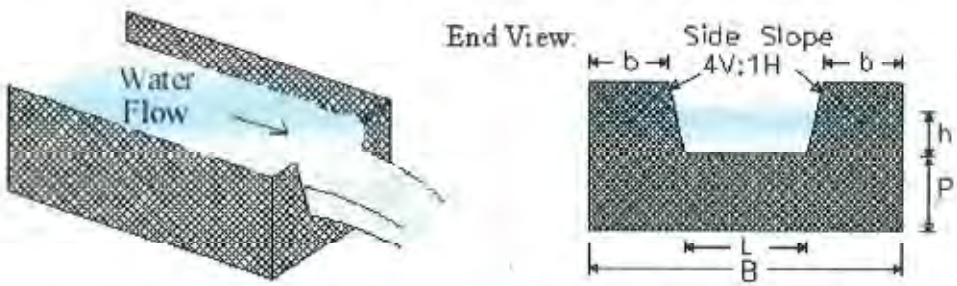
Units in Cipoletti weir calculation: ft=foot, gal=US gallon, m=meter, min=minute, s=second.

Cipoletti Weir:



Cipoletti weir topics: Introduction Equations Installation Guidelines and Equation Applicability Error Messages References

Introduction

Weirs are typically installed in open channels such as streams to determine discharge (flowrate). The basic principle is that discharge is directly related to the water depth (h) in the figure above; h is known as the "head." The Cipoletti (or trapezoidal) weir has side slopes in the vertical to horizontal ratio of 4 to 1. Cipoletti weirs are considered fully contracted and have the installation requirements shown below. The discharge coefficient for Cipoletti weirs is 3.367 (in English units), and it does not depend on L or P like it does for a rectangular weir. Though the discharge coefficient formulation is simpler than for rectangular weirs, its accuracy is not as good - about ±5% (USBR, 1997). Cipoletti is sometimes spelled Cipoleti, Cipolleti, Cipolletti, Cippoleti, Cippolleti, Cippoletti, and Cippolletti.

Cipoletti Weir Equation

The Cipoletti weir equation is shown below for Q in cfs (ft^3/s) and head and length in feet units (USBR, 1997). Our calculation allows you to work in a variety of units.

$$Q = 3.367\ L\ h^{3/2}$$

where Q = Discharge (cfs), L = Weir Length (ft), h = Head (ft)

Note that L is measured along the bottom of the weir (called the crest), not along the water surface.

Cipoletti Weir Installation Guidelines and Equation Applicability (USBR,

To: LMNO Engineering home page (more calculations)

Related calculations:

Weirs: Rectangular V-Notch

End Depth Method: Circular Rectangular Triangular

Flumes: Parshall (submerged)

Parshall, Trapezoidal, Rectangular, and U shape

Unit Conversions

Register

1997) Top of Page

Cipoletti weir side slopes should have a vertical to horizontal ratio of 4 to 1.

Head (h) should be measured at a distance of at least 4h upstream of the weir.

It doesn't matter how thick the weir is except where water flows through the weir. The weir should be between 0.03 and 0.08 inches (0.8 to 2 mm) thick in the opening. If the bulk of the weir is thicker than 0.08 inch, the downstream edge of the opening can be chamfered at an angle greater than 45° (60° is recommended) to achieve the desired thickness of the edges. You want to avoid having water cling to the downstream face of the weir.

Water surface downstream of the Cipoletti weir should be at least 0.2 ft. (6 cm) below the weir crest (i.e. below the bottom of the opening).

Measured head (h) should be greater than 0.2 ft. (6 cm) but less than L/3.

P is measured from the bottom of the upstream channel and should be greater than $2h_{max}$ where h_{max} is the maximum expected head.

b is measured from the sides of the channel and also should be greater than $2h_{max}$.

Error Messages in Cipoletti weir calculation

Top of Page

"All inputs must be positive". This is an initial check of user input.

References

USBR (1997). U.S. Department of the Interior, Bureau of Reclamation. Water Measurement Manual. 1997. 3ed. Available from http://www.usbr.gov/tsc/techreferences/mands/wmm/index.htm .

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Please contact us for consulting or other questions.

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7860 Angel Ridge Rd. Athens, Ohio 45701 USA Phone: (740) 592-1890
LMNO@LMNOeng.com http://www.LMNOeng.com

 SENECA DEPOT WET POND 2

Cipoletti (Trapezoidal) Weir Calculator	Discharge, Head, and Weir Length Calculations. Equations and Installation Guidelines.

Solve for: Click to Calculate Initial Values

Length

Discharge, Q: 20.92 ft3/s (cfs)

Head, h: 1 ft

Length, L: 6.2132462 ft

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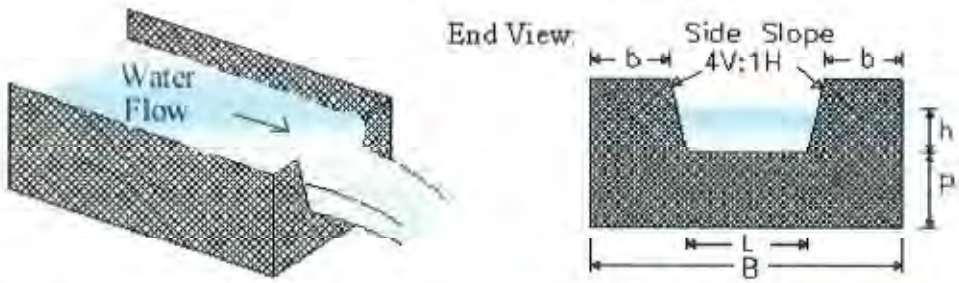
Units in Cipoletti weir calculation: ft=foot, gal=US gallon, m=meter, min=minute, s=second.

Cipoletti Weir:



Cipoletti weir topics: Introduction Equations Installation Guidelines and Equation Applicability Error Messages References

Introduction

Weirs are typically installed in open channels such as streams to determine discharge (flowrate). The basic principle is that discharge is directly related to the water depth (h) in the figure above; h is known as the "head." The Cipoletti (or trapezoidal) weir has side slopes in the vertical to horizontal ratio of 4 to 1. Cipoletti weirs are considered fully contracted and have the installation requirements shown below. The discharge coefficient for Cipoletti weirs is 3.367 (in English units), and it does not depend on L or P like it does for a rectangular weir. Though the discharge coefficient formulation is simpler than for rectangular weirs, its accuracy is not as good - about ±5% (USBR, 1997). Cipoletti is sometimes spelled Cipoleti, Cipolleti, Cipolletti, Cippoleti, Cippolleti, Cippoletti, and Cippolletti.

Cipoletti Weir Equation

The Cipoletti weir equation is shown below for Q in cfs (ft^3/s) and head and length in feet units (USBR, 1997). Our calculation allows you to work in a variety of units.

$$Q = 3.367\ L\ h^{3/2}$$

where Q = Discharge (cfs), L = Weir Length (ft), h = Head (ft)

Note that L is measured along the bottom of the weir (called the crest), not along the water surface.

Cipoletti Weir Installation Guidelines and Equation Applicability (USBR,

To: LMNO Engineering home page (more calculations)

Related calculations:

Weirs: Rectangular V-Notch

End Depth Method: Circular Rectangular Triangular

Flumes: Parshall (submerged)

Parshall, Trapezoidal, Rectangular, and U shape

Unit Conversions

Register

1997) Top of Page

Cipoletti weir side slopes should have a vertical to horizontal ratio of 4 to 1.

Head (h) should be measured at a distance of at least 4h upstream of the weir.

It doesn't matter how thick the weir is except where water flows through the weir. The weir should be between 0.03 and 0.08 inches (0.8 to 2 mm) thick in the opening. If the bulk of the weir is thicker than 0.08 inch, the downstream edge of the opening can be chamfered at an angle greater than 45° (60° is recommended) to achieve the desired thickness of the edges. You want to avoid having water cling to the downstream face of the weir.

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P is measured from the bottom of the upstream channel and should be greater than $2h_{max}$ where h_{max} is the maximum expected head.

b is measured from the sides of the channel and also should be greater than $2h_{max}$.

Error Messages in Cipoletti weir calculation

Top of Page

"All inputs must be positive". This is an initial check of user input.

References

USBR (1997). U.S. Department of the Interior, Bureau of Reclamation. Water Measurement Manual. 1997. 3ed. Available from http://www.usbr.gov/tsc/techreferences/mands/wmm/index.htm .

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LMNO@LMNOeng.com http://www.LMNOeng.com

 SENECA DEPOT WET POND 3

Cipoletti (Trapezoidal) Weir Calculator	Discharge, Head, and Weir Length Calculations. Equations and Installation Guidelines.

Solve for: Click to Calculate Initial Values

Length

Discharge, Q: 16.68 ft3/s (cfs)

Head, h: 1 ft

Length, L: 4.953965 ft

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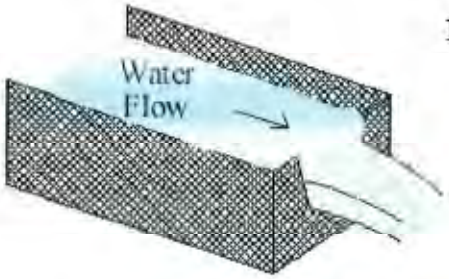
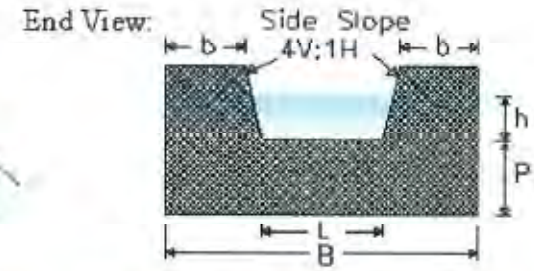
Units in Cipoletti weir calculation: ft=foot, gal=US gallon, m=meter, min=minute, s=second.

Cipoletti Weir:





Cipoletti weir topics: Introduction Equations Installation Guidelines and Equation Applicability Error Messages References

Introduction

Weirs are typically installed in open channels such as streams to determine discharge (flowrate). The basic principle is that discharge is directly related to the water depth (h) in the figure above; h is known as the "head." The Cipoletti (or trapezoidal) weir has side slopes in the vertical to horizontal ratio of 4 to 1. Cipoletti weirs are considered fully contracted and have the installation requirements shown below. The discharge coefficient for Cipoletti weirs is 3.367 (in English units), and it does not depend on L or P like it does for a rectangular weir. Though the discharge coefficient formulation is simpler than for rectangular weirs, its accuracy is not as good - about ±5% (USBR, 1997). Cipoletti is sometimes spelled Cipoleti, Cipolleti, Cipolletti, Cippoleti, Cippolleti, Cippoletti, and Cippolletti.

Cipoletti Weir Equation

The Cipoletti weir equation is shown below for Q in cfs (ft^3/s) and head and length in feet units (USBR, 1997). Our calculation allows you to work in a variety of units.

$$Q = 3.367\ L\ h^{3/2}$$

where Q = Discharge (cfs), L = Weir Length (ft), h = Head (ft)

Note that L is measured along the bottom of the weir (called the crest), not along the water surface.

Cipoletti Weir Installation Guidelines and Equation Applicability (USBR,

To: LMNO Engineering home page (more calculations)

Related calculations:

Weirs: Rectangular V-Notch

End Depth Method: Circular Rectangular Triangular

Flumes: Parshall (submerged)

Parshall, Trapezoidal, Rectangular, and U shape

Unit Conversions

Register

1997) Top of Page

Cipoletti weir side slopes should have a vertical to horizontal ratio of 4 to 1.

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Error Messages in Cipoletti weir calculation

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SENECA DEPOT
WET POND 4

Cipoletti (Trapezoidal) Weir Calculator	Discharge, Head, and Weir Length Calculations. Equations and Installation Guidelines.

Solve for: Click to Calculate Initial Values

Length

Discharge, Q: 88.68 ft3/s (cfs)

Head, h: 1 ft

Length, L: 26.337986 ft

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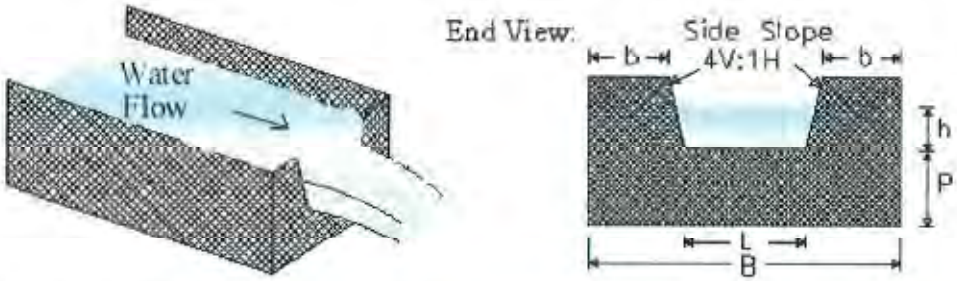
Units in Cipoletti weir calculation: ft=foot, gal=US gallon, m=meter, min=minute, s=second.

Cipoletti Weir:



Cipoletti weir topics: Introduction Equations Installation Guidelines and Equation Applicability Error Messages References

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Cipoletti Weir Installation Guidelines and Equation Applicability (USBR,

To: LMNO Engineering home page (more calculations)

Related calculations:

Weirs: Rectangular V-Notch

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Flumes: Parshall (submerged)

Parshall, Trapezoidal, Rectangular and U shape

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APPENDIX III

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-0-15-002

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)
Circular energ LLC

Owner/Operator Contact Person Last Name (NOT CONSULTANT)
Palumbo

Owner/Operator Contact Person First Name
Michael

Owner/Operator Mailing Address
400 Andrews Street, Suite 360

City
Rochester

State: NY
Zip: 14604 -

Phone (Owner/Operator): 585 - 546 - 4866
Fax (Owner/Operator): 585 - 325 - 6058

Email (Owner/Operator)
mpalumbo@flaummgt.com

FED TAX ID
81 - 5157926 (not required for individuals)

Project Site Information

Project/Site Name

Circular energ Facility

Street Address (NOT P.O. BOX)

E Kendaia Road

Side of Street

○ **North** ● **South** ○ **East** ○ **West**

City/Town/Village (THAT ISSUES BUILDING PERMIT)

Romulus

State: NY

Zip: 14541 -

County: Seneca

DEC Region: 8

Name of Nearest Cross Street

E Patrol Road

Distance to Nearest Cross Street (Feet): 740

Project In Relation to Cross Street

○ **North** ○ **South** ○ **East** ● **West**

Tax Map Numbers
Section-Block-Parcel: 08.00-01-0.35

Tax Map Numbers: 08.00-01-0.35

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): 348999

Y Coordinates (Northing): 4734034

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

***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
48.3	46.8	8.3	18.3

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
%	%	%	100%

7. Is this a phased project? ○ **Yes** ● **No**

8. Enter the planned start and end dates of the disturbance activities.

Start Date 04/01/2020 - **End Date** 04/01/2022

9. Identify the nearest surface waterbody(ies) to which construction site runoff will discharge.

Name

Kendig Creek

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-0-15-002? ○ **Yes** ● **No**

11. Is this project located in one of the Watersheds identified in Appendix C of GP-0-15-002? ○ **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 Romulus

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
Costich Engineering, D.P.C.

Contact Name (Last, Space, First)
McWilliams, Corey

Mailing Address
217 Lake Ave

City
Rochester

State Zip
NY 14608-

Phone
585-458-3020

Fax
585-458-2731

Email
coreymc@costich.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-0-15-002. 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
Corey

MI
J

Last Name
McWilliams

Signature

Date
11/01/2017

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

1.537 **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)			13.0
○ Dry Swale (O-1)			
Standard SMPs			
○ Micropool Extended Detention (P-1)			
● Wet Pond (P-2)			19.2
○ 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

0.419 **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

0.307 **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

8.979 **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). 9.398

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

4.574 **acre-feet**

CPv Provided

5.876 **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

64.30 **CFS**

Post-development

54.42 **CFS**

Total Extreme Flood Control Criteria (Qf)

Pre-Development

98.44 **CFS**

Post-development

81.83 **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

Circular energ, LLC

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.

100% of the required WQv has been provided for the site using both Runoff Reduction techniques (Bio-retention) and Standard Management Practices (Wet Pond). The Minimum Runoff Reduction Volume has been provided for the site. 100% of the WQv could not be provided using Runoff Reduction techniques because the site soils are unsuitable for infiltration per the Stormwater Design Manual.

40. Identify other DEC permits, existing and new, that are required for this project/facility.

- ○ Air Pollution Control
- ○ Coastal Erosion
- ○ Hazardous Waste
- ○ Long Island Wells
- ○ Mined Land Reclamation
- ○ Solid Waste
- ○ Navigable Waters Protection / Article 15
- ○ Water Quality Certificate
- ○ Dam Safety
- ○ Water Supply
- ○ Freshwater Wetlands/Article 24
- ○ Tidal Wetlands
- ○ Wild, Scenic and Recreational Rivers
- ○ Stream Bed or Bank Protection / Article 15
- ○ Endangered or Threatened Species(Incidental Take Permit)
- ○ Individual SPDES
- ○ SPDES Multi-Sector GP N Y R
- ○ Other
- ● None

41. Does this project require a US Army Corps of Engineers Wetland Permit? ● **Yes** ○ **No**
If Yes, Indicate Size of Impact. 0.6

42. Is this project subject to the requirements of a regulated, traditional land use control MS4? ○ **Yes** ● **No**
(If No, skip question 43)

43. Has the "MS4 SWPPP Acceptance" form been signed by the principal executive officer or ranking elected official and submitted along with this NOI? ○ **Yes** ○ **No**

44. If this NOI is being submitted for the purpose of continuing or transferring coverage under a general permit for stormwater runoff from construction activities, please indicate the former SPDES number assigned. N Y R

Owner/Operator Certification

I have read or been advised of the permit conditions and believe that I understand them. I also understand that, under the terms of the permit, there may be reporting requirements. I hereby certify that this document and the corresponding documents were prepared under my direction or supervision. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I further understand that coverage under the general permit will be identified in the acknowledgment that I will receive as a result of submitting this NOI and can be as long as sixty (60) business days as provided for in the general permit. I also understand that, by submitting this NOI, I am acknowledging that the SWPPP has been developed and will be implemented as the first element of construction, and agreeing to comply with all the terms and conditions of the general permit for which this NOI is being submitted.

Print First Name: Michael

MI:

Print Last Name: Palumbo

Owner/Operator Signature:

Date: / /

Circular enerG Facility

Stormwater Construction Site Inspection Report

General Information			
Project Name	**Circular enerG Facility**		
SPDES Tracking No.		**Location**	**E. Kendaia Road**
Date of Inspection		**Start/End Time**	
Inspector's Name(s)			
Inspector's Contact Information			
Inspector's Qualifications			
Describe present phase of construction			

Type of Inspection:
q Regular q Pre-storm event q During storm event q Post-storm event

Weather Information

Has there been a storm event since the last inspection? q Yes q No
If yes, provide:
Storm Start Date & Time: Storm Duration (hrs): Approximate Amount of Precipitation (in):

Weather at time of this inspection?
q Clear q Cloudy q Rain q Sleet q Fog q Snowing q High Winds
q Other: Temperature:

Have any discharges occurred since the last inspection? q Yes q No
If yes, describe:

Are there any discharges at the time of inspection? q Yes q No
If yes, describe:

Site-specific BMPs

- *Number the structural and non-structural BMPs identified in your SWPPP on your site map and list them below (add as many BMPs as necessary). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required BMPs at your site.*
- *Describe corrective actions initiated, date completed, and note the person that completed the work in the Corrective Action Log.*

	BMP	BMP Installed?	BMP Maintenance Required?	Corrective Action Needed and Notes
1	Silt Fence	q Yes q No	q Yes q No	
2	Stabilized Construction Entrance	q Yes q No	q Yes q No	
3	Inlet protection	q Yes q No	q Yes q No	
4	Stabilization	q Yes q No	q Yes q No	
5	Stormwater Management Facility	q Yes q No	q Yes q No	

Overall Site Issues
Below are some general site issues that should be assessed during inspections. Customize this list as needed for conditions at your site.

Circular enerG Facility

	BMP/activity	Implemented?	Maintenance Required?	Corrective Action Needed and Notes
1	Are all slopes and disturbed areas not actively being worked properly stabilized?	q Yes q No	q Yes q No	
2	Are natural resource areas (e.g., streams, wetlands, mature trees, etc.) protected with barriers or similar BMPs?	q Yes q No	q Yes q No	
3	Are perimeter controls and sediment barriers adequately installed (keyed into substrate) and maintained?	q Yes q No	q Yes q No	
4	Are discharge points and receiving waters free of any sediment deposits?	q Yes q No	q Yes q No	
5	Are storm drain inlets properly protected?	q Yes q No	q Yes q No	
6	Is the construction exit preventing sediment from being tracked into the street?	q Yes q No	q Yes q No	
7	Is trash/litter from work areas collected and placed in covered dumpsters?	q Yes q No	q Yes q No	
8	Are washout facilities (e.g., paint, stucco, concrete) available, clearly marked, and maintained?	q Yes q No	q Yes q No	
9	Are vehicle and equipment fueling, cleaning, and maintenance areas free of spills, leaks, or any other deleterious material?	q Yes q No	q Yes q No	
10	Are materials that are potential stormwater contaminants stored inside or under cover	q Yes q No	q Yes q No	
11	Are non-stormwater discharges (e.g., wash water, dewatering) properly controlled?	q Yes q No	q Yes q No	
12	Temporary basin	q Yes q No	q Yes q No	q Yes q No

Non-Compliance

Circular enerG Facility

Describe any incidents of non-compliance not described above:

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print name and title:

Signature:_____ Date:_____

Stormwater Pond/Wetland Operation, Maintenance and Management Inspection Checklist

Project _____
Location: _____
Site Status: _____

Date: _____
Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
1. Embankment and emergency spillway (Annual, After Major Storms)		
1. Vegetation and ground cover adequate		
2. Embankment erosion		
3. Animal burrows		
4. Unauthorized planting		
5. Cracking, bulging, or sliding of dam		
a. Upstream face		
b. Downstream face		
c. At or beyond toe		
downstream		
upstream		
d. Emergency spillway		
6.Pond, toe & chimney drains clear and functioning		
7.Seeps/leaks on downstream face		
8.Slope protection or riprap failure		
9. Vertical/horizontal alignment of top of dam "As-Built"		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
10. Emergency spillway clear of obstructions and debris		
11. Other (specify)		
2. Riser and principal spillway (Annual)		
Type: Reinforced concrete _____ Corrugated pipe _____ Masonry _____ 1. Low flow orifice obstructed		
2. Low flow trash rack. a. Debris removal necessary		
b. Corrosion control		
3. Weir trash rack maintenance a. Debris removal necessary		
b. corrosion control		
4. Excessive sediment accumulation insider riser		
5. Concrete/masonry condition riser and barrels a. cracks or displacement		
b. Minor spalling (<1")		
c. Major spalling (rebars exposed)		
d. Joint failures		
e. Water tightness		
6. Metal pipe condition		
7. Control valve a. Operational/exercised		
b. Chained and locked		
8. Pond drain valve a. Operational/exercised		
b. Chained and locked		
9. Outfall channels functioning		
10. Other (specify)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
3. Permanent Pool (Wet Ponds) (monthly)		
1. Undesirable vegetative growth		
2. Floating or floatable debris removal required		
3. Visible pollution		
4. Shoreline problem		
5. Other (specify)		
4. Sediment Forebays		
1.Sedimentation noted		
2. Sediment cleanout when depth < 50% design depth		
5. Dry Pond Areas		
1. Vegetation adequate		
2. Undesirable vegetative growth		
3. Undesirable woody vegetation		
4. Low flow channels clear of obstructions		
5. Standing water or wet spots		
6. Sediment and / or trash accumulation		
7. Other (specify)		
6. Condition of Outfalls (Annual , After Major Storms)		
1. Riprap failures		
2. Slope erosion		
3. Storm drain pipes		
4.Endwalls / Headwalls		
5. Other (specify)		
7. Other (Monthly)		
1. Encroachment on pond, wetland or easement area		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
2. Complaints from residents		
3.Aesthetics a. Grass growing required		
b. Graffiti removal needed		
c. Other (specify)		
4. Conditions of maintenance access routes.		
5. Signs of hydrocarbon build-up		
6. Any public hazards (specify)		
8. Wetland Vegetation (Annual)		
1. Vegetation healthy and growing Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)		
2. Dominant wetland plants: Survival of desired wetland plant species Distribution according to landscaping plan?		
3. Evidence of invasive species		
4. Maintenance of adequate water depths for desired wetland plant species		
5. Harvesting of emergent plantings needed		
6. Have sediment accumulations reduced pool volume significantly or are plants "choked" with sediment		
7. Eutrophication level of the wetland.		
8. Other (specify)		

Comments:

Actions to be Taken:

Bioretention Construction Inspection Checklist

Project:
Location:
Site Status:

Date:

Time:

Inspector:

CONSTRUCTION SEQUENCE	SATISFACTORY/ UNSATISFACTORY	COMMENTS
1. Pre-Construction		
Pre-construction meeting		
Runoff diverted		
Facility area cleared		
If designed as exfilter, soil testing for permeability		
Facility location staked out		
2. Excavation		
Size and location		
Lateral slopes completely level		
If designed as exfilter, ensure that excavation does not compact susoils.		
Longitudinal slopes within design range		

CONSTRUCTION SEQUENCE	SATISFACTORY / UNSATISFACTORY	COMMENTS
3. Structural Components		
Stone diaphragm installed correctly		
Outlets installed correctly		
Underdrain		
Pretreatment devices installed		
Soil bed composition and texture		
4. Vegetation		
Complies with planting specs		
Topsoil adequate in composition and placement		
Adequate erosion control measures in place		
5. Final Inspection		
Dimensions		
Proper stone diaphragm		
Proper outlet		
Soil/ filter bed permeability testing		
Effective stand of vegetation and stabilization		
Construction generated sediments removed		
Contributing watershed stabilized before flow is diverted to the practice		

Comments:

Actions to be Taken:

STANDARD AND SPECIFICATIONS FOR COMPOST FILTER SOCK

Definition & Scope

A **temporary** sediment control practice composed of a degradable geotextile mesh tube filled with compost filter media to filter sediment and other pollutants associated with construction activity to prevent their migration offsite.

Condition Where Practice Applies

Compost filter socks can be used in many construction site applications where erosion will occur in the form of sheet erosion and there is no concentration of water flowing to the sock. In areas with steep slopes and/or rocky terrain, soil conditions must be such that good continuous contact between the sock and the soil is maintained throughout its length. For use on impervious surfaces such as road pavement or parking areas, proper anchorage must be provided to prevent shifting of the sock or separation of the contact between the sock and the pavement. Compost filter socks are utilized both at the site perimeter as well as within the construction areas. These socks may be filled after placement by blowing compost into the tube pneumatically, or filled at a staging location and moved into its designed location.

Design Criteria

1. Compost filter socks will be placed on the contour with both terminal ends of the sock extended 8 feet upslope at a 45 degree angle to prevent bypass flow.

2. Diameters designed for use shall be 12" – 32" except that 8" diameter socks may be used for residential lots to control areas less than 0.25 acres.

3. The flat dimension of the sock shall be at least 1.5 times the nominal diameter.

4. The **Maximum Slope Length** (in feet) above a compost filter sock shall not exceed the following limits:

Dia. (in.)	Slope %						
	2	5	10	20	25	33	50
8	225*	200	100	50	20	—	—
12	250	225	125	65	50	40	25
18	275	250	150	70	55	45	30
24	350	275	200	130	100	60	35
32	450	325	275	150	120	75	50

* Length in feet

5. The compost infill shall be well decomposed (matured at least 3 months), weed-free, organic matter. It shall be aerobically composted, possess no objectionable odors, and contain less than 1%, by dry weight, of man-made foreign matter. The physical parameters of the compost shall meet the standards listed in Table 5.2 - Compost Standards Table. **Note: All biosolids compost produced in New York State (or approved for importation) must meet NYS DEC's 6 NYCRR Part 360 (Solid Waste Management Facilities) requirements. The Part 360 requirements are equal to or more stringent than 40 CFR Part 503 which ensure safe standards for pathogen reduction and heavy metals content. When using compost filter socks adjacent to surface water, the compost should have a low nutrient value.**

6. The compost filter sock fabric material shall meet the

7. Compost filter socks shall be anchored in earth with 2" x 2" wooden stakes driven 12" into the soil on 10 foot centers on the centerline of the sock. On uneven terrain, effective ground contact can be enhanced by the placement of a fillet of filter media on the disturbed area side of the compost sock.

8. All specific construction details and material specifications shall appear on the erosion and sediment control constructions drawings when compost filter socks are included in the plan.

Maintenance

1. Traffic shall not be permitted to cross filter socks.

2. Accumulated sediment shall be removed when it reaches half the above ground height of the sock and disposed of in accordance with the plan.

3. Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired in the manner required by the manufacturer or replaced within 24 hours of inspection notification.

4. Biodegradable filter socks shall be replaced after 6 months; photodegradable filter socks after 1 year. Polypropylene socks shall be replaced according to the manufacturer's recommendations.

5. Upon stabilization of the area contributory to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed in accordance with the stabilization plan. For removal the mesh can be cut and the compost spread as an additional mulch to act as a soil supplement.

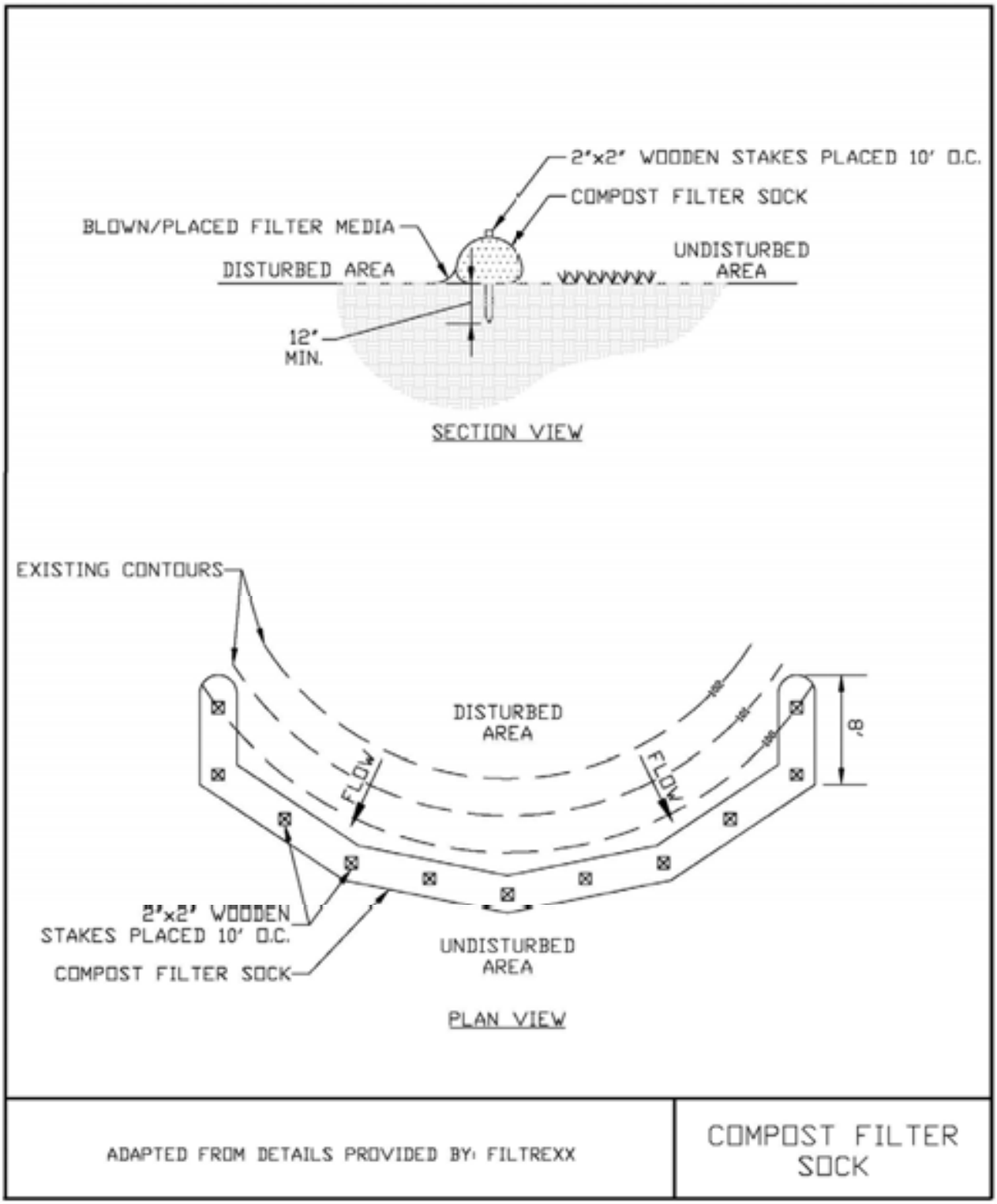
Table 5.1 - Compost Sock Fabric Minimum Specifications Table

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photodegradable	Photodegradable	Biodegradable	Photodegradable	Photodegradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

Table 5.2 - Compost Standards Table

Organic matter content	25% - 100% (dry weight)
Organic portion	Fibrous and elongated
pH	6.0 – 8.0
Moisture content	30% - 60%
Particle size	100% passing a 1" screen and 10 - 50% passing a 3/8" screen
Soluble salt concentration	5.0 dS/m (mmhos/cm) maximum

Figure 5.2
Compost Filter Sock



STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition & Scope

A **temporary** barrier of geotextile fabric installed on the contours across a slope used to intercept sediment laden runoff from small drainage areas of disturbed soil by temporarily ponding the sediment laden runoff allowing settling to occur. The maximum period of use is limited by the ultraviolet stability of the fabric (approximately one year).

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope length and fence length will not exceed the limits shown in the Design Criteria for the specific type of silt fence used ; and
2. Maximum ponding depth of 1.5 feet behind the fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier; and
5. Soil conditions allow for proper keying of fabric, or other anchorage, to prevent blowouts.

Design Criteria

1. Design computations are not required for installations of 1 month or less. Longer installation periods should be designed for expected runoff.
2. All silt fences shall be placed as close to the disturbed area as possible, but at least 10 feet from the toe of a slope steeper than 3H:1V, to allow for maintenance and roll down. The area beyond the fence must be undisturbed or stabilized.
3. The type of silt fence specified for each location on the plan shall not exceed the maximum slope length and maximum fence length requirements shown in the following table:

		Slope Length/Fence Length (ft.)		
Slope	Steepness	Standard	Reinforced	Super
<2%	< 50:1	300/1500	N/A	N/A
2-10%	50:1 to 10:1	125/1000	250/2000	300/2500
10-20%	10:1 to 5:1	100/750	150/1000	200/1000
20-33%	5:1 to 3:1	60/500	80/750	100/1000
33-50%	3:1 to 2:1	40/250	70/350	100/500
>50%	> 2:1	20/125	30/175	50/250

Standard Silt Fence (SF) is fabric rolls stapled to wooden stakes driven 16 inches in the ground.
Reinforced Silt Fence (RSF) is fabric placed against welded wire fabric with anchored steel posts driven 16 inches in the ground.
Super Silt Fence (SSF) is fabric placed against chain link fence as support backing with posts driven 3 feet in the ground.

4. Silt fence shall be removed as soon as the disturbed area has achieved final stabilization.

The silt fence shall be installed in accordance with the appropriate details. Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. Butt joints are not acceptable. A detail of the silt fence shall be shown on the plan. See Figure 5.30 on page 5.56 for Reinforced Silt Fence as an example of details to be provided.

Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot. Posts for super silt fence shall be standard chain link fence posts.

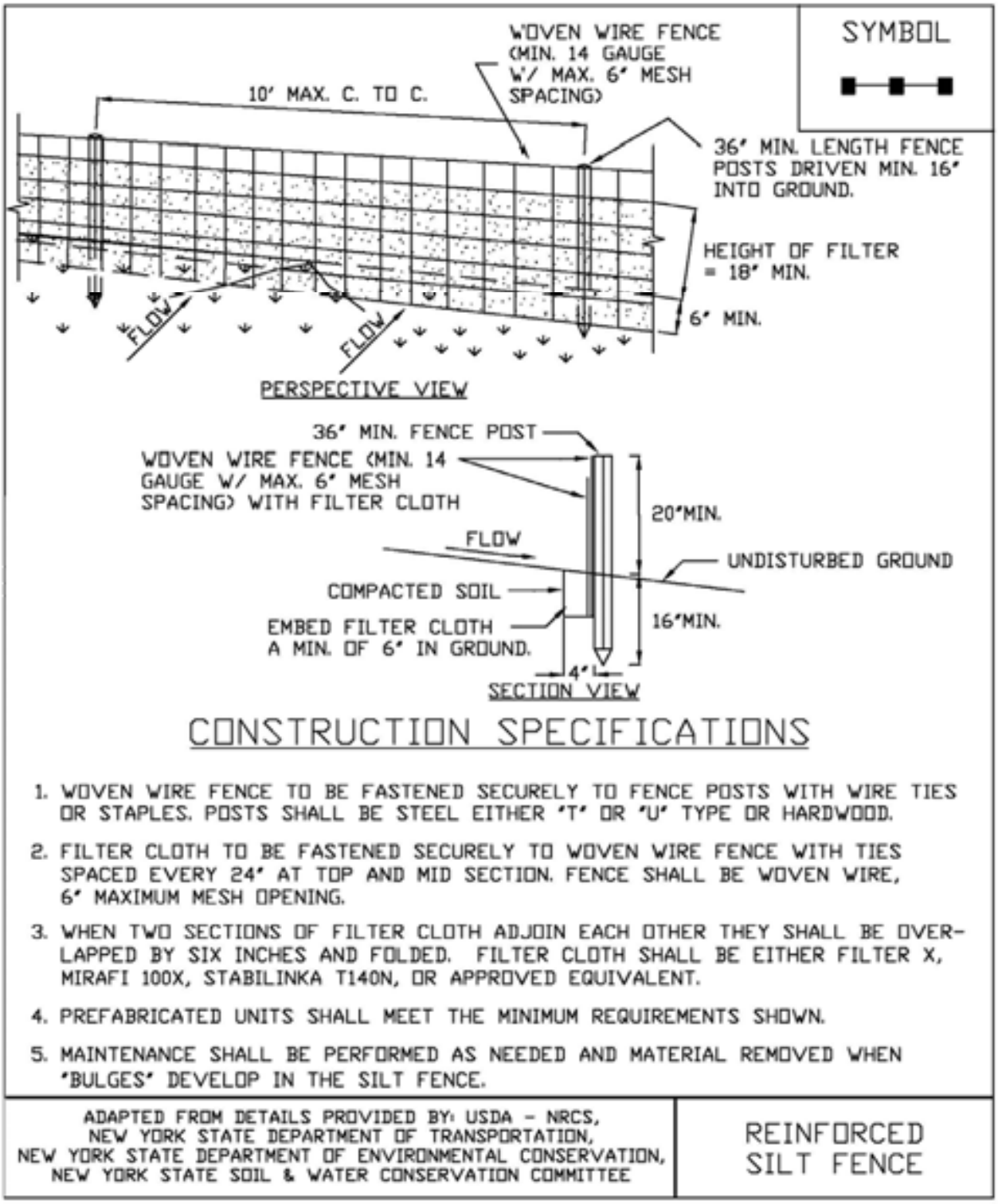
3. Wire Fence for reinforced silt fence: Wire fencing shall be a minimum 14 gage with a maximum 6 in. mesh opening, or as approved.

4. Prefabricated silt fence is acceptable as long as all material specifications are met.

Super Silt Fence

Reinforced Silt Fence

Figure 5.30
Reinforced Silt Fence



STANDARD AND SPECIFICATIONS FOR STORM DRAIN INLET PROTECTION

Definition & Scope

A **temporary** barrier with low permeability, installed around inlets in the form of a fence, berm or excavation around an opening, detaining water and thereby reducing the sediment content of sediment laden water by settling thus preventing heavily sediment laden water from entering a storm drain system.

Conditions Where Practice Applies

This practice shall be used where the drainage area to an inlet is disturbed, it is not possible to temporarily divert the storm drain outfall into a trapping device, and watertight blocking of inlets is not advisable. **It is not to be used in place of sediment trapping devices.** This practice shall be used with an upstream buffer strip if placed at a storm drain inlet on a paved surface. It may be used in conjunction with storm drain diversion to help prevent siltation of pipes installed with low slope angle.

Types of Storm Drain Inlet Practices

There are five (5) specific types of storm drain inlet protection practices that vary according to their function, location, drainage area, and availability of materials:

I. Excavated Drop Inlet Protection
II. Fabric Drop Inlet Protection
III. Stone & Block Drop Inlet Protection
IV. Paved Surface Inlet Protection
V. Manufactured Insert Inlet Protection

Design Criteria

Drainage Area – The drainage area for storm drain inlets shall not exceed one acre. Erosion control/temporary stabilization measures must be implemented on the disturbed drainage area tributary to the inlet. The crest elevations of these practices shall provide storage and minimize bypass flow.

Type I – Excavated Drop Inlet Protection

This practice is generally used during initial overlot grading after the storm drain trunk line is installed.

Limit the drainage area to the inlet device to 1 acre. Excavated side slopes shall be no steeper than 2:1. The minimum depth shall be 1 foot and the maximum depth 2 feet as measured from the crest of the inlet structure. Shape the excavated basin to fit conditions with the longest dimension oriented toward the longest inflow area to provide maximum trap efficiency. The capacity of the excavated basin should be established to contain 900 cubic feet per acre of disturbed area. Weep holes, protected by fabric and stone, should be provided for draining the temporary pool.

Inspect and clean the excavated basin after every storm. Sediment should be removed when 50 percent of the storage volume is achieved This material should be incorporated into the site in a stabilized manner.

Type II – Fabric Drop Inlet Protection

This practice is generally used during final elevation grading phases after the storm drain system is completed.

Limit the drainage area to 1 acre per inlet device. Land area slope immediately surrounding this device should not exceed 1 percent. The maximum height of the fabric above the inlet crest shall not exceed 1.5 feet unless reinforced.

The top of the barrier should be maintained to allow overflow to drop into the drop inlet and not bypass the inlet to

unprotected lower areas. Support stakes for fabric shall be a minimum of 3 feet long, spaced a maximum 3 feet apart. They should be driven close to the inlet so any overflow drops into the inlet and not on the unprotected soil. Improved performance and sediment storage volume can be obtained by excavating the area.

Inspect the fabric barrier after each rain event and make repairs as needed. Remove sediment from the pool area as necessary with care not to undercut or damage the filter fabric. Upon stabilization of the drainage area, remove all materials and unstable sediment and dispose of properly. Bring the adjacent area of the drop inlet to grade, smooth and compact and stabilize in the appropriate manner to the site.

Type III – Stone and Block Drop Inlet Protection

This practice is generally used during the initial and intermediate overlot grading of a construction site.

Limit the drainage area to 1 acre at the drop inlet. The stone barrier should have a minimum height of 1 foot and a maximum height of 2 feet. Do not use mortar. The height should be limited to prevent excess ponding and bypass flow.

Recess the first course of blocks at least 2 inches below the crest opening of the storm drain for lateral support. Subsequent courses can be supported laterally if needed by placing a 2x4 inch wood stud through the block openings perpendicular to the course. The bottom row should have a few blocks oriented so flow can drain through the block to dewater the basin area.

The stone should be placed just below the top of the blocks on slopes of 2:1 or flatter. Place hardware cloth of wire mesh with ½ inch openings over all block openings to hold stone in place.

As an optional design, the concrete blocks may be omitted and the entire structure constructed of stone, ringing the outlet ("doughnut"). The stone should be kept at a 3:1 slope toward the inlet to keep it from being washed into the inlet. A level area 1 foot wide and four inches below the crest will further prevent wash. Stone on the slope toward the inlet should be at least 3 inches in size for stability and 1 inch or smaller away from the inlet to control flow rate. The elevation of the top of the stone crest must be maintained 6 inches lower than the ground elevation down slope from the inlet to ensure that all storm flows pass over the stone into the storm drain and not past the structure. Temporary diking should be used as necessary to prevent bypass flow.

The barrier should be inspected after each rain event and repairs made where needed. Remove sediment as necessary to provide for accurate storage volume for subsequent rains. Upon stabilization of contributing drainage area, remove all materials and any unstable soil and dispose of properly.

Bring the disturbed area to proper grade, smooth, compact and stabilize in a manner appropriate to the site.

Type IV – Paved Surface Inlet Protection

This practice is generally used after pavement construction has been done while final grading and soil stabilization is occurring. These practices should be used with upstream buffer strips in linear construction applications, and with temporary surface stabilization for overlot areas, to reduce the sediment load at the practice. This practice includes sand bags, compost filter socks, geo-tubes filled with ballast, and manufactured surface barriers. Pea gravel can also be used in conjunction with these practices to improve performance. When the inlet is not at a low point, and is offset from the pavement or gutter line, protection should be selected and installed so that flows are not diverted around the inlet.

The drainage area should be limited to 1 acre at the drain inlet. All practices will be placed at the inlet perimeter or beyond to maximize the flow capacity of the inlet. Practices shall be weighted, braced, tied, or otherwise anchored to prevent movement or shifting of location on paved surfaces. Traffic safety shall be integrated with the use of this practice. All practices should be marked with traffic safety cones as appropriate. Structure height shall not cause flooding or by-pass flow that would cause additional erosion.

The structure should be inspected after every storm event. Any sediment should be removed and disposed of on the site. Any broken or damaged components should be replaced. Check all materials for proper anchorage and secure as necessary.

Type V - Manufactured Insert Inlet Protection

The drainage area shall be limited to 1 acre at the drain inlet. All inserts will be installed and anchored in accordance with the manufacturers recommendations and design details. The fabric portion of the structure will equal or exceed the performance standard for the silt fence fabric. The inserts will be installed to preserve a minimum of 50 percent of the open, unobstructed design flow area of the storm drain inlet opening to maintain capacity for storm events.

Figure 5.31
Excavated Drop Inlet Protection

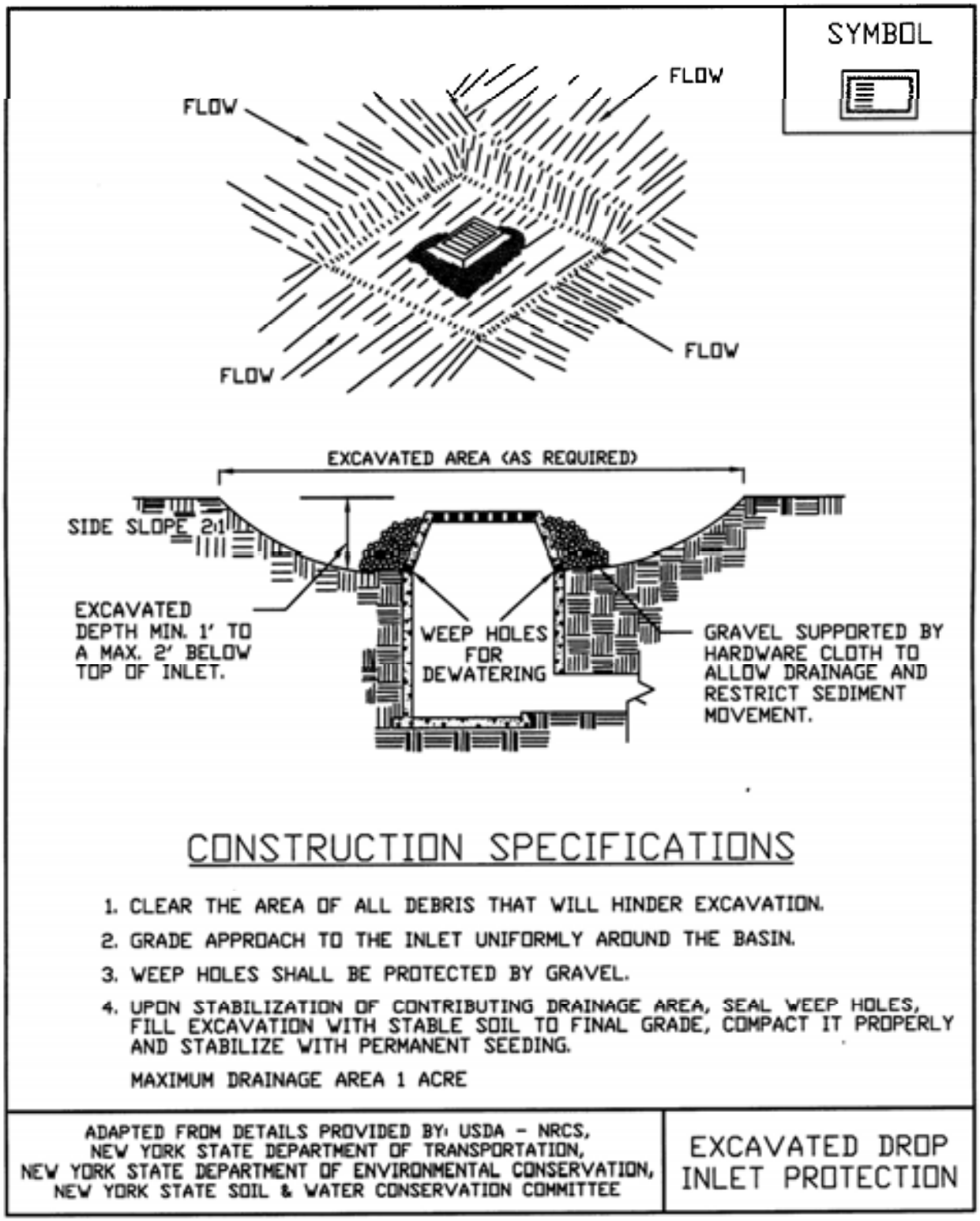


Figure 5.32
Fabric Drop Inlet Protection

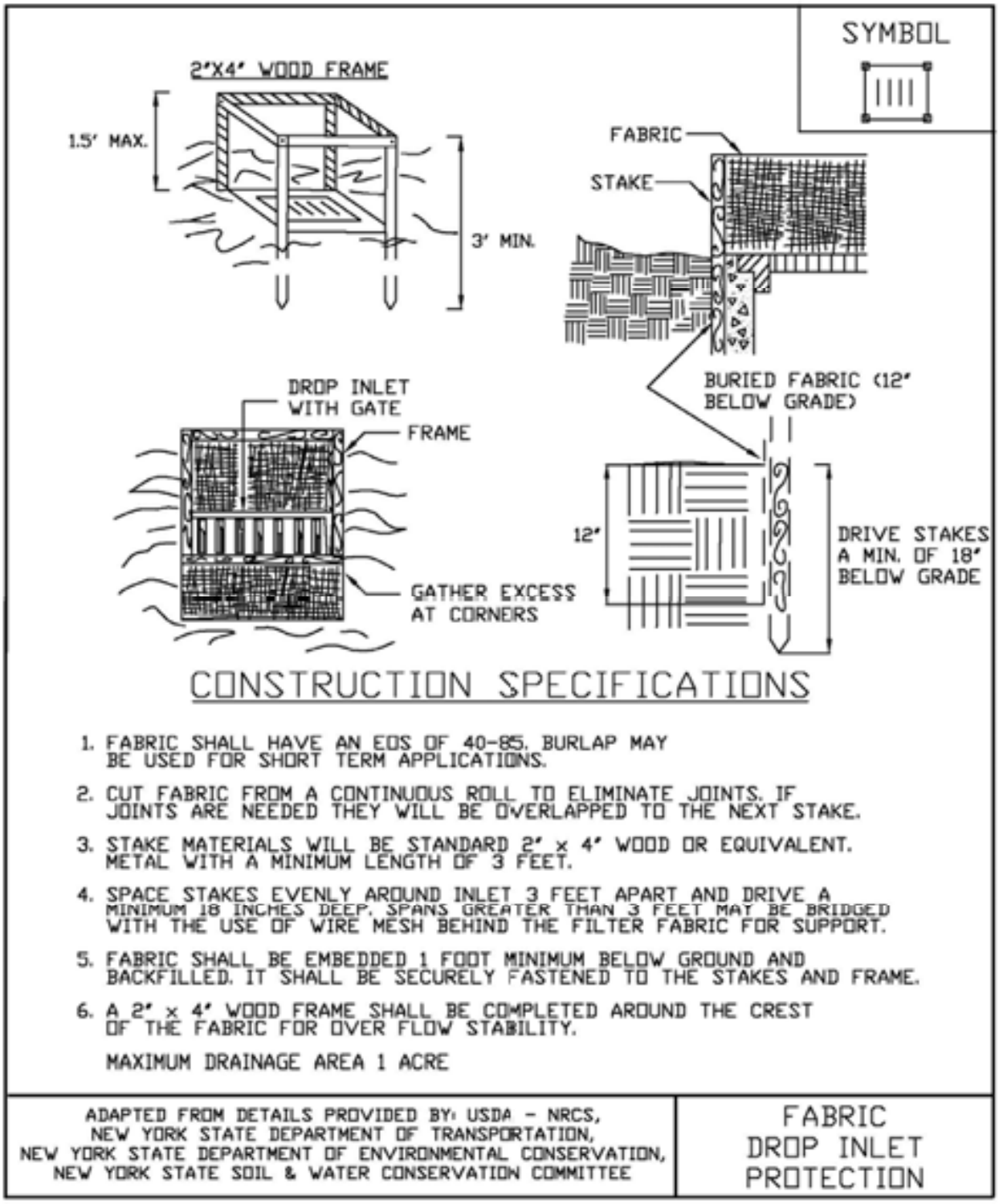
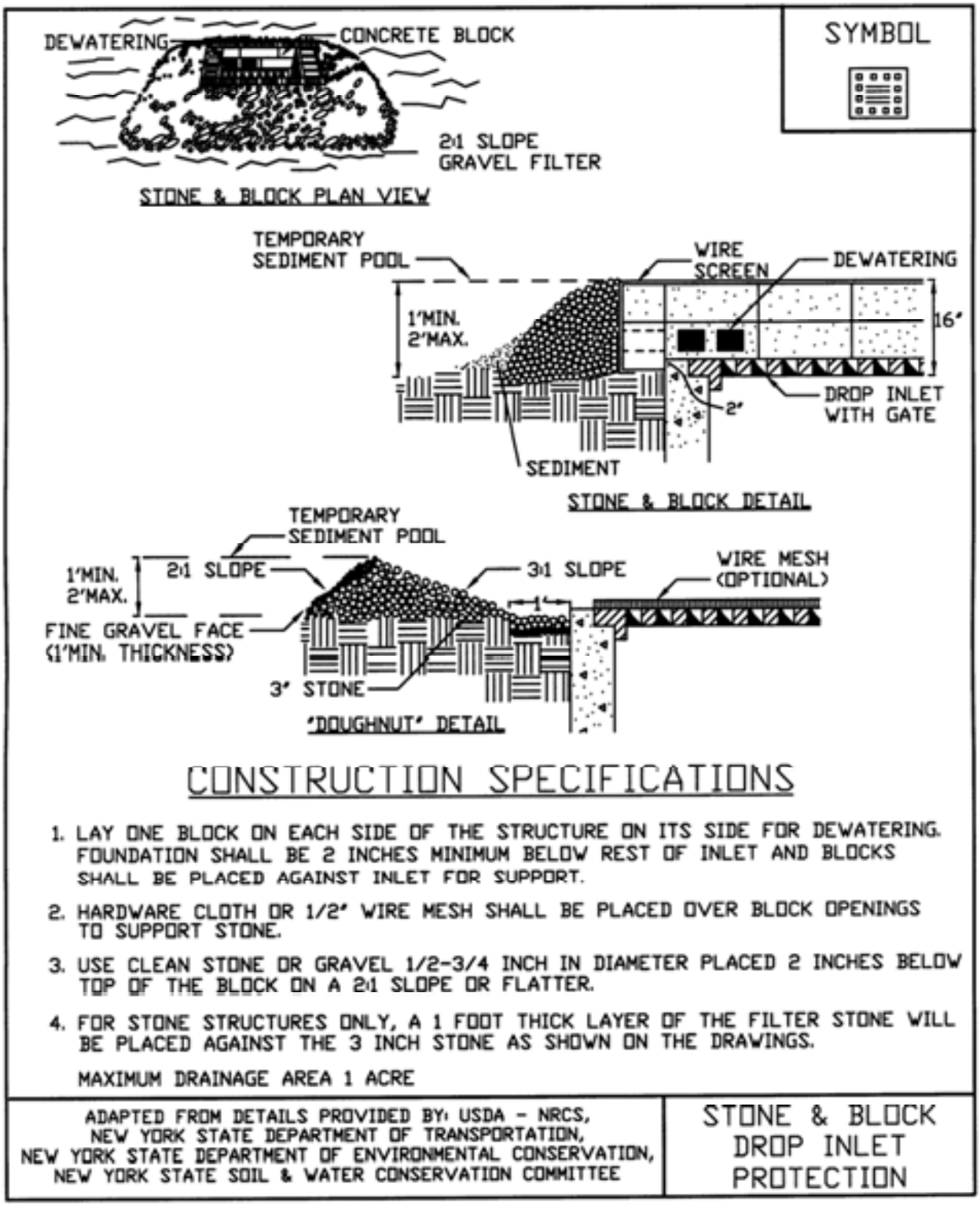


Figure 5.33
Stone & Block Drop Inlet Protection



STANDARD AND SPECIFICATIONS FOR CHECK DAM

Definition & Scope

Small barriers or dams constructed of stone, bagged sand or gravel, or other durable materials across a drainageway to reduce erosion in a drainage channel by reducing the velocity of flow in the channel.

Conditions Where Practice Applies

This practice is used as a **temporary** and, in some cases, a **permanent** measure to limit erosion by reducing velocities in open channels that are degrading or subject to erosion or where permanent stabilization is impractical due to short period of usefulness and time constraints of construction.

Design Criteria

Drainage Area: Maximum drainage area above the check dam shall not exceed two (2) acres.

Height: Not greater than 2 feet. Center shall be maintained 9 inches lower than abutments at natural ground elevation.

Side Slopes: Shall be 2:1 or flatter.

Spacing: The check dams shall be spaced as necessary in the channel so that the crest of the downstream dam is at the elevation of the toe of the upstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

Therefore:

$$S = \frac{h}{s}$$

Where: S = spacing interval (ft.)
h = height of check dam (ft.)
s = channel slope (ft./ft.)

Example:

For a channel with a 4% slope and 2 ft. high stone check dams, they are spaced as follows:

$$S = \frac{2\ \text{ft}}{0.04\ \frac{\text{ft}}{\text{ft}}} = 50\ \text{ft}$$

For stone check dams: Use a well graded stone matrix 2 to 9 inches in size (NYS – DOT Light Stone Fill meets these requirements).

The overflow of the check dams will be stabilized to resist erosion that might be caused by the check dam. See Figure 3.1 on page 3.3 for details.

Check dams should be anchored in the channel by a cutoff trench 1.5 ft. wide and 0.5 ft. deep and lined with filter fabric to prevent soil migration.

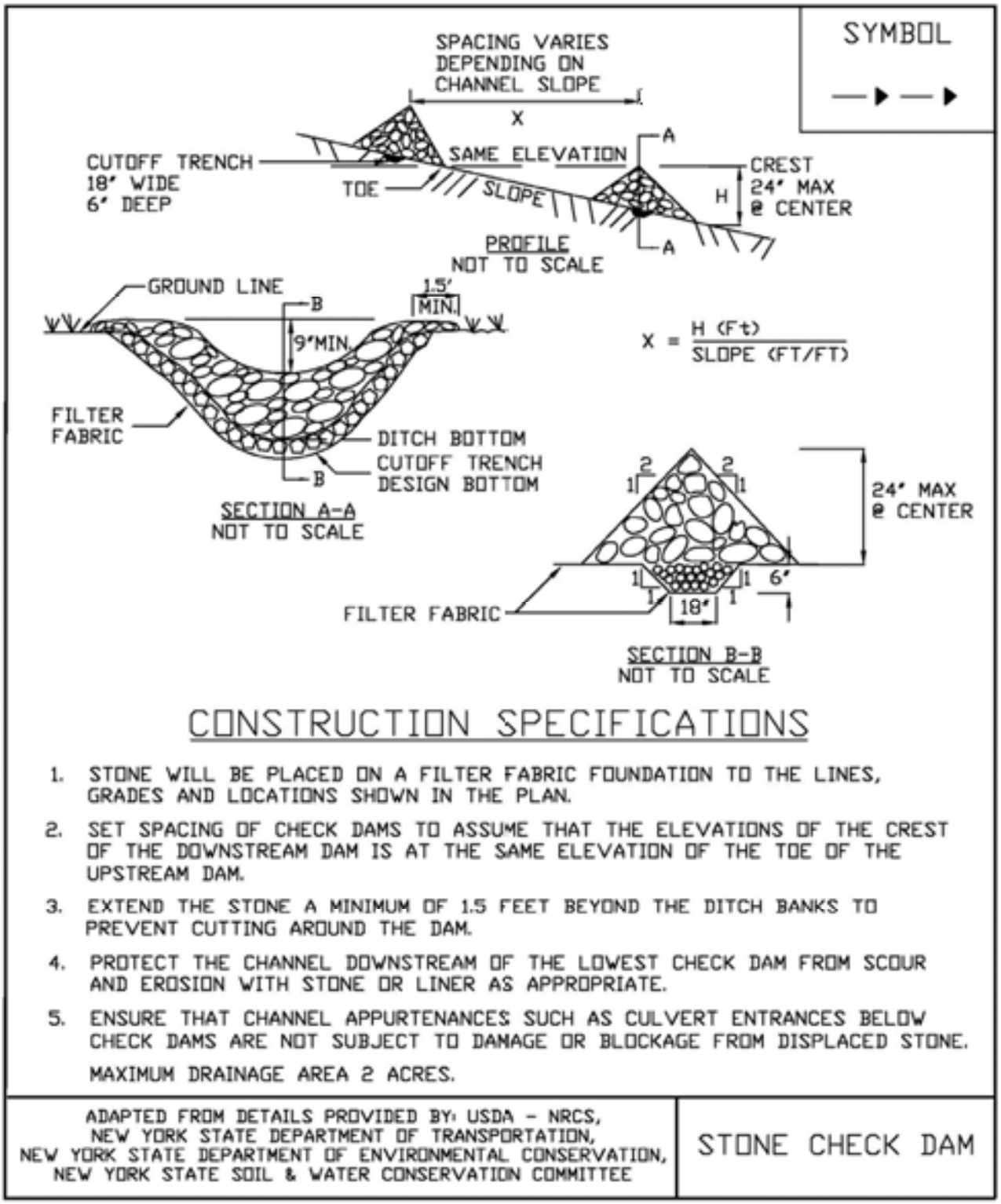
For filter sock or fiber roll check dams: The check dams will be anchored by staking the dam to the earth contact surface. The dam will extend to the top of the bank. The check dam will have a splash apron of NYS DOT #2 crushed stone extending a minimum 3 feet downstream from the dam and 1 foot up the sides of the channel. The compost and materials for a filter sock check dam shall meet the requirements shown in the standard for Compost Filter Sock on page 5.7.

Maintenance

The check dams should be inspected after each runoff event. Correct all damage immediately. If significant erosion has occurred between structures, a liner of stone or other suitable material should be installed in that portion of the channel or additional check dams added.

Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam.

Figure 3.1
Stone Check Dam Detail



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

MAXIMUM DRAINAGE AREA 2 ACRES.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE

STONE CHECK DAM

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with geotextile located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk, or parking area.

Purpose

The purpose of stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction entrance shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 5A.35 on page 5A.76 for details.

Aggregate Size: Use a matrix of 1-4 inch stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12-foot minimum but not less than the full width of points where ingress or egress occurs. 24-foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Geotextile: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single-family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Geotextile

The geotextile shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Opening Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth	6	10	--

[1]Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2]Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent.

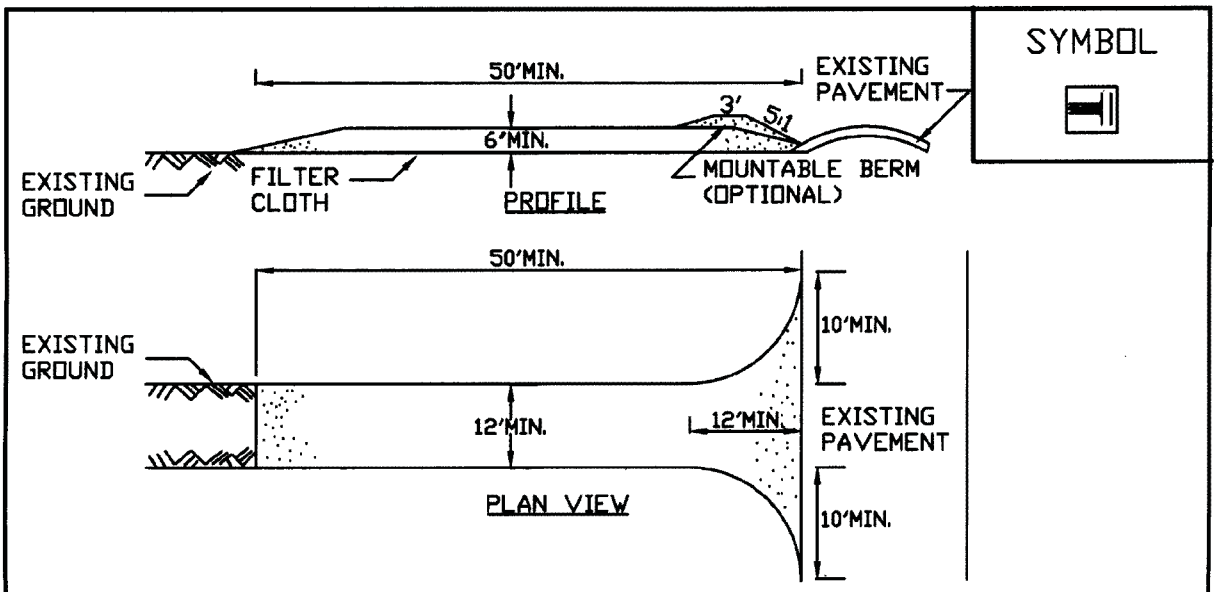
[3]Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment-trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 5A.35
Stabilized Construction Entrance



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 1-4 INCH STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
3. THICKNESS - NOT LESS THAN SIX (6) INCHES.
4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.
5. GEOTEXTILE - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON A AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NRCS, NEW YORK STATE DEPARTMENT OF TRANSPORTATION, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, NEW YORK STATE SOIL & WATER CONSERVATION COMMITTEE	STABILIZED CONSTRUCTION ENTRANCE

STORMWATER POLLUTION PREVENTION PLAN
GENERAL CONTRACTOR'S CERTIFICATION

Circular energy Facility
Town of Romulus, County of Seneca,
State of New York

GENERAL CONTRACTOR'S CERTIFICATION:

"I hereby certify 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 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. "

Name: _____ Signature: _____
(Print)
Title: _____
Company Name: _____
Address: _____
_____
Name and Title of Trained Individual _____
4-hour Stormwater Training Certificate #_____
Telephone Number: _____
Date : _____

Scope of Services: Site Contractor

The above listed contractor is responsible for the following practices: (check all that apply and add more as needed)

ü	SW Management Practice	ü	SW Management Practice	ü	SW Management Practice
	Construction Exit		Diversions		Solid Waste
	Silt Fence		Sediment Traps		Sanitary Waste
	Check Dams		Sediment Basins		Hazardous Waste Management
	Inlet Protection		Dust Control		Record Keeping/SWPPP modifications
	Erosion Control		Concrete Wash-out		
	Vegetation		Fuel Storage/Containment		

STORMWATER POLLUTION PREVENTION PLAN
SUBCONTRACTOR'S CERTIFICATION

Circular enerG Facility
Town of Romulus, County of Seneca, State of New York

SUBCONTRACTOR'S CERTIFICATION:

"I hereby certify 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 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. "

Name: _____ Signature: _____
(Print)
Title: _____
Company Name: _____
Address: _____
_____
Name and Title of Trained Individual _____
4-hour Stormwater Training Certificate #_____
Telephone Number: _____
Date : _____

Scope of Services: Site Contractor

The above listed contractor is responsible for the following practices: (check all that apply and add more as needed)

ü	SW Management Practice	ü	SW Management Practice	ü	SW Management Practice
	Construction Exit		Diversions		Solid Waste
	Silt Fence		Sediment Traps		Sanitary Waste
	Check Dams		Sediment Basins		Hazardous Waste Management
	Inlet Protection		Dust Control		Record Keeping/SWPPP modifications
	Erosion Control		Concrete Wash-out		
	Vegetation		Fuel Storage/Containment		

CIRCULAR enerG FACILITY
TOWN OF ROMULUS
SENECA COUNTY, NEW YORK STATE
ENGINEER'S REPORT

1.0 INTRODUCTION

Costich Engineering, D.P.C. has prepared this engineering report to supplement the Long Form EAF, design plans and the Special Use Permit application for the Circular enerG Facility

The project consists of the development within the former Seneca Army Depot, having tax map parcel no. 8-1-3.5 in the Town of Romulus for the construction and operation of a waste to energy power plant. The property is currently zoned Industrial/Warehousing (I/W) and is within the Environmental Restrictions Overlay. The proposed project is considered a renewable energy production use and requires a Special Use Permit from the Town of Romulus Planning Board.

The development site will consist of a main processing building and a number of outparcel buildings integral to the project. The main processing building contains the majority of the components required for the waste to energy process. Municipal solid waste (MSW) and combustible construction and demolition debris (C&D) will be delivered to the main processing building within sealed containers designed specifically for waste transport by a combination of over the road transfer trailers and rail cars.

The site currently exists as a portion of the decommissioned Seneca Army Depot. A majority of the required utilities currently exist on site (sanitary, water, gas, and electric).

Circular enerG, LLC intends to develop and maintain the property with frontage on East Kendaia Road, in the Town of Romulus. The project site includes approximately 48.3 acres, and is within a larger tax parcel totaling approximately 940.56 acres. The Project Site will be subdivided from the larger parcel. Figure 1.0 depicts the project location.

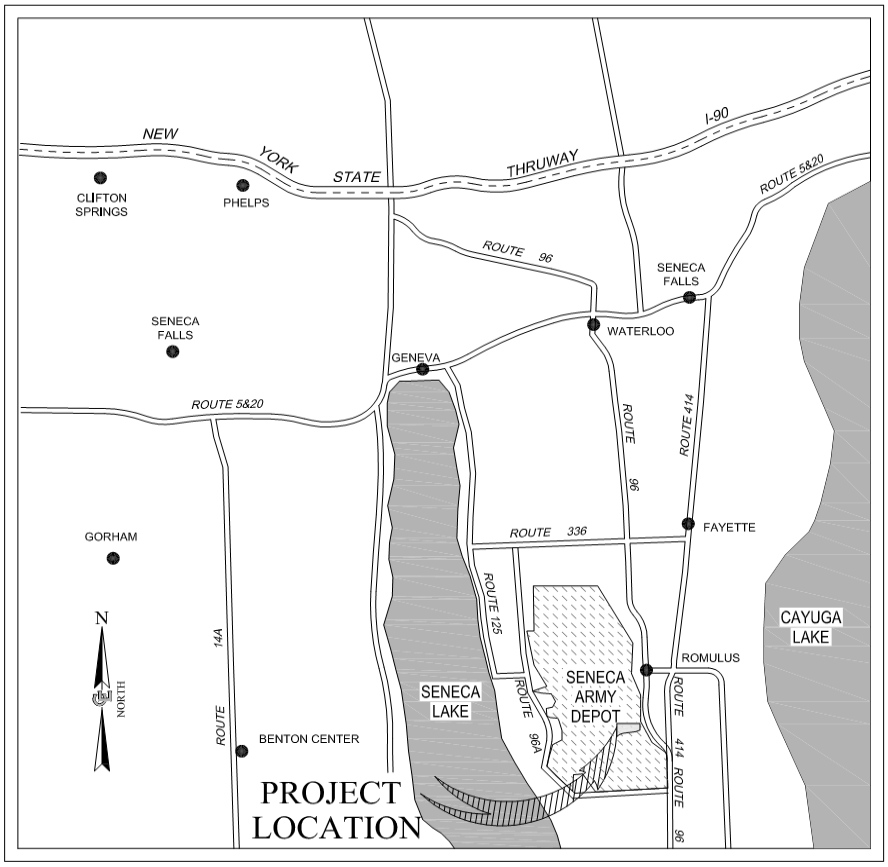
The development utilizes one existing access point to NYS Route 96. East Kendaia Road is privately owned and will be maintained by Circular enerG, LLC.

This report will outline the proposed site improvements and provide the design criteria and calculations used to support those improvements.

Sections 2 through 6 of this report will:

- Demonstrate domestic water, fire protection water and process can be provided in accordance with requirements for public water distribution systems.
- Explain the design of the sanitary mains and individual building laterals in accordance with standards.

- Provide documentation of the proposed on-site storm water conveyance system.
- Address the siltation/erosion control devices proposed during construction.
- Discuss the proposed traffic generations for the site.



LOCATION MAP

NOT TO SCALE

Figure 1.0 - Location Map

2.0 WATER MAINS & SERVICES

2.1 WATER DISTRIBUTION SYSTEM

Domestic water, for use in the facility bathrooms, laboratories and fire hydrants would be obtained from the Village of Waterloo municipal water supply. An existing 8-inch watermain adjacent to the facility is capable of supplying the required domestic and hydrant flow for the development.

Hydrant Flow Test Data

Test Location: +/- 1,900 ft west of Administration Ave.

Static Pressure: 93 psi Residual Pressure: 30 psi
Q_{20} = 996 gpm Observed Flow: 920 gpm

A proposed 8" diameter private watermain is proposed for the development The watermain will be internally looped to provide a redundant source of water. The public water supply will be metered and protected from entering public mains with a backflow preventor at the point of connection.

2.2 FIRE FLOW

The worst case model for fire flow is based on a hydrant at the most distant point in the system. A conservative hydrant demand of 750 gallons per minute was modeled and results indicate a residual pressure at the most remote hydrant of 47 psi. The residual pressure in the main at the connection equals 49 psi.

The proposed project will include an onsite underground reservoir used for recirculated process water storage and supplemental fire protection storage. The collected process water is stored in a divided 475,000 gallon concrete tank with 171,000 reserved for fire protection. In the adjacent water pump house, a pumping system circulates process water and pressurizes the fire protection system.

Calculations located in Appendix 1 demonstrate that sufficient volume and pressure is available for domestic and fire protection demands.

2.3 PROCESS WATER

The proposed project requires a constant supply of purified water. The project is proposing to withdraw water from Seneca Lake by utilizing the existing abandoned-in-place 8-inch watermain and treating the raw water onsite to meet the project needs. It is anticipated that upgrades and/or replacement of the existing watermain, pump, wetwell, and intake pipes will be required for this project. The process water demand is estimated at 445,000 gallons per day (309 gallons/minute). A Water Withdrawal Permit from NYSDEC will likely be required.

3.0 SANITARY MAINS & LATERALS

An existing 10-inch and 12-inch clay tile gravity sanitary sewer currently exists within the property, and flows in a northerly direction to the existing Seneca County Wastewater Treatment Plant #4, located on West Romulus Road.

The proposed development will generate both domestic wastewater and process wastewater. All flows will be directed to the existing Seneca County Wastewater Treatment Plant #4. Preliminary reconnaissance and communication with the County has begun to determine the required upgrades to the existing wastewater treatment plant.

The proposed 8-inch mains conveying flows from the development, contributes an estimated full flow capacity of 88 gallons per minute (GPM). The proposed main has a capacity under gravity conditions of 378 gallons per minute.

Connection to the sanitary sewer will be made in accordance with the Town of Romulus specifications and NYS Department of Health. Appendix 2 contains calculations for sanitary lateral flow capacities and anticipated facility flows.

4.0 SWPPP & DRAINAGE

Stormwater management practices for the project will be developed in accordance with the NYS-DEC Phase II Stormwater regulations and Town of Romulus Design Guidelines.

The overall drainage patterns for the site are being maintained. Bioretention areas are to be implemented as green infrastructure practices to provide water quality and runoff reduction volume. Post development peak runoff rates are to be kept below existing runoff rates through the use of extended detention wet ponds.

Please refer to the full Stormwater Pollution Prevention Plan, as prepared by Costich Engineering for a complete drainage overview, description of soils, description of existing and developed drainage conditions and routings, WQv/RRv/CPv methodology and calculations, basis for design and all other topics as required by the NYSDEC SPDES General Permit for Stormwater Discharge for Construction Activities.

5.0 EARTHWORK, EROSION CONTROL& SEDIMENT CONTROL

The grading scheme for the site will be developed to allow development of the parcel in a manner which maintains the general character of the site. The proposed grading plan has been designed to allow for the site to be developed in a generally "balanced" earthwork condition utilizing onsite soils.

The installation, maintenance, and subsequent removal of all erosion and sediment controls are to be outlined on a ‘Grading, Erosion and Sediment Control Plan’ and in the Stormwater Pollution Prevention Plan. Proposed erosion and sediment control practices to be implemented are to include (but not limited to) stabilized construction entrances perimeter silt fence, check dams, inlet protection, temporary sediment basin and dust control (if applicable).

Prior to removing ground cover, silt fence perimeter protection must be installed in accordance with the contract drawing and SWPPP details. All erosion and sediment control measures as listed above will remain in-place until sufficient ground cover has been installed and established.

6.0 TRAFFIC

The development of the parcel will include one existing access point to NYS Route 96. No highway utility or access permits will be required from the NYSDOT for the project.

Traffic generated by the development will not adversely affect traffic flows and patterns within the adjacent roadway corridors. Please refer to detailed Traffic Impact Study as completed by SRF and Associates.

APPENDIX I

```
**********************************************************************
*                            E P A N E T                             *
*                    Hydraulic and Water Quality                     *
*                    Analysis for Pipe Networks                      *
*                          Version 2.0                               *
**********************************************************************
```

Input File: Fire Flow.net

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in	
2	3	2	266	8	
3	3	4	58	8	
4	4	5	660	8	
5	5	6	92	8	
7	7	8	158	8	
8	8	9	167	8	
9	2	10	150	8	
10	10	11	100	8	
17	7	19	165	8	
18	19	6	30	8	
19	19	20	10	6	
20	9	11	870	8	
1	1	2	#N/A	#N/A	Pump

Energy Usage:

Pump	Usage Factor	Avg. Effic.	Kw-hr /Mgal	Avg. Kw	Peak Kw	Cost /day
1	100.00	75.00	482.67	21.72	21.72	0.00
				Demand Charge:		0.00
				Total Cost:		0.00

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality
2	0.00	845.23	49.93	0.00
3	0.00	843.94	49.37	0.00
4	0.00	843.66	49.25	0.00
5	0.00	840.47	47.87	0.00
6	0.00	840.02	48.11	0.00
7	0.00	840.43	47.85	0.00
8	0.00	840.95	48.08	0.00
9	0.00	841.51	47.45	0.00

Node Results: (continued)

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
10	0.00	844.73	49.71	0.00	
11	0.00	844.40	49.14	0.00	
19	0.00	839.88	47.61	0.00	
20	750.00	839.29	47.35	0.00	
1	-750.00	730.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status	
2	-412.89	2.64	4.84	Open	
3	412.89	2.64	4.84	Open	
4	412.89	2.64	4.84	Open	
5	412.89	2.64	4.84	Open	
7	-337.11	2.15	3.32	Open	
8	-337.11	2.15	3.32	Open	
9	337.11	2.15	3.32	Open	
10	337.11	2.15	3.32	Open	
17	337.11	2.15	3.32	Open	
18	-412.89	2.64	4.84	Open	
19	750.00	8.51	59.32	Open	
20	-337.11	2.15	3.32	Open	
1	750.00	0.00	-115.23	Open	Pump

APPENDIX II

COSTICH ENGINEERING
217 Lake Avenue
ROCHESTER, NEW YORK 14608
(585) 458-3020
Fax (585) 458-2731

JOB CIRCULAR energ
SHEET NO. 1 OF 1
CALCULATED BY M.O.R. DATE 10/31/17
CHECKED BY DATE
SCALE

SANITARY SEWER CAPACITY CALCULATION

- PROPOSED PROJECT GENERATES APPROXIMATELY 127,000 GALLONS/DAY FROM THE LEACHATE AND DOMESTIC WASTEWATER.

PROPOSED FLOW = $127{,}000 \text{ gpd} \div \frac{24 \text{ HOURS}}{1 \text{ DAY}} \div \frac{60 \text{ MIN}}{1 \text{ HOUR}} = 88.2 \text{ gpm}$

PEAK FLOW = FOUR TIMES AVERAGE FLOW

$= 88.2 \times 4 = 352.8 \text{ gpm (PEAK)}$

- PROPOSED 8" DIA. PVC SANITARY SEWER HAS THE FOLLOWING CAPACITY:

$$Q = \frac{1.49}{n} \times A \times R^{2/3} \times S^{1/2}$$

WHERE: n = mannings friction factor = 0.012

A = cross-sectional Area = $\pi(0.33)^2 = 0.35 \text{ ft}^2$

$R = A/WP \quad WP = \pi(0.67) = 2.1 \text{ ft}$

$R = 0.35 \text{ ft}^2 / 2.1 \text{ ft} = 0.17 \text{ ft}$

$S = 0.40\% = 0.004 \text{ ft/ft}$

$$Q = \frac{1.49}{0.012} \times (0.35 \text{ ft}^2)(0.17)^{2/3}(0.004)^{1/2}$$

$$Q = 0.84 \text{ ft}^3/\text{sec} \times \frac{7.48 \text{ GAL}}{1 \text{ ft}^3} \times \frac{60 \text{ sec}}{1 \text{ min}} = \underline{378 \text{ gal/min}}$$

PROPOSED SEWER HAS CAPACITY TO CONVEY PEAK FLOWS.

100 Year Flood Zones

Floodplains (National Flood Hazard Layer)

FIRM Panels

Flood Zones

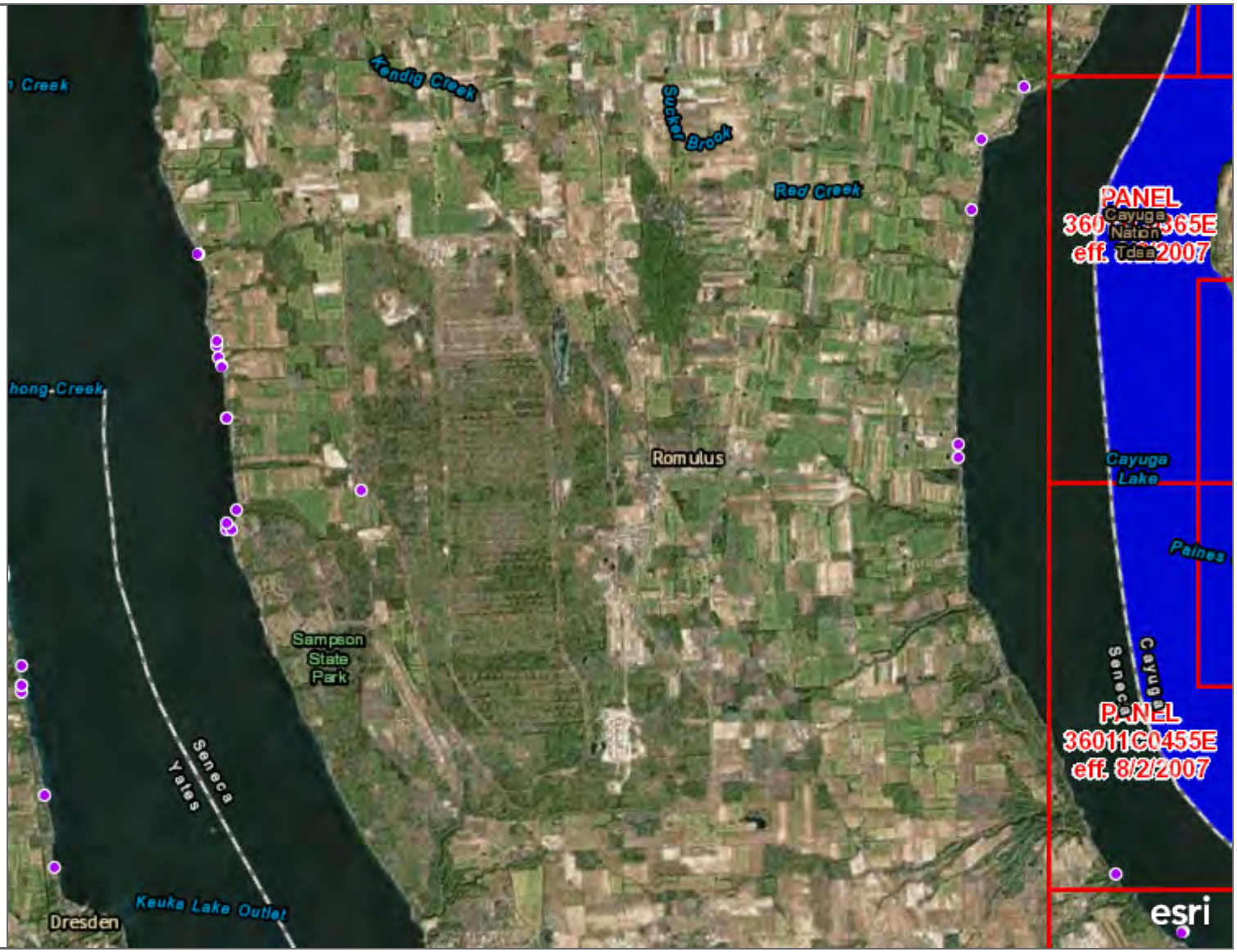
100 Year Flood Areas

National Flood Hazard Layer

FIRM Panels

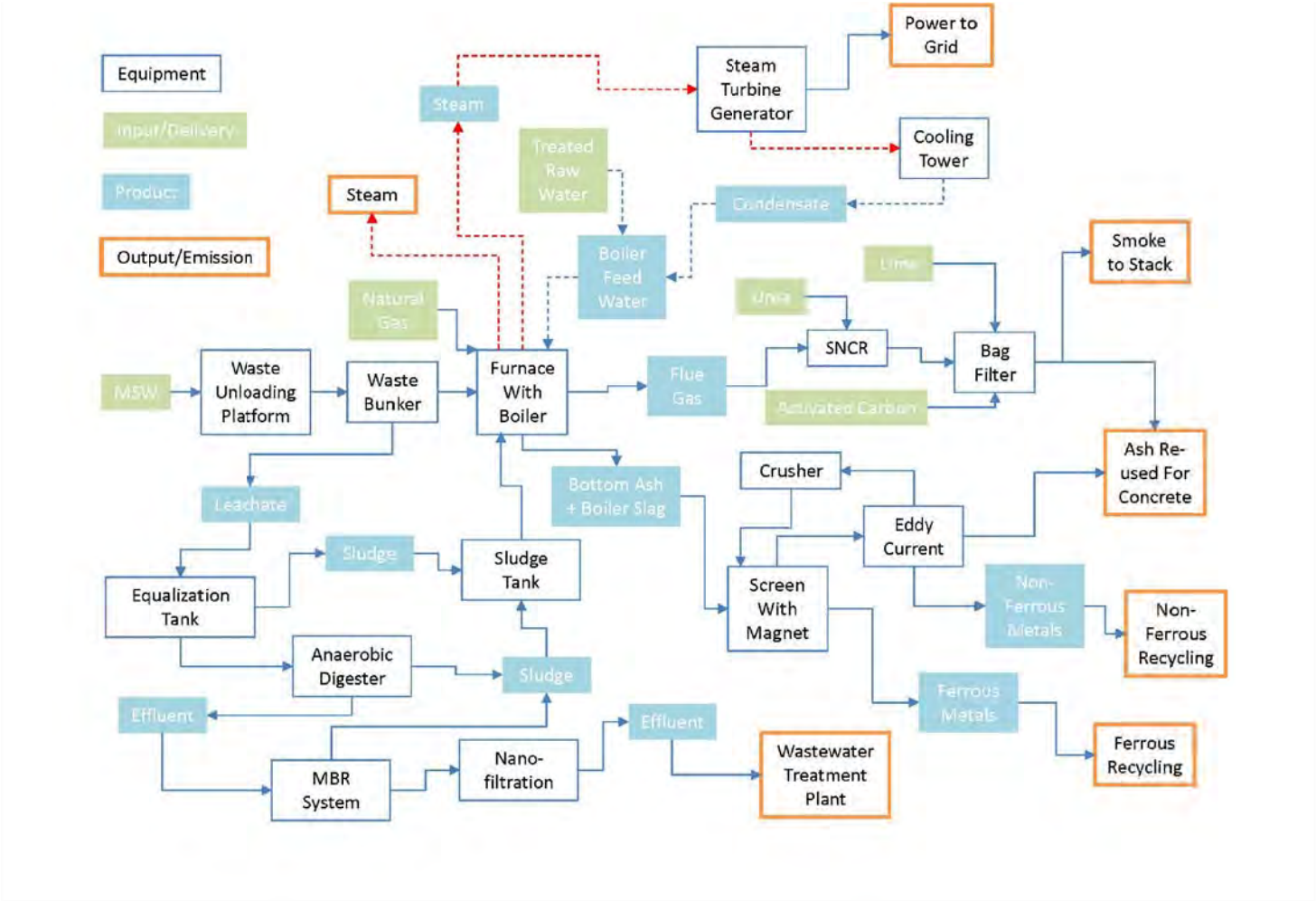
FEMA Letters of Map Amendments (LOMA) - NFHL

LOMAs



This web map represents Flood Insurance Rate Map (FIRM) data important for floodplain management, mitigation and insurance activities.

Esri, HERE, Garmin | Earthstar Geographics, CNES/Airbus DS | Source: FEMA, Esri



DAIGLER ENGINEERING, P.C.
CIVIL & GEO-ENVIRONMENTAL ENGINEERING
2620 GRAND ISLAND BLVD. GRAND ISLAND, NEW YORK 14072
(716) 773-6872 (716) 773-6873 FAX

CIRCULAR EnerG, LLC		NYWTE GENERAL PROCESS FLOW DIAGRAM			FIGURE 5-1
SCALE: N/A	REVISION # 0	WASTE-TO-ENERGY PLANT			
October 2017		TOWN OF ROMULUS	SENECA COUNTY	NEW YORK	

rsion 14

Waste Reduction Model (WARM) -- Inputs

Use this worksheet to describe the baseline and alternative waste management scenarios that you want to compare. The blue shaded areas indicate where you need to enter information.

1. Describe the baseline generation and management for the waste materials listed below.
If the material is not generated in your community or you do not want to analyze it, leave it blank or enter 0. Make sure that the total quantity generated equals the total quantity managed.

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Tons Generated
Aluminum Cans				NA	NA	0.0
Aluminum Ingot				NA	NA	0.0
Steel Cans				NA	NA	0.0
Copper Wire				NA	NA	0.0
Glass				NA	NA	0.0
HDPE				NA	NA	0.0
LDPE	NA			NA	NA	0.0
PET				NA	NA	0.0
LLDPE	NA			NA	NA	0.0
PP	NA			NA	NA	0.0
PS	NA			NA	NA	0.0
PVC	NA			NA	NA	0.0
PLA	NA				NA	0.0
Corrugated Containers				NA	NA	0.0
Magazines/Third-class Mail				NA	NA	0.0
Newspaper				NA	NA	0.0
Office Paper				NA	NA	0.0
Phonebooks				NA	NA	0.0
Textbooks				NA	NA	0.0
Dimensional Lumber				NA	NA	0.0
Medium-density Fiberboard				NA	NA	0.0
Food Waste (non-meat)	NA					0.0
Food Waste (meat only)	NA					0.0
Beef	NA					0.0
Poultry	NA					0.0
Grains	NA					0.0
Bread	NA					0.0
Fruits and Vegetables	NA					0.0
Dairy Products	NA					0.0
Yard Trimmings	NA					0.0
Grass	NA					0.0
Leaves	NA					0.0
Branches	NA					0.0
Mixed Paper (general)				NA	NA	0.0
Mixed Paper (primarily residential)				NA	NA	0.0
Mixed Paper (primarily from offices)				NA	NA	0.0
Mixed Metals				NA	NA	0.0
Mixed Plastics				NA	NA	0.0
Mixed Recyclables				NA	NA	0.0
Food Waste	NA					0.0
Mixed Organics	NA					0.0
Mixed MSW	NA	963,600.0		NA	NA	963,600.0
Carpet				NA	NA	0.0
Personal Computers				NA	NA	0.0
Clay Bricks	NA		NA	NA	NA	0.0
Concrete [1]			NA	NA	NA	0.0
Fly Ash [2]			NA	NA	NA	0.0
Tires [3]				NA	NA	0.0
Asphalt Concrete			NA	NA	NA	0.0
Asphalt Shingles				NA	NA	0.0
Drywall			NA	NA	NA	0.0
Fiberglass Insulation	NA		NA	NA	NA	0.0
Vinyl Flooring	NA			NA	NA	0.0
Wood Flooring	NA			NA	NA	0.0

2. Describe the alternative management scenario for the waste materials generated in the baseline.
Any decrease in generation should be entered in the Source Reduction column.
Any increase in generation should be entered in the Source Reduction column as a negative value.
Make sure that the total quantity generated equals the total quantity managed.

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested
Aluminum Cans					NA	NA
Aluminum Ingot					NA	NA
Steel Cans					NA	NA
Copper Wire					NA	NA
Glass					NA	NA
HDPE					NA	NA
LDPE		NA			NA	NA
PET					NA	NA
LLDPE		NA			NA	NA
PP		NA			NA	NA
PS		NA			NA	NA
PVC		NA			NA	NA
PLA		NA				NA
Corrugated Containers					NA	NA
Magazines/Third-class Mail					NA	NA
Newspaper					NA	NA
Office Paper					NA	NA
Phonebooks					NA	NA
Textbooks					NA	NA
Dimensional Lumber					NA	NA
Medium-density Fiberboard					NA	NA
Food Waste (non-meat)		NA				
Food Waste (meat only)		NA				
Beef		NA				
Poultry		NA				
Grains		NA				
Bread		NA				
Fruits and Vegetables		NA				
Dairy Products		NA				
Yard Trimmings	NA	NA				
Grass	NA	NA				
Leaves	NA	NA				
Branches	NA	NA				
Mixed Paper (general)					NA	NA
Mixed Paper (primarily residential)					NA	NA
Mixed Paper (primarily from offices)					NA	NA
Mixed Metals					NA	NA
Mixed Plastics					NA	NA
Mixed Recyclables	NA				NA	NA
Food Waste		NA				
Mixed Organics	NA	NA				
Mixed MSW	NA	NA		963,600.0	NA	NA
Carpet					NA	NA
Personal Computers					NA	NA
Clay Bricks		NA		NA	NA	NA
Concrete [1]	NA			NA	NA	NA
Fly Ash [2]	NA			NA	NA	NA
Tires [3]					NA	NA
Asphalt Concrete				NA	NA	NA
Asphalt Shingles					NA	NA
Drywall				NA	NA	NA
Fiberglass Insulation		NA		NA	NA	NA
Vinyl Flooring		NA			NA	NA
Wood Flooring		NA			NA	NA

Please enter data in short tons (1 short ton = 2,000 lbs.)
Please refer to the User's Guide if you need assistance completing this table.
1 Recycled concrete used as aggregate in the production of new concrete.
2 Recycled fly ash is utilized to displace portland cement in concrete production.
3 Recycling tires is defined in this analysis as using tires for crumb rubber applications and tire-derived aggregate uses in civil engineering applications.

3. In order to account for the avoided electricity-related emissions in the landfilling and combustion pathways, EPA assigns the appropriate regional "marginal" electricity grid mix emission factor based on your location. Select state for which you are conducting this analysis.

Please select state or select national average:	New York
Region Location:	Middle Atlantic

4. To estimate the benefits from source reduction, EPA usually assumes that the material that is source reduced would have been manufactured from the current mix of virgin and recycled inputs. However, you may choose to estimate the emission reductions from source reduction under the assumption that the material would have been manufactured from 100% virgin inputs in order to obtain an upper bound estimate of the benefits from source reduction. Select which assumption you want to use in the analysis. Note that for materials for which information on the share of recycled inputs used in production is unavailable or is not a common practice; EPA assumes that the current mix is comprised of 100% virgin inputs. Consequently, the source reduction benefits of both the "Current mix" and "100% virgin" inputs are the same.

- ● Current Mix
- ○ 100% Virgin

5. The emissions from landfilling depends on whether the landfill where your waste is disposed has a landfill gas (LFG) control system. If you do not know whether your landfill has LFG control, select "National Average" to calculate emissions based on the estimated proportions of landfills with LFG control in 2012 and proceed to question 7. If your landfill does not have a LFG system, select "No LFG Recovery" and proceed to question 8. If a LFG system is in place at your landfill, select "LFG Recovery" and click one of the options in 6a to indicate whether LFG is recovered for energy or flared.

- ○ National Average
- ● LFG Recovery
- ○ No LFG Recovery

6a. If your landfill has gas recovery, does it recover the methane for energy or flare it?

- ● Recover for energy
- ○ Flare

6b. For landfills that recover gas, the landfill gas collection efficiency will vary throughout the life of the landfill. Based on a literature review of field measurements and expert discussion, a range of collection efficiencies was estimated for a series of different landfill scenarios. The "typical" landfill is judged to represent the average U.S. landfill, although it must be recognized that every landfill is unique and a typical landfill is an approximation of reality. The worst-case collection scenario represents a landfill that is in compliance with EPA's New Source Performance Standards (NSPS). The aggressive gas collection scenario includes landfills where the operator is aggressive in gas collection relative to a typical landfill. Bioreactor landfills, which are operated to accelerate decomposition, are assumed to collect gas aggressively. The California regulatory collection scenario allows users to estimate and view landfill management results based on California regulatory requirements.

- ● Typical operation - DEFAULT
- ○ Worst-case collection
- ○ Aggressive gas collection
- ○ California regulatory collection

	Landfill gas collection efficiency (%) assumptions
Typical	*Years 0-1: 0%; Years 2-4: 50%; Years 5-14: 75%; Years 15 to 1 year before final cover: 82.5%; Final cover: 90%*
Worst-case	*Years 0-4: 0%; Years 5-9: 50%; Years 10-14: 75%; Years 15 to 1 year before final cover: 82.5%; Final cover: 90%*
Aggressive	*Year 0: 0%; Years 0.5-2: 50%; Years 3-14: 75%; Years 15 to 1 year before final cover: 82.5%; Final cover: 90%*
California	*Year 0: 0%; Year 1: 50%; Years 2-7: 80%; Years 8 to 1 year before final cover: 85%; Final cover: 90%*

7. Which of the following moisture conditions and associated bulk MSW decay rate (k) most accurately describes the average conditions at the landfill? The decay rates, also referred to as k values, describe the rate of change per year (yr-1) for the decomposition of organic waste in landfills. A higher average decay rate means that waste decomposes faster in the landfill.

- ● National average - DEFAULT
- ○ Dry (k=0.02)
- ○ Moderate (k = 0.04)
- ○ Wet (k = 0.06)
- ○ Bioreactor (k = 0.12)

	Moisture condition assumptions
Dry (k=0.02)	*Less than 20 inches of precipitation per year*
Moderate (k=0.04)	*Between 20 and 40 inches of precipitation per year*
Wet (k=0.06)	*Greater than 40 inches of precipitation per year*
Bioreactor (k=0.12)	*Water is added until the moisture content reaches 40 percent moisture on a wet weight basis*
National average	*Weighted average based on the share of waste received at each landfill type*

8a. For anaerobic digestion of food waste materials (including beef, poultry, grains, bread, fruits and vegetables, and dairy products), please choose the appropriate type of anaerobic digestion process used. Note that for grass, leaves, branches, yard trimmings and mixed organics, wet digestion is not applicable based on current technology and practices in the United States. Therefore, dry digestion is the only digestion type modeled in WARM for these materials. Only one type of digestion process (wet or dry) can be modeled at a time in WARM.

- ● Wet Digestion
- ○ Dry Digestion

8b. WARM assumes that digestate resulting from anaerobic digestion processes will be applied to land. In many cases, the digestate is cured before land application. When digestate is cured, the digestate is dewatered and any liquids are recovered and returned to the reactor (when using a wet digester). Next, the digestate is aerobically cured in turned windrows, then screened and applied to agricultural fields. Select whether the digestate resulting from your anaerobic digester is cured before land application.

- ● Cured - DEFAULT
- ○ Not cured

9a. Emissions that occur during transport of materials to the management facility are included in this model. You may use default transport distances, indicated in the table below, or provide information on the transport distances for the various MSW management options.

- ● Use Default Distances
- ○ Provide Information

9b. If you have chosen to provide information, please fill in the table below. Distances should be from the curb to the landfill, combustor, or material recovery facility (MRF). *Please note that if you chose to provide information, you must provide distances for both the baseline and the alternative scenarios.

Management Option	Default Distance (Miles)	Distance (Miles)
Landfill	20	245
Combustion	20	245
Recycling	20	
Composting	20	
Anaerobic Digestion	20	

10. If you wish to personalize your results report, input your name & organization, and also specify the project period corresponding to the data you entered above.

Name	Circular enerG Renewable Energy Project
Organization	Circular enerG, LLC

Project Period	From	Annual	to	Basis

Congratulations! You have finished all the inputs.
A summary of your results awaits you on the sheet(s) titled "Summary Report."
For more detailed analyses of GHG emissions, see the sheet(s) titled "Analysis Results."

GHG Emissions Analysis -- Summary Report

Version 14

GHG Emissions Waste Management Analysis for Circular enerG, LLC
Prepared by: Circular enerG Renewable Energy Project
Project Period for this Analysis: Annual to Basis

Note: If you wish to save these results, rename this file (e.g., WARM-MN1) and save it. Then the "Analysis Inputs" sheet of the "WARM" file will be blank when you are ready to make another model run.

GHG Emissions from Baseline Waste Management ($MTCO_2E$): 136,726

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$
Mixed MSW	NA	963,600.0	-	NA	NA	136,726

GHG Emissions from Alternative Waste Management Scenario ($MTCO_2E$): (31,759)

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total $MTCO_2E$	Change (Alt - Base) $MTCO_2E$
Mixed MSW	NA	NA	-	963,600.0	NA	NA	(31,759)	(168,485)

Total Change in GHG Emissions ($MTCO_2E$): (168,485)

Note: a negative value (i.e., a value in parentheses) indicates an emission reduction; a positive value

a) For explanation of methodology, see the EPA WARM Documentation:

Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks

-- available on the Internet at http://epa.gov/epawaste/conserve/tools/warm/SWMGHGreport.html
b) Emissions estimates provided by this model are intended to support voluntary GHG measurement and reporting initiatives.

c) The GHG emissions results estimated in WARM indicate the full life-cycle benefits waste management alternatives. Due to the timing of the GHG emissions from the waste management pathways, (e.g., avoided landfilling and increased recycling), the actual GHG implications may accrue over the long-term. Therefore, one should not interpret the GHG emissions implications as occurring all in one year, but rather through time.

This is equivalent to…

annual emissions from	**35,471**	Passenger Vehicles
Conserving	**18,958,636**	Gallons of Gasoline
Conserving	**7,020,225**	Cylinders of Propane Used for Home Barbeques
Conserving	**903**	Railway Cars of Coal
	0.00969%	Annual CO_2 emissions from the U.S. transportation sector
	0.00833%	Annual CO_2 emissions from the U.S. electricity sector

STANDARD AND SPECIFICATIONS FOR DUST CONTROL

Definition & Scope

The control of dust resulting from land-disturbing activities, to prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures shall be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Water quality must be considered when materials are selected for dust control. Where there is a potential for the material to wash off to a stream, ingredient information must be provided to the NYSDEC.

No polymer application shall take place without written approval from the NYSDEC.

Construction Specifications

A. **Non-driving Areas** – These areas use products and materials applied or placed on soil surfaces to prevent airborne migration of soil particles.

Vegetative Cover For disturbed areas not subject to traffic, vegetation provides the most practical method of dust control (see Section 3).

Mulch (including gravel mulch) – Mulch offers a fast effective means of controlling dust. This can also include rolled erosion control blankets.

Spray adhesives – These are products generally composed of polymers in a liquid or solid form that are mixed with water to form an emulsion that is sprayed on the soil surface with typical hydroseeding equipment. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations for the specific soils on the site. In no case should the application of these adhesives be made on wet soils or if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators and others working with the material.

B. **Driving Areas** – These areas utilize water, polymer emulsions, and barriers to prevent dust movement from the traffic surface into the air.

Sprinkling The site may be sprayed with water until the surface is wet. This is especially effective on haul roads and access route to provide short term limited dust control.

Polymer Additives – These polymers are mixed with water and applied to the driving surface by a water truck with a gravity feed drip bar, spray bar or automated distributor truck. The mixing ratios and application rates will be in accordance with the manufacturer's recommendations. Incorporation of the emulsion into the soil will be done to the appropriate depth based on expected traffic. Compaction after incorporation will be by vibratory roller to a minimum of 95%. The prepared surface shall be moist and no application of the polymer will be made if there is a probability of precipitation within 48 hours of its proposed use. Material Safety Data Sheets will be provided to all applicators working with the material.

Barriers – Woven geo-textiles can be placed on the driving surface to effectively reduce dust throw and particle migration on haul roads. Stone can also be used for construction roads for effective dust control.

Windbreak – A silt fence or similar barrier can control air currents at intervals equal to ten times the barrier height. Preserve existing wind barrier vegetation as much as practical.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

IPaC **U.S. Fish & Wildlife Service**

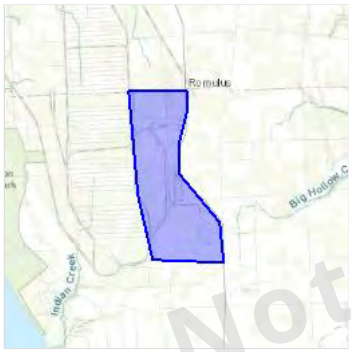
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Seneca County, New York



Not for consultation

Local office

New York Ecological Services Field Office

(607) 753-9334
(607) 753-9699

3817 Luker Road
Cortland, NY 13045-9349

http://www.fws.gov/northeast/nyfo/es/section7.htm

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.

5. Click REQUEST SPECIES LIST.

Listed species[1] are managed by the Endangered Species Program of the U.S. Fish and Wildlife Service.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat Myotis septentrionalis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Not for consultation

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any activity that results in the take (to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of migratory birds or eagles is prohibited unless authorized by the U.S. Fish and Wildlife Service[3]. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The migratory birds species listed below are species of particular conservation concern (e.g. Birds of Conservation Concern) that may be potentially affected by activities in this location. It is not a list of every bird species you may find in this location, nor a guarantee that all of the bird species on this list will be found on or near this location. Although it is important to try to avoid and minimize impacts to all birds, special attention should be made to avoid and minimize impacts to birds of priority concern. To view available data on other bird species that may occur in your project area, please visit the AKN Histogram Tools and Other Bird Data Resources. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

NAME	SEASON(S)
American Bittern Botaurus lentiginosus https://ecos.fws.gov/ecp/species/6582	Breeding
Bald Eagle Haliaeetus leucocephalus https://ecos.fws.gov/ecp/species/1626	Year-round
Black Tern Chlidonias niger https://ecos.fws.gov/ecp/species/3093	Breeding
Black-billed Cuckoo Coccyzus erythropthalmus https://ecos.fws.gov/ecp/species/9399	Breeding

Blue-winged Warbler Vermivora pinus	Breeding
Canada Warbler Wilsonia canadensis	Breeding
Cerulean Warbler Dendroica cerulea https://ecos.fws.gov/ecp/species/2974	Breeding
Golden-winged Warbler Vermivora chrysoptera https://ecos.fws.gov/ecp/species/8745	Breeding
Least Bittern Ixobrychus exilis https://ecos.fws.gov/ecp/species/6175	Breeding
Olive-sided Flycatcher Contopus cooperi https://ecos.fws.gov/ecp/species/3914	Breeding
Peregrine Falcon Falco peregrinus https://ecos.fws.gov/ecp/species/8831	Breeding
Pied-billed Grebe Podilymbus podiceps	Breeding
Prairie Warbler Dendroica discolor	Breeding
Red-headed Woodpecker Melanerpes erythrocephalus	Breeding
Short-eared Owl Asio flammeus https://ecos.fws.gov/ecp/species/9295	Wintering
Upland Sandpiper Bartramia longicauda https://ecos.fws.gov/ecp/species/9294	Breeding
Willow Flycatcher Empidonax traillii https://ecos.fws.gov/ecp/species/3482	Breeding
Wood Thrush Hylocichla mustelina	Breeding

Not for consultation

What does IPaC use to generate the list of migratory bird species potentially occurring in my specified location?

Landbirds:

Migratory birds that are displayed on the IPaC species list are based on ranges in the latest edition of the National Geographic Guide, Birds of North America (6th Edition, 2011 by Jon L. Dunn, and Jonathan Alderfer). Although these ranges are coarse in nature, a number of U.S. Fish and Wildlife Service migratory bird biologists agree that these maps are some of the best range maps to date. These ranges were clipped to a specific Bird Conservation Region (BCR) or USFWS Region/Regions, if it was indicated in the 2008 list of Birds of Conservation Concern (BCC) that a species was a BCC species only in a particular Region/Regions. Additional modifications have been made to some ranges based on more local or refined range information and/or information provided by U.S. Fish and Wildlife Service biologists with species expertise. All migratory birds that show in areas on land in IPaC are those that appear in the 2008 Birds of Conservation Concern report.

Atlantic Seabirds:

Ranges in IPaC for birds off the Atlantic coast are derived from species distribution models developed by the National Oceanic and Atmospheric Association (NOAA) National Centers for Coastal Ocean Science (NCCOS) using the best available seabird survey data for the offshore Atlantic Coastal region to date. NOAANCCOS assisted USFWS in developing seasonal species ranges from their models for specific use in IPaC. Some of these birds are not BCC species but were of interest for inclusion because they may occur in high abundance off the coast at different times throughout the year, which potentially makes them more susceptible to certain types of development and activities taking place in that area. For more refined details about the abundance and richness of bird species within your project area off the Atlantic Coast, see the Northeast Ocean Data Portal. The Portal also offers data and information about other types of taxa that may be helpful in your project review.

About the NOAANCCOS models: the models were developed as part of the NOAANCCOS project: Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf. The models resulting from this project are being used in a number of decision-support/mapping products in order to help guide decision-making on activities off the Atlantic Coast with the goal of reducing impacts to migratory birds. One such product is the Northeast Ocean Data Portal, which can be used to explore details about the relative occurrence and abundance of bird species in a particular area off the Atlantic Coast.

All migratory bird range maps within IPaC are continuously being updated as new and better information becomes available.

Can I get additional information about the levels of occurrence in my project area of specific birds or groups of birds listed in IPaC?

Landbirds:

The Avian Knowledge Network (AKN) provides a tool currently called the "Histogram Tool", which draws from the data within the AKN (latest,survey, point count, citizen science datasets) to create a view of relative abundance of species within a particular location over the course of the year. The results of the tool depict the frequency of detection of a species in survey events, averaged between multiple datasets within AKN in a particular week of the year. You may access the histogram tools through the Migratory Bird Programs AKN Histogram Tools webpage.

The tool is currently available for 4 regions (California, Northeast U.S., Southeast U.S. and Midwest), which encompasses the following 32 states: Alabama, Arkansas, California, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Hampshire, New Jersey, New York, North, Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, West Virginia, and Wisconsin.

In the near future, there are plans to expand this tool nationwide within the AKN, and allow the graphs produced to appear with the list of trust resources generated by IPaC, providing you with an additional level of detail about the level of occurrence of the species of particular concern potentially occurring in your project area throughout the course of the year.

Atlantic Seabirds:

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAANCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Facilities

Wildlife refuges

Any activity proposed on National Wildlife Refuge lands must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGES AT THIS LOCATION.

Not for consultation

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND
- PEM1E
- PEM1Ed

FRESHWATER FORESTED/SHRUB WETLAND
- PFO1Ed
- PFO1E
- PFO1Ad
- PSS1Ed
- PSS1/EM1E
- PSS1E
- PFO1Fb
- PFO1A
- PSS1Ad

FRESHWATER POND
- PUBHh
- PUBHx

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Not for consultation

2017 SENECA ARMY DEPOT ENERGY PROJECT

Seneca County, NY

08 July – 09 July 2017

ACOUSTIC SITE SA01

Bat Conservation and Management, Inc.
Carlisle, Pennsylvania

2017 SENECA ARMY DEPOT ENERGY PROJECT
Task Order 17102
Acoustic Bat Surveys

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Executive Summary

Introduction

The 2017 Seneca Army Depot Energy Project (Task Order 17102) includes the development of a renewable energy production facility within a 100-acre (0.41 km^2) project area in Seneca County, NY near the town of Romulus. In order to proceed with the proposed construction of the project, Knauf Shaw LLP on behalf of Circular Energy LLC has subcontracted Bat Conservation and Management, Inc. (BCM) to conduct an acoustic bat survey within the project area.

Objective

An acoustic bat survey was conducted to determine presence or probable absence of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened Northern long-eared bat (*Myotis septentrionalis*) within the project area. This survey was conducted following the protocols outlined within the 2017 U.S. Fish and Wildlife Service (USFWS) Range-wide Indiana Bat Summer Survey Guidelines.

Outcome

A total of three acoustic sites were selected and surveyed within the project area for two consecutive nights (July 08 and July 09, 2017) and a total of six detector nights. A total of 62 confirmed bat passes were recorded. Utilizing two acoustic software programs with auto-classification followed by qualitative (manual) analysis of each file a total of three bat species were confirmed within the Seneca Army Depot Energy Project area in 2017: the big brown bat (*Eptesicus fuscus*), the hoary bat (*Lasiurus cinereus*), and the Eastern red bat (*Lasiurus borealis*). One hi-frequency call was detected at site SA02. However, following further qualitative analysis, the call was determined to be a low quality atypical call and therefore too ambiguous to classify to species. No Indiana bat (*Myotis sodalis*) or Northern long-eared bat (*Myotis septentrionalis*) calls were detected during the survey and based on these results, probable absence of these two species within the project area can be presumed.

Methods

Project Area

The 2017 Seneca Army Depot Energy Project area is a 100-acre (0.41 km^2) tract of land that was once part of the 10,500-acre (42.5 km^2) Seneca Army Depot. The Army closed the depot in 2000 and approximately 7000 acres (28.3 km^2) of the property has remained undeveloped. The project area includes a network of improved roads, railway corridors, and vegetated cuts through primarily deciduous forest and shrub land habitat interspersed with open fields and abandoned buildings (Figure 1).

Survey Locations

BCM selected a total of three survey sites by reviewing aerial photographs of the project area. Sites were placed within the project area boundary along probable bat flyways and then adjusted to accommodate onsite conditions before detectors were deployed (Table 1, Figure 2).

Three full-spectrum Pettersson, model D500x, acoustic detectors (Pettersson Elektronik, Uppsala Sweden) were deployed, one at each of three sites. Sites included: SA01, an open grassy flyway running east-west through a deciduous forest patch and high shrubs; SA02, an intersection of several open grassy flyways within a deciduous forest patch and high shrubs; SA03, an abandoned railroad running southwest to northeast within a deciduous forest patch and high shrubs (Appendix A).

Survey Protocol: Acoustic Background

An acoustic survey for bats involves recording echolocation calls with a specially designed high-frequency-sensitive microphone on a "bat detector," which then digitizes the recordings. Analysis involves converting the digitized sound into illustrations (spectrograms) representing how the frequencies and intensities of the sounds change over time, and then qualitatively and quantitatively measuring the sound content represented by the metrics in the spectrograms. Acoustic surveys are based on the assumption that different bat species will exhibit unique call-types much like birds and other vocal animals. By collecting recordings from bats, researchers can determine species by measuring key sound parameters against a known library of reference files.

This survey used external, cabled microphones (Uppsala, Sweden) with the Pettersson D500x full-spectrum bat detectors. The microphones are directional, and under ideal conditions can record a 40 kHz sound from up to 30 feet (9m). Detectors run for several nights off four internal C-cell batteries and store data on up to four 32 GB compact flash (CF) cards.

Detectors were programmed to record sound from bat echolocation calls beginning 15 minutes before sunset, and continuing until 15 minutes after sunrise, at a resolution of 500,000 samples per second, and to make individual 4-second recordings of triggered activity each night. This allows for the highest quality sound-content possible with the Pettersson D500x units and usually results in each individual recording representing a single "pass" (fly by) from a single bat. However, if multiple bats are flying thru the optimal volume of detection during the same 4-second interval, they will be recorded in tandem.

Acoustic files were recorded in standard, lossless, WAV audio format, with each 4-second file being about 3MB in size. Detectors were also programmed to record an extended "log file" for each session that details when the detector switches on each night and turns off each morning. Low battery and/or full memory errors are logged if they occur, which provides the user with accurate metrics to quantify total survey hours.

Metadata from all survey sites were collected, which included all pertinent details about the deployment including complete geographic information, start day and time, end day and time, weather conditions, all relevant detector details, including recording settings, position and elevation of the microphone, a qualitative assessment of habitat type, especially amount of "clutter" present in the sampled airspace, and the name and contact information for the surveyor. This type of site-specific information was included during the acoustic recording attribution process and can be found in on the acoustic data sheets in Appendix A.

Survey Protocol: Acoustic Analysis

All files recorded were organized by site and night for analysis. Recordings from each night at each site were classified using two different "Echolocation Call Auto-analysis" software programs: Kaleidoscope Pro (KaPRO) version 4.2.0, developed by Wildlife Acoustics, Inc. (Maynard MA, USA) and SonoBat version 4.2.1 NE (Joe Szewczak, Arcata CA). The following auto-classification results were generated from both software programs: (1) a "file-level" species classification (suggested identification) for every recording considered in the data set; and (2) a "night-level/site-level" maximum likelihood estimate (MLE) for species presence (P-value) for each species considered in the data set. According to the USFWS/USGS testing and guidelines, software programs approved for use in acoustic surveys "clearly made some misidentifications but within the parameters set for use, [they] should be acceptable for Indiana, gray, northern long-eared, little brown bats and non-myotids" (red, hoary, sliver-haired, evening, and tri-colored bats). The KaPRO classifier and settings used for this analysis have been approved by the most current (2017) USFWS guidance documents.

In addition to the auto-classifications, all call files at each site generated by the outputs for species presence/absence and file-level classification to species from both software programs were qualitatively (manually) confirmed by J.D. Tyburec (Tucson AZ) and J. Chenger (Carlisle, PA). Qualifications for biologists conducting the qualitative analysis can be found in Appendix D. Qualitative analysis included the examination of each file generated by auto-classification that was classified to species, high or low frequency unknown, or noise. Classifications were either confirmed or rejected by visually inspecting the resulting frequency-time spectrograms of individual echolocation call recordings using the SonoBat4 "viewer." For each species, confident classifications were ranked using metrics displayed by each program, with the outputs sorted from highest to lowest confidence for each species, then progressively evaluated until at least one archetypical recording for each species was identified using a combination of quantitative and qualitative characteristics.

Bat echolocation call recordings are made up of discrete "pulses" of sounds, sometimes up to 200 such pulses in a single 3-5 second recording. Both software programs will generate two different Auto-ID classifications: one that identifies individual pulses in a file and provides a classification for each, and another that uses analysis algorithms to weigh the pulse-level classifications and provide a sequence-level species or species-guild identification. Because *Myotis* species are of special interest when conducting acoustic surveys, every recording with any sequence-level *Myotis* species classification and all recordings with any pulse-level *Myotis* species classifications were identified and manually reviewed. Final classifications of all calls were determined using qualitative analysis. Auto-classified *Myotis* species calls that were determined to be a false positive following qualitative analysis are addressed in the results.

Weather Data

Nightly weather conditions and temperature data was compiled from the nearest weather station in Romulus, NY (KNYROMUL2, www.wunderground.com). Temperature data was collected using a Kestrel Drop 3 ® temperature data logger onsite to verify that the survey was conducted under acceptable weather conditions (Appendix C).

Results

Sampling Effort and Species Occupancy

A total of 62 "bat passes" (two or more echolocation call pulses in a sequence is one bat pass) were recorded at three acoustic sites. The number of bat call recordings at each site is an indicator of relative activity which ranged from a high of 39 bat passes at site SA03 to a low of seven at site SA02 (quantitatively confirmed results, Table 1).

Species diversity was low at all three sites with the hoary (*Lasiurus cinereus*) and big brown bat (*Eptesicus fuscus*) the dominant species at sites SA02 and SA03 and just the hoary bat recorded at site SA01 (Table 2).

The classification outputs from both KaPRO and SonoBat were used to initially identify recordings for later qualitative (manual) analysis to confirm species presence. Each software program is based on its own proprietary library of reference calls to determine species classifications, therefore, each program will render slightly different results for both the site-level and night-level MLE values and on the individual file-level classifications. Confident species confirmation was diminished by a small percentage of recordings at two sites (SA01 and SA03) having multiple bat species and/or individuals in them. Presence of more than one bat pass in a recording will confound auto-analysis results and expected accuracy due to the tendency of bats to adjust their echolocation call types so as not to overlap each other. In so doing, either individual can produce call types that fall outside the norm known for that species, thus cannot be reliably identified. Likewise, poor-quality recordings and/or recordings of bats just on the edge of detection of a detector microphone will also generate spurious classification results due to insufficient metrics upon which to confidently base an Auto-ID classification.

Because each program relies on it's own set of algorithms to determine species classification, each program returned slightly different results. KaPRO does not report on files that its algorithm determined to be noise or did not pass its internal quality control check. The KaPRO software program analyzed a total of 61 recordings. Of those, all 61 were determined to contain at least one recognizable bat echolocation call pulse in the file that it identified to species with varying degrees of confidence. Of these, 4 were classified using just one call pulse, including a call identified at site SA02 that was classified as a little brown bat (*Myotis lucifigus*). The remaining 57 files were given sequence-level classifications using two or more pulses to a single prominent species. Location-level classifications from KaPRO are reported in Table 3 and Appendix B.

SonoBat is a more conservative Auto-ID software program and does not identify as many low-probability recordings to species. When possible it will identify call passes to one of two species guilds: (1) "high frequency" species; all *Myotis* species, plus *Lasiurus borealis* (red bat), *Perimyotis subflavus* (tricolored bat), or *Nycticeius humeralis* (evening bat); or (2) "low frequency" species; big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*) or hoary bat (*Lasiurus cinereus*). SonoBat will also rank all call-pulses in a recording that are identified to species in order of prevalence even when the sequence does not receive a confident sequence-level classification. SonoBat identified six recordings that could not be classified to species or assigned to a species guild and 17 recordings that could only be identified to a high- or low-frequency species guild and therefore did not receive a confident species-classification. The remaining 42 files were given sequence-level classifications to a single confident species for a total of 59 bat passes from the SonoBat classifier. Location level classifications from the SonoBat outputs are reported in Table 5 and Appendix B.

MLE values for species presence generated by the software program outputs also varied from each program. Low P-values (0) suggested probable presence; high P-values (1) suggested probable absence. Both auto-classifiers indicated that two species were likely present in the project area, the big brown bat (*Eptesicus fuscus*) and the hoary bat

(*Lasiurus cinereus*). Although KaPRO classified three additional species, the eastern-red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*) and the little brown bat, the MLE values that were generated for each species did not indicate presence. A summary of bat species with MLE values suggesting presence by each software program appears in Table 4 for KaPRO and Table 6 for SonoBat.

The MLE calculation is a probabilistic value; species can be present but may not rise to significance to satisfy the statistical probability for presence. Therefore, all acoustic files, including those receiving a file-level classification to species or to guild by either program, were manually reviewed (qualitatively analyzed) to confirm or reject species presence for each site at each location surveyed. Both auto-classifiers identified at least one call as a silver-hared bat (*Lasionycteris noctivagans*), however, following the review of those calls it was determined that there was not enough evidence to conclusively identify the calls to species. Those calls were classified as lo-frequency unknown (LOFU). In addition, two files contained two individual bats in them. In one file neither bat could be identified and both were classified as LOFU, while in the second file one call was identified as a hoary bat (*Lasiurus cinereus*) and the second as a LOFU. The total bat numbers were adjusted to reflect the additional bats in each file (Table 2).

Two high frequency calls that were identified on the project were manually reviewed. KaPRO correctly identified one of them as an Eastern red bat (*Lasiurus borealis*). The second was a call recorded at site SA02 and classified by KaPRO as a little brown bat (*Myotis lucifigus*). SonoBat did not have enough information to classify either call and identified them as a "hi-frequency unknown" (HIFU) calls. After manually reviewing both calls the first was confirmed to be a red bat. The second hi-frequency call recorded at SA02 was of a bat far from the microphone where the signal-to-noise ratio quality was poor, making the details of the call difficult to distinguish. There were 13 pulses per second in the call file indicating it was a bat exhibiting approach phase behavior, not a typical search phase call that is used for identification. The call was classified as a HIFU call. All file level manually vetted classifications can be found adjacent to the auto-classified files in Appendix B.

As a result of the manual review of all acoustic recordings collected from the 2017 Seneca Army Depot Energy Project acoustic sites, the following species can be considered to be present: the hoary bat (*Lasiurus cinereus*), the big brown bat (*Eptesicus fuscus*), and the Eastern red bat (*Lasiurus borealis*). The hoary bat was present at all three sites while the big brown bat was absent from site SA01. The one red bat call was detected along the railroad tracks at Site SA03. No Indiana bat (*Myotis sodalis*) or Northern long-eared bat (*Myotis septentrionalis*) calls were detected during the survey.

Figures

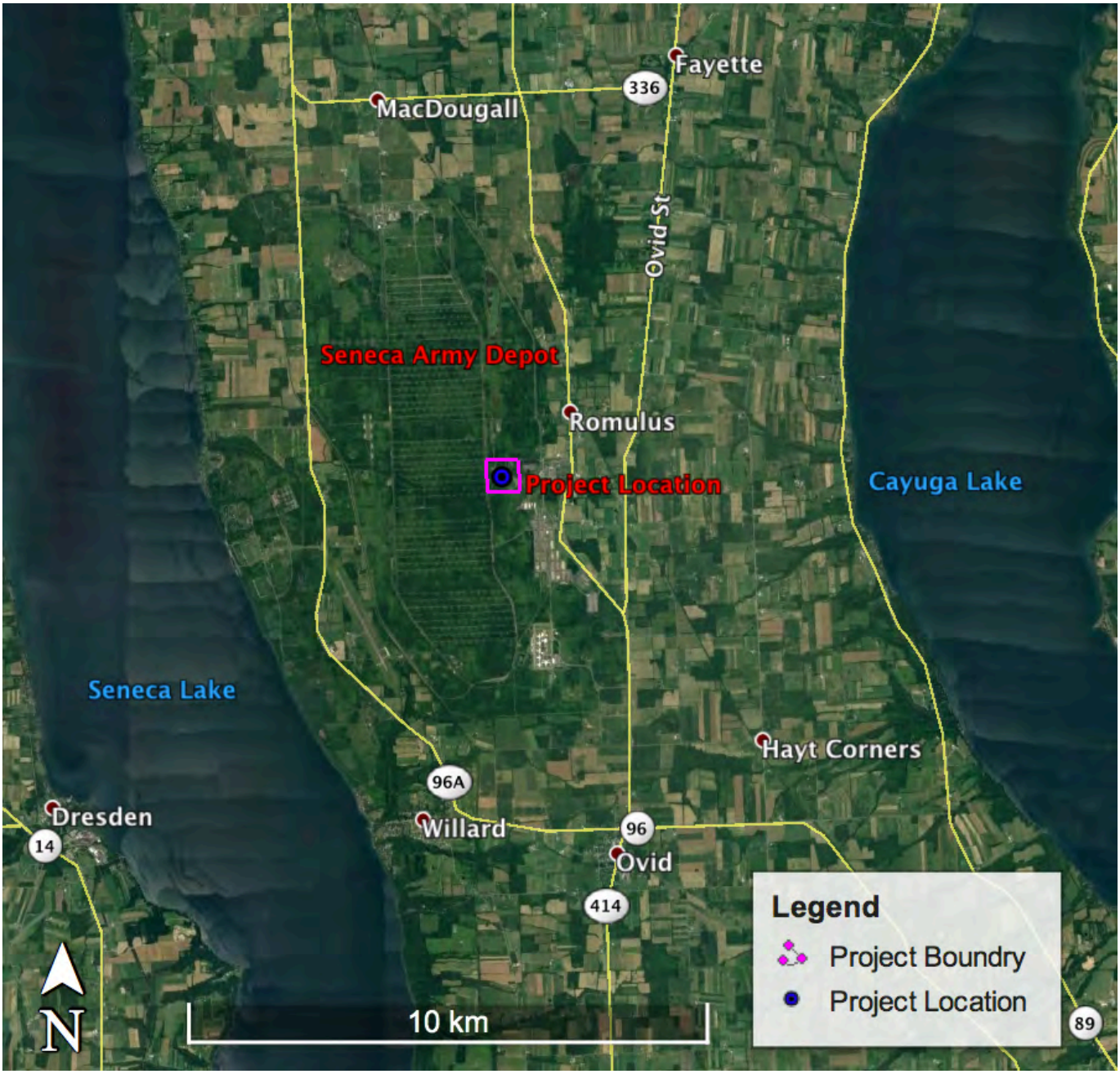


Figure 1. Project location in relation to Seneca Army Depot and the surrounding area.

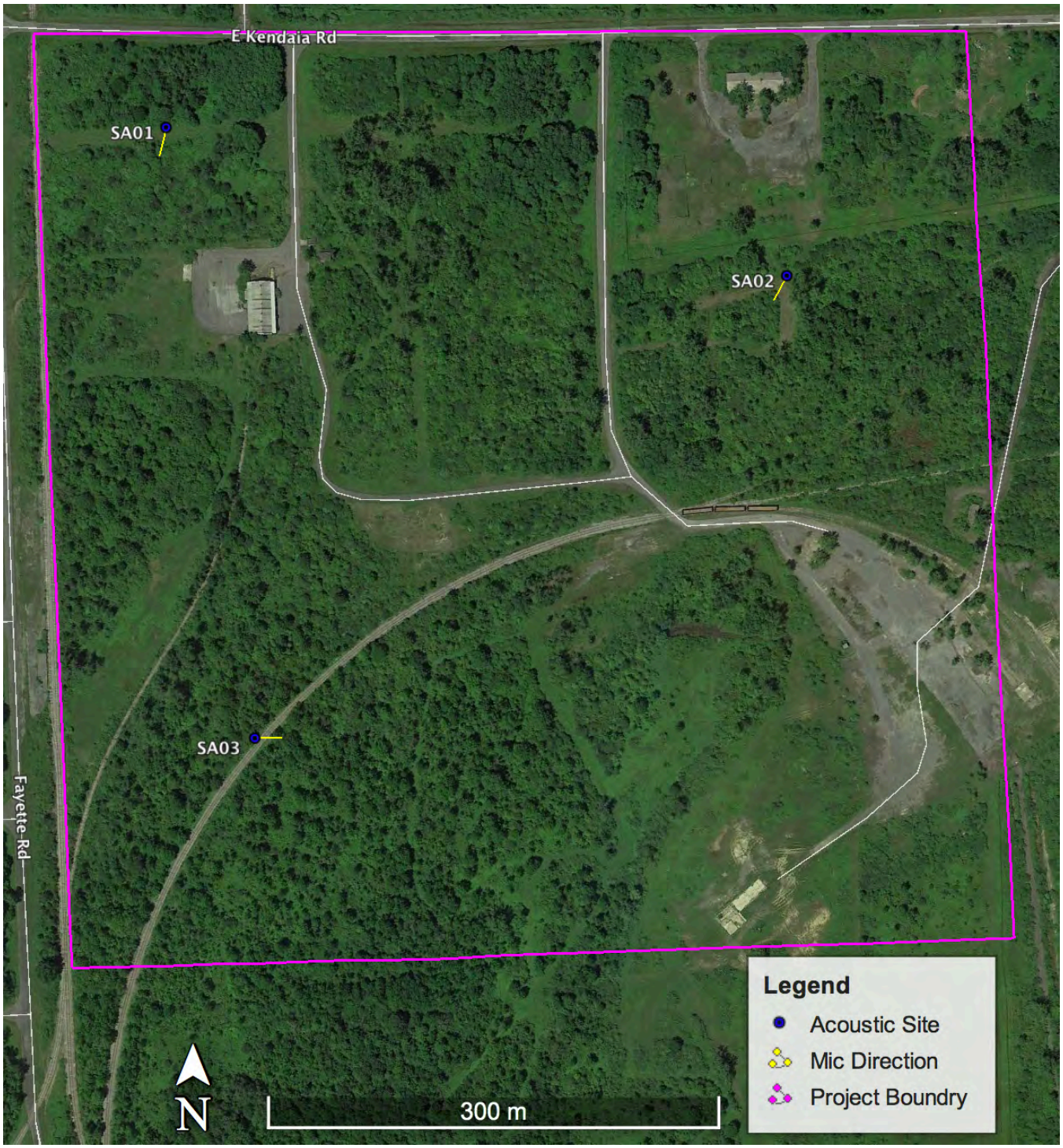


Figure 2. Project area with acoustic site locations indicating microphone direction.

Tables

Table 1. Acoustic site locations, survey dates, and relative bat activity.

Site	Survey Sites Lat/Long (WGS84)	Survey Dates	Bat Passes
SA01	42.743681°, -76.852705°	7/8-9/17	16
SA02	42.742791°, -76.847673°	7/8-9/17	7
SA03	42.740067°, -76.851969°	7/8-9/17	39

Bat Passes = Number of files recorded that contained bat calls.

Table 2. Quantitative (manual) analysis results for all acoustic files by site, by night, and project totals.

Site/ Date/Night	BAT PASSES	MYOLEI	MYOSEP	MYOSOD	MYOLUC	PERSUB	LASBOR	EPTFUS	LASNOC	LASCIN	HIFU	LOFU	NOISE
SA01 7/8/17 Night1	7	-	-	-	-	-	-	-	-	3	0	4*	3
SA01 7/9/17 Night2	9	-	-	-	-	-	-	-	-	4	0	5	2
SA01 Total	16	-	-	-	-	-	-	-	-	7	0	9	5
SA02 7/8/17 Night1	1	-	-	-	-	-	-	-	-	-	0	1	0
SA02 7/9/17 Night2	6	-	-	-	-	-	-	3	-	1	1	1	0
SA02 Total	7	-	-	-	-	-	-	3	-	1	1	2	0
SA03 7/8/17 Night1	14	-	-	-	-	-	-	7	-	5	0	2	1
SA03 7/9/17 Night2	25	-	-	-	-	-	1	5	-	13	0	6*	0
SA03 Total	39	-	-	-	-	-	1	12	0	18	0	8	1
Project Total	62	-	-	-	-	-	1	15	0	26	1	19	6
Species Presence Yes/No	-	-	N	N	N	N	Y	Y	N	Y	-	-	-

* One file included two bats increasing the total by one. Bat Passes = Number of files recorded that contained bat calls, MYOLEI = *Myotis leibii* (small-footed bat), MYOSEP = *Myotis septentrionalis* (northern long-eared bat), MYOSOD = *Myotis sodalis* (Indiana bat), MYOLUC = *Myotis lucifugus* (little brown bat), PERSUB = Tricolored bat (Perimyotis subflavus), LASBOR = *Lasiurus borealis* (eastern red bat), EPTFUS = *Eptesicus fuscus* (big brown bat), LASCIN = *Lasiurus cinereus* (hoary bat), LASNOC = *Lasionycteris noctivagans* (silver-haired bat), HIFU = Hi-frequency unknown, LOFU = Low-frequency unknown, NOISE = No bat calls within recoding, only ultrasonic noise from other sources.

Table 3. Auto-ID KaPRO classifier results by site, by night results, and project totals.

Site/ Date/Night	BAT PASSES	MYOLEI	MYOSEP	MYOSOD	MYOLUC	PERSUB	LASBOR	EPTFUS	LASNOC	LASCIN	NOISE
SA01 7/8/17 Night1	5	-	-	-	-	-	-	-	1	4	4
SA01 7/9/17 Night2	8	-	-	-	-	-	-	1	1	6	3
SA01 Total	13	-	-	-	-	-	-	1	2	10	7
SA02 7/8/17 Night1	1	-	-	-	-	-	-	1	-	-	0
SA02 7/9/17 Night2	6	-	-	-	1	-	-	3	-	2	0
SA02 Total	7	-	-	-	1	-	-	4	-	2	0
SA03 7/8/17 Night1	15	-	-	-	-	-	-	8	-	7	0
SA03 7/9/17 Night2	26	-	-	-	-	-	1	5	2	18	0
SA03 Total	41	-	-	-	-	-	1	13	2	25	0
Project Total	61	-	-	-	1	-	1	18	4	37	7

Bat Passes = Number of files recorded that contained bat calls, MYOLEI = *Myotis leibii* (small-footed bat), MYOSEP = *Myotis septentrionalis* (northern long-eared bat), MYOSOD = *Myotis sodalis* (Indiana bat), MYOLUC = *Myotis lucifugus* (little brown bat), PERSUB = Tricolored bat (Perimyotis subflavus), LASBOR = *Lasiurus borealis* (eastern red bat), EPTFUS = *Eptesicus fuscus* (big brown bat), LASCIN = *Lasiurus cinereus* (hoary bat), LASNOC = *Lasionycteris noctivagans* (silver-haired bat), NOISE = No bat calls within recoding, only ultrasonic noise from other sources.

Table 4. KaPro MLE results at each site.

Site/Night	Date	MYOLEI	MYOSEP	MYOSOD	MYOLUC	PERSUB	LASBOR	EPTFUS	LASNOC	LASCIN
SA01 Night1	7/8/17	1	1	1	1	1	1	1	0.9763742	0.0000906
SA01 Night2	7/9/17	1	1	1	1	1	1	0.7186819	1	0.0000057
SA01 Night 1&2		1	1	1	1	1	1	0.9223220	0.9970772	0
SA02 Night1	7/8/17	1	1	1	1	1	1	0.1515555	1	1
SA02 Night2	7/9/17	1	1	1	0.1959723	1	1	0.0080520	1	0.1435283
SA02 Night 1&2		1	1	1	0.1959722	1	1	0	1	0.2079734
SA03 Night1	7/8/17	1	1	1	1	1	1	0.0000059	1	0.0003354
SA03 Night2	7/9/17	1	1	1	1	1	0.0598212	0.0424060	1	0
SA03 Night 1&2		1	1	1	1	1	0.0834249	0.0000012	1	0
Project MLE		1	1	1	0.6032949	1	0.211702	0	1	0

Low P-values (0) indicate probable presence; high P-values (1) indicate probable absence.
MYOLEI = *Myotis leibii* (small-footed bat), MYOSEP = *Myotis septentrionalis* (northern long-eared bat), MYOSOD = *Myotis sodalis* (Indiana bat), MYOLUC = *Myotis lucifugus* (little brown bat), PERSUB = Tricolored bat (Perimyotis subflavus), LASBOR = *Lasiurus borealis* (eastern red bat), EPTFUS = *Eptesicus fuscus* (big brown bat), LASNOC = *Lasionycteris noctivagans* (silver-haired bat), LASCIN = *Lasiurus cinereus* (hoary bat), NOISE = No bat calls within recoding, only ultrasonic noise from other sources.

Table 5. Auto-ID Results from the SonoBat Classifier at each Site.

Site/ Date/Night	BAT PASSES	MYOLEI	MYOSEP	MYOSOD	MYOLUC	PERSUB	LASBOR	EPTFUS	LASNOC	LASCIN	HIFU	LOFU	NOISE
SA01 7/8/17 Night1	6	-	-	-	-	-	-	-	-	3	0	3	3
SA01 7/9/17 Night2	7	-	-	-	-	-	-	-	-	4	0	3	4
SA01 Total	13	-	-	-	-	-	-	-	-	7	0	6	7
SA02 7/8/17 Night1	1	-	-	-	-	-	-	1	-	-	0	0	0
SA02 7/9/17 Night2	6	-	-	-	-	-	-	2	-	1	1	2	0
SA02 Total	7	-	-	-	-	-	-	3	-	1	1	2	0
SA03 7/8/17 Night1	14	-	-	-	-	-	-	7	-	5	0	2	1
SA03 7/9/17 Night2	25	-	-	-	-	-	-	5	1	13	1	5	1
SA03 Total	39	-	-	-	-	-	-	12	1	18	1	7	2
Project	59	-	-	-	-	-	-	15	1	26	2	15	9

Bat Passes = Number of files recorded that contained bat calls, MYOLEI = *Myotis leibii* (small-footed bat), MYOSEP = *Myotis septentrionalis* (northern long-eared bat), MYOSOD = *Myotis sodalis* (Indiana bat), MYOLUC = *Myotis lucifugus* (little brown bat), PERSUB = Tricolored bat (Perimyotis subflavus), LASBOR = *Lasiurus borealis* (eastern red bat), EPTFUS = *Eptesicus fuscus* (big brown bat), LASCIN = *Lasiurus cinereus* (hoary bat), LASNOC = *Lasionycteris noctivagans* (silver-haired bat), HIFU = Hi-frequency unknown, LOFU = Low-frequency unknown, NOISE = No bat calls within recoding, only ultrasonic noise from other sources.

Table 6. SonoBat MLE Results from each classifier at each site.

Site/Night	Date	MYOLEI	MYOSEP	MYOSOD	MYOLUC	PERSUB	LASBOR	EPTFUS	LASNOC	LASCIN
SA01 Night1	7/8/17	1	1	1	1	1	1	1	1	0.17
SA01 Night2	7/9/17	1	1	1	1	1	1	1	1	0.09
SA01 Night 1&2		1	1	1	1	1	1	1	1	0.02
SA02 Night1	7/8/17	1	1	1	1	1	1	0.63	1	1
SA02 Night2	7/9/17	1	1	1	1	1	1	0.41	1	0.63
SA02 Night 1&2		1	1	1	1	1	1	0.26	1	0.66
SA03 Night1	7/8/17	1	1	1	1	1	1	0.05	1	0.08
SA03 Night2	7/9/17	1	1	1	1	1	1	0.17	0.98	0
SA03 Night 1&2		1	1	1	1	1	1	0.01	0.98	0
Project MLE		1	1	1	1	1	1	0	0.98	0

Low P-values (0) indicate probable presence; high P-values (1) indicate probable absence.
Bat Passes = Number of files recorded that contained bat calls, MYOLEI = *Myotis leibii* (small-footed bat), MYOSEP = *Myotis septentrionalis* (northern long-eared bat), MYOSOD = *Myotis sodalis* (Indiana bat), MYOLUC = *Myotis lucifugus* (little brown bat), PERSUB = Tricolored bat (Perimyotis subflavus), LASBOR = *Lasiurus borealis* (eastern red bat), EPTFUS = *Eptesicus fuscus* (big brown bat), LASCIN = *Lasiurus cinereus* (hoary bat), LASNOC = *Lasionycteris noctivagans* (silver-haired bat),

Appendix A

Bat Survey and Acoustic Survey Site Data Forms

Acoustic Survey Data-D500x-BCM

1263 Claremont Road. Carlisle PA 17015, 717-241-2228

Page_____ of _____

Project: 2017 Seneca Army Depot Energy	State: NY	County: Seneca	Site Name: SA01
Biologist: Todd Sinander	Photo #: SA01	Start Date: 07/08/2017	End Date: 07/10/2017

Latitude (decimal degrees):	Longitude (decimal degrees):	Datum:	Mic Ht:	Mic Direction: (1-360°)	Clutter:
42.743681°	-76.852705°	WGS-84	6 m	190°	Med

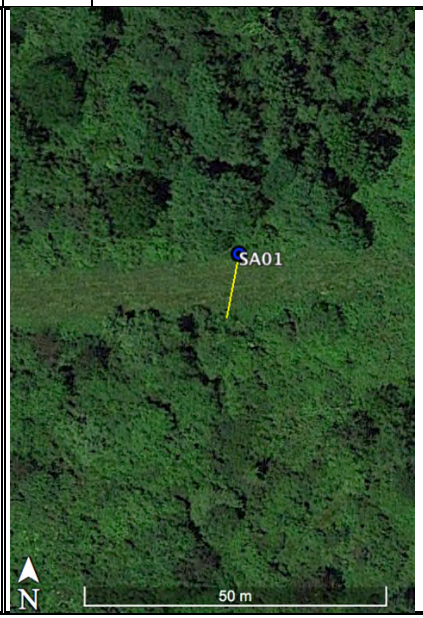
Service Date	Samp Freq	Trig Sens	Rec Len	Gain	Trig Sens	Interval	Start Time	Stop Time	Comments
0710/17	500	Low-3	4	60	160	0	20:36	05:57	Int batt, 5.1v good, 2579 files, mic good. No precipitation. Low temp: 7/8-9/17 = 11.6° C, 7/9-10/17 = 17.4° C.

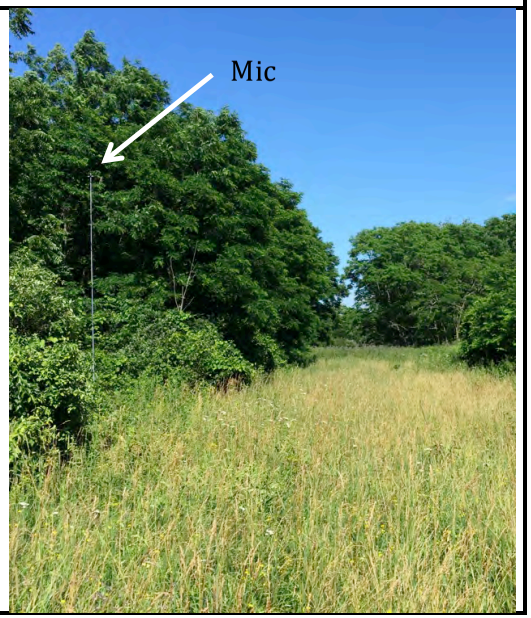
Site Description: (Can be used as D500x Attributor text note)

PAS_SNARMY_SA01_D500

NY: Seneca County, Romulus. Elevation: 225 m. Passive monitoring with Pettersson D500x using external microphone (cone on) oriented horizontally on a 6 m high pole. Deployed on the north side of an open 10 m wide grassy flyway running east-west through a deciduous forest patch consisting of honey locust trees and high shrubs. Forest patch is part of the 10,000 acre abandoned Seneca Army Depot with a network of improved roads and vegetated cuts through forest, shrub land, and open fields interspersed with abandoned buildings. Mic pointing south over open flyway with Med clutter. HPF=On, InputGain=60, TrigLev=160, Int=0, TrigSen=3, RecLen=4s, SF=500. sset-srise. Lat/Long: 42.743681°, -76.852705°. Todd Sinander, Bat Conservation and Management, www.batmanagement.com

Note: Weather data collected from www.wunderground.com (Varick KNYROMUL2) Kestrel Drop 3® data logger.





CLUTTER: NO = stadium-sized open meadow without vegetation or topography interfering with the airspace, LOW = large fields or other open areas bordered by hedgerows or tree lines, EDGE = significant vegetation, topography, or anthropogenic structures bordering a NO or LOW clutter open area, MED = large area with widely spaced trees and other topographic or anthropogenic structures, HIGH = understory travel corridors either along tree-covered roads or within a forested clearing.

Acoustic Survey Data-D500x-BCM

1263 Claremont Road. Carlisle PA 17015, 717-241-2228

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Project: 2017 Seneca Army Depot Energy	State: NY	County: Seneca	Site Name: SA02
Biologist: Todd Sinander	Photo #: SA02	Start Date: 07/08/2017	End Date: 07/10/2017

Latitude (decimal degrees):	Longitude (decimal degrees):	Datum:	Mic Ht:	Mic Direction: (1-360°)	Clutter:
42.742791°	-76.847673°	WGS-84	6 m	205°	Med

Service Date	Samp Freq	Trig Sens	Rec Len	Gain	Trig Sens	Interval	Start Time	Stop Time	Comments
0710/17	500	Low-3	4	60	160	0	20:36	05:57	Int batt, 5.4v good, 17 files, mic good. No precipitation. Low temp: 7/8-9/17 = 11.6° C, 7/9-10/17 = 17.4° C.

Site Description: (Can be used as D500x Attributor text note)

PAS_SNARMY_SA02_D500

NY: Seneca County, Romulus. Elevation: 225 m. Passive monitoring with Pettersson D500x using external microphone (cone on) oriented horizontally on a 6 m high pole. Deployed on the north side of where several open grassy flyways (5-10 m wide) intersect within a deciduous forest patch consisting of cottonwood trees and high shrubs. Forest patch is part of the 10,000 acre abandoned Seneca Army Depot with a network of improved roads and vegetated cuts through forest, shrub land, and open fields interspersed with abandoned buildings. Mic pointing southwest over open flyway with Med clutter. HPF=On, InputGain=60, TrigLev=160, Int=0, TrigSen=3, RecLen=4s, SF=500. sset-srise. Lat/Long: 42.742791°, -76.847673°. Todd Sinander, Bat Conservation and Management, www.batmanagement.com

Note: Weather data collected from www.wunderground.com (Varick KNYROMUL2) Kestrel Drop 3® data logger.

CLUTTER: NO = stadium-sized open meadow without vegetation or topography interfering with the airspace, LOW = large fields or other open areas bordered by hedgerows or tree lines, EDGE = significant vegetation, topography, or anthropogenic structures bordering a NO or LOW clutter open area, MED = large area with widely spaced trees and other topographic or anthropogenic structures, HIGH = understory travel corridors either along tree-covered roads or within a forested clearing.

Acoustic Survey Data-D500x-BCM

1263 Claremont Road. Carlisle PA 17015, 717-241-2228

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Project: 2017 Seneca Army Depot Energy	State: NY	County: Seneca	Site Name: SA03
Biologist: Todd Sinander	Photo #: SA03	Start Date: 07/08/2017	End Date: 07/10/2017

Latitude (decimal degrees): 42.740067°	Longitude (decimal degrees): -76.851969°	Datum: WGS-84	Mic Ht: 6 m	Mic Direction: (1-360°) 205°	Clutter: Med

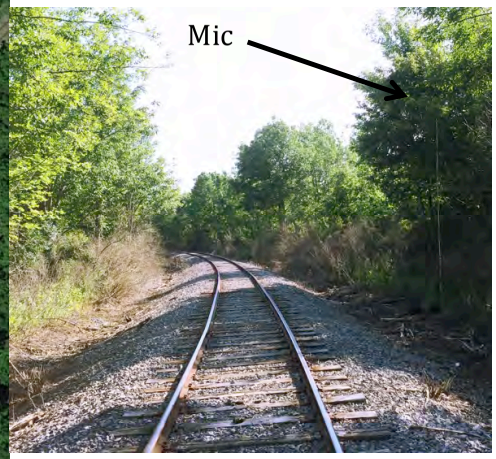
Service Date	Samp Freq	Trig Sens	Rec Len	Gain	Trig Sens	Interval	Start Time	Stop Time	Comments
0710/17	500	Low-3	4	60	160	0	20:36	05:57	Int batt, 5.3v good, 60 files, mic good. No precipitation. Low temp: 7/8-9/17 = 11.6° C, 7/9-10/17 = 17.4° C.

Site Description: (Can be used as D500x Attributor text note)

PAS_SNARMY_SA02_D500

NY: Seneca County, Romulus. Elevation: 225 m. Passive monitoring with Pettersson D500x using external microphone (cone on) oriented horizontally on a 5 m high pole. Deployed on the west side of a10 m wide abandoned railroad running northeast-southwest within a deciduous forest patch consisting of ash trees and high shrubs. Forest patch is part of the 10,000 acre abandoned Seneca Army Depot with a network of improved roads and vegetated cuts through forest, shrub land, and open fields interspersed with abandoned buildings. Mic pointing east over open flyway with med clutter. HPF=On, InputGain=60, TrigLev=160, Int=0, TrigSen=3, RecLen=4s, SF=500. sset-srise. Lat/Long: 42.740067°, -76.851969°. T. Sinander, Bat Conservation and Management, www.batmanagement.com

Note: Weather data collected from www.wunderground.com (Varick KNYROMUL2) Kestrel Drop 3® data logger.



CLUTTER: NO = stadium-sized open meadow without vegetation or topography interfering with the airspace, LOW = large fields or other open areas bordered by hedgerows or tree lines, EDGE = significant vegetation, topography, or anthropogenic structures bordering a NO or LOW clutter open area, MED = large area with widely spaced trees and other topographic or anthropogenic structures, HIGH = understory travel corridors either along tree-covered roads or within a forested clearing.

Appendix B

File Level Auto-Classifier and Qualitative (Manual) Analysis Results

SonoBat 4.2.1 File Output with Qualatative (Manual) Results													
	Filename	HiF	LoF	Species Manual ID	SppAccp	#Maj	#Accp	~Spp	1st	2nd	3rd	AccpQuality	Max#CallsConsidered
SA01 Night 1	PAS_SNARMY_SA01_D500-20170708_213502-XNOISE.wav	x	x	XNOISE	x	x	x	x	x	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170708_213630-XNOISE.wav	x	x	XNOISE	x	x	x	x	x	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170708_220320-LOFU.wav	x	1	LOFU	x	1	3	Lano/Epfu/Laci	Epfu	Lano	Laci	0.8	16
	PAS_SNARMY_SA01_D500-20170708_220547-LOFU.wav	x	1	LOFU	x	x	x	x	x	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170708_224446-XNOISE.wav	x	x	XNOISE	x	x	x	x	x	x	x	0.8	0
	PAS_SNARMY_SA01_D500-20170709_020433-LACI+LOFU.wav	x	1	LACI+LOFU	Laci	4	4	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170709_024131-LOFU.wav	x	1	LOFU	x	1	1	Laci	Laci	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170709_030649-LACI.wav	x	1	LACI	Laci	5	6	x	Laci	Lano	x	0.8	16
	PAS_SNARMY_SA01_D500-20170709_044344-LACI.wav	x	1	LACI	Laci	8	8	x	Laci	x	x	0.8	16
SA01 Night 2	PAS_SNARMY_SA01_D500-20170709_221528-LOFU.wav	x	1	LOFU	x	2	3	Laci/Lano	Laci	Lano	x	0.8	16
	PAS_SNARMY_SA01_D500-20170709_222140-LOFU.wav	x	x	LOFU	x	x	x	x	x	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170709_224327-LOFU.wav	x	1	LOFU	x	1	1	Epfu	Epfu	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170710_002832-XNOISE.wav	x	x	XNOISE	x	x	x	x	x	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170710_005559-XNOISE.wav	x	x	XNOISE	x	x	x	x	x	x	x	0.8	0
	PAS_SNARMY_SA01_D500-20170710_020158-LOFU.wav	x	x	LOFU	x	x	x	x	x	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170710_025115-LOFU.wav	x	1	LOFU	x	1	1	Laci/	Laci	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170710_033746-LACI.wav	x	1	LACI	Laci	2	2	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170710_041148-LACI.wav	x	1	LACI	Laci	5	5	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170710_041207-LACI.wav	x	1	LACI	Laci	10	10	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA01_D500-20170710_041213-LACI.wav	x	1	LACI	Laci	5	5	x	Laci	x	x	0.8	16
SA02 Night 1	PAS_SNARMY_SA02_D500-20170708_212232-LOFU.wav	x	1	LOFU	Epfu	5	5	x	Epfu	x	x	0.8	16
SA02 Night 2	PAS_SNARMY_SA02_D500-20170709_211854-EPFU.wav	x	1	EPFU	x	1	1	Epfu/	Epfu	x	x	0.8	16
	PAS_SNARMY_SA02_D500-20170709_225252-EPFU.wav	x	1	EPFU	Epfu	11	11	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA02_D500-20170709_230522-EPFU.wav	x	1	EPFU	Epfu	9	9	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA02_D500-20170709_231151-LACI.wav	x	1	LACI	Laci	11	12	x	Laci	Epfu	x	0.8	16
	PAS_SNARMY_SA02_D500-20170710_022612-HIFU.wav	1	x	HIFU	x	1	1	Myle	Myle	x	x	0.8	16
	PAS_SNARMY_SA02_D500-20170710_033645-LOFU.wav	x	1	LOFU	x	1	1	Laci	Laci	x	x	0.8	16
SA03 Night 1	PAS_SNARMY_SA03_D500-20170708_213053-EPFU.wav	x	1	EPFU	Epfu	6	6	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_213157-EPFU.wav	x	1	EPFU	Epfu	12	12	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_214041-EPFU.wav	x	1	EPFU	Epfu	6	6	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_214356-EPFU.wav	x	1	EPFU	Epfu	8	8	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_214930-EPFU.wav	x	1	EPFU	Epfu	3	3	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_214938-EPFU.wav	x	1	EPFU	Epfu	9	9	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_215651-LACI.wav	x	1	LACI	Laci	7	7	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_220446-LACI.wav	x	1	LACI	Laci	2	2	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_222843-LOFU.wav	x	1	LOFU	x	2	2	Epfu	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_223637-EPFU.wav	x	1	EPFU	Epfu	11	11	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170708_225712-LOFU.wav	x	1	LOFU	x	5	9	Laci/Lano	Laci	Lano	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_003217-LACI.wav	x	1	LACI	Laci	4	4	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_031033-LACI.wav	x	1	LACI	Laci	10	10	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_031038-LACI.wav	x	1	LACI	Laci	3	3	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_054218-XNOISE.wav	x	x	XNOISE	x	x	x	x	x	x	x	0.8	0
SA03 Night 2	PAS_SNARMY_SA03_D500-20170709_214732-EPFU.wav	x	1	EPFU	Epfu	11	11	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_220310-LACI.wav	x	1	LACI	Laci	6	6	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_221114-EPFU.wav	x	1	EPFU	Epfu	7	7	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_221235-LACI.wav	x	1	LACI	Laci	6	6	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_222326-LOFU.wav	x	1	LOFU	Laci	3	4	x	Laci	Lano	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_223035-LOFU.wav	x	1	LOFU	x	1	1	Laci	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_230622-EPFU.wav	x	1	EPFU	Epfu	10	10	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_231210-LACI.wav	x	1	LACI	Laci	4	4	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_232339-LACI.wav	x	1	LACI	Laci	7	9	x	Laci	Lano	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_232721-LOFU.wav	x	1	LOFU	x	2	4	Lano/Laci	Lano	Laci	x	0.8	16
	PAS_SNARMY_SA03_D500-20170709_233010-LOFU.wav	x	1	LOFU	x	1	1	Lano	Lano	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_005206-EPFU.wav	x	1	EPFU	Epfu	13	13	x	Epfu	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_012008-EPFU.wav	x	1	EPFU	Epfu	9	13	x	Epfu	Lano	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_012017-LOFU.wav	x	1	LOFU	x	1	1	Lano/	Lano	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_014157-LOFU.wav	x	1	LOFU	Lano	6	10	x	Lano	Laci	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_040020-LABO.wav	1	x	LABO	x	2	2	Labo	Labo	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_040451-LACI.wav	x	1	LACI	Laci	2	2	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_041328-LACI.wav	x	1	LACI	x	1	1	Laci	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_041939-LOFU+LOFU.wav	x	x	LOFU+LOFU	x	1	1	Laci	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_050618-LACI.wav	x	1	LACI	Laci	10	11	x	Laci	Epfu	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_050626-LACI.wav	x	1	LACI	Laci	9	9	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_050632-LACI.wav	x	1	LACI	Laci	9	9	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_050642-LACI.wav	x	1	LACI	Laci	12	12	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_050649-LACI.wav	x	1	LACI	Laci	12	12	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_050658-LACI.wav	x	1	LACI	Laci	5	5	x	Laci	x	x	0.8	16
	PAS_SNARMY_SA03_D500-20170710_050724-LACI.wav	x	1	LACI	Laci	2	2	x	Laci	x	x	0.8	16

Kaleidoscope Pro 4.2.0 with Qualatative (Manual) Results																								
	OUT FILE	DATE	TIME	MANUAL ID	AUTO ID*	PULSES	MATCHING	MATCH RATIO	MARGIN	ALTERNATES	N	Fc	Sc	Dur	Fmax	Fmin	Fmean	TBC	Fk	Tk	S1	Tc	Qual
SA01 Night 1	PAS_SNARMY_SA01_D500-20170708_220320_000	7/8/17	22:03:20	LOFU	LASNOC	2	1	0.5	0.422406	EPTFUS;LASCIN	2	27.408	28.62	4.306	37.129	27.174	30.085	239.312	27.887	3.222	234.835	4.157	0.83
	PAS_SNARMY_SA01_D500-20170709_020433_000	7/9/17	2:04:33	LACI+LOF	LASCIN	24	21	0.875	0.683473		24	18.494	5.18	7.191	19.537	18.232	18.708	140.92	18.592	3.205	45.097	5.001	4.9
	PAS_SNARMY_SA01_D500-20170709_024131_000	7/9/17	2:41:31	LOFU	LASCIN	2	2	1	0.342478	LASNOC	2	24.976	18.15	5.421	29.169	23.07	25.408	352.05	25.282	2.785	239.262	3.429	0.64
	PAS_SNARMY_SA01_D500-20170709_030649_000	7/9/17	3:06:49	LACI	LASCIN	9	8	0.889	0.624781	EPTFUS	9	21.933	19.81	4.415	25.173	21.83	22.767	388.737	22.542	2.378	147.951	4.146	1.6
	PAS_SNARMY_SA01_D500-20170709_044344_000	7/9/17	4:43:44	LACI	LASCIN	13	11	0.846	0.758698	EPTFUS	13	21.59	27.92	5.404	27.429	21.524	23.318	323.094	22.161	3.978	181.376	5.241	1.74
SA01 Night 2	PAS_SNARMY_SA01_D500-20170709_221528_000	7/9/17	22:15:28	LOFU	EPTFUS	1	0	0	0.465491	LASCIN	1	26.403	41.34	4.182	37.56	26.317	29.651	0	27.211	3.13	351.402	4.182	0.37
	PAS_SNARMY_SA01_D500-20170709_224327_000	7/9/17	22:43:27	LOFU	LASCIN	1	0	0	0.409112	LASNOC;EPTFUS	1	26.405	32.59	2.386	27.494	26.32	26.823	0	27.222	0.585	-104.519	1.934	0.75
	PAS_SNARMY_SA01_D500-20170710_020158_000	7/10/17	2:01:58	LOFU	LASNOC	2	1	0.5	0.456663	EPTFUS;LASCIN	2	26.49	81.66	3.124	36.855	26.49	29.756	238.364	28.224	2.014	418.878	3.124	0.49
	PAS_SNARMY_SA01_D500-20170710_025115_000	7/10/17	2:51:15	LOFU	LASCIN	3	1	0.333	0.327109	LASNOC	3	25.868	49.67	4.36	30.934	25.484	27.211	591.37	27.691	1.496	189.24	3.608	0.83
	PAS_SNARMY_SA01_D500-20170710_033746_000	7/10/17	3:37:46	LACI	LASCIN	4	3	0.75	0.603525	EPTFUS	4	22.188	22.29	7.295	24.366	22.113	23.005	596.009	22.735	5.056	38.362	6.724	0.98
	PAS_SNARMY_SA01_D500-20170710_041148_000	7/10/17	4:11:48	LACI	LASCIN	7	6	0.857	0.74519	EPTFUS	7	20.353	24	5.269	23.232	20.29	21.27	480.356	20.96	3.158	108.421	4.954	0.93
	PAS_SNARMY_SA01_D500-20170710_041207_000	7/10/17	4:12:07	LACI	LASCIN	20	20	1	0.797525	EPTFUS	20	20.267	17.71	8.583	26.372	20.095	21.546	205.713	20.861	5.289	254.536	8.025	2.88
	PAS_SNARMY_SA01_D500-20170710_041213_000	7/10/17	4:12:13	LACI	LASCIN	10	10	1	0.819929	EPTFUS	10	19.744	26.04	6.593	25.255	19.614	21.201	401.785	20.396	4.646	210.478	6.246	1.87
SA02 Night 1	PAS_SNARMY_SA02_D500-20170708_212232_000	7/8/17	21:22:32	LOFU	EPTFUS	16	13	0.812	0.274793	LASNOC	16	31.419	121.39	4.316	51.782	29.984	37.921	186.501	36.264	2.46	318.542	3.936	3.11
SA02 Night 2	PAS_SNARMY_SA02_D500-20170709_211854_000	7/9/17	21:18:54	EPFU	EPTFUS	8	8	1	0.407872	LASCIN	8	29.058	34.37	6.754	40.815	27.702	32.039	118.345	30.352	3.923	257.088	5.598	1.5
	PAS_SNARMY_SA02_D500-20170709_225252_000	7/9/17	22:52:52	EPFU	EPTFUS	17	17	1	0.428196	LASCIN	17	28.451	46.61	6.441	48.359	28.23	34.043	133.85	29.956	4.79	333.351	6.316	2.6
	PAS_SNARMY_SA02_D500-20170709_230522_000	7/9/17	23:05:22	EPFU	EPTFUS	12	12	1	0.364599	LASNOC	12	29.997	56.67	5.993	46.617	29.759	34.831	167.154	31.788	4.159	260.762	5.742	2.35
	PAS_SNARMY_SA02_D500-20170709_231151_000	7/9/17	23:11:51	LACI	LASCIN	19	17	0.895	0.626216	EPTFUS;LASNOC	19	22.289	43.24	7.689	35.208	21.952	25.668	214.601	23.634	5.215	245.466	7.324	2.12
	PAS_SNARMY_SA02_D500-20170710_022612_000	7/10/17	2:26:12	HIFU	MYOLUC	1	0	0	0.342336	MYOSEP	1	42.11	224.93	2.184	68.986	42.11	51.282	0	50.316	1.042	619.395	2.184	0.29
	PAS_SNARMY_SA02_D500-20170710_033645_000	7/10/17	3:36:45	LOFU	LASCIN	5	3	0.6	0.612347	LASNOC	5	24.366	27.32	3.747	28.714	24.061	25.397	364.11	24.829	2.436	279.793	3.517	2.25
SA03 Night 1	PAS_SNARMY_SA03_D500-20170708_213053_000	7/8/17	21:30:53	EPFU	EPTFUS	27	12	0.444	0.315904	LASNOC	27	29.84	29.68	4.31	45.831	29.2	34.551	140.359	30.451	3.045	269.409	3.989	7.42
	PAS_SNARMY_SA03_D500-20170708_213157_000	7/8/17	21:31:57	EPFU	EPTFUS	19	18	0.947	0.447993	LASNOC;LASCIN	19	28.108	26.06	7.135	42.276	27.656	32.19	186.321	29.106	5.315	267.819	6.694	2.69
	PAS_SNARMY_SA03_D500-20170708_214041_000	7/8/17	21:40:41	EPFU	EPTFUS	31	30	0.968	0.30705	LASNOC	31	29.407	74.97	5.527	55.46	28.284	36.324	129.052	31.447	3.946	402.052	5.163	4.91
	PAS_SNARMY_SA03_D500-20170708_214356_000	7/8/17	21:43:56	EPFU	EPTFUS	28	22	0.786	0.255515	LASNOC	28	30.837	50.99	4.964	56.227	29.953	37.769	129.349	32.292	3.706	425.428	4.609	5.23
	PAS_SNARMY_SA03_D500-20170708_214930_000	7/8/17	21:49:30	EPFU	EPTFUS	24	23	0.958	0.29899	LASNOC	24	29.675	70.03	5.391	51	28.88	35.576	132.977	31.607	3.826	392.447	5.077	3.8
	PAS_SNARMY_SA03_D500-20170708_214938_000	7/8/17	21:49:38	EPFU	EPTFUS	22	17	0.773	0.276767	LASNOC	22	30.801	47.97	4.324	54.84	30.338	37.926	128.429	31.588	3.449	473.908	4.151	3.94
	PAS_SNARMY_SA03_D500-20170708_215651_000	7/8/17	21:56:51	LACI	LASCIN	11	9	0.818	0.672485	EPTFUS	11	22.268	24.8	7.245	26.437	22.12	23.545	381.232	22.72	5.302	95.699	6.738	1.98
	PAS_SNARMY_SA03_D500-20170708_220446_000	7/8/17	22:04:46	LACI	LASCIN	4	4	1	0.813548	EPTFUS;LASBOR	4	20.408	16.78	4.884	22.766	20.26	21.1	282.779	20.815	2.699	83.212	4.404	0.67
	PAS_SNARMY_SA03_D500-20170708_222843_000	7/8/17	22:28:43	LOFU	EPTFUS	8	7	0.875	0.330986	LASNOC;LASCIN	8	29.574	41.96	4.467	39.011	28.875	32.368	529.634	30.516	3.194	106.446	4.329	2.84
	PAS_SNARMY_SA03_D500-20170708_223637_000	7/8/17	22:36:37	EPFU	EPTFUS	20	20	1	0.452057	LASCIN	20	28.199	27.94	8.229	53.33	27.918	34.845	193.524	29.105	6.527	314.714	8.003	2.48
	PAS_SNARMY_SA03_D500-20170708_225712_000	7/8/17	22:57:12	LOFU	LASCIN	16	13	0.812	0.459947	LASNOC;EPTFUS	16	25.694	36.68	4.205	37.338	25.47	28.512	221.098	26.622	2.665	326.748	3.945	2.75
	PAS_SNARMY_SA03_D500-20170709_003217_000	7/9/17	0:32:17	LACI	LASCIN	4	4	1	0.491713	LASNOC	4	24.433	36.82	3.748	29.297	24.31	25.745	278.693	25.424	2.169	253.065	3.622	0.66
	PAS_SNARMY_SA03_D500-20170709_031033_000	7/9/17	3:10:33	LACI	LASCIN	27	22	0.815	0.703842	EPTFUS	27	21.181	39.84	8.475	26.134	20.858	22.418	148.082	22.379	4.759	173.716	7.216	4.63
	PAS_SNARMY_SA03_D500-20170709_031038_000	7/9/17	3:10:38	LACI	LASCIN	16	14	0.875	0.723531		16	19.028	3.75	8.086	20.407	18.726	19.256	121.253	19.165	3.493	101.121	5.487	3.42
	PAS_SNARMY_SA03_D500-20170709_054218_000	7/9/17	5:42:18	XNOI	LASCIN	1	1	1	0.944286		1	16.809	-0.02	11.658	17.102	16.634	16.812	0	16.808	2.628	40.386	8.815	0.31
SA03 Night 2	PAS_SNARMY_SA03_D500-20170709_214732_000	7/9/17	21:47:32	EPFU	EPTFUS	30	29	0.967	0.279459	LASNOC	30	30.773	68.27	5.105	59.329	30.283	38.82	132.297	32.798	3.791	452.675	4.945	5.42
	PAS_SNARMY_SA03_D500-20170709_220310_000	7/9/17	22:03:10	LACI	LASCIN	10	10	1	0.802021	EPTFUS;LASNOC	10	21.494	21.37	7.995	29.956	21.202	23.292	223.11	22.098	5.491	362.717	7.32	1.42
	PAS_SNARMY_SA03_D500-20170709_221114_000	7/9/17	22:11:14	EPFU	EPTFUS	24	21	0.875	0.381071	LASNOC;LASCIN	24	27.6	44.73	7.757	40.22	27.05	31.068	161.379	29.339	5.176	225.989	7.224	3.43
	PAS_SNARMY_SA03_D500-20170709_221235_000	7/9/17	22:12:35	LACI	LASCIN	10	9	0.9	0.74244	EPTFUS	10	21.931	4.92	7.988	24.911	21.434	22.606	406.128	22.222	4.387	98.861	6.208	1.66
	PAS_SNARMY_SA03_D500-20170709_222326_000	7/9/17	22:23:26	LOFU	LASCIN	7	5	0.714	0.454981	LASNOC;EPTFUS	7	25.53	61.46	3.989	36.102	25.008	28.337	192.378	26.916	2.39	288.09	3.647	1.14
	PAS_SNARMY_SA03_D500-20170709_223035_000	7/9/17	22:30:35	LOFU	LASCIN	2	2	1	0.768622	EPTFUS	2	21.819	17.07	6.024	30.097	21.41	23.654	343.717	22.19	4.049	205.273	5.319	0.83
	PAS_SNARMY_SA03_D500-20170709_230622_000	7/9/17	23:06:22	EPFU	EPTFUS	28	28	1	0.354232	LASNOC	28	29.008	62.9	6.543	55.816	28.204	36.472	141.989	31.189	4.67	332.039	6.156	3.8
	PAS_SNARMY_SA03_D500-20170709_231210_000	7/9/17	23:12:10	LACI	LASCIN	4	4	1	0.796219	EPTFUS	4	19.648	21.86	7.696	23.748	19.335	20.59	998.013	19.944	5.249	145.99	6.382	0.78
	PAS_SNARMY_SA03_D500-20170709_232339_000	7/9/17	23:23:39	LACI	LASCIN	18	13	0.722	0.591896	LASNOC;EPTFUS	18	23.225	13.44	6.204	29.188	22.871	24.491	200.499	23.695	4.056	247.53	5.438	2.77
	PAS_SNARMY_SA03_D500-20170709_232721_000	7/9/17	23:27:21	LOFU	LASCIN	8	0	0	0.310643	LASNOC	8	25.503	86.55	3.921	38.406	25.246	29.322	142.917	28.058	2.174	365.369	3.842	1.61
	PAS_SNARMY_SA03_D500-20170709_233010_000	7/9/17	23:30:10	LOFU	LASNOC	3	0	0	0.402216	LASCIN;EPTFUS	3	25.635	86.92	3.596	38.045	25.635	29.405	151.189	28.158	1.984	308.151	3.596	0.55
	PAS_SNARMY_SA03_D500-20170710_005206_000	7/10/17	0:52:06	EPFU	EPTFUS	27	17	0.63	0.235087	LASNOC	27	28.481	88.3	5.967	53.761	26.639	35.548	150.646	32.065	3.415	371.378	5.331	4.67
	PAS_SNARMY_SA03_D500-20170710_012008_000	7/10/17	1:20:08	EPFU	EPTFUS	24	17	0.708	0.332993	LASNOC	24	29.279	62.78	4.937	53.779	28.786	36.179	134.021	30.771	3.836	437.918	4.782	4.3
	PAS_SNARMY_SA03_D500-20170710_012017_000	7/10/17	1:20:17	LOFU	LASNOC	4	0	0	0.444322	LASCIN;EPTFUS	4	27.141	90.93	2.954	35.342	26.675	29.379	334.949	29.936	1.094	290.899	2.653	0.63
	PAS_SNARMY_SA03_D500-20170710_014157_000	7/10/17	1:41:57	LOFU	LASCIN	11	10	0.909	0.419829	LASNOC;EPTFUS	11	26.48	57.59	4.746	38.4	25.717	29.335	190.572	27.94	2.813	394.822	4.253	1.18
	PAS_SNARMY_SA03_D500-20170710_040020_000	7/10/17	4:00:20	LABO	LASBOR	4	0	0	0.223354	MYOLUC	4	44.571	80.93	4.855	88.208	44.571	57.213	77.471	48.694	3.299	478.867	4.855	0.71
	PAS_SNARMY_SA03_D500-20170710_040451_000	7/10/17	4:04:51	LACI	LASCIN	7	6	0.857	0.741994	EPTFUS	7	21.054	12.45	4.229	22.724	20.764	21.508	571.916	21.464	2.054	76.181	3.803	1.38
	PAS_SNARMY_SA03_D500-20170710_041328_000	7/10/17	4:13:28	LACI	LASCIN	8	8	1	0.818443	EPTFUS	8	19.805	15.45	5.651	22.35	19.578	20.504	400.655	20.155	3.548	86.685	5.045	1.99
	PAS_SNARMY_SA03_D500-20170710_041939_000	7/10/17	4:19:39	LOFU+LOFU	LASCIN	7	4	0.571	0.292181	EPTFUS	7	28.409	7.74	5.831	30.983	27.974	29.089	646.722	28.755	3.075	92.957	4.71	1.29
	PAS_SNARMY_SA03_D500-20170710_050618_000	7/10/17	5:06:18	LACI	LASCIN	18	18	1	0.784435	EPTFUS	18	20.465	12.18	9.267	25.737	20.3	21.829	211.037	20.974	6.325	134.871	8.73	2.95
	PAS_SNARMY_SA03_D500-20170710_050626_000	7/10/17	5:06:26	LACI	LASCIN	17	15	0.882	0.71757	EPTFUS;LASNOC	17	20.791	27.15	7.304	25.226	20.338	21.985	208.575	21.469	5.065	104.929	6.57	3.4
	PAS_SNARMY_SA03_D500-20170710_050632_000	7/10/17	5:06:32	LACI	LASCIN	17	15	0.882	0.785219	EPTFUS;LASNOC	17	20.923	23.93	9.121	27.561	20.555	22.65	242.941	21.586	6.782	179.858	8.416	3.27
	PAS_SNARMY_SA03_D500-20170710_050642_000	7/10/17	5:06:42	LACI	LASCIN	16	14	0.875	0.738582	EPTFUS;LASNOC	16	21.144	18.68	10.068	29.526	20.676	23.257	223.454	21.761	7.773	190.713	9.543	3.7
	PAS_SNARMY_SA03_D500-20170710_050649_000	7/10/17	5:06:49	LACI	LASCIN	16	15	0.938	0.754755	EPTFUS;LASNOC	16	20.295	23.29	11.644	29.497	19.965	22.496	258.41	21.127	8.694	237.886	10.594	2.07
	PAS_SNARMY_SA03_D500-20170710_050658_000	7/10/17	5:06:58	LACI	LASCIN	15	15	1	0.806434	EPTFUS	15	19.641	5.34	11.789	26.17	19.347	21.169	273.122	19.828	9.334	154.834	10.883	2.02
	PAS_SNARMY_SA03_D500-20170710_050724_000	7/10/17	5:07:24	LACI	LASCIN	8	8	1	0.768593	EPTFUS	8	19.013	23.38	9.537	21.808	18.87	19.852	505.86	19.415	6.876	36.214	8.739	2.04

Appendix C

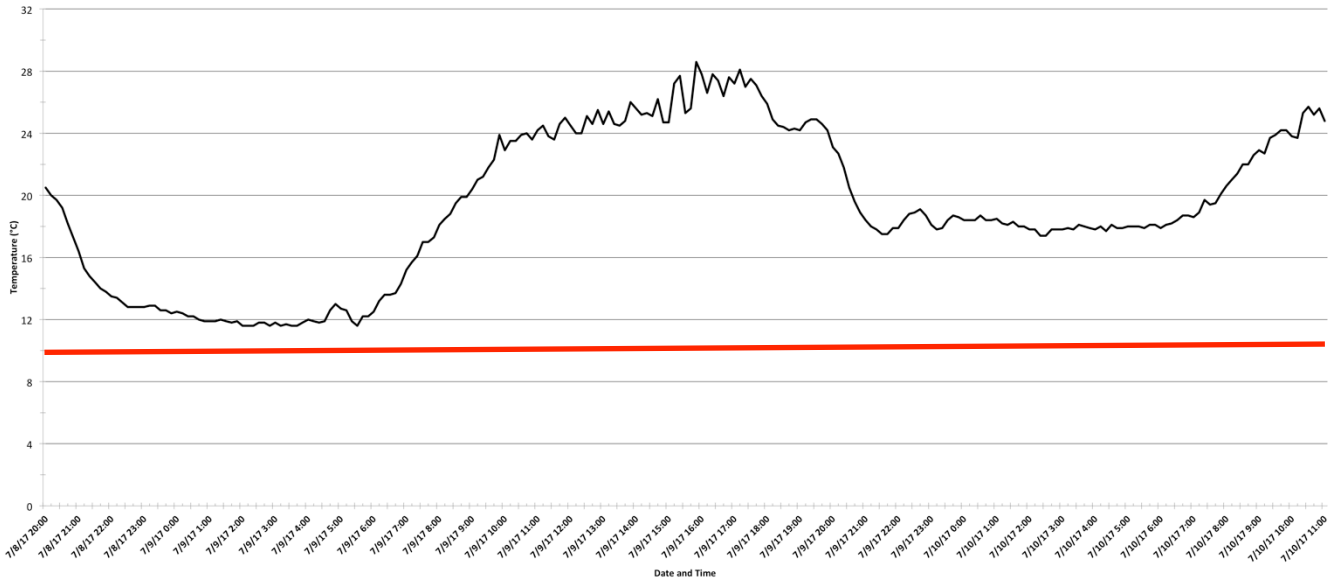
Survey Weather Data

Weather Conditions Data For Nights 07/08/17 and 07/09/17

Date	Time	Humidity	Wind	Speed	Gust	Precip. Rate.	Precip. Accum.	Solar
7/8/17	18:00	0 %	WNW	9 mph	19 mph	0 in	0 in	443 w/m²
7/8/17	18:31	0 %	West	12 mph	18 mph	0 in	0 in	137 w/m²
7/8/17	19:06	0 %	NW	16 mph	17 mph	0 in	0 in	247 w/m²
7/8/17	19:32	0 %	NW	6 mph	15 mph	0 in	0 in	186 w/m²
7/8/17	20:02	0 %	NW	6 mph	11 mph	0 in	0 in	27 w/m²
7/8/17	20:33	0 %	NW	3 mph	9 mph	0 in	0 in	11 w/m²
7/8/17	21:03	0 %	NW	0 mph	3 mph	0 in	0 in	0 w/m²
7/8/17	21:34	0 %	NW	0 mph	1 mph	0 in	0 in	0 w/m²
7/8/17	22:04	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/8/17	22:31	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/8/17	23:01	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/8/17	23:32	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/9/17	0:02	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/9/17	0:33	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/9/17	1:03	0 %	SSW	0 mph	6 mph	0 in	0 in	0 w/m²
7/9/17	1:35	0 %	SW	0 mph	4 mph	0 in	0 in	0 w/m²
7/9/17	2:00	0 %	WSW	1 mph	3 mph	0 in	0 in	0 w/m²
7/9/17	2:30	0 %	WSW	0 mph	1 mph	0 in	0 in	0 w/m²
7/9/17	3:01	0 %	SW	3 mph	6 mph	0 in	0 in	0 w/m²
7/9/17	3:31	0 %	SW	0 mph	4 mph	0 in	0 in	0 w/m²
7/9/17	4:02	0 %	SW	2 mph	5 mph	0 in	0 in	0 w/m²
7/9/17	4:32	0 %	SSW	6 mph	7 mph	0 in	0 in	0 w/m²
7/9/17	5:03	0 %	SSW	3 mph	9 mph	0 in	0 in	0 w/m²
7/9/17	5:33	0 %	WSW	1 mph	7 mph	0 in	0 in	0 w/m²
7/9/17	6:04	0 %	SW	7 mph	9 mph	0 in	0 in	18 w/m²
7/9/17	6:34	0 %	SSW	3 mph	8 mph	0 in	0 in	162 w/m²
7/9/17	7:01	0 %	SW	6 mph	9 mph	0 in	0 in	250 w/m²
Date	Time	Humidity	Wind	Speed	Gust	Precip. Rate.	Precip. Accum.	Solar
7/9/17	18:00	0 %	SSW	7 mph	11 mph	0 in	0 in	470 w/m²
7/9/17	18:31	0 %	SSW	6 mph	11 mph	0 in	0 in	462 w/m²
7/9/17	19:02	0 %	SSW	3 mph	7 mph	0 in	0 in	140 w/m²
7/9/17	19:32	0 %	SSW	6 mph	12 mph	0 in	0 in	249 w/m²
7/9/17	20:03	0 %	SW	4 mph	4 mph	0 in	0 in	27 w/m²
7/9/17	20:33	0 %	SW	0 mph	3 mph	0 in	0 in	11 w/m²
7/9/17	21:04	0 %	SW	3 mph	4 mph	0 in	0 in	0 w/m²
7/9/17	21:30	0 %	SW	4 mph	4 mph	0 in	0 in	0 w/m²
7/9/17	22:03	0 %	SW	4 mph	6 mph	0 in	0 in	0 w/m²
7/9/17	22:33	0 %	SW	4 mph	6 mph	0 in	0 in	0 w/m²
7/9/17	23:04	0 %	SW	5 mph	5 mph	0 in	0 in	0 w/m²
7/9/17	23:30	0 %	SW	2 mph	4 mph	0 in	0 in	0 w/m²
7/10/17	0:02	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/10/17	0:33	0 %	NW	0 mph	0 mph	0 in	0 in	0 w/m²
7/10/17	1:03	0 %	SSW	0 mph	6 mph	0 in	0 in	0 w/m²
7/10/17	1:35	0 %	SW	0 mph	4 mph	0 in	0 in	0 w/m²
7/10/17	2:00	0 %	WSW	1 mph	3 mph	0 in	0 in	0 w/m²
7/10/17	2:30	0 %	WSW	0 mph	1 mph	0 in	0 in	0 w/m²
7/10/17	3:01	0 %	SW	3 mph	6 mph	0 in	0 in	0 w/m²
7/10/17	3:31	0 %	SW	0 mph	4 mph	0 in	0 in	0 w/m²
7/10/17	4:02	0 %	SW	2 mph	5 mph	0 in	0 in	0 w/m²
7/10/17	4:32	0 %	SSW	6 mph	7 mph	0 in	0 in	0 w/m²
7/10/17	5:03	0 %	SSW	3 mph	9 mph	0 in	0 in	0 w/m²
7/10/17	5:33	0 %	WSW	1 mph	7 mph	0 in	0 in	0 w/m²
7/10/17	6:04	0 %	SW	7 mph	9 mph	0 in	0 in	18 w/m²
7/10/17	6:34	0 %	SSW	3 mph	8 mph	0 in	0 in	162 w/m²
7/10/17	7:01	0 %	SW	6 mph	9 mph	0 in	0 in	250 w/m²

From Romulus, NY (KNYROMUL2, www.wunderground.com)

Temperature Data from Kestrel Drop 3® temperature data logger



USFWS minimum temperature for acoustic Indiana and Northern long-eared bat survey = 10° C.

Appendix D

Biologist Qualifications

John Chenger

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- **Endangered species biologist and company head with 27+ years of bat sampling and management**
- **Designer of projects, sampling plans, and specialty equipment to meet clients' permit sampling needs**

Areas of Expertise

Large Project Mist Net Sampling Plans	*Indiana Bat Migration Telemetry*	*Bat Acoustic Survey & Analysis*
PCG WEVCA/USFWS Compliance	*Bat Artificial Roost Design*	*Bat Survey Training*

Professional Experience

Bat Conservation and Management, Inc. — Carlisle, PA — 1999 to Present

President/Project Biologist

Created a company based on performing high quality bat sampling and management services for industrial, commercial and government clients. Selected Contributions:

- Design, supervise and run projects to meet USFWS section 7 and 10 Indiana bat consultation needs.
- Supervise up to 20 employees, sampling over 2,000 summer mist net sites and fall & spring mine surveys in 18 states across more than 140 projects.
- Designs bat acoustic monitoring studies in 8 states and provides expert manual analysis of recordings. Expert using SonoBat, Kaleidoscope, Echoclass, BCID analysis software, and Binary Acoustics, Pettersson, and Wildlife Acoustics bat acoustic hardware.
- Supervised employees radio tracking of over 230 bats of 6 species since 2000, including Myso, Myse, Myle, Mylu, Labo, and Laci. Tracking included migration, summer foraging, and locating roosts.
- Supervise employees providing surveys covering most of the needs of developers including mist net surveys, woodrat surveys, bat acoustic surveys, cave and mine project area evaluations, small-footed bat habitat evaluations, and artificial roost design and creation.
- Specialist with macro, near infrared, thermal, and multi-flash photography and video.
- Instructed or co-led over 60 training workshops for federal & state biologists, land managers, and consultants for proper use of acoustic monitoring equipment and bat capture techniques.
- Permitted to sample bats nationwide.

Pennsylvania Game Commission — 1992-2006

Biologist Aide

Assisted PGC biologists in a wide variety of biological sampling; Target animals included bats, woodrats, flying squirrels, small mammals, and peregrine falcons. Selected Contributions:

- Performed bat mist net, harp trap, and Anabat surveys; Handled 20,000+ individual bats
- Performed 300+ hibernacula surveys in caves, mines, tunnels, and aqueducts; Skilled in internal and external surveys; Identified 200,000+ individual bats in cave and mine surveys
- Assisted with first identification of modern use at 8 of PA and 2 NJ *M. sodalis* (Indiana bat) hibernacula
- Surveyed potential sites for presence or historic presence of the Allegheny woodrat (*N. magister*)
- Ran small mammal trap lines in remote locations across PA

Janet Debelak Tyburec

Professional Profile

Experienced author, educator, photographer, presenter, and wildlife biologist specializing in environmental and nature studies, especially addressing bat conservation and research. Able to work in various settings from lecture halls, to classrooms, to outdoor field locations. Professional development, coordination, and management of multi-day trainings, workshops, and field studies. Excellent attention to detail, reporting, organization, and budgeting skills.

Lifetime Work Experience

Author, Educator, Photographer, Wildlife Biologist (September 2002 to present)
Janet Tyburec Consulting, LLC , Tucson AZ
Duties: Provide training and instruction on bat research, inventory, and monitoring, including physical capture techniques, radio-tracking, and acoustic surveys for numerous private, federal and state agencies, including the USDA Forest Service, USDI Bureau of Land Management, USDI National Park Service, USDI Fish and Wildlife Service, and the Department of Defense. Design and conduct custom training workshops and professional bat surveys for agency directors, staff, wildlife biologists, resource managers, seasonal employees, and volunteers.

Contract Instructor (September 2002 to September 2012)
Bat Conservation International, Austin TX
Job Duties: Design and teach 6-8 weeks of field workshops annually for BCI and its partner agencies and organizations about bat research and conservation, advanced capture techniques, acoustic monitoring, *Myotis sodalis* survey techniques, and inventory and management techniques, using field study techniques including mist netting, harp trapping, acoustic monitoring equipment and software; radio-tracking, banding, light-tagging, species identification, habitat assessment and management, status determination, and data management tools.

Director of Education Programs (June 1996 to September 2002)
Bat Conservation International, Austin TX
Administrative duties: Prepare annual departmental budget for three program activities; contribute to semi-annual departmental reports and provide organizational and donor annual reports.
Job duties: Organize, schedule, promote, and instruct at BCI's educational workshops. Manage and lead BCI's Latin American Eco-tours to destinations throughout Central and South America. Liaison with Arizona-Sonora Desert Museum and the Migratory Pollinators Conservation Campaign. Develop and edit educational materials, posters, books, audio / visual programs.

Assistant Director of Programs (June 1993 to June 1996)
Bat Conservation International, Austin TX
Administrative duties: Prepare annual departmental budget and implementation plan for 6 staff and all related program activities; supervise 2 department staff.
Job duties: Organize, schedule, promote, and assist teaching BCI's "Bat Conservation and Management Workshops."; Manage and implement Latin American Natural History Tour Programs to destinations including Costa Rica, Belize, Peruvian Amazon, and Mexico; Develop educational lectures for the Central Texas community at various local nature centers, special events, and area elementary schools; Consult with editors, authors, educators, designers, and other professionals to assist in producing educational materials, publications, exhibits, and interactive multi-media tools about bats and bat conservation.

Janet Debelak Tyburec

Educational Resources Coordinator (May 1992 to June 1993)
Bat Conservation International, Austin TX
Administrative duties: Assist with annual budget and implementation plan preparation; supervise 1 department staff.
Job duties: Develop and coordinate field-study workshops on bat conservation and management techniques; Manage visual resources staff and procedures; Develop educational materials about bat conservation; Write grant proposals to fund special projects and general operating.

Education Assistant (September 1989 to May 1992)
Bat Conservation International, Austin TX
Job duties: Reply to phone and mail inquiries of a general educational and scientific nature; Provide media interviews and public lectures; Manage circulation of 60,000 visual images of bats to publishers, colleagues, and media; Assist with development of educational materials, workshops, and natural history tours.

Field Assistant (May 1989 to July 1989)
National Geographic Research Project, Directed by: Dr. T.H. Fleming (University of Miami) Bahia Kino, MEXICO
Job duties: Assist with data collection for all aspects of field work including: recording vegetational transects, plant phenologies, capturing birds and bats for tissue samples, radio-tracking endangered lesser long-nosed bats (*Leptonycteris yerbabuenae*), recording visitation rates for cacti flowers using night-vision equipment, develop survey and recording techniques for studying seed set in cacti fruits and monitoring the invasiveness of plant study techniques.

Data entry Clerk (January 1989 to May 1989)
Trinity University, Department of Biology, San Antonio TX
Job duties: Accession and automate over 1000 bibliographic entries about bat research from scientific journals, texts, articles and compilations.

Technical Writing Intern (August 1988 to December 1988)
University of Texas Health Science Center School of Dentistry, San Antonio TX
Job duties: Analyze data from community water fluoridation studies to develop position papers on its use as a caries prophylaxis and publish notes on fluoride use in medical, dental, and health journals; extensive library research; computer assisted statistical analysis on findings.

Education

Trinity University, San Antonio TX. — ***May 1989***
B.A., Biology and English
University of Colorado, Boulder CO. — ***August 1988***
Course work in Comparative Ecology of Alpine and Desert Ecosystems
Pima Community College, Tucson AZ. — ***August 1984 - May 1985***
Course work in Creative Writing

Undergraduate Science Studies: Botany, Plant Physiology, Vertebrate Zoology, Ecology, Oceanography, Genetics, General Biology, Chemistry, Physics, Statistics
Undergraduate English Studies: Elizabethan Playwrights, Complete Works of Shakespeare, American Novelists, Complete Works of Faulkner, Language Arts, Magazine Writing

TODD A. SINANDER

Bat Conservation and Management, Inc.
1263 Claremont Road
Carlisle, PA 17015
tsinander@batmanagement.com
(717) 241-2228

Education

1989 **State University of New York College of Environmental Science and Forestry,** Syracuse, NY-*BS, Forest Biology*

Work Experience

2004 - Present **Bat Conservation and Management**, Carlisle, PA
Wildlife Biologist

- Conduct Indiana bat summer mist netting surveys, hibernacula counts, spring emergence and fall swarming harp trapping surveys, radio telemetry studies, acoustic surveys, habitat assessments.
- Supervise and manage employees conducting Indiana bat summer mist netting and radio telemetry surveys.
- Locate and organize base camps that include living areas, white nose syndrome decontamination stations, mist netting and telemetry equipment stations.
- Maintain field vehicles such as field trucks, ATVs, trailers, and RVs.
- Supervise and train employees in the proper micrositing, set up, and take down of mist netting equipment, removal and processing of bats from mist nets, and data collection and management.
- Communicate with clients to schedule surveys and site access, review safety procedures, explain mist netting protocols and methodology, report survey results, and alleviate concerns.
- Communicate with adjacent landowners of project sites to explain project goals, obtain property access, and alleviate concerns.
- Document bat migratory routes, foraging patterns, and maternity and day roost sites using radio telemetry.
- Edit and compile mist netting survey results for submission of final reports to clients and state and federal agencies.
- Assist in the organizing and teaching of acoustic monitoring workshops.
- Conduct habitat and population surveys of the Allegheny woodrat (*Neotoma magister*) and other mammals of conservation concern.
- Manage the production of products manufactured and sold for bat population assessment and habitat enhancement.

1993 - 2010 **Philadelphia Zoo**, Philadelphia, PA
Lead Keeper, Small Mammals

- Responsible for the daily husbandry and management of a diverse collection of mammals and birds.
- Supervised the daily activities of relief keepers.
- Designed and constructed animal exhibits for public display.
- Presented both informal talks and formal lectures to the public.
- Conducted behavioral research on a variety of small mammal species.

1990 - 1993 **Philadelphia Zoo**, Philadelphia, PA
Relief Keeper

- Responsible for the daily husbandry of a variety of mammals, birds, and reptile species.
- Conducted behavior and reproductive research on the blind mole rat (*Nannospalax ehrenbergi*).

1989 - 1990 **New York State Department of Environmental Conservation**, New Paltz, NY
Fish and Wildlife Technician

- Operated cooperative big and small game check stations.
- Reviewed construction permit applications and conducted site inspections for stream and lake disturbances under New York State's environmental protection law.
- Sampled anadromous fish from the Hudson River Estuary using seine nets, electro-shocking, and by monitoring the commercial fishery.

Additional Experience

- Collected environmental data and used radio telemetry for tracking and to collect echidna (*Tachyglossus aculeatus*) body temperatures from short-beaked echidnas on Kangaroo Island, Australia.
- Tracked coyotes (*Canis latrans*) to determine habitat use, behavioral patterns, and prey densities in the Adirondack Park, NY. Investigated kill sites and deer carcasses preyed upon by coyotes and bobcat. Conducted the analysis of coyote fecal samples to determine prey preference.
- Located, captured, and marked eastern massasauga rattlesnakes (*Sistrurus catenatus)* in Syracuse, NY using radio telemetry to determine their habitat use.
- Captured, took blood samples, and banded spruce grouse (*Falcipennis Canadensis)* for an ongoing census and genetics study of the population in the Adirondack Park, NY.
- Trapped broad-winged hawks (*Buteo platypterus*), tracked using radio telemetry, and observed nest visits.
- Organized three annual fund raising events for the Ngare Sergoi Rhino Sanctuary in Kenya, Africa that raised over $25,000.

Certifications

- U.S. Fish And Wildlife Service Qualified Indiana Bat Surveyor (QIBS)

Publications and Presentations

- 2008. Management Techniques for the Reproduction of Short-beaked Echidnas (*Tachyglossus aculeatus*) at the Philadelphia Zoo: Is there Potential for Long-term Reproductive Studies of the Echidna in Captivity? Boden Research Conference, Beyond the Platypus Genome, Victor Harbor, South Australia.
- 2007. Overcoming Challenges in Short-beaked Echidna Reproduction at the Philadelphia Zoo, AZA Annual Conference, Philadelphia, PA.
- 2007. Improving Exhibit Quality and Reproductive Success of Echidnas (*Tachyglossus aculeatus*) At The Philadelphia Zoo, AZA Annual Conference, Philadelphia, PA.
- 2007. Managing Echidnas for Reproduction at The Philadelphia Zoo, AZA Regional Conference, Denver, CO.
- 1999. To Bag a Dik-dik: Another Option in Small Antelope Management. Animal Keepers' Forum, Vol. 26, No. 12, pp. 492-496.
- 1995. Overcoming Spatial Constraints Using Enrichment in the Exhibition of Small Mammals. Animal Keepers' Forum, Vol. 22, No. 5, pp. 170-173.
- 1998. An Aardvark Adventure. Zoo One (Philadelphia Zoo), Vol. 5. Issue 1.

References

John Chenger, Bat Conservation and Management, Inc., 220 North Old Stone House Road, Carlisle, PA 17015. (814) 442-4246. jchenger@batmanagement.com.

Chris Sanders, Sanders Environmental, Inc., 322 Borealis Way, Bellefonte, PA 16823, (818) 659-8257, sanders@batgate.com.

Matthew Hopkins, Sanders Environmental, Inc., 322 Borealis Way, Bellefonte, PA 16823, (818) 659-8257, mhopkins1531@gmail.com.

ENVIRONMENTAL RESOURCES, LLC
CONSULTING SERVICES

September 29, 2017

Mr. Gene Zhou
Circular EnerG, LLC
400 Andrews Street, Suite 300
Rochester, New York 14604

Subject: Rare, Threatened, and Endangered Species Evaluation; Circular EnerG, LLC Project Site (Former Seneca Army Depot), Town of Romulus, Seneca County, New York.

Dear Mr. Zhou:

Environmental Resources, L.L.C. (ERS) conducted an ecological assessment of the above referenced 4± acre project site located within the former Seneca Army Depot property, south of East Kendaia Road and west of Administration Avenue, in accordance with New York State Environmental Quality Review Act requirements with regard to State listed rare, threatened, and endangered species and/or natural communities. This evaluation is based on the results of New York Natural Heritage Program (NYNHP) file review, literature reviews of information concerning the listed species of concern, and a field assessment of current site conditions.

The following Exhibits are provided in support of our determination:

- Exhibit A - Figure 1. Site Location
  Figure 2. Google Earth Aerial
- Exhibit B - New York Natural Heritage Program Correspondence

RESULTS

New York Natural Heritage Program

New York Natural Heritage Program response to our request for file review indicates the Short-eared Owl (*Asio flammeus*) to be a New York State endangered species suspected to inhabit areas in the vicinity of the project site as it has been documented at the project site and within 0.5 mile of the site.

Short-eared Owl - An owl requiring broad expanses of open country including grasslands, marshlands, prairies, dunes, and tundra's, often abroad at dusk and dawn. Identified as a medium sized owl (13 to 17 inches) of streaked tawny brown color, and irregular flopping flight. Short-eared Owl preferably inhabit sites with an abundance of meadow voles (*Microtus pennsylvanicus)* and other small mammals, flying low over open ground before pouncing on prey from above. Nests are placed on the ground in open country.

33 KRESS HILL DRIVE • SPENCERPORT, NY 14559 • (585) 594-4450 • FAX: (585) 594-4499

Site Description/Habitat Characteristics

This 40± acre study area occurs within the defunct Seneca Army Depot property. The abandoned former army depot is currently characterized by advanced successional scrub-shrub habitat with wooded pockets that fragment numerous small, successional stage old field habitats. Slight depressions in these areas have resulted in the several pocket areas of wet shrub and wet meadow wetlands. Much of the character of the more open lands is fragmented, successional field vegetation growing out of old graveled roadways, parking lots, equipment and material storage areas, and railroads which served as infrastructure for the former Seneca Army Depot. Numerous brush-hogged laneways are cut through the scrub-shrub habitats. Common vegetative species in the successional scrub-shrub/woods include: black locust (*Robinia pseudoacacia*), and scattered Scotch pine (*Pinus sylvestris*), green ash (*Fraxinus pennsylvanica*), and eastern cottonwood (*Populus deltoides*) trees; and areas of common buckthorn (*Rhamnus cathartica*), autumn olive (*Elaeagnus umbellata*), grey dogwood (*Cornus racemosa*) and hawthorn (*Crataegus sps.)* shrub thickets.

The small wetlands are characterized by dogbane (*Apocynum sps.*), swamp milkweed (*Asclepias incarnata*), sedges (*Carex spp.),* and purple loosestrife (*Lythrum salicaria*).

The generally small open lands often have a solid gravel base with characterizing sparsely spaced vegetation that includes Canada goldenrod (*Solidago canadensis*), Queen Ann's lace (*Daucus carota*), teasel (*Dipsacus sylvestris*), timothy (*Phleum pratensis*), knapweed (*Centaurea sps.*), and other grasses and forbs. In addition, along the old railroad, roadways, and storage areas are simple non-vegetated gravel areas.

CONCLUSIONS

The former Seneca Army Depot project site is characterized by areas of successional scrub-shrub and wooded pockets, which fragment numerous areas of small open fields. Most of the natural areas on Circular EnerG project site are characterized by vegetation growing out of old gravel roadways, parking lots, equipment and material storage yards, and railroad corridors that served as infrastructure for the former Seneca Army Depot. This gravel substrate is impenetrable to borrowing/tunneling mammals, and has resulted in the natural succession of vegetation that is sparsely distributed. It is our professional opinion that the lack of dense herbaceous vegetation which serves as cover for small mammals and loose organic soils necessary for tunneling/borrowing mammals, is not conducive in accommodating an abundance of small mammals (meadow voles, field mice, etc.) that serve as prey for Short-eared Owl. While the NYNHP response indicates Sort-eared Owl has been documented at, and within 0.5 miles of the project site, it is evident that there is more appropriate habitat for this species in the surrounding rural areas of Seneca County.

Based on the small areas of the open fields that are each fragmented by surrounding successional shrubs and woodlots, the impenetrable un-natural gravel substrate underlying the study area, and the vast rural acreages of more appropriate Short-eared Owl habitat surrounding the former Seneca Army Depot project site, it is our professional opinion that while this species may be in the area, it is unlikely that the site provides optimum habitat for the species. Therefore it is our opinion that the development of this study area will not jeopardize or adversely affect Short-eared Owl individuals or populations.

Sincerely,
Environmental Resources, LLC

Gene Pellett
PWS/Ecologist

CC: Sarah Costich, Costich Engineering

Attachments.

References:

Audubon, Guide to North American Birds, Kenn Kaufman, "Lives of North American Birds", 2017.

Cornell Lab of Ornithology, "All About Birds", Hugh Powell, Editor, August 12, 2010, Cornell University, Ithaca, NY.

New York State Department of Environmental Conservation, Short-eared Owl Fact Sheet, Endangered Species Unit, Albany, NY.

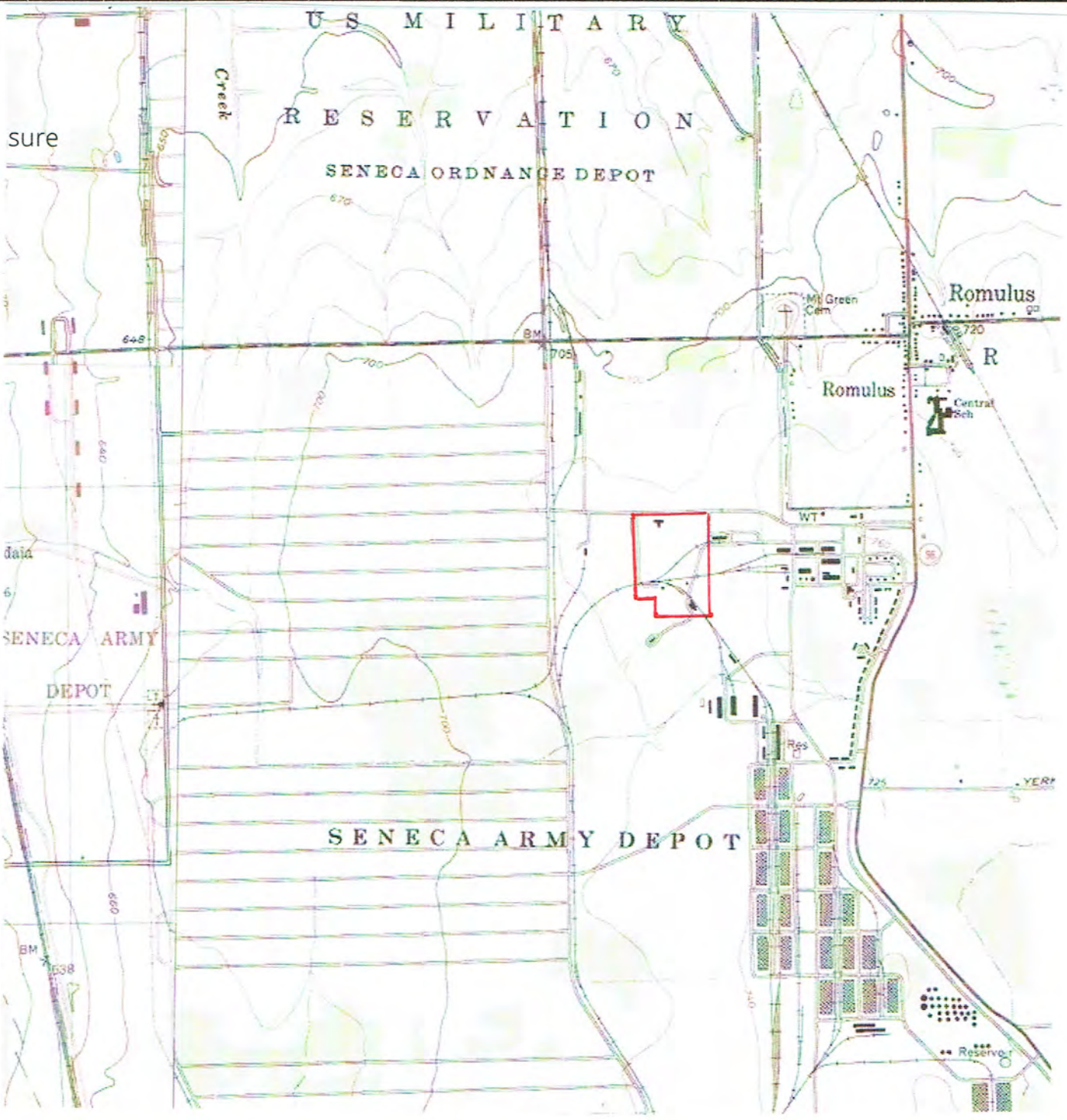
www.dec.ny.gov › Animals, Plants, Aquatic Life › Birds › Bird Species

www.fws.gov/r5gomp/gom/habitatstudy/metadata/short-eared_owl_model.htm

EXHIBIT A

Figure 1. Site Location

Figure 2. Google Earth Aerial - 2015



Prepared By: ***Environmental Resources, LLC***

Legend: Site Boundary
Base Map: USGS Quadrangle Map – Ovid, NY

FIGURE 1. SITE LOCATION

N

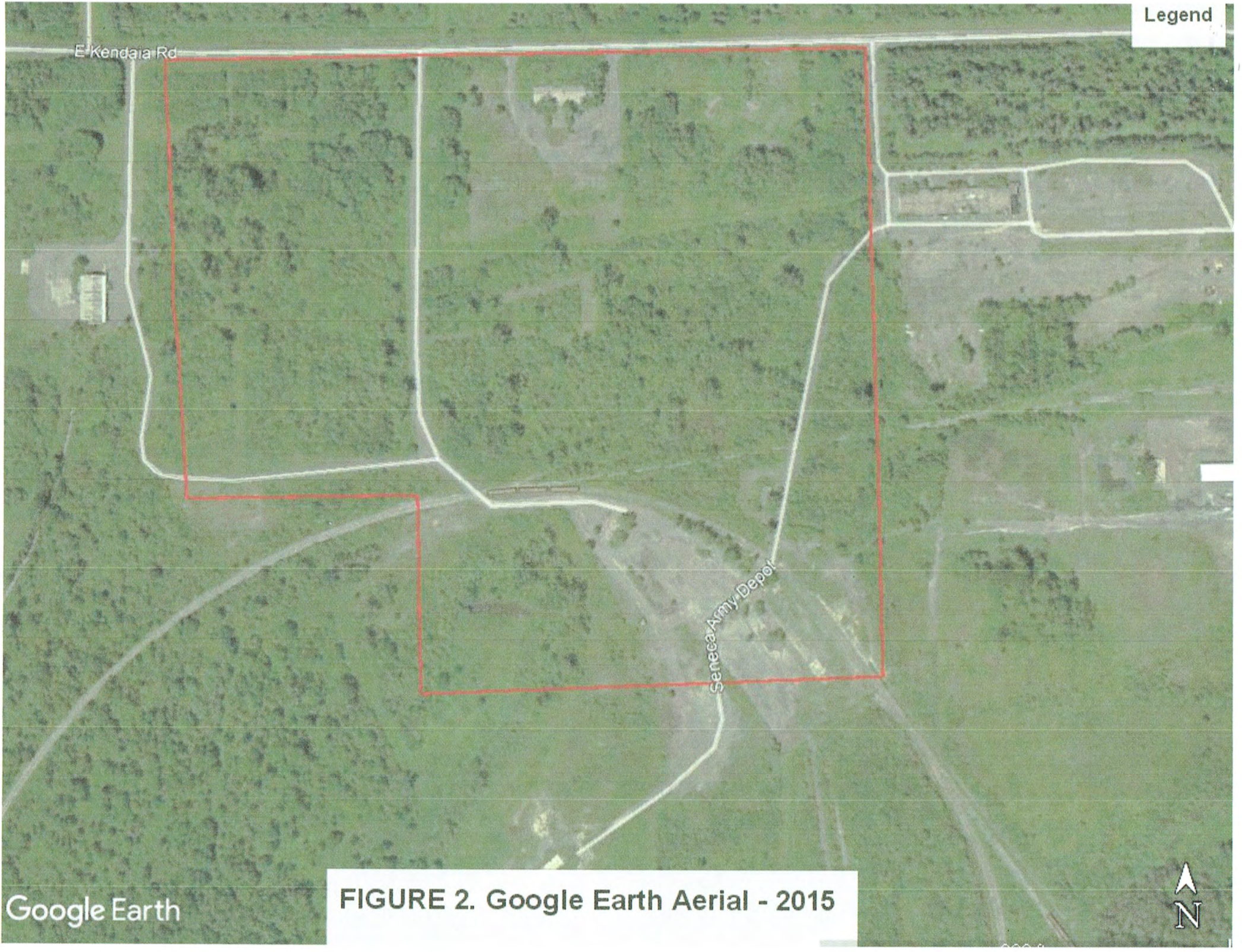


FIGURE 2. Google Earth Aerial - 2015

EXHIBIT B

New York Natural Heritage Program, Correspondence

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

August 18, 2017

Gene Pellett
Environmental Resources, LLC
33 Kress Hill Drive
Spencerport, NY 14559

Re: NA
County: Seneca Town/City: Romulus

Dear Mr. Pellett:

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 state-listed animals 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.

Our database is continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

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 8 Office, Division of Environmental Permits, as listed at www.dec.ny.gov/about/39381.html.

Sincerely,

Colleen Lutz
Assistant Biologist
New York Natural Heritage Program

1007

The following state-listed animal has 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 or are candidates for federal listing.

For information about any permit considerations for the project, contact the Permits staff at the NYSDEC Region 8 Office. For information about potential impacts of the project on these species, and how to avoid, minimize, or mitigate any impacts, contact the Wildlife Manager.

A listing of Regional Offices is at http://www.dec.ny.gov/about/558.html.

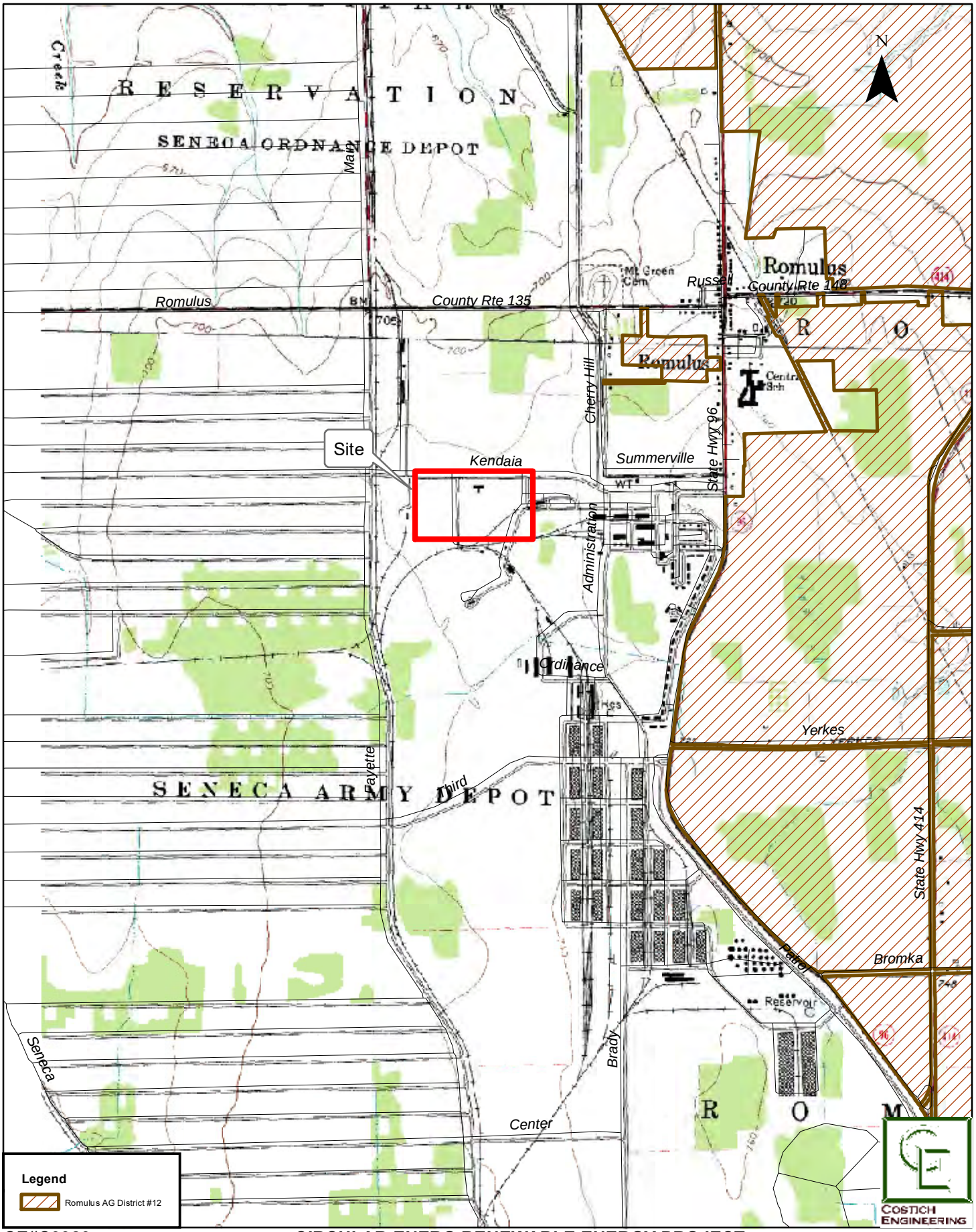
The following species have been documented at the project site and within 0.5 mile.

COMMON NAME	*SCIENTIFIC NAME*	*NY STATE LISTING*	*FEDERAL LISTING*	
Short-eared Owl *Nonbreeding*	*Asio flammeus*	Endangered		11101

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.



CE#C3320

NOT TO SCALE

PER NYS DEPT OF AGRICULTURE AND MARKETS

CIRCULAR ENERG RENEWABLE ENERGY PROJECT
TOWN OF ROMULUS, SENECA COUNTY
AG DISTRICT MAP

DISCLAIMER: This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ROSE HARVEY
Commissioner

September 21, 2017

Mr. Michael Ritchie
Vice President
Costich Engineering, DPC
217 Lake Avenue
Rochester, NY 14608

Re: DEC
Seneca Army Depot: Proposed green energy facility
1 East Kendala, Romulus, NY
17PR05837

Dear Mr. Ritchie:

Thank you for continuing to consult with the Division for Historic Preservation of the Office of Parks, Recreation and Historic Preservation (OPRHP). We have reviewed the submitted materials in accordance with the New York State Historic Preservation Act of 1980 (section 14.09 of the New York State Parks, Recreation and Historic Preservation Law. These comments are those of the Division for Historic Preservation and relate only to Historic/Cultural resources.

Our office continues to note that the Seneca Army Depot Historic District is eligible for listing on the National Register of Historic Places. Based upon further research our office has determined that that the boundaries of the historic district have been modified and that building 310: Lunch Room and Building S-311: Popping plant are not contributing to the historic district and are outside the district boundaries. As such, we have no concerns with potential impacts to these properties.

Based upon our review of the proposed green energy facility, it is OPRHP's opinion the proposed facility will have No Adverse Impact upon historic resources.
If you have any questions, I can be reached at (518) 268-2181.

Sincerely,

Beth A. Cumming
Senior Historic Site Restoration Coordinator
e-mail: beth.cumming@parks.ny.gov

via e-mail only

cc: L. Scannell, T. Tocano

NEW YORK STATE OF OPPORTUNITY. | Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ROSE HARVEY
Commissioner

September 21, 2017

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Sincerely,

Beth A. Cumming
Senior Historic Site Restoration Coordinator
e-mail: beth.cumming@parks.ny.gov

via e-mail only

cc: L. Scannell, T. Tocano

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Critical Environmental Areas

CEA's

Local agencies may designate specific geographic areas within their boundaries as "Critical Environmental Areas" (CEAs). State agencies may also designate geographic areas they own, manage or regulate.

Contact the designating agency for more information concerning a specific Critical Environmental Area.

To be designated as a CEA, an area must have an exceptional or unique character with respect to one or more of the following:

- a benefit or threat to human health;
- a natural setting (e.g., fish and wildlife habitat, forest and vegetation, open space and areas of important aesthetic or scenic quality);
- agricultural, social, cultural, historic, archaeological, recreational, or educational values; or
- an inherent ecological, geological or hydrological sensitivity to change that may be adversely affected by any change.

Following designation, the potential impact of any Type I or Unlisted Action on the environmental characteristics of the CEA is a relevant area of environmental concern and must be evaluated in the determination of significance prepared pursuant to Section 617.7 of SEQR.

Where available, a link to a map of the Critical Environmental Area is provided. If a county is not listed below, there are presently no Critical Environmental Areas in that county.

Critical Environmental Areas in Broome County
Critical Environmental Areas in Columbia County
Critical Environmental Areas in Cortland County
Critical Environmental Areas in Delaware County
Critical Environmental Areas in Dutchess County
Critical Environmental Areas in Erie County
Critical Environmental Areas in Essex County
Critical Environmental Areas in Kings County
Critical Environmental Areas in Madison County
Critical Environmental Areas in Monroe County
Critical Environmental Areas in Nassau County
Critical Environmental Areas in Onondaga County
Critical Environmental Areas in Ontario County
Critical Environmental Areas in Orange County
Critical Environmental Areas in Oswego County
Critical Environmental Areas in Putnam County
Critical Environmental Areas in Queens County

Critical Environmental Areas in Rockland County
Critical Environmental Areas in Saratoga County
Critical Environmental Areas in Schenectady County
Critical Environmental Areas in Schoharie County
Critical Environmental Areas in Schuyler County
Critical Environmental Areas in St. Lawrence County
Critical Environmental Areas in Steuben County
Critical Environmental Areas in Suffolk County
Critical Environmental Areas in Tioga County
Critical Environmental Areas in Tompkins County
Critical Environmental Areas in Ulster County
Critical Environmental Areas in Warren County
Critical Environmental Areas in Washington County
Critical Environmental Areas in Westchester County

Traffic Impact Study

for the proposed

NY Waste to Energy Facility

Town of Romulus
Seneca County, New York

October 2017

Project No. 36070

Prepared For:

Gene Zhou

400 Andrews Street
Rochester, NY 14604

Prepared By:

SRF ASSOCIATES
WWW.SRFA.NET
Transportation Engineering & Planning Consultants

3495 Winton Place
Building E, Suite 110
Rochester, New York 14623

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A1. COLLECTED TRAFFIC VOLUME DATA
A2. MISCELLANEOUS TRAFFIC DATA AND CALCULATIONS
A3. LOS CRITERIA/DEFINITIONS
A4. LEVEL OF SERVICE CALCULATIONS – BASE CONDITIONS
A5. LEVEL OF SERVICE CALCULATIONS – BACKGROUND CONDITIONS
A6. LEVEL OF SERVICE CALCULATIONS – FULL DEVELOPMENT CONDITIONS

LIST OF REFERENCES

1. Highway Capacity Manual, Fifth Edition. Transportation Research Board. National Research Council, Washington, DC. 2016.
2. New York State Department of Transportation (NYSDOT) Traffic Data Viewer. 2017. Retrieved from https://www.dot.ny.gov/tdv.
3. Manual on Uniform Traffic Control Devices for Street and Highways (MUTCD). Federal Highway Administration. 2009.
4. New York State Supplement to the Manual on Uniform Traffic Control Devices for Streets and Highways (2009 Edition). NYSDOT. 2011.
5. Trip Generation, Ninth Edition. Institute of Transportation Engineers. Washington D.C. 2012.
6. Trip Generation Handbook, 3rd Edition. Institute of Transportation Engineers. Washington, DC. 2014.

EXECUTIVE SUMMARY

OVERVIEW

The purpose of this report is to identify and evaluate the potential traffic impacts associated with the proposed NY Waste to Energy Facility in the Town of Romulus, Seneca County, New York. Within this report, the operating characteristics of the proposed access points and impacts to the adjacent roadway network are identified and evaluated. In an effort to define traffic impact, this analysis establishes base traffic conditions including area growth, and determines the traffic operations that would result from the proposed project.

The project site is located on the former Seneca Army Depot south of East Kendaia Road and west of the existing County of Seneca Building 147 in the Town of Romulus, Seneca County, New York. The site is currently vacant. Land uses in the vicinity of the project site primarily include residential and commercial development as well as the Seneca County Jail. The project study area consists of four existing intersections as follows: NY Route 414/Cayuga Street (NY Route 148), NY Route 96/Cayuga Street, NY Route 96/E. Patrol Road, NY Route 96/Bromka Road.

The proposed development consists of a new facility designed to convert waste to energy. The facility will employ approximately 85 people when operating at full capacity. Access to the site is proposed via the existing NY Route 96 intersection with E. Patrol Road. The proposed facility is expected to reach full operating capacity in 2024. Historical traffic volume data indicates very little growth in traffic volumes over the last 10 to 15 years. In order to provide a conservative analysis, a growth rate of 0.5% per year has been used for the seven (7) year development period.

The operating characteristics of the study intersection and impacts to the adjacent roadway network are identified and mitigating measures are provided in order to address any potentially significant adverse traffic impacts or identified safety concerns.

CONCLUSIONS & RECOMMENDATIONS

This study addresses the traffic impact that can be expected from the proposed NY Waste to Energy Facility in the Town of Romulus, Seneca County, New York as described in this Study. Our firm's comprehensive analysis indicates that the existing transportation network can adequately accommodate the projected traffic volumes and resulting impacts to study area intersections with the recommended modifications in place. The following sets forth our firm's conclusions based upon the results of the analyses:

1. Based upon information provided by the facility operator, employees are expected to work three shifts: 6 AM-2 PM, 2 PM-10 PM, and 10 PM-6 AM. Given that these shift times occur outside of the commuter peaks on the adjacent roadways (7-8 AM and 4-5 PM), no employee traffic is anticipated during the peak hours studied. However, truck and other heavy vehicle traffic is anticipated to enter and exit the site during the peak hours.

2. The proposed development is expected to generate approximately 57(23) total truck trips during the AM(PM) peak hours, respectively.

3. All intersections operate at LOS "B" or better on all approaches during both peak hours under existing, background, and full build conditions.

4. There are no significant changes in levels of service as a result of the proposed NY Waste to Energy Facility and no mitigation is warranted or recommended at any of the study area intersections.

I. INTRODUCTION

The purpose of this report is to identify and evaluate the potential traffic impacts associated with the proposed NY Waste to Energy Facility in the Town of Romulus, Seneca County, New York. Within this report, the operating characteristics of the proposed access points and impacts to the adjacent roadway network are identified and evaluated.

In an effort to define traffic impact, this analysis establishes base traffic conditions including including area growth, and determines the traffic operations that would result from the proposed project.

II. LOCATION

The project site is located on the former Seneca Army Depot south of East Kendaia Road and west of the existing County of Seneca Building 147 in the Town of Romulus, Seneca County, New York. The site is currently vacant. Land uses in the vicinity of the project site primarily include residential and commercial development as well as the Seneca County Jail. The project study area consists of four existing intersections as follows: NY Route 414/Cayuga Street (NY Route 148), NY Route 96/Cayuga Street, NY Route 96/E. Patrol Road, NY Route 96/Bromka Road.

The site location and study area are illustrated in **Figure 1 - Site Location & Study Area**.

III. EXISTING HIGHWAY SYSTEM

NY Route 96 is a north-south highway, functionally classified as a rural major collector adjacent to the site, extending from NY Routes 252 and 65 in the Village of Pittsford to the north through the Village of Waterloo to Interstate 86 in Owego to the south. NYS Route 96 generally consists of one 11 feet wide travel lane in each direction with 5 to 7 feet wide paved shoulders and a posted speed limit of 35 mph to 55 mph in the study area. According to the most recent traffic volume data recorded by the NYSDOT, Route 96 between the Route 414 intersection and Route 336 carried as estimated Annual Average Daily Traffic (AADT) of 2,700 vehicles per day (vpd) in 2010.

NY Route 414 is a north-south highway, functionally classified as a rural major collector between Route 96 and the Village of Seneca Falls, extending from Route 31 in the Village of Clyde to the north through the Village of Seneca Falls to Watkins Glen and points to the south. NY Route 414 generally consists of one travel lane in each direction with a posted speed limit of 55 mph in the study area. According to the most recent traffic volume data recorded by the NYSDOT, Route 414 between Route 96 and NY Route 336 carried as estimated Annual Average Daily Traffic (AADT) of 2,660 vehicles per day (vpd) in 2010.

Bromka Road is an east-west roadway connecting the Route 96 and Route 414. Bromka Road consists of approximately 18 feet pavement supporting one travel lane in each direction with no shoulders and no posted speed limit. The intersection of Bromka Road with Routes 96 is a "T" – intersections with stop sign control on Bromka Road.

The existing lane geometry at the study intersections and the AADT volumes are depicted in **Figure 2**.

IV. EXISTING TRAFFIC CONDITIONS

A. Peak Intervals for Analysis

Given the functional characteristics of the corridor, the land use proposed for the site (industrial type facility), the peak hours selected for analysis are the weekday commuter AM and PM peaks. The combination of site traffic and adjacent through traffic produces the greatest demand during these time periods.

B. Existing Traffic Volume Data

Turning movement traffic counts were obtained on Thursday, September 14th, 2017 by SRF at the study intersections. Traffic counts were conducted between 7:00-9:00 AM and 4:00-6:00 PM. The data indicates that during these periods, the peak hours of traffic at the study intersections are generally 7:00-8:00 AM and 4:00-5:00 PM.

No adverse weather conditions impacted the traffic counts. The traffic volumes were reviewed to confirm the accuracy and relative balance of the collective traffic counts. The actual differences in traffic volumes can be attributed to temporal variations in traffic volumes as well as activity related to driveways located in the segments between the study intersections.

The 2017 Base Conditions weekday AM and PM peak hour volumes are shown in **Figure 3**.

V. FUTURE AREA DEVELOPMENT AND LOCAL GROWTH

The proposed waste to energy facility is expected to be completed within the next seven (7) years. Historical traffic volume data indicates very little growth in traffic volumes over the last 10 to 15 years. In order to provide a conservative analysis, a growth rate of 0.5% per year has been used for the seven-year development period. Future 2024 background traffic volumes are shown in **Figure 4**.

VI. PROPOSED DEVELOPMENT

A. Description

The proposed development consists of a new facility designed to convert waste to energy. The facility will employ approximately 85 people when operating at full capacity. Access to the site is proposed via the existing NY Route 96 intersection with E. Patrol Road. **Figure 5** illustrates the proposed Site Plan.

B. Site Traffic Generation

The next step in the evaluation is to determine the traffic attributable to the proposed waste to energy facility, vehicle trips entering and exiting the site. The volume of traffic generated by a site is dependent on the intended land use and size of the development. Trip generation is an estimate of the number of trips generated by a specific building or land use. These trips represent the volume of traffic entering and exiting the development. Trip Generation, 9th Edition is used as a reference for this information. The trip rate for the peak hour of the generator may or may not coincide in time or volume with the trip rate for the peak hour of adjacent street traffic. Volumes generated during the peak hour of adjacent street traffic, in this case the weekday AM and PM commuter peaks, represent a more critical volume when analyzing the capacity of the system; those intervals will provide the basis of this analysis.

Based upon information provided by the facility operator, employees are expected to work three shifts: 6 AM-2 PM, 2 PM-10 PM, and 10 PM-6 AM. Given that these shift times occur outside of the commuter peaks on the adjacent roadways (7-8 AM and 4-5 PM), no employee traffic is anticipated during the peak hours studied. However, truck and other heavy vehicle traffic is anticipated to enter and exit the site during the peak hours. Detailed trip generation information is included in Appendix A2 of this report.

Table I summarizes the volume of projected trips for the weekday AM and PM peak hours.

TABLE I

PROJECTED TRIP GENERATION

DESCRIPTION	AM PEAK		PM PEAK	
	ENTER	EXIT	ENTER	EXIT
Employees	0	0	0	0
Trucks/Other Vehicles	36	21	9	14
Total Site Generated Trips	***36***	***21***	***9***	***14***

C. ***Site Traffic Distribution***

The cumulative effect of site traffic on the transportation network is dependent on the origins and destinations of that traffic and the location of the driveways serving the site.

The proposed arrival/departure distribution of traffic to be generated at this site is considered a function of several parameters, including the following:

- Population centers in the area;
- Site access driveway locations;
- Existing highway network; and
- Existing traffic conditions and controls.

Figure 6 shows the anticipated trip distribution pattern percentages for the proposed NY Waste to Energy Facility traffic. **Figure 7** illustrates the peak hour site generated traffic based on those percentages.

VII. FULL DEVELOPMENT VOLUMES

Proposed design hour traffic volumes are developed for each peak by combining the background traffic conditions (Figure 4) and the new site-generated traffic volumes (Figures 7) to yield the traffic volumes under full development conditions. The resulting design hour volumes for the proposed development are illustrated in **Figure 8** under full build-out conditions.

VIII. CAPACITY ANALYSIS

Capacity analysis is a technique used for determining a measure of effectiveness for a section of roadway and/or intersection based on the number of vehicles during a specific time period. The measure of effectiveness used for the capacity analysis is referred to as a Level of Service (LOS). Levels of Service are calculated to provide an indication of the amount of delay that a motorist experiences while traveling along a roadway or through an intersection. Since the most amount of delay to motorists usually occurs at intersections, capacity analysis typically focuses on intersections, as opposed to highway segments.

Six Levels of Service are defined for analysis purposes. They are assigned letter designations, from "A" to "F", with LOS "A" representing the best conditions and LOS "F" the worst. Suggested ranges of service capacity and an explanation of Levels of Service are included in the Appendix.

The standard procedure for capacity analysis of signalized and unsignalized intersections is outlined in the Highway Capacity Manual (HCM 2010) published by the Transportation Research Board. Traffic analysis software, Synchro 9, which is based on procedures and

methodologies contained in the HCM 2010, was used to analyze operating conditions at study area intersections. The procedure yields a Level of Service (LOS) based on the HCM 2010 as an indicator of how well intersections operate.

2017 base and 2024 background operating conditions during the peak study periods are evaluated to determine a basis for comparison with the projected future conditions. The future traffic conditions generated by the development were analyzed to assess the operations of the intersections in the study area. Capacity results for 2017 base, 2024 background, and 2024 full build-out conditions, are listed in **Table II**. The discussion following the table summarizes capacity conditions. All capacity analysis calculations are included in the Appendix.

TABLE II: CAPACITY ANALYSIS RESULTS

INTERSECTION	*2017 EXISTING CONDITIONS*		*2024 BACKGROUND CONDITIONS*		*2024 FULL DEVELOPMENT CONDITIONS*	
	AM	*PM*	*AM*	*PM*	*AM*	*PM*
Route 96/Cayuga Street						
Westbound – Cayuga Street	B(10.1)	A(9.8)	B(10.2)	A(9.8)	B(11.3)	B(10.3)
Southbound left – Route 96	A(7.4)	A(7.6)	A(7.5)	A(7.6)	A(7.5)	A(7.6)
Route 414/Cayuga Street						
Eastbound – Cayuga Street	A(9.9)	B(10.0)	A(9.9)	B(10.1)	B(10.7)	B(10.6)
Northbound left – Route 414	A(7.6)	A(7.5)	A(7.6)	A(7.5)	A(8.0)	A(7.8)
Route 96/E. Patrol Road						
Eastbound – E Patrol Road	B(10.3)	A(0.0)	B(10.4)	A(0.0)	B(12.7)	B(11.5)
Northbound left – Route 96	A(7.5)	A(0.0)	A(7.6)	A(0.0)	A(8.5)	A(8.6)
Route 96/Bromka Road						
Westbound – Bromka Road	A(8.9)	A(9.1)	A(8.9)	A(9.2)	A(9.0)	A(9.2)
Southbound left – Route 96	A(7.4)	A(7.4)	A(7.4)	A(7.4)	A(7.4)	A(7.4)

NOTES:
B(10.6) = Level Of Service (delay in seconds per vehicle)
N/A = Approach does not exist/was not analyzed during this condition.
F(*) = Delays greater than two minutes per vehicle

All intersections operate at LOS "B" or better on all approaches during both peak hours under existing, background, and full build conditions. There are no significant changes in levels of service as a result of the proposed NY Waste to Energy Facility and no mitigation is warranted or recommended at any of the study area intersections.

IX. CONCLUSIONS & RECOMMENDATIONS

This study addresses the traffic impact that can be expected from the proposed NY Waste to Energy Facility in the Town of Romulus, Seneca County, New York as described in this Study. Our firm's comprehensive analysis indicates that the existing transportation network can adequately accommodate the projected traffic volumes and resulting impacts

to study area intersections with the recommended modifications in place. The following sets forth our firm's conclusions based upon the results of the analyses:

1. Based upon information provided by the facility operator, employees are expected to work three shifts: 6 AM-2 PM, 2 PM-10 PM, and 10 PM-6 AM. Given that these shift times occur outside of the commuter peaks on the adjacent roadways (7-8 AM and 4-5 PM), no employee traffic is anticipated during the peak hours studied. However, truck and other heavy vehicle traffic is anticipated to enter and exit the site during the peak hours.

2. The proposed development is expected to generate approximately 57(23) total truck trips during the AM(PM) peak hours, respectively.

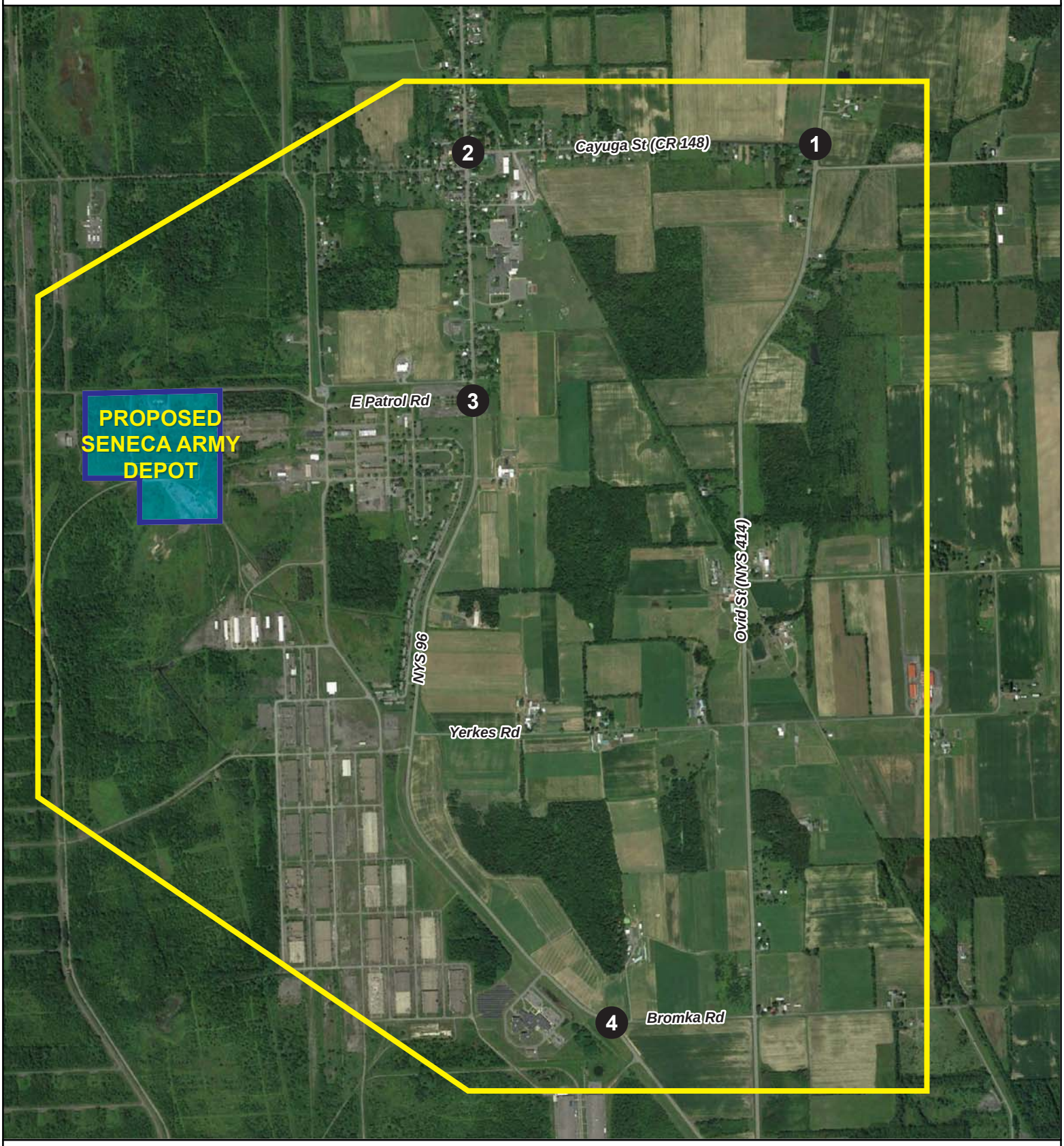
3. All intersections operate at LOS "B" or better on all approaches during both peak hours under existing, background, and full build conditions.

4. There are no significant changes in levels of service as a result of the proposed NY Waste to Energy Facility and no mitigation is warranted or recommended at any of the study area intersections.

X. FIGURES

Figures 1 through 8 are included on the following pages.

FIGURE 1 - SITE LOCATION AND STUDY AREA



Legend

- Study Intersection
- Site Location
- Study Area

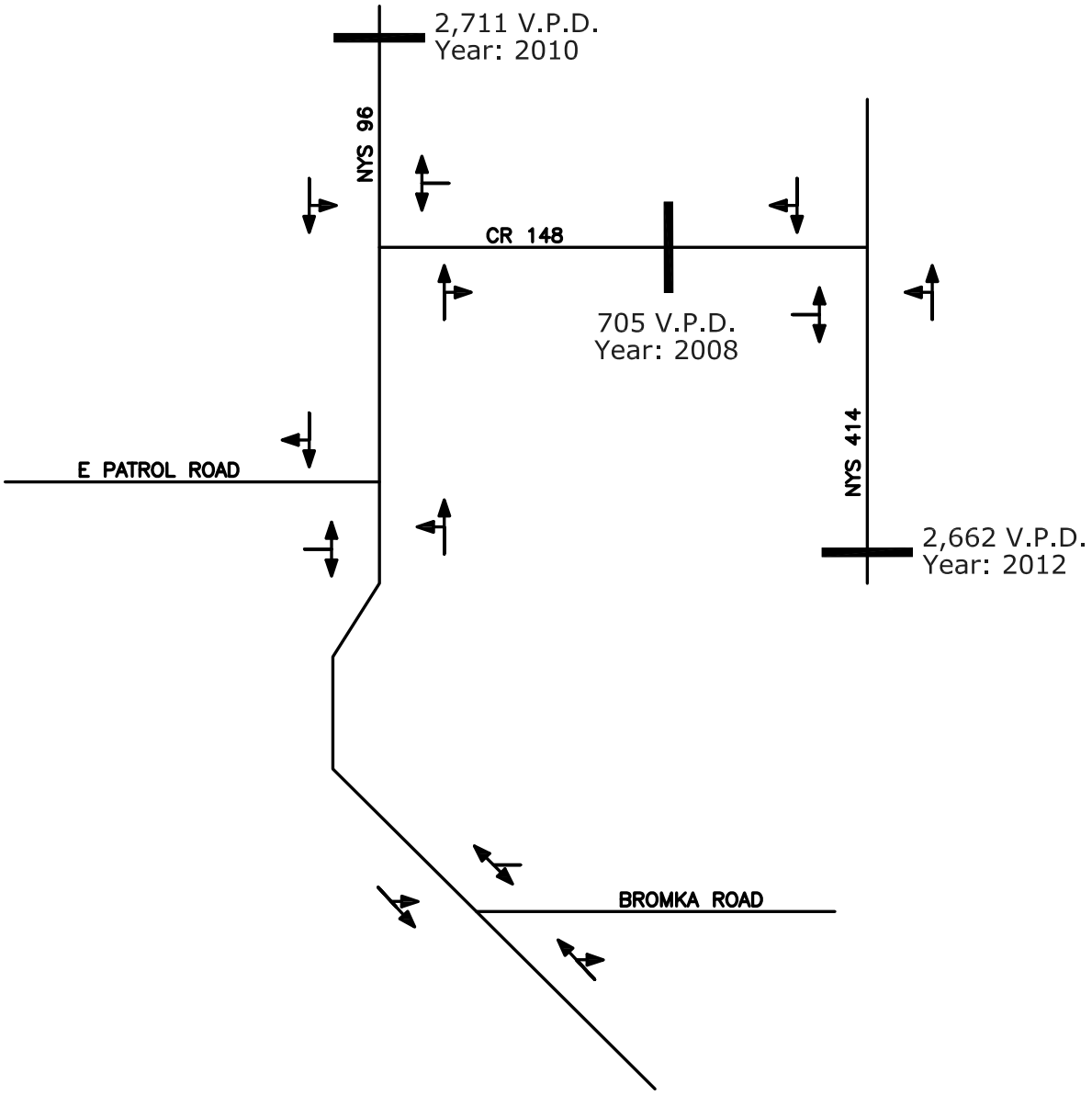
PROPOSED
NY WASTE TO ENERGY FACILITY
TOWN OF ROMULUS, NY

0 1,000 2,000 4,000
Feet

N

SRF ASSOCIATES
WWW.SRFA.NET
Transportation Engineering & Planning Consultants

Note: All counts by New York State Dept of Transportation
V.P.D. = Vehicles Per Day



PROJECT NO: 370XX

KEY

N

NOT TO SCALE

FIGURE 2

LANE GEOMETRY &
AVERAGE DAILY TRAFFIC

PROPOSED NY WASTE TO ENERGY FACILITY
SENECA ARMY DEPOT,
TOWN OF ROMULUS, NY

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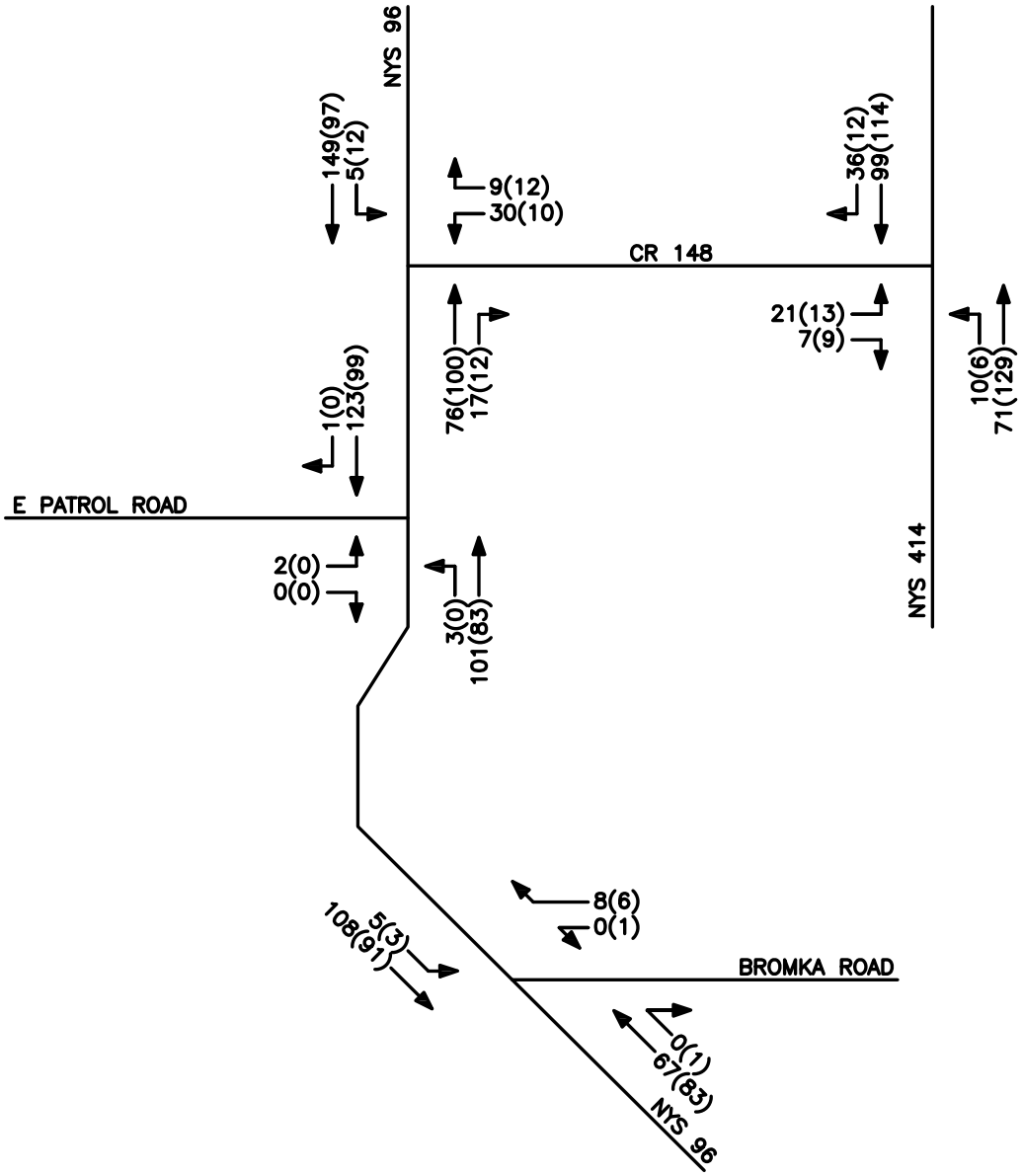
Transportation Engineering & Planning Consultants



AM PEAK HOUR: 7:00–8:00AM
PM PEAK HOUR: 4:00–5:00PM

KEY
00(00) = AM(PM)

N

NOT TO SCALE

FIGURE 3

PEAK HOUR VOLUMES
2017 EXISTING CONDITIONS

PROPOSED NY WASTE TO ENERGY FACILITY
SENECA ARMY DEPOT,
TOWN OF ROMULUS, NY

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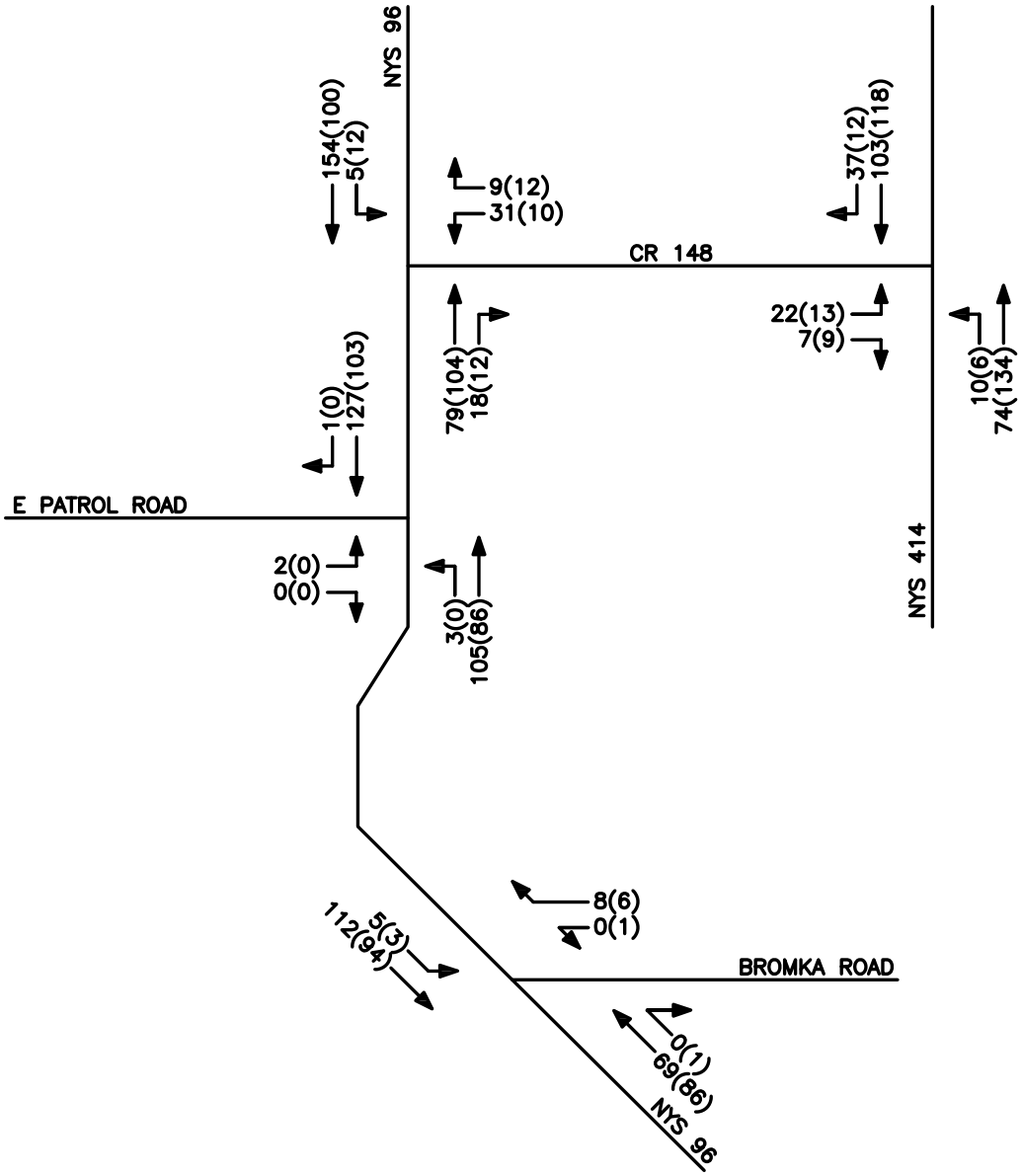

KEY

N

NOT TO SCALE

00(00) = AM(PM)

FIGURE 4

PEAK HOUR VOLUMES
2017 BACKGROUND CONDITIONS

PROPOSED NY WASTE TO ENERGY FACILITY
SENECA ARMY DEPOT,
TOWN OF ROMULUS, NY

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FIGURE 5: SITE PLAN

Dig Safely. New York
Underground Facilities Protection Organization
- Call Before You Dig
- Walk The Required Time
- Confirm Utility Response
- Respect The Marks
- Dig With Care

800-962-7962
www.digsafelynewyork.com

EXISTING UTILITIES (LOCATION, SIZES AND INVERTS) SHOWN ON THE PLANS ARE APPROXIMATE AND ARE NOT CERTIFIED AS TO THE ACCURACY OF THEIR LOCATION OR COMPLETENESS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATIONS AND DEPTHS OF ALL UTILITIES AND STRUCTURES IN THE PATH OF, OR CLOSELY PARALLEL TO, OR UNDER, THE PROPOSED CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DELAYS OR DAMAGES OCCURRING AS A RESULT OF INCORRECTLY LOCATED UTILITIES. IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE VARIOUS UTILITY OWNERS IN AMPLE TIME FOR THEM TO LOCATE AND MARK THEIR FACILITIES. THE CONTRACTOR SHALL ALSO NOTIFY UNDERGROUND UTILITY LOCATION SERVICE AT LEAST 48 HOURS IN ADVANCE OF COMMENCING ANY WORK.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

NO.	DATE	REVISION	BY	CHKD.	APV'LS.

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COSTICH ENGINEERING, D.P.C.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, LAND SURVEYOR, ARCHITECT OR LANDSCAPE ARCHITECT, TO ALTER ANY ITEM ON THIS DOCUMENT IN ANY WAY. ANY LICENSEE WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX HIS/HER SEAL AND THE NOTATION "ALTERED BY", FOLLOWED BY HIS/HER SIGNATURE AND SPECIFIC DESCRIPTION OF THE ALTERATION, TO THE DOCUMENT.

PRELIMINARY

PROJECT ENGINEER: M.O.R.
DRAWN BY: D.E.L.
BOUNDARY: ---
TOPO/BASE: ---
DATE: 07/25/2017
SCALE: 1"=200'

Costich Engineering
- Civil Engineering
- Land Surveying
- Landscape Architecture

217 Lake Avenue
Rochester, NY 14608
(585) 458-3020

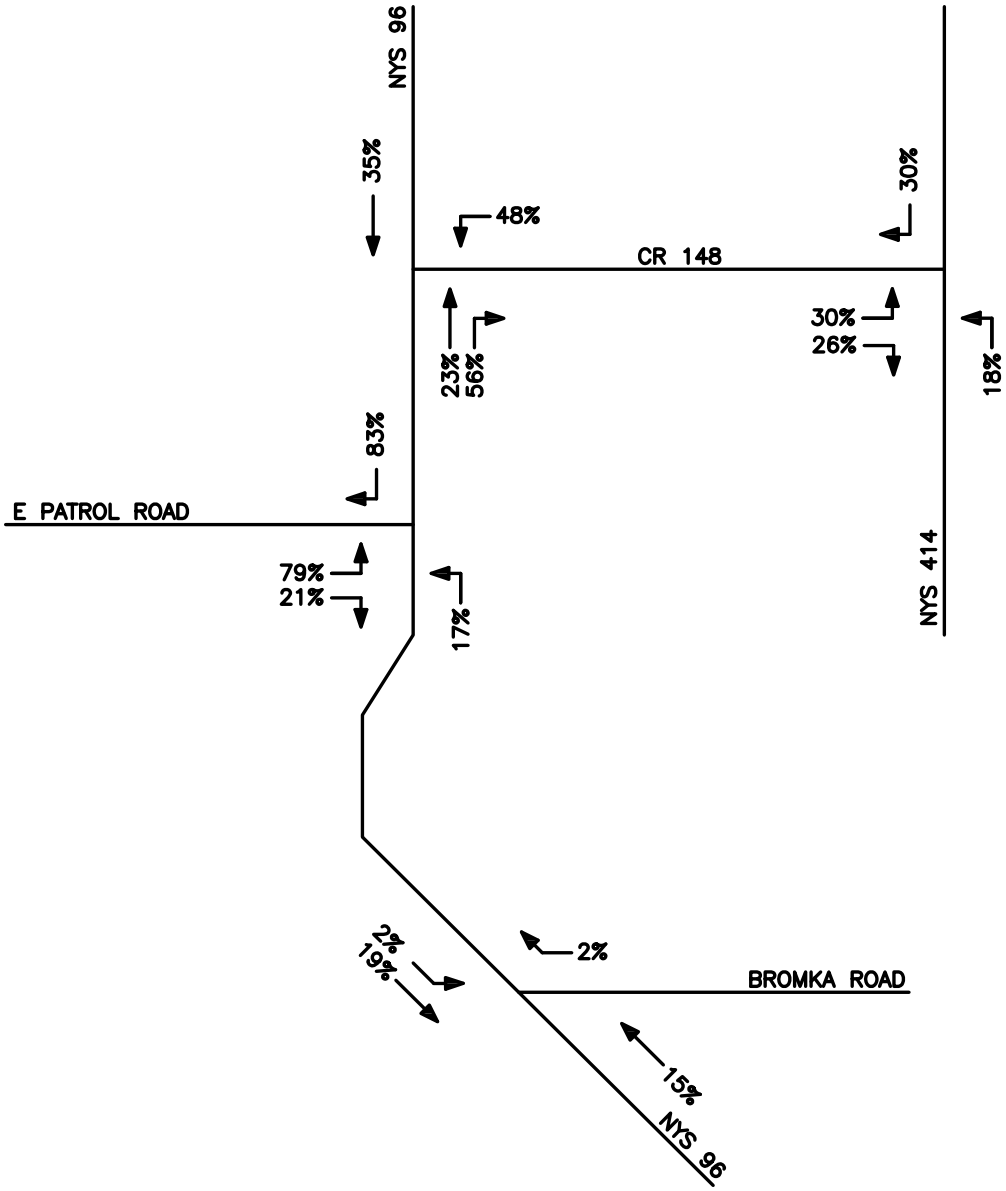
TITLE OF PROJECT: SENECA ARMY DEPOT

TITLE OF DRAWING: CONCEPTUAL SITE PLAN

LOCATION OF PROJECT: TAX PARCEL NO. 08-1-03
IN PARTS MILITARY LOTS 68, 75, 76, 81, 82 IN THE TOWN OF ROMULU
COUNTY OF SENECA, STATE OF NEW YORK

CLIENT: CIRCULAR ENERG, LLC
400 ANDREWS STREET, SUITE 360
ROCHESTER, NEW YORK 14604

DWG. # C3320
CN104
SHEET 1 OF 1



KEY

N

NOT TO SCALE

00(00) = AM(PM)

→ = ENTERING TRIPS

→ = EXITING TRIPS

FIGURE 6

TRIP DISTRIBUTION

PROPOSED NY WASTE TO ENERGY FACILITY
SENECA ARMY DEPOT,
TOWN OF ROMULUS, NY

SRF ASSOCIATES

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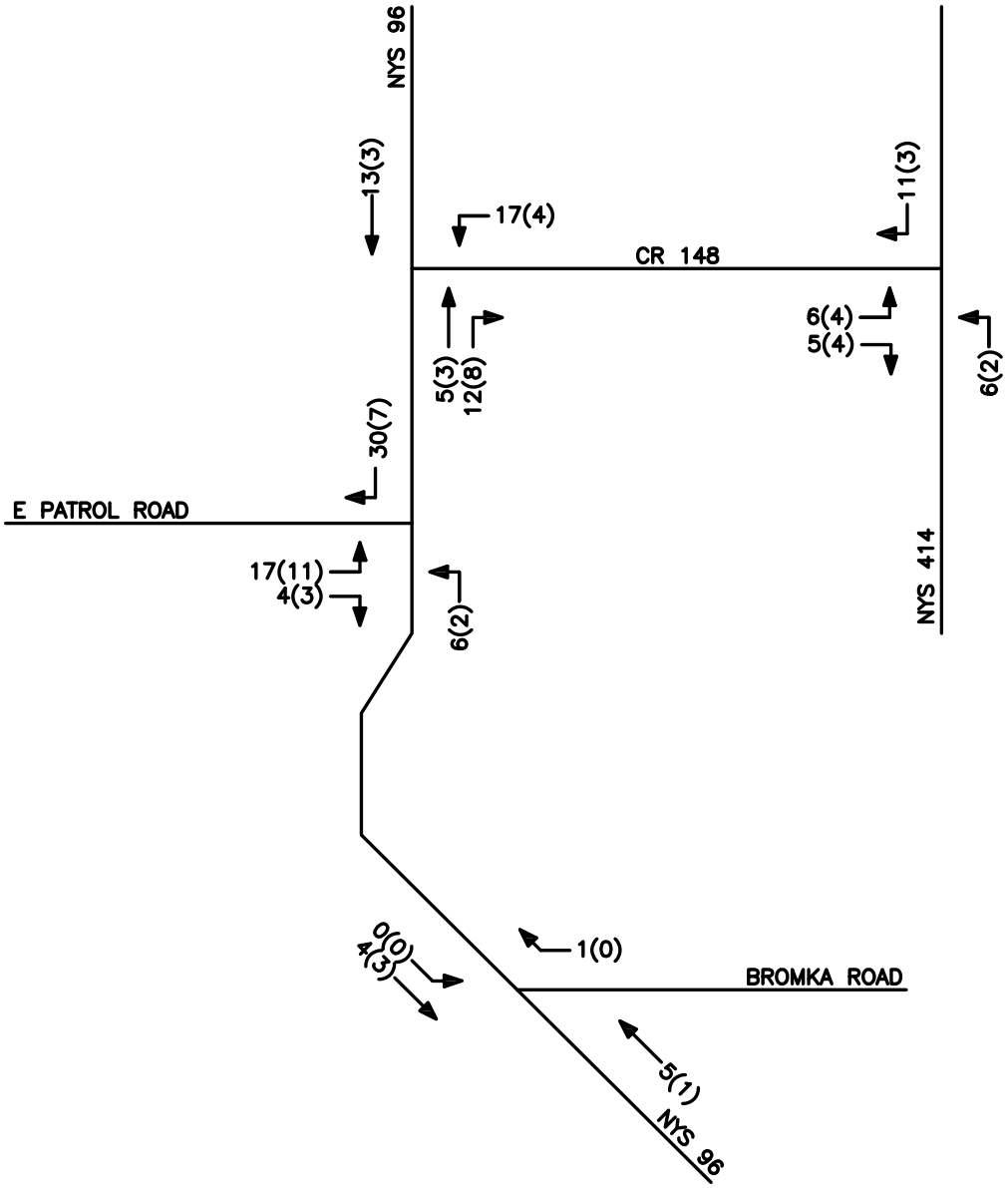
Transportation Engineering & Planning Consultants



KEY

N

NOT TO SCALE

00(00) = AM(PM)

→ = ENTERING TRIPS

→ = EXITING TRIPS

FIGURE 7

SITE GENERATED TRIPS

PROPOSED NY WASTE TO ENERGY FACILITY
SENECA ARMY DEPOT,
TOWN OF ROMULUS, NY

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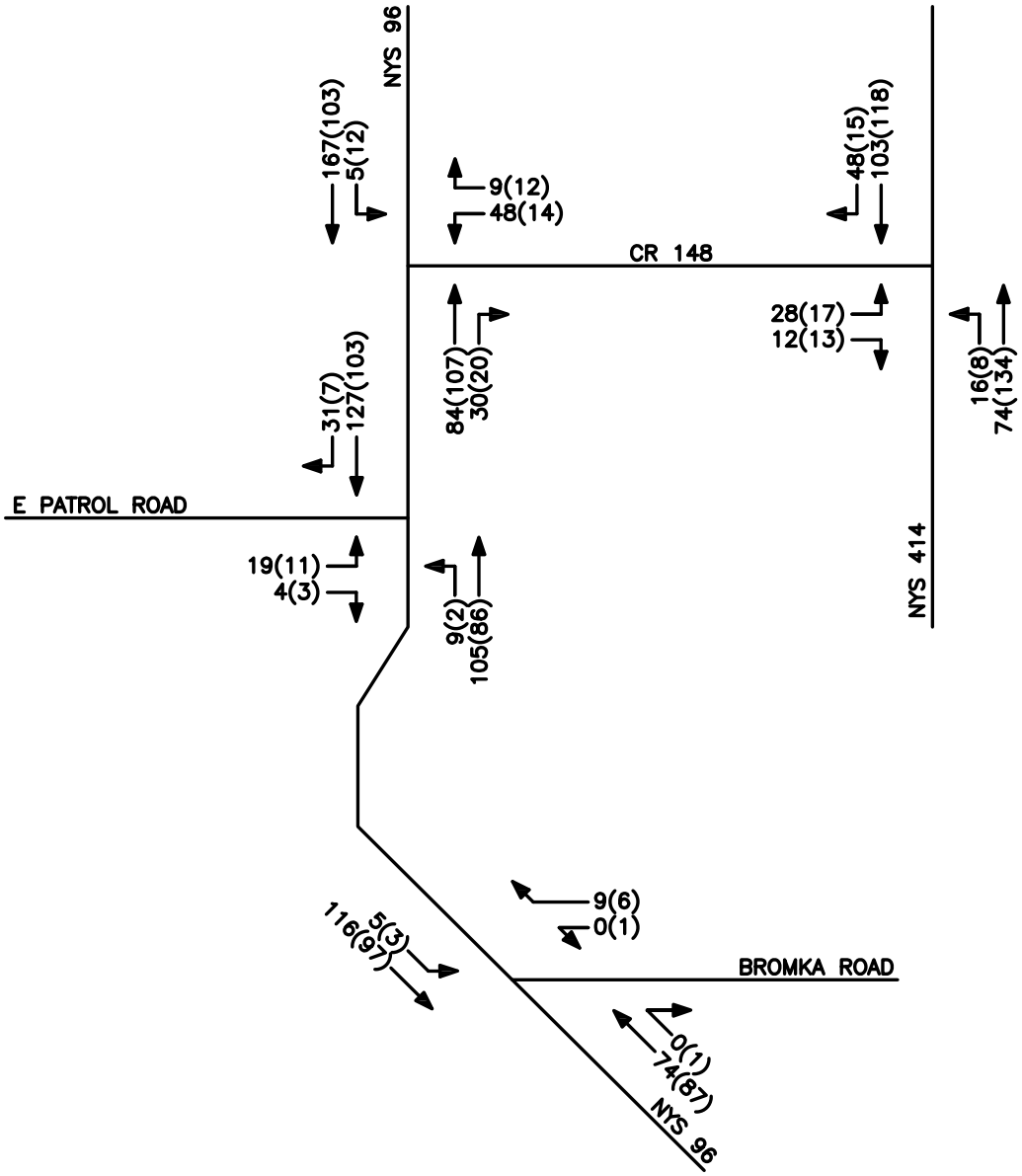

KEY

N

NOT TO SCALE

00(00) = AM(PM)

FIGURE 8

PEAK HOUR VOLUMES
FULL DEVELOPMENT CONDITIONS

PROPOSED NY WASTE TO ENERGY FACILITY
SENECA ARMY DEPOT,
TOWN OF ROMULUS, NY

SRF ASSOCIATES

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Transportation Engineering & Planning Consultants

APPENDICES

A1

Collected Traffic Volume Data

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT414.Cayuga
Site Code : 00000000
Start Date : 9/14/2017
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

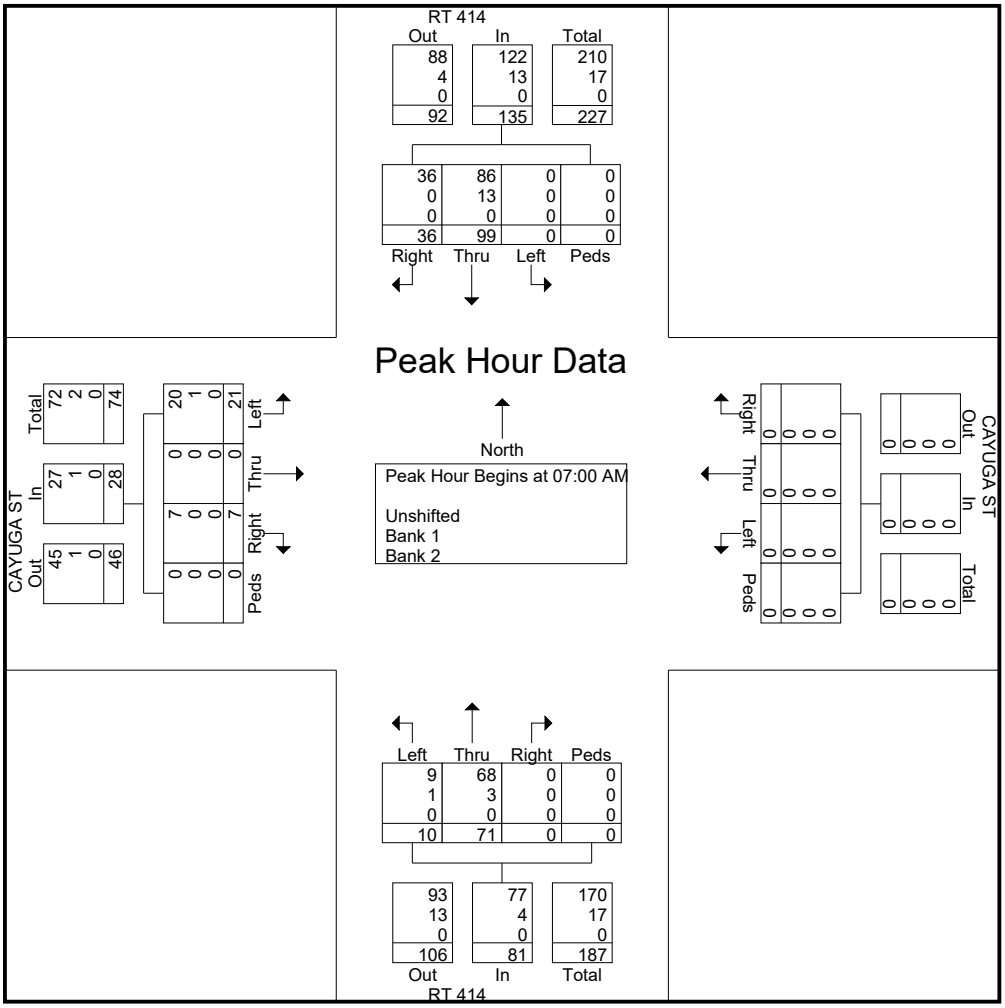
	RT 414 Southbound				CAYUGA ST Westbound				RT 414 Northbound				CAYUGA ST Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	0	24	7	0	0	0	0	0	4	21	0	0	5	0	3	0	64
07:15 AM	0	24	9	0	0	0	0	0	1	17	0	0	5	0	1	0	57
07:30 AM	0	24	13	0	0	0	0	0	2	16	0	0	4	0	1	0	60
07:45 AM	0	27	7	0	0	0	0	0	3	17	0	0	7	0	2	0	63
Total	0	99	36	0	0	0	0	0	10	71	0	0	21	0	7	0	244
08:00 AM	0	12	4	0	0	0	0	0	1	23	0	0	7	0	2	0	49
08:15 AM	0	15	0	0	0	0	0	0	4	18	0	0	5	0	0	0	42
08:30 AM	0	19	6	0	0	0	0	0	4	14	0	0	0	0	0	0	43
08:45 AM	0	14	0	0	0	0	0	0	0	17	0	0	2	0	0	0	33
Total	0	60	10	0	0	0	0	0	9	72	0	0	14	0	2	0	167
*** BREAK ***																	
04:00 PM	1	34	0	0	0	0	0	0	0	39	0	0	4	0	1	0	79
04:15 PM	0	31	6	0	0	0	0	0	5	39	0	0	6	0	3	0	90
04:30 PM	0	18	5	0	0	0	0	0	1	36	0	0	1	0	2	0	63
04:45 PM	0	31	1	0	0	0	0	0	0	15	0	0	2	0	3	0	52
Total	1	114	12	0	0	0	0	0	6	129	0	0	13	0	9	0	284
05:00 PM	0	15	2	0	0	0	0	0	0	33	0	0	5	0	3	0	58
05:15 PM	0	32	1	0	0	0	0	0	3	19	0	0	4	0	1	0	60
05:30 PM	0	17	3	0	0	0	0	0	1	22	0	0	0	0	3	0	46
05:45 PM	0	23	2	0	0	0	0	0	2	21	0	0	3	0	2	0	53
Total	0	87	8	0	0	0	0	0	6	95	0	0	12	0	9	0	217
Grand Total	1	360	66	0	0	0	0	0	31	367	0	0	60	0	27	0	912
Apprch %	0.2	84.3	15.5	0	0	0	0	0	7.8	92.2	0	0	69	0	31	0	
Total %	0.1	39.5	7.2	0	0	0	0	0	3.4	40.2	0	0	6.6	0	3	0	
Unshifted	1	319	60	0	0	0	0	0	29	339	0	0	59	0	26	0	833
% Unshifted	100	88.6	90.9	0	0	0	0	0	93.5	92.4	0	0	98.3	0	96.3	0	91.3
Bank 1	0	41	6	0	0	0	0	0	2	28	0	0	1	0	1	0	79
% Bank 1	0	11.4	9.1	0	0	0	0	0	6.5	7.6	0	0	1.7	0	3.7	0	8.7
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT414.Cayuga
Site Code : 00000000
Start Date : 9/14/2017
Page No : 2

	RT 414 Southbound					CAYUGA ST Westbound					RT 414 Northbound					CAYUGA ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	24	7	0	31	0	0	0	0	0	**4**	**21**	0	0	**25**	5	0	**3**	0	8	**64**
07:15 AM	0	24	9	0	33	0	0	0	0	0	1	17	0	0	18	5	0	1	0	6	57
07:30 AM	0	24	**13**	0	**37**	0	0	0	0	0	2	16	0	0	18	4	0	1	0	5	60
07:45 AM	0	**27**	7	0	34	0	0	0	0	0	3	17	0	0	20	**7**	0	2	0	**9**	63
Total Volume	0	99	36	0	135	0	0	0	0	0	10	71	0	0	81	21	0	7	0	28	244
% App. Total	0	73.3	26.7	0		0	0	0	0		12.3	87.7	0	0		75	0	25	0		
PHF	.000	.917	.692	.000	.912	.000	.000	.000	.000	.000	.625	.845	.000	.000	.810	.750	.000	.583	.000	.778	.953
Unshifted	0	86	36	0	122	0	0	0	0	0	9	68	0	0	77	20	0	7	0	27	226
% Unshifted	0	86.9	100	0	90.4	0	0	0	0	0	90.0	95.8	0	0	95.1	95.2	0	100	0	96.4	92.6
Bank 1	0	13	0	0	13	0	0	0	0	0	1	3	0	0	4	1	0	0	0	1	18
% Bank 1	0	13.1	0	0	9.6	0	0	0	0	0	10.0	4.2	0	0	4.9	4.8	0	0	0	3.6	7.4
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

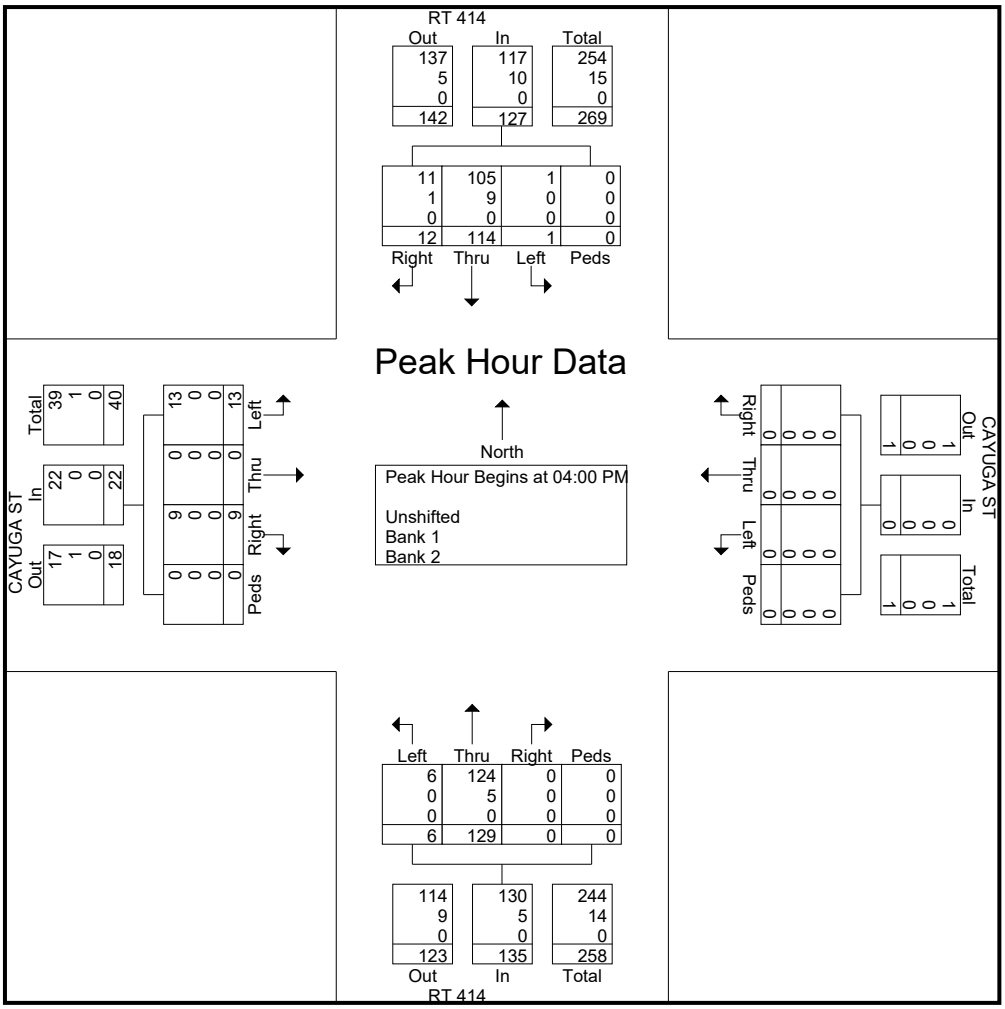


SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT414.Cayuga
Site Code : 00000000
Start Date : 9/14/2017
Page No : 3

	RT 414 Southbound					CAYUGA ST Westbound					RT 414 Northbound					CAYUGA ST Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	**1**	**34**	0	0	35	0	0	0	0	0	0	**39**	0	0	39	4	0	1	0	5	79
04:15 PM	0	31	**6**	0	**37**	0	0	0	0	0	**5**	39	0	0	**44**	**6**	0	**3**	0	**9**	**90**
04:30 PM	0	18	5	0	23	0	0	0	0	0	1	36	0	0	37	1	0	2	0	3	63
04:45 PM	0	31	1	0	32	0	0	0	0	0	0	15	0	0	15	2	0	3	0	5	52
Total Volume	1	114	12	0	127	0	0	0	0	0	6	129	0	0	135	13	0	9	0	22	284
% App. Total	0.8	89.8	9.4	0		0	0	0	0		4.4	95.6	0	0		59.1	0	40.9	0		
PHF	.250	.838	.500	.000	.858	.000	.000	.000	.000	.000	.300	.827	.000	.000	.767	.542	.000	.750	.000	.611	.789
Unshifted	1	105	11	0	117	0	0	0	0	0	6	124	0	0	130	13	0	9	0	22	269
% Unshifted	100	92.1	91.7	0	92.1	0	0	0	0	0	100	96.1	0	0	96.3	100	0	100	0	100	94.7
Bank 1	0	9	1	0	10	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	15
% Bank 1	0	7.9	8.3	0	7.9	0	0	0	0	0	0	3.9	0	0	3.7	0	0	0	0	0	5.3
Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Cayuga.AM
Site Code : 11111111
Start Date : 9/14/2017
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

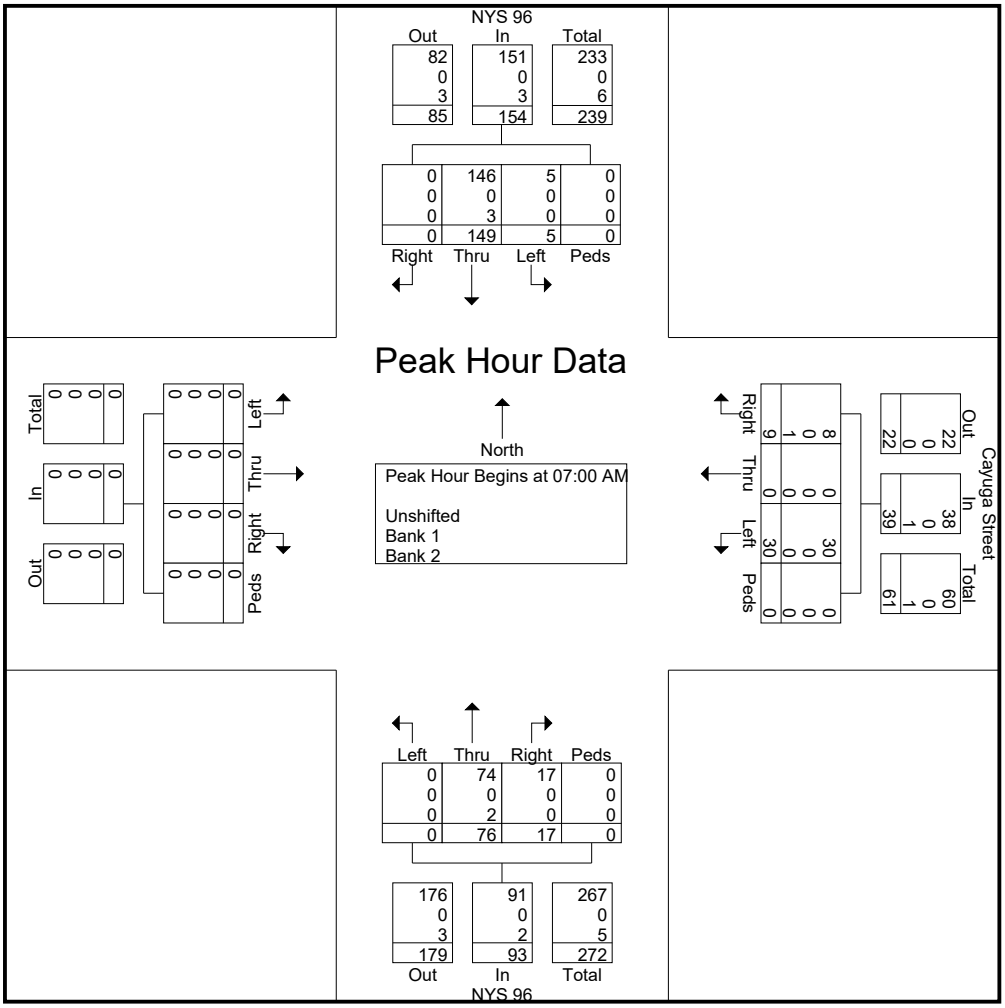
	NYS 96 Southbound				Cayuga Street Westbound				NYS 96 Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	1	38	0	0	9	0	2	0	0	21	5	0	0	0	0	0	76
07:15 AM	1	36	0	0	6	0	2	0	0	17	3	0	0	0	0	0	65
07:30 AM	1	42	0	0	6	0	3	0	0	25	5	0	0	0	0	0	82
07:45 AM	2	33	0	0	9	0	2	0	0	13	4	0	0	0	0	0	63
Total	5	149	0	0	30	0	9	0	0	76	17	0	0	0	0	0	286
08:00 AM	4	19	0	0	4	0	5	0	0	19	6	0	0	0	0	0	57
08:15 AM	1	19	0	0	1	0	2	0	0	17	2	0	0	0	0	0	42
08:30 AM	1	15	0	0	1	0	1	0	0	18	2	0	0	0	0	0	38
08:45 AM	2	23	0	0	0	0	5	0	0	14	0	0	0	0	0	0	44
Total	8	76	0	0	6	0	13	0	0	68	10	0	0	0	0	0	181
Grand Total	13	225	0	0	36	0	22	0	0	144	27	0	0	0	0	0	467
Apprch %	5.5	94.5	0	0	62.1	0	37.9	0	0	84.2	15.8	0	0	0	0	0	
Total %	2.8	48.2	0	0	7.7	0	4.7	0	0	30.8	5.8	0	0	0	0	0	
Unshifted	13	220	0	0	36	0	21	0	0	137	27	0	0	0	0	0	454
% Unshifted	100	97.8	0	0	100	0	95.5	0	0	95.1	100	0	0	0	0	0	97.2
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	5	0	0	0	0	1	0	0	7	0	0	0	0	0	0	13
% Bank 2	0	2.2	0	0	0	0	4.5	0	0	4.9	0	0	0	0	0	0	2.8

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Cayuga.AM
Site Code : 11111111
Start Date : 9/14/2017
Page No : 2

	NYS 96 Southbound					Cayuga Street Westbound					NYS 96 Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	38	0	0	39	**9**	0	2	0	**11**	0	21	**5**	0	26	0	0	0	0	0	76
07:15 AM	1	36	0	0	37	6	0	2	0	8	0	17	3	0	20	0	0	0	0	0	65
07:30 AM	1	**42**	0	0	**43**	6	0	**3**	0	9	0	**25**	5	0	**30**	0	0	0	0	0	**82**
07:45 AM	**2**	33	0	0	35	9	0	2	0	11	0	13	4	0	17	0	0	0	0	0	63
Total Volume	5	149	0	0	154	30	0	9	0	39	0	76	17	0	93	0	0	0	0	0	286
% App. Total	3.2	96.8	0	0		76.9	0	23.1	0		0	81.7	18.3	0		0	0	0	0		
PHF	.625	.887	.000	.000	.895	.833	.000	.750	.000	.886	.000	.760	.850	.000	.775	.000	.000	.000	.000	.000	.872
Unshifted	5	146	0	0	151	30	0	8	0	38	0	74	17	0	91	0	0	0	0	0	280
% Unshifted	100	98.0	0	0	98.1	100	0	88.9	0	97.4	0	97.4	100	0	97.8	0	0	0	0	0	97.9
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	3	0	0	3	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	6
% Bank 2	0	2.0	0	0	1.9	0	0	11.1	0	2.6	0	2.6	0	0	2.2	0	0	0	0	0	2.1



SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Cayuga.PM
Site Code : 22222222
Start Date : 9/14/2017
Page No : 1

Groups Printed- Unshifted - Bank 1 - Bank 2

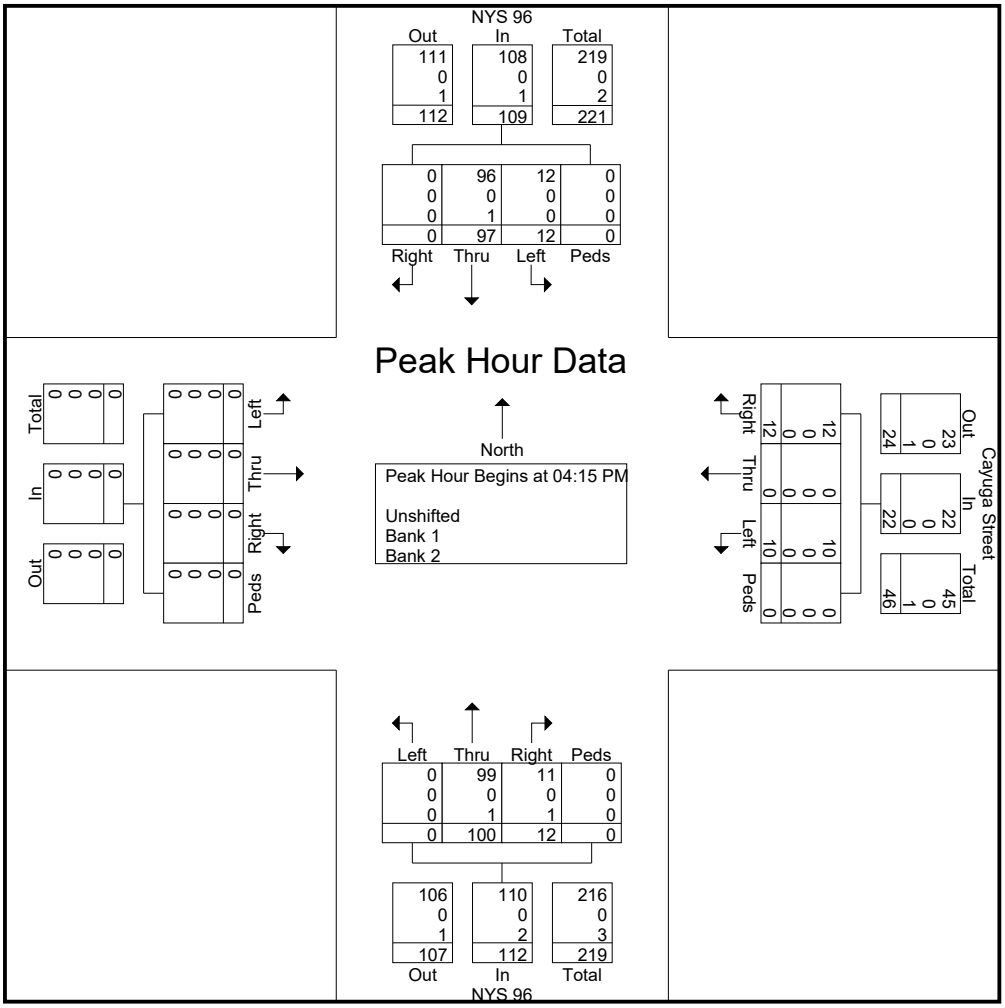
	NYS 96 Southbound				Cayuga Street Westbound				NYS 96 Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
04:00 PM	1	28	0	0	0	0	1	0	0	35	2	0	0	0	0	0	67
04:15 PM	3	25	0	0	5	0	5	0	0	30	2	0	0	0	0	0	70
04:30 PM	1	24	0	0	2	0	1	0	0	16	1	0	0	0	0	0	45
04:45 PM	4	24	0	0	1	0	4	0	0	17	4	0	0	0	0	0	54
Total	9	101	0	0	8	0	11	0	0	98	9	0	0	0	0	0	236
05:00 PM	4	24	0	0	2	0	2	0	0	37	5	0	0	0	0	0	74
05:15 PM	1	19	0	0	2	0	3	0	0	29	2	0	0	0	0	0	56
05:30 PM	4	28	0	0	2	0	2	0	0	16	1	0	0	0	0	0	53
05:45 PM	2	23	0	0	3	0	0	0	0	16	3	0	0	0	0	0	47
Total	11	94	0	0	9	0	7	0	0	98	11	0	0	0	0	0	230
Grand Total	20	195	0	0	17	0	18	0	0	196	20	0	0	0	0	0	466
Apprch %	9.3	90.7	0	0	48.6	0	51.4	0	0	90.7	9.3	0	0	0	0	0	
Total %	4.3	41.8	0	0	3.6	0	3.9	0	0	42.1	4.3	0	0	0	0	0	
Unshifted	20	194	0	0	17	0	18	0	0	192	19	0	0	0	0	0	460
% Unshifted	100	99.5	0	0	100	0	100	0	0	98	95	0	0	0	0	0	98.7
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	1	0	0	0	0	0	0	0	4	1	0	0	0	0	0	6
% Bank 2	0	0.5	0	0	0	0	0	0	0	2	5	0	0	0	0	0	1.3

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Cayuga.PM
Site Code : 22222222
Start Date : 9/14/2017
Page No : 2

	NYS 96 Southbound					Cayuga Street Westbound					NYS 96 Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	3	**25**	0	0	**28**	**5**	0	**5**	0	**10**	0	30	2	0	32	0	0	0	0	0	70
04:30 PM	1	24	0	0	25	2	0	1	0	3	0	16	1	0	17	0	0	0	0	0	45
04:45 PM	**4**	24	0	0	28	1	0	4	0	5	0	17	4	0	21	0	0	0	0	0	54
05:00 PM	4	24	0	0	28	2	0	2	0	4	0	**37**	**5**	0	**42**	0	0	0	0	0	**74**
Total Volume	12	97	0	0	109	10	0	12	0	22	0	100	12	0	112	0	0	0	0	0	243
% App. Total	11	89	0	0		45.5	0	54.5	0		0	89.3	10.7	0		0	0	0	0		
PHF	.750	.970	.000	.000	.973	.500	.000	.600	.000	.550	.000	.676	.600	.000	.667	.000	.000	.000	.000	.000	.821
Unshifted	12	96	0	0	108	10	0	12	0	22	0	99	11	0	110	0	0	0	0	0	240
% Unshifted	100	99.0	0	0	99.1	100	0	100	0	100	0	99.0	91.7	0	98.2	0	0	0	0	0	98.8
Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bank 2	0	1	0	0	1	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	3
% Bank 2	0	1.0	0	0	0.9	0	0	0	0	0	0	1.0	8.3	0	1.8	0	0	0	0	0	1.2



SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Patrol.AM
Site Code : 00037070
Start Date : 9/14/2017
Page No : 1

Groups Printed- Unshifted - Trucks - School Buses

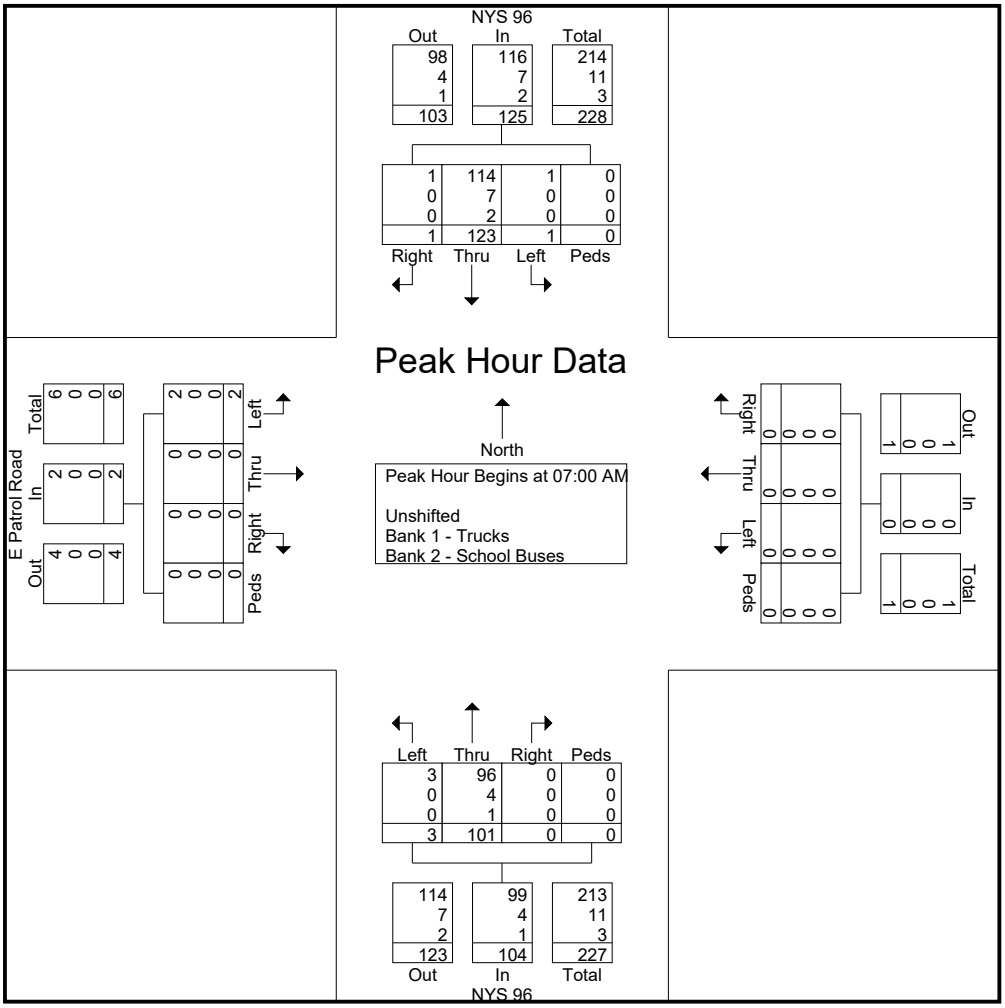
	NYS 96 Southbound				Westbound				NYS 96 Northbound				E Patrol Road Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	0	29	0	0	0	0	0	0	1	22	0	0	0	0	0	0	52
07:15 AM	1	27	0	0	0	0	0	0	1	25	0	0	1	0	0	0	55
07:30 AM	0	24	1	0	0	0	0	0	0	35	0	0	1	0	0	0	61
07:45 AM	0	43	0	0	0	0	0	0	1	19	0	0	0	0	0	0	63
Total	1	123	1	0	0	0	0	0	3	101	0	0	2	0	0	0	231
08:00 AM	1	12	1	0	0	0	1	0	0	18	0	0	0	0	0	0	33
08:15 AM	1	24	0	0	0	0	0	0	0	12	0	0	0	0	0	0	37
08:30 AM	0	16	0	0	0	0	0	0	0	20	0	0	0	0	0	0	36
08:45 AM	0	14	2	0	0	0	0	0	1	10	0	0	2	0	0	0	29
Total	2	66	3	0	0	0	1	0	1	60	0	0	2	0	0	0	135
Grand Total	3	189	4	0	0	0	1	0	4	161	0	0	4	0	0	0	366
Apprch %	1.5	96.4	2	0	0	0	100	0	2.4	97.6	0	0	100	0	0	0	
Total %	0.8	51.6	1.1	0	0	0	0.3	0	1.1	44	0	0	1.1	0	0	0	
Unshifted	3	174	4	0	0	0	1	0	4	147	0	0	3	0	0	0	336
% Unshifted	100	92.1	100	0	0	0	100	0	100	91.3	0	0	75	0	0	0	91.8
Bank 1 - Trucks	0	13	0	0	0	0	0	0	0	12	0	0	1	0	0	0	26
% Bank 1 - Trucks	0	6.9	0	0	0	0	0	0	0	7.5	0	0	25	0	0	0	7.1
Bank 2 - School Buses	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	4
% Bank 2 - School Buses	0	1.1	0	0	0	0	0	0	0	1.2	0	0	0	0	0	0	1.1

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Patrol.AM
Site Code : 00037070
Start Date : 9/14/2017
Page No : 2

	NYS 96 Southbound					Westbound					NYS 96 Northbound					E Patrol Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	0	29	0	0	29	0	0	0	0	0	**1**	22	0	0	23	0	0	0	0	0	52
07:15 AM	**1**	27	0	0	28	0	0	0	0	0	1	25	0	0	26	**1**	0	0	0	**1**	55
07:30 AM	0	24	**1**	0	25	0	0	0	0	0	0	**35**	0	0	**35**	1	0	0	0	1	61
07:45 AM	0	**43**	0	0	**43**	0	0	0	0	0	1	19	0	0	20	0	0	0	0	0	**63**
Total Volume	1	123	1	0	125	0	0	0	0	0	3	101	0	0	104	2	0	0	0	2	231
% App. Total	0.8	98.4	0.8	0		0	0	0	0		2.9	97.1	0	0		100	0	0	0		
PHF	.250	.715	.250	.000	.727	.000	.000	.000	.000	.000	.750	.721	.000	.000	.743	.500	.000	.000	.000	.500	.917
Unshifted	1	114	1	0	116	0	0	0	0	0	3	96	0	0	99	2	0	0	0	2	217
% Unshifted	100	92.7	100	0	92.8	0	0	0	0	0	100	95.0	0	0	95.2	100	0	0	0	100	93.9
Bank 1 - Trucks	0	7	0	0	7	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	11
% Bank 1 - Trucks	0	5.7	0	0	5.6	0	0	0	0	0	0	4.0	0	0	3.8	0	0	0	0	0	4.8
Bank 2 - School Buses	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
% Bank 2 - School Buses	0	1.6	0	0	1.6	0	0	0	0	0	0	1.0	0	0	1.0	0	0	0	0	0	1.3



SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Patrol.PM
Site Code : 00037070
Start Date : 9/14/2017
Page No : 1

Groups Printed- Unshifted - Trucks - School Buses

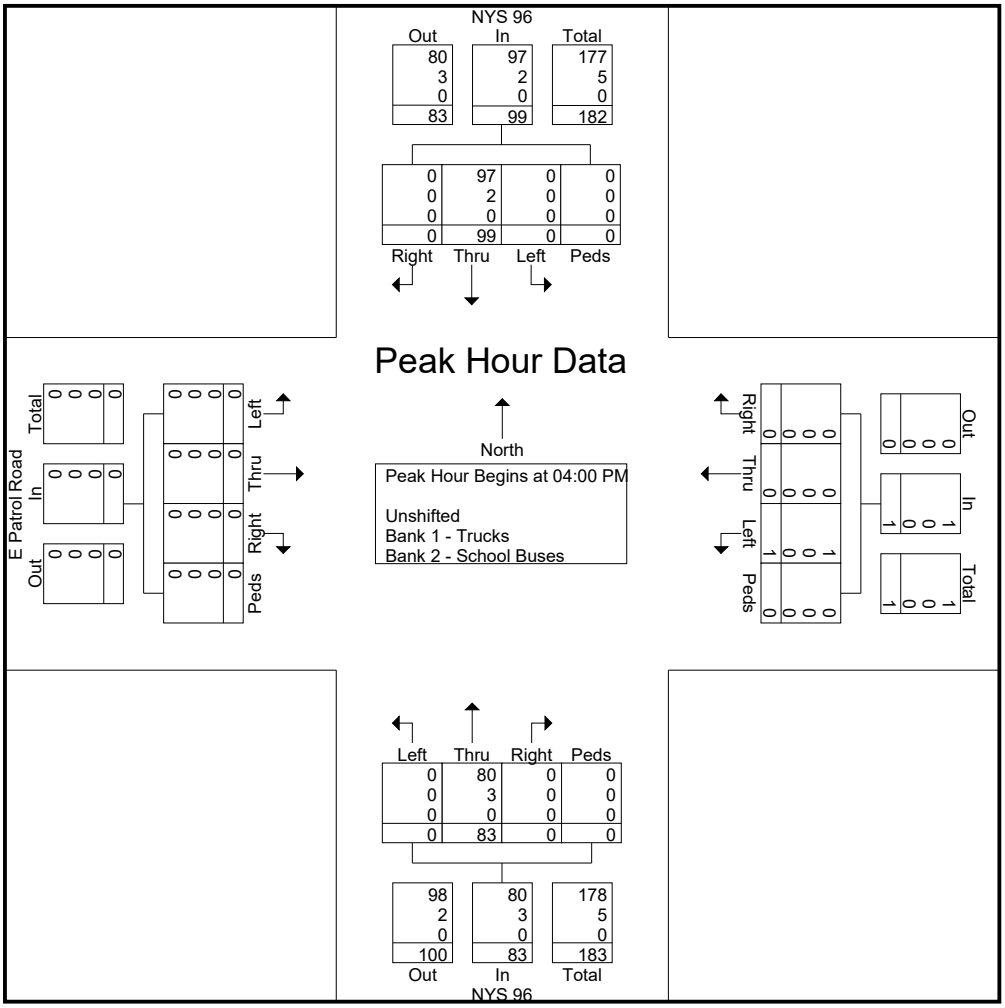
	NYS 96 Southbound				Westbound				NYS 96 Northbound				E Patrol Road Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
04:00 PM	0	31	0	0	0	0	0	0	0	29	0	0	0	0	0	0	60
04:15 PM	0	23	0	0	0	0	0	0	0	22	0	0	0	0	0	0	45
04:30 PM	0	25	0	0	1	0	0	0	0	10	0	0	0	0	0	0	36
04:45 PM	0	20	0	0	0	0	0	0	0	22	0	0	0	0	0	0	42
Total	0	99	0	0	1	0	0	0	0	83	0	0	0	0	0	0	183
05:00 PM	0	25	0	0	0	0	1	0	0	29	0	0	0	0	0	0	55
05:15 PM	0	24	0	0	0	0	0	0	0	25	0	0	0	0	0	0	49
05:30 PM	0	19	0	0	0	0	0	0	0	12	0	0	0	0	0	0	31
05:45 PM	0	23	0	0	0	0	0	0	0	24	1	0	0	0	0	0	48
Total	0	91	0	0	0	0	1	0	0	90	1	0	0	0	0	0	183
Grand Total	0	190	0	0	1	0	1	0	0	173	1	0	0	0	0	0	366
Apprch %	0	100	0	0	50	0	50	0	0	99.4	0.6	0	0	0	0	0	
Total %	0	51.9	0	0	0.3	0	0.3	0	0	47.3	0.3	0	0	0	0	0	
Unshifted	0	187	0	0	1	0	1	0	0	166	1	0	0	0	0	0	356
% Unshifted	0	98.4	0	0	100	0	100	0	0	96	100	0	0	0	0	0	97.3
Bank 1 - Trucks	0	3	0	0	0	0	0	0	0	7	0	0	0	0	0	0	10
% Bank 1 - Trucks	0	1.6	0	0	0	0	0	0	0	4	0	0	0	0	0	0	2.7
Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Patrol.PM
Site Code : 00037070
Start Date : 9/14/2017
Page No : 2

	NYS 96 Southbound					Westbound					NYS 96 Northbound					E Patrol Road Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	0	**31**	0	0	**31**	0	0	0	0	0	0	**29**	0	0	**29**	0	0	0	0	0	**60**
04:15 PM	0	23	0	0	23	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	45
04:30 PM	0	25	0	0	25	**1**	0	0	0	**1**	0	10	0	0	10	0	0	0	0	0	36
04:45 PM	0	20	0	0	20	0	0	0	0	0	0	22	0	0	22	0	0	0	0	0	42
Total Volume	0	99	0	0	99	1	0	0	0	1	0	83	0	0	83	0	0	0	0	0	183
% App. Total	0	100	0	0		100	0	0	0		0	100	0	0		0	0	0	0		
PHF	.000	.798	.000	.000	.798	.250	.000	.000	.000	.250	.000	.716	.000	.000	.716	.000	.000	.000	.000	.000	.763
Unshifted	0	97	0	0	97	1	0	0	0	1	0	80	0	0	80	0	0	0	0	0	178
% Unshifted	0	98.0	0	0	98.0	100	0	0	0	100	0	96.4	0	0	96.4	0	0	0	0	0	97.3
Bank 1 - Trucks	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	5
% Bank 1 - Trucks	0	2.0	0	0	2.0	0	0	0	0	0	0	3.6	0	0	3.6	0	0	0	0	0	2.7
Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Bromka.AM
Site Code : 00370701
Start Date : 9/14/2017
Page No : 1

Groups Printed- Unshifted - Trucks - School Buses

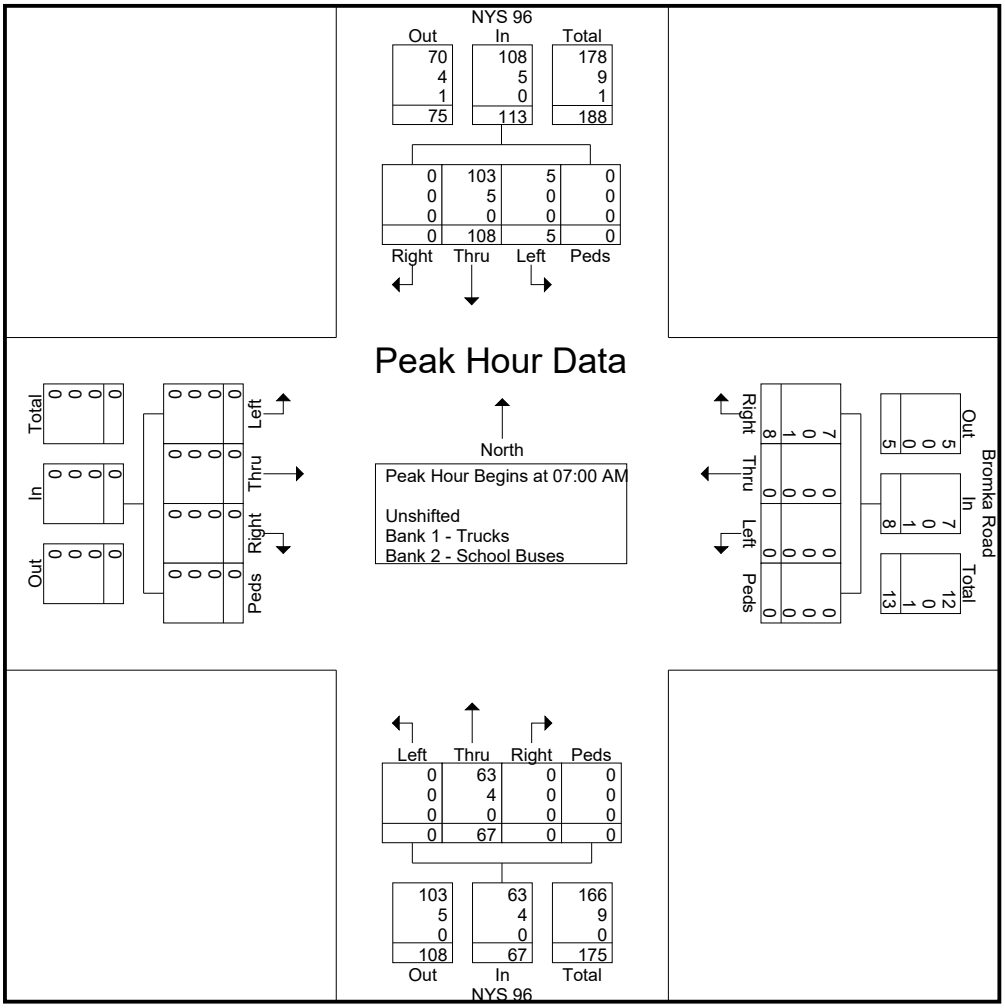
	NYS 96 Southbound				Bromka Road Westbound				NYS 96 Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
07:00 AM	1	28	0	0	0	0	0	0	0	17	0	0	0	0	0	0	46
07:15 AM	1	31	0	0	0	0	2	0	0	11	0	0	0	0	0	0	45
07:30 AM	0	18	0	0	0	0	1	0	0	26	0	0	0	0	0	0	45
07:45 AM	3	31	0	0	0	0	5	0	0	13	0	0	0	0	0	0	52
Total	5	108	0	0	0	0	8	0	0	67	0	0	0	0	0	0	188
08:00 AM	2	25	0	0	0	0	2	0	0	11	0	0	0	0	0	0	40
08:15 AM	0	15	0	0	0	0	1	0	0	6	0	0	0	0	0	0	22
08:30 AM	0	19	0	0	0	0	2	0	0	13	0	0	0	0	0	0	34
08:45 AM	0	13	0	0	0	0	0	0	0	12	0	0	0	0	0	0	25
Total	2	72	0	0	0	0	5	0	0	42	0	0	0	0	0	0	121
Grand Total	7	180	0	0	0	0	13	0	0	109	0	0	0	0	0	0	309
Apprch %	3.7	96.3	0	0	0	0	100	0	0	100	0	0	0	0	0	0	
Total %	2.3	58.3	0	0	0	0	4.2	0	0	35.3	0	0	0	0	0	0	
Unshifted	5	172	0	0	0	0	11	0	0	100	0	0	0	0	0	0	288
% Unshifted	71.4	95.6	0	0	0	0	84.6	0	0	91.7	0	0	0	0	0	0	93.2
Bank 1 - Trucks	0	8	0	0	0	0	1	0	0	8	0	0	0	0	0	0	17
% Bank 1 - Trucks	0	4.4	0	0	0	0	7.7	0	0	7.3	0	0	0	0	0	0	5.5
Bank 2 - School Buses	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4
% Bank 2 - School Buses	28.6	0	0	0	0	0	7.7	0	0	0.9	0	0	0	0	0	0	1.3

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Bromka.AM
Site Code : 00370701
Start Date : 9/14/2017
Page No : 2

	NYS 96 Southbound					Bromka Road Westbound					NYS 96 Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	1	28	0	0	29	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	46
07:15 AM	1	**31**	0	0	32	0	0	2	0	2	0	11	0	0	11	0	0	0	0	0	45
07:30 AM	0	18	0	0	18	0	0	1	0	1	0	**26**	0	0	**26**	0	0	0	0	0	45
07:45 AM	**3**	31	0	0	**34**	0	0	**5**	0	**5**	0	13	0	0	13	0	0	0	0	0	**52**
Total Volume	5	108	0	0	113	0	0	8	0	8	0	67	0	0	67	0	0	0	0	0	188
% App. Total	4.4	95.6	0	0		0	0	100	0		0	100	0	0		0	0	0	0		
PHF	.417	.871	.000	.000	.831	.000	.000	.400	.000	.400	.000	.644	.000	.000	.644	.000	.000	.000	.000	.000	.904
Unshifted	5	103	0	0	108	0	0	7	0	7	0	63	0	0	63	0	0	0	0	0	178
% Unshifted	100	95.4	0	0	95.6	0	0	87.5	0	87.5	0	94.0	0	0	94.0	0	0	0	0	0	94.7
Bank 1 - Trucks	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	9
% Bank 1 - Trucks	0	4.6	0	0	4.4	0	0	0	0	0	0	6.0	0	0	6.0	0	0	0	0	0	4.8
Bank 2 - School Buses	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
% Bank 2 - School Buses	0	0	0	0	0	0	0	12.5	0	12.5	0	0	0	0	0	0	0	0	0	0	0.5



SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Bromka.PM
Site Code : 00370602
Start Date : 9/14/2017
Page No : 1

Groups Printed- Unshifted - Trucks - School Buses

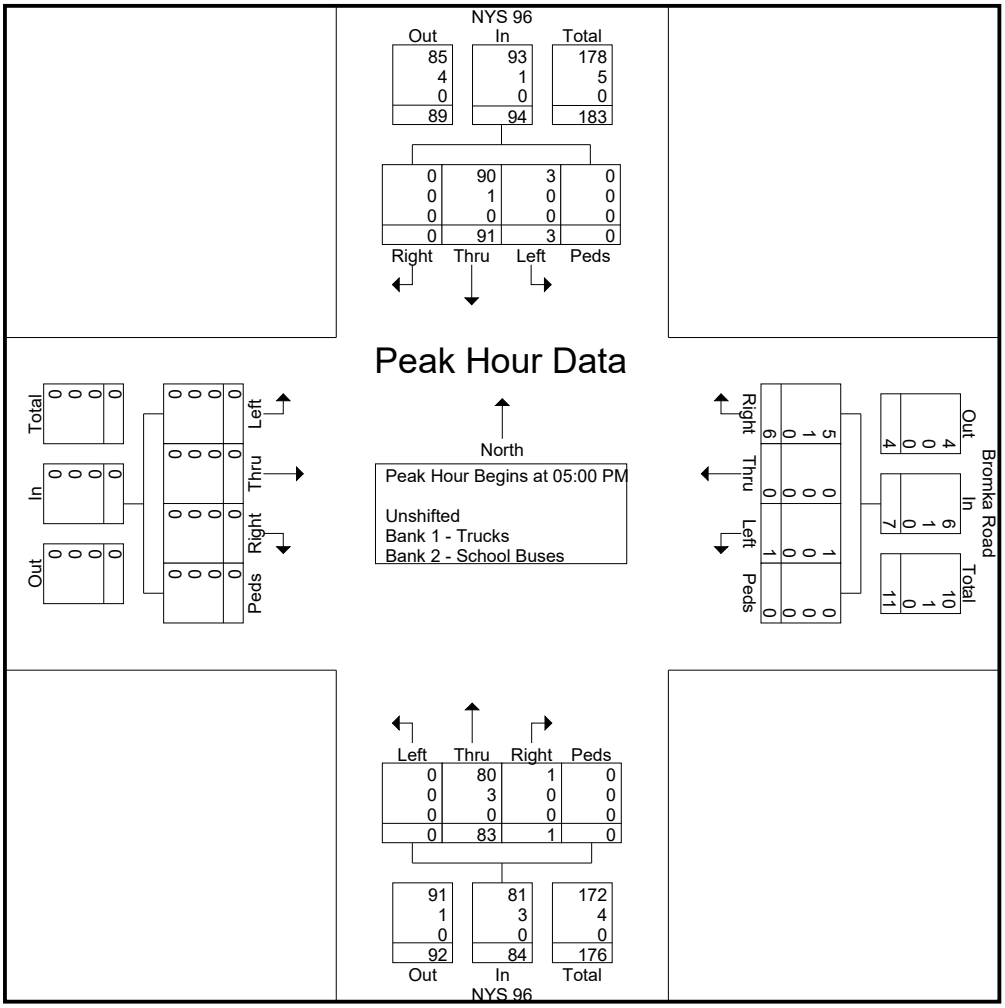
	NYS 96 Southbound				Bromka Road Westbound				NYS 96 Northbound				Eastbound				
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Int. Total
04:00 PM	3	23	0	0	2	0	0	0	0	23	0	0	0	0	0	0	51
04:15 PM	2	31	0	0	0	0	0	0	0	25	0	0	0	0	0	0	58
04:30 PM	3	14	0	0	0	0	1	0	0	14	0	0	0	0	0	0	32
04:45 PM	1	22	0	0	0	0	1	0	0	19	0	0	0	0	0	0	43
Total	9	90	0	0	2	0	2	0	0	81	0	0	0	0	0	0	184
05:00 PM	1	19	0	0	0	0	3	0	0	23	0	0	0	0	0	0	46
05:15 PM	1	28	0	0	0	0	2	0	0	26	1	0	0	0	0	0	58
05:30 PM	0	20	0	0	0	0	0	0	0	14	0	0	0	0	0	0	34
05:45 PM	1	24	0	0	1	0	1	0	0	20	0	0	0	0	0	0	47
Total	3	91	0	0	1	0	6	0	0	83	1	0	0	0	0	0	185
Grand Total	12	181	0	0	3	0	8	0	0	164	1	0	0	0	0	0	369
Apprch %	6.2	93.8	0	0	27.3	0	72.7	0	0	99.4	0.6	0	0	0	0	0	
Total %	3.3	49.1	0	0	0.8	0	2.2	0	0	44.4	0.3	0	0	0	0	0	
Unshifted	12	178	0	0	3	0	7	0	0	159	1	0	0	0	0	0	360
% Unshifted	100	98.3	0	0	100	0	87.5	0	0	97	100	0	0	0	0	0	97.6
Bank 1 - Trucks	0	3	0	0	0	0	1	0	0	5	0	0	0	0	0	0	9
% Bank 1 - Trucks	0	1.7	0	0	0	0	12.5	0	0	3	0	0	0	0	0	0	2.4
Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SRF & Associates

3495 Winton Place, Building E, Suite 110
Rochester, NY 14623

File Name : RT96.Bromka.PM
Site Code : 00370602
Start Date : 9/14/2017
Page No : 2

	NYS 96 Southbound					Bromka Road Westbound					NYS 96 Northbound					Eastbound					
Start Time	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:00 PM																					
05:00 PM	**1**	19	0	0	20	0	0	**3**	0	**3**	0	23	0	0	23	0	0	0	0	0	46
05:15 PM	1	**28**	0	0	**29**	0	0	2	0	2	0	**26**	**1**	0	**27**	0	0	0	0	0	**58**
05:30 PM	0	20	0	0	20	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	34
05:45 PM	1	24	0	0	25	**1**	0	1	0	2	0	20	0	0	20	0	0	0	0	0	47
Total Volume	3	91	0	0	94	1	0	6	0	7	0	83	1	0	84	0	0	0	0	0	185
% App. Total	3.2	96.8	0	0		14.3	0	85.7	0		0	98.8	1.2	0		0	0	0	0		
PHF	.750	.813	.000	.000	.810	.250	.000	.500	.000	.583	.000	.798	.250	.000	.778	.000	.000	.000	.000	.000	.797
Unshifted	3	90	0	0	93	1	0	5	0	6	0	80	1	0	81	0	0	0	0	0	180
% Unshifted	100	98.9	0	0	98.9	100	0	83.3	0	85.7	0	96.4	100	0	96.4	0	0	0	0	0	97.3
Bank 1 - Trucks	0	1	0	0	1	0	0	1	0	1	0	3	0	0	3	0	0	0	0	0	5
% Bank 1 - Trucks	0	1.1	0	0	1.1	0	0	16.7	0	14.3	0	3.6	0	0	3.6	0	0	0	0	0	2.7
Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Bank 2 - School Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



A2

Miscellaneous Traffic Data and Calculations

SRF ASSOCIATES
WWW.SRFA.NET
Traffic Engineering & Planning Consultants

Proposed Energy Facility, Seneca Army Depot, Town of Romulus, Seneca County, NY

Documentation of Ambient Traffic Volume Growth

Roadway	Segment starts at	Segment end at	2000	2003	2005	2006	2008	2010	2017 *	Annual Growth
NY 96	End Rt 414 Ovlp	NY Route 336	3095	3,289		2,684		2,711	2,400	-1.48%
NY Route 414	End Rt 414 Ovlp	NY Route 336	2539			1984		2662	2975	0.94%
NY Route 336	NY Route 96	NY Route 414	677	844		751		842		2.21%
CR 148	NY Route 96	Varick TL			564		713		560	-0.06%

*estimated based upon SRF PM peak hour counts

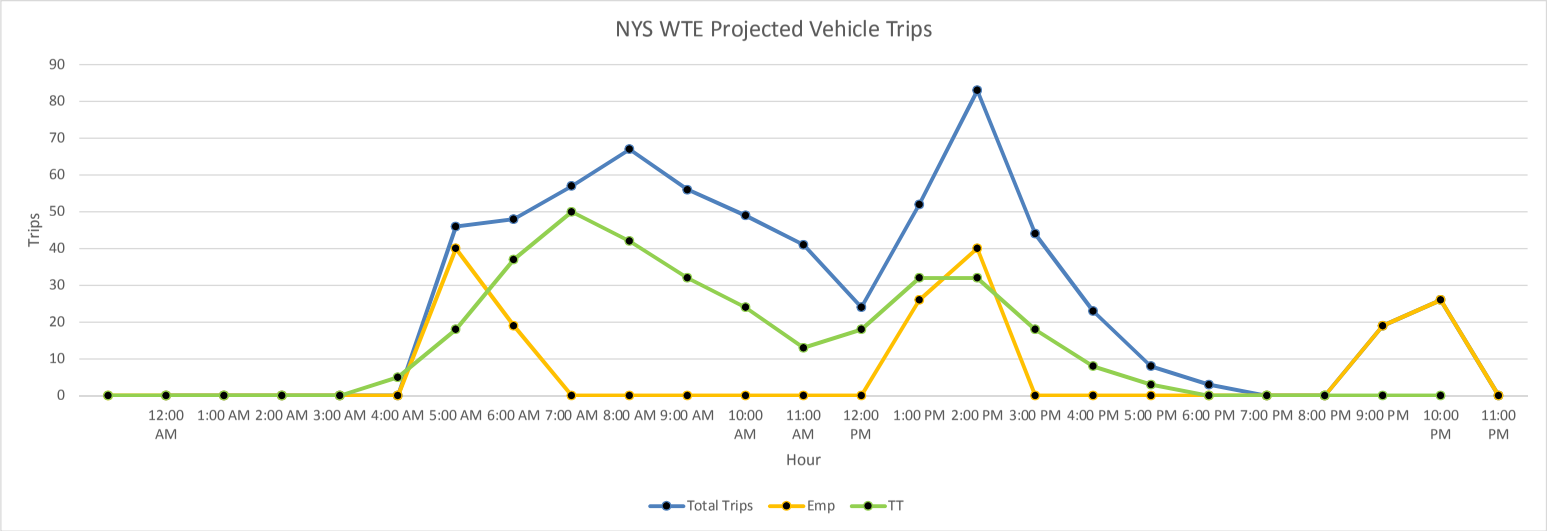
New York Waste to Energy Facility
Circular EnerG, LLC
Romulus, New York
September 12, 2017

Conservative Summary of Traffic Generation

Hour of day	Total Trips	Employee		Transfer Trailer		Rear Loader		Front Loader		Slaked Lime		Carbon		Urea		Oil		Fer. Metal		Non-Fer. Metal		Ash		Emp	TT
		(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	(in)	(out)	Total	Total
12:00 AM	0																							0	0
1:00 AM	0																							0	0
2:00 AM	0																							0	0
3:00 AM	0																							0	0
4:00 AM	0																							0	0
5:00 AM	46	40		5		1																		40	5
6:00 AM	48		19	13	5	1	1			1									1		1		6	19	18
7:00 AM	57			24	13	1	1	1			1	1				1		1		1		6	6	0	37
8:00 AM	67			26	24	1	1		1				1				1					6	6	0	50
9:00 AM	56			16	26	1	1															6	6	0	42
10:00 AM	49			16	16	1	1			1				1					1			6	6	0	32
11:00 AM	41			8	16	1	1	1			1				1			1				6	5	0	24
12:00 PM	24			5	8		1		1													5	4	0	13
1:00 PM	52	26		13	5																	4	4	26	18
2:00 PM	83		40	19	13														1		1	4	5	40	32
3:00 PM	44			13	19			1										1		1		5	4	0	32
4:00 PM	23			5	13				1													4		0	18
5:00 PM	8			3	5																			0	8
6:00 PM	3				3																			0	3
7:00 PM	0																							0	0
8:00 PM	0																							0	0
9:00 PM	19	19																						19	0
10:00 PM	26		26																					26	0
11:00 PM	0																							0	0
Total	646	85	85	166	166	7	7	3	3	2	2	1	1	1	1	1	1	3	3	2	2	52	52		

*time between in bound / out bound = 1 hr.

Employee Shift	Prod.	Mgmt.	total
6:00AM-2:00PM	29	11	40
2:00PM-10:00PM	20	6	26
10:00PM-6:00AM	15	4	19



New York Waste to Energy Facility
Circular EnerG, LLC
Romulus, New York
September 12, 2017

Deliveries		
Waste Hauling Vehicles		
Vehicle = Transfer Trailers		
Assumptions		
Waste Density = 0.375 ton/C.Y. - light compaction		
Tare Weight = 40,000 lbs		
Gross Weight = 80,000 lbs		
Capacity = 100 C.Y. (max) / 70 C.Y. (avg)		
98% of MSW deliveries are made by transfer trailer		
286 working days/year (5.5 days per week)		
Calculations		
Average load = 70 C.Y. x 0.375 ton/C.Y.	26.3	ton/trailer
To conservatively estimate traffic volume, use	20	ton/trailer
98% of MSW deliveries are made by transfer trailer		
98% of 2,640 tons/day	2587.2	ton/day
Weigh deliveries for 5.5 working days per week		
365 days/year / 286 working days/year	3301.8	ton/day
Total Deliveries = Waste delivered/size of delivery		
3,301.8 ton/day / 20 ton/trailer	165.1	trailers/day
Results		
Use	166	trailers/day
Vehicle = Rear Loader (packer)		
Assumptions		
Waste Density = 0.375 ton/C.Y. - light compaction		
Capacity = 17 C.Y.		
1% of MSW deliveries are made by rear loader		
260 working days/year (5 days per week)		
Deliveries shall not exceed waste production of Seneca County pop.		
NYSDEC estimates waste production of 5.15 lbs per person, per day		
Population of Seneca County = 35,000		
Calculations		
Waste by Seneca County = Population x Production		
35,000 people x 5.15 lbs per person, per day	180250	lbs/day
	90.1	ton/day
Average load = 17 C.Y. x 0.375 ton/C.Y.	6.4	ton/truck

To conservatively estimate traffic volume, use	6	ton/truck
1% of MSW deliveries are made by rear loader		
1% of 2,640 tons/day	26.4	ton/day
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	37.1	ton/day
Total Deliveries = Waste delivered/size of delivery		
37.1 ton/day / 6 ton/truck	6.2	trucks/day
Results		
Use	7	trucks/day

Vehicle = Front Loader

Assumptions

Waste Density = 0.375 ton/C.Y. - light compaction
Capacity = 36 C.Y.
1% of MSW deliveries are made by front loader
260 working days/year (5 days per week)
Deliveries shall not exceed waste production of Seneca County pop.
NYSDEC estimates waste production of 5.15 lbs per person, per day
Population of Seneca County = 35,000

Calculations

Waste by Seneca County = Population x Production		
35,000 people x 5.15 lbs per person, per day	180250	lbs/day
	90.1	ton/day
Average load = 36 C.Y. x 0.375 ton/C.Y.	13.5	ton/truck
To conservatively estimate traffic volume, use	13	ton/truck
1% of MSW deliveries are made by front loader		
1% of 2,640 tons/day	26.4	ton/day
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	37.1	ton/day
Total Deliveries = Waste delivered/size of delivery		
37.1 ton/day / 13 ton/truck	2.9	trucks/day
Results		
Use	3	trucks/day

Slaked Lime		
Vehicle = 20-ton pneumatic tanker		
Assumptions		
Facility uses 10,549 tons/yr or 28.9 tons/day	28.9	ton/day
Capacity = 20 ton	20	ton/truck
260 working days/year (5 days per week)		
Calculations		
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	40.6	ton/day
Total Deliveries = daily use/size of delivery		
40.6 ton/day / 20 ton/truck	2.0	trucks/day
Results		
Use	2	trucks/day
Activated Carbon		
Vehicle = Flatbed truck with (6) 500# supersacks		
Assumptions		
Facility uses 351 tons/yr or 0.96 tons/day	0.96	ton/day
Capacity = 1.5 ton	1.5	ton/truck
260 working days/year (5 days per week)		
Calculations		
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	1.3	ton/day
Total Deliveries = daily use/size of delivery		
1.3 ton/day / 1.5 ton/truck	0.9	trucks/day
Results		
Use	1	truck/day
Urea		
Vehicle = Flatbed truck with (12) 500# supersacks		
Assumptions		
Facility uses 704 tons/yr or 1.93 tons/day	1.93	ton/day
Capacity = 3.0 ton	3	ton/truck
260 working days/year (5 days per week)		
Calculations		
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	2.7	ton/day

Total Deliveries = daily use/size of delivery		
2.7 ton/day / 3.0 ton/truck	0.9	trucks/day
Results		
Use	1	truck/day
Lubricating Oil		
Vehicle = Flatbed truck with (10) 5-gallon buckets		
Assumptions		
Facility uses 2.6 tons/yr or 0.007123 tons/day	0.007	ton/day
Density of oil = 7.51 lbs/gallon	7.51	lbs/gallon
Capacity = 50 gallons	50	gal/truck
260 working days/year (5 days per week)		
Calculations		
Quantity of oil		
Daily usage x 2,000lbs/ton / 7.51 lbs/gallon	1.897	gallons/day
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	2.663	gallons/day
Total Deliveries = daily use/size of delivery		
2.663 gal/day / 50 gal/truck	0.05	trucks/day
Results		
Conservatively Use	1	truck/day
Shipments		
Scrap Ferrous Metals		
Vehicle = 20-ton Dump Truck		
Assumptions		
Facility ships 31.7 tons/day	31.7	ton/day
Capacity = 20 ton	20	ton/truck
260 working days/year (5 days per week)		
Calculations		
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	44.5	ton/day
Total Deliveries = daily production/size of delivery		
44.5 ton/day / 20 ton/truck	2.2	trucks/day
Results		

Use	3	trucks/day
Non-ferrous - Aluminum		
Vehicle = 20-ton Dump Truck		
Assumptions		
Facility ships 26.4 tons/day	26.4	ton/day
Capacity = 20 ton	20	ton/truck
260 working days/year (5 days per week)		
Calculations		
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	37.1	ton/day
Total Deliveries = daily production/size of delivery		
37.1 ton/day / 20 ton/truck	1.9	trucks/day
Results		
Use	2	trucks/day
Ash for concrete sand		
Vehicle = 20-ton Dump Truck		
Assumptions		
Facility ships 734 tons/day	734	ton/day
Capacity = 20 ton	20	ton/truck
260 working days/year (5 days per week)		
Calculations		
Weigh deliveries for 5 working days per week		
365 days/year / 260 working days/year	1030.4	ton/day
Total Deliveries = daily production/size of delivery		
1,030.4 ton/day / 20 ton/truck	51.5	trucks/day
Results		
Use	52	trucks/day

Project Information	
Project Name:	New York Waste to Energy Facility
No:	
Date:	10/7/2017
City:	
State/Province:	Romulus, New York
Zip/Postal Code:	
Country:	
Client Name:	
Analyst's Name:	
Edition:	Edition

AM Peak		PM Peak	
Entry	**Exit**	**Entry**	**Exit**
36	21	9	14

SENECA ARMY DEPOT
TOWN OF ROMULUS, NY
AM PEAK

Num of yrs
7

LOCATION NUMBER	INTERSECTION DESCRIPTION	2017 Existing Volume	Bkgd Volume 0.50%	Proposed Energy Development				Total Site Trips	FULL Build Volumes
				Enter Dist. %	Exit Dist. %	Trips IN 36	Trips OUT 21		
1	NYS 414/ Cayuga Street								
	SR	36	37	30%		11		11	48
	ST	99	103						103
	SL								
	WR								
	WT								
	WL								
	NR								
	NT	71	74						74
	NL	10	10	18%		6		6	16
	ER	7	7		26%		5	5	12
	ET								
	EL	21	22		30%		6	6	28
2	NYS 96/ Cayuga Street								
	SR								
	ST	149	154	35%		13		13	167
	SL	5	5						5
	WR	9	9						9
	WT								
	WL	30	31	48%		17		17	48
	NR	17	18		56%		12	12	30
	NT	76	79		23%		5	5	84
	NL								
	ER								
	ET								
	EL								
3	NYS 96/ E Patrol Road								
	SR	1	1	83%		30		30	31
	ST	123	127						127
	SL								
	WR								
	WT								
	WL								
	NR								
	NT	101	105						105
	NL	3	3	17%		6		6	9
	ER				21%		4	4	4
	ET								
	EL	2	2		79%		17	17	19
4	NYS 96/ Bromka Road								
	SR								
	ST	108	112		19%		4	4	116
	SL	5	5		2%		0	0	5
	WR	8	8	2%		1		1	9
	WT								
	WL								
	NR								
	NT	67	69	15%		5		5	74
	NL								
	ER								
	ET								
	EL								

SENECA ARMY DEPOT
TOWN OF ROMULUS, NY
PM PEAK

LOCATION NUMBER	INTERSECTION DESCRIPTION	2017 Existing Volume	Bkgd Volume 0.50% (Num of yrs 7)	Proposed Residential Development: Enter Dist. %	Exit Dist. %	Trips IN 9	Trips OUT 14	Total Site Trips	FULL Build Volumes
1	NYS 414/ Cayuga Street								
	SR	12	12	30%		3		3	15
	ST	114	118						118
	SL								
	WR								
	WT								
	WL								
	NR								
	NT	129	134						134
	NL	6	6	18%		2		2	8
	ER	9	9		26%		4	4	13
	ET								
	EL	13	13		30%		4	4	17
2	NYS 96/ Cayuga Street								
	SR								
	ST	97	100	35%		3		3	103
	SL	12	12						12
	WR	12	12						12
	WT								
	WL	10	10	48%		4		4	14
	NR	12	12		56%		8	8	20
	NT	100	104		23%		3	3	107
	NL								
	ER								
	ET								
	EL								
3	NYS 96/ E Patrol Road								
	SR			83%		7		7	7
	ST	99	103						103
	SL								
	WR								
	WT								
	WL								
	NR								
	NT	83	86						86
	NL			17%		2		2	2
	ER				21%		3	3	3
	ET								
	EL				79%		11	11	11
4	NYS 96/ Bromka Road								
	SR	3	3						3
	ST	91	94		19%		3	3	97
	SL				2%		0	0	0
	WR	6	6	2%		0		0	6
	WT								
	WL	1	1						1
	NR	1	1						1
	NT	83	86	15%		1		1	87
	NL								
	ER								
	ET								
	EL								

A3

Level of Service: Criteria and Definitions

Level of Service Criteria

Highway Capacity Manual 2010

SIGNALIZED INTERSECTIONS

Level of Service is a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience. Level of Service for signalized intersections is defined in terms of delay specifically, average total delay per vehicle for a 15 minute analysis period. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 20
C	20 – 35
D	35 – 55
E	55 – 80
F	>80

UNSIGNALIZED INTERSECTIONS

Level of Service for unsignalized intersections is also defined in terms of delay. However, the delay criteria are different from a signalized intersection. The primary reason for this is driver expectation that a signalized intersection is designed to carry higher volumes than an unsignalized intersection. The total delay threshold for any given Level of Service is less for an unsignalized intersection than for a signalized intersection. The ranges are as follows:

Level of Service	Control Delay per vehicle (seconds)
A	< 10
B	10 – 15
C	15 – 25
D	25 – 35
E	35 - 50
F	>50

A4

Level of Service Calculations: Existing Conditions

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	9	76	17	5	146
Future Vol, veh/h	30	9	76	17	5	146
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	78	78	90	90
Heavy Vehicles, %	0	11	3	0	0	3
Mvmt Flow	34	10	97	22	6	162

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	282	108	0	0	119	0
Stage 1	108	-	-	-	-	-
Stage 2	174	-	-	-	-	-
Critical Hdwy	6.4	6.31	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.399	-	-	2.2	-
Pot Cap-1 Maneuver	712	922	-	-	1482	-
Stage 1	921	-	-	-	-	-
Stage 2	861	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	709	922	-	-	1482	-
Mov Cap-2 Maneuver	709	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	861	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.1	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	749	1482	-
HCM Lane V/C Ratio	-	-	0.059	0.004	-
HCM Control Delay (s)	-	-	10.1	7.4	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	21	7	10	71	99	36
Future Vol, veh/h	21	7	10	71	99	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	81	81	91	91
Heavy Vehicles, %	5	0	10	4	13	0
Mvmt Flow	27	9	12	88	109	40

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	241	129	149	0	-	0
Stage 1	129	-	-	-	-	-
Stage 2	112	-	-	-	-	-
Critical Hdwy	6.45	6.2	4.2	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.3	2.29	-	-	-
Pot Cap-1 Maneuver	741	926	1385	-	-	-
Stage 1	890	-	-	-	-	-
Stage 2	905	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	734	926	1385	-	-	-
Mov Cap-2 Maneuver	734	-	-	-	-	-
Stage 1	882	-	-	-	-	-
Stage 2	905	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1385	-	774	-	-
HCM Lane V/C Ratio	0.009	-	0.046	-	-
HCM Control Delay (s)	7.6	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	3	101	123	1
Future Vol, veh/h	2	0	3	101	123	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	50	74	74	73	73
Heavy Vehicles, %	0	0	0	4	6	0
Mvmt Flow	4	0	4	136	168	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	313	169	169	0	-	0
Stage 1	169	-	-	-	-	-
Stage 2	144	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	684	880	1421	-	-	-
Stage 1	866	-	-	-	-	-
Stage 2	888	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	682	880	1421	-	-	-
Mov Cap-2 Maneuver	682	-	-	-	-	-
Stage 1	863	-	-	-	-	-
Stage 2	888	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.3	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1421	-	682	-	-
HCM Lane V/C Ratio	0.003	-	0.006	-	-
HCM Control Delay (s)	7.5	0	10.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	8	67	0	5	108
Future Vol, veh/h	0	8	67	0	5	108
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	40	40	64	64	83	83
Heavy Vehicles, %	0	0	6	0	0	5
Mvmt Flow	0	20	105	0	6	130

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	247	105	0	0	105	0
Stage 1	105	-	-	-	-	-
Stage 2	142	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	746	955	-	-	1499	-
Stage 1	924	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	743	955	-	-	1499	-
Mov Cap-2 Maneuver	743	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	955	1499	-
HCM Lane V/C Ratio	-	-	0.021	0.004	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	12	100	12	12	97
Future Vol, veh/h	10	12	100	12	12	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	55	55	67	67	97	97
Heavy Vehicles, %	0	0	1	8	0	1
Mvmt Flow	18	22	149	18	12	100

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	282	158	0	0	167	0
Stage 1	158	-	-	-	-	-
Stage 2	124	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	712	893	-	-	1423	-
Stage 1	875	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	706	893	-	-	1423	-
Mov Cap-2 Maneuver	706	-	-	-	-	-
Stage 1	867	-	-	-	-	-
Stage 2	907	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	797	1423	-
HCM Lane V/C Ratio	-	-	0.05	0.009	-
HCM Control Delay (s)	-	-	9.8	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	9	6	124	114	12
Future Vol, veh/h	13	9	6	124	114	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	77	77	86	86
Heavy Vehicles, %	0	0	0	4	8	8
Mvmt Flow	21	15	8	161	133	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	317	140	147	0	-	0
Stage 1	140	-	-	-	-	-
Stage 2	177	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	680	913	1447	-	-	-
Stage 1	892	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	676	913	1447	-	-	-
Mov Cap-2 Maneuver	676	-	-	-	-	-
Stage 1	887	-	-	-	-	-
Stage 2	859	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1447	-	756	-	-
HCM Lane V/C Ratio	0.005	-	0.048	-	-
HCM Control Delay (s)	7.5	0	10	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	83	99	0
Future Vol, veh/h	0	0	0	83	99	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	50	71	71	80	80
Heavy Vehicles, %	0	0	0	4	2	0
Mvmt Flow	0	0	0	117	124	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	241	124	124	0	-	0
Stage 1	124	-	-	-	-	-
Stage 2	117	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	752	932	1475	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	913	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	752	932	1475	-	-	-
Mov Cap-2 Maneuver	752	-	-	-	-	-
Stage 1	907	-	-	-	-	-
Stage 2	913	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1475	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	6	83	1	3	91
Future Vol, veh/h	1	6	83	1	3	91
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	58	58	78	78	81	81
Heavy Vehicles, %	0	17	4	0	0	1
Mvmt Flow	2	10	106	1	4	112

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	227	107	0	0	107	0
Stage 1	107	-	-	-	-	-
Stage 2	120	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.2	-
Pot Cap-1 Maneuver	766	908	-	-	1497	-
Stage 1	922	-	-	-	-	-
Stage 2	910	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	764	908	-	-	1497	-
Mov Cap-2 Maneuver	764	-	-	-	-	-
Stage 1	919	-	-	-	-	-
Stage 2	910	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.1	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	884	1497	-
HCM Lane V/C Ratio	-	-	0.014	0.002	-
HCM Control Delay (s)	-	-	9.1	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

A5

Level of Service Calculations: Background Conditions

Intersection	
Int Delay, s/veh	1.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	31	9	79	18	5	154
Future Vol, veh/h	31	9	79	18	5	154
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	78	78	90	90
Heavy Vehicles, %	0	11	3	0	0	3
Mvmt Flow	35	10	101	23	6	171

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	296	113	0	0	124	0
Stage 1	113	-	-	-	-	-
Stage 2	183	-	-	-	-	-
Critical Hdwy	6.4	6.31	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.399	-	-	2.2	-
Pot Cap-1 Maneuver	699	916	-	-	1475	-
Stage 1	917	-	-	-	-	-
Stage 2	853	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	696	916	-	-	1475	-
Mov Cap-2 Maneuver	696	-	-	-	-	-
Stage 1	913	-	-	-	-	-
Stage 2	853	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	736	1475	-
HCM Lane V/C Ratio	-	-	0.061	0.004	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	7	10	74	103	37
Future Vol, veh/h	22	7	10	74	103	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	81	81	91	91
Heavy Vehicles, %	5	0	10	4	13	0
Mvmt Flow	28	9	12	91	113	41

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	249	134	154	0	-	0
Stage 1	134	-	-	-	-	-
Stage 2	115	-	-	-	-	-
Critical Hdwy	6.45	6.2	4.2	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.3	2.29	-	-	-
Pot Cap-1 Maneuver	733	920	1379	-	-	-
Stage 1	885	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	726	920	1379	-	-	-
Mov Cap-2 Maneuver	726	-	-	-	-	-
Stage 1	877	-	-	-	-	-
Stage 2	902	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.9	0.9	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1379	-	765	-	-
HCM Lane V/C Ratio	0.009	-	0.049	-	-
HCM Control Delay (s)	7.6	0	9.9	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	2	0	3	105	127	1
Future Vol, veh/h	2	0	3	105	127	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	50	74	74	73	73
Heavy Vehicles, %	0	0	0	4	6	0
Mvmt Flow	4	0	4	142	174	1

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	325	175	175	0	-	0
Stage 1	175	-	-	-	-	-
Stage 2	150	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	673	874	1414	-	-	-
Stage 1	860	-	-	-	-	-
Stage 2	883	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	671	874	1414	-	-	-
Mov Cap-2 Maneuver	671	-	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	883	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.4	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1414	-	671	-	-
HCM Lane V/C Ratio	0.003	-	0.006	-	-
HCM Control Delay (s)	7.6	0	10.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection						
Int Delay, s/veh	0.8					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	8	69	0	5	112
Future Vol, veh/h	0	8	69	0	5	112
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	40	40	64	64	83	83
Heavy Vehicles, %	0	0	6	0	0	5
Mvmt Flow	0	20	108	0	6	135

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	255	108	0	0	108	0
Stage 1	108	-	-	-	-	-
Stage 2	147	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	738	951	-	-	1495	-
Stage 1	921	-	-	-	-	-
Stage 2	885	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	735	951	-	-	1495	-
Mov Cap-2 Maneuver	735	-	-	-	-	-
Stage 1	917	-	-	-	-	-
Stage 2	885	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.9	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	951	1495	-
HCM Lane V/C Ratio	-	-	0.021	0.004	-
HCM Control Delay (s)	-	-	8.9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	12	104	12	12	100
Future Vol, veh/h	10	12	104	12	12	100
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	55	55	67	67	97	97
Heavy Vehicles, %	0	0	1	8	0	1
Mvmt Flow	18	22	155	18	12	103

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	291	164	0	0	173	0
Stage 1	164	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	704	886	-	-	1416	-
Stage 1	870	-	-	-	-	-
Stage 2	904	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	698	886	-	-	1416	-
Mov Cap-2 Maneuver	698	-	-	-	-	-
Stage 1	862	-	-	-	-	-
Stage 2	904	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	789	1416	-
HCM Lane V/C Ratio	-	-	0.051	0.009	-
HCM Control Delay (s)	-	-	9.8	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	13	9	6	134	118	12
Future Vol, veh/h	13	9	6	134	118	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	77	77	86	86
Heavy Vehicles, %	0	0	0	4	8	8
Mvmt Flow	21	15	8	174	137	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	334	144	151	0	-	0
Stage 1	144	-	-	-	-	-
Stage 2	190	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	665	909	1442	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	661	909	1442	-	-	-
Mov Cap-2 Maneuver	661	-	-	-	-	-
Stage 1	883	-	-	-	-	-
Stage 2	847	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.1	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1442	-	744	-	-
HCM Lane V/C Ratio	0.005	-	0.048	-	-
HCM Control Delay (s)	7.5	0	10.1	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	86	103	0
Future Vol, veh/h	0	0	0	86	103	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	50	71	71	80	80
Heavy Vehicles, %	0	0	0	4	2	0
Mvmt Flow	0	0	0	121	129	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	250	129	129	0	-	0
Stage 1	129	-	-	-	-	-
Stage 2	121	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	743	926	1469	-	-	-
Stage 1	902	-	-	-	-	-
Stage 2	909	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	743	926	1469	-	-	-
Mov Cap-2 Maneuver	743	-	-	-	-	-
Stage 1	902	-	-	-	-	-
Stage 2	909	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	0	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1469	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	6	86	1	3	94
Future Vol, veh/h	1	6	86	1	3	94
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	58	58	78	78	81	81
Heavy Vehicles, %	0	17	4	0	0	1
Mvmt Flow	2	10	110	1	4	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	235	111	0	0	111	0
Stage 1	111	-	-	-	-	-
Stage 2	124	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.2	-
Pot Cap-1 Maneuver	758	903	-	-	1492	-
Stage 1	919	-	-	-	-	-
Stage 2	907	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	756	903	-	-	1492	-
Mov Cap-2 Maneuver	756	-	-	-	-	-
Stage 1	916	-	-	-	-	-
Stage 2	907	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	879	1492	-
HCM Lane V/C Ratio	-	-	0.014	0.002	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

A6

Level of Service Calculations: Full Development Conditions

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	48	9	84	30	5	167
Future Vol, veh/h	48	9	84	30	5	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	78	78	90	90
Heavy Vehicles, %	35	11	9	40	0	11
Mvmt Flow	54	10	108	38	6	186

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	325	127	0	0	146	0
Stage 1	127	-	-	-	-	-
Stage 2	198	-	-	-	-	-
Critical Hdwy	6.75	6.31	-	-	4.1	-
Critical Hdwy Stg 1	5.75	-	-	-	-	-
Critical Hdwy Stg 2	5.75	-	-	-	-	-
Follow-up Hdwy	3.815	3.399	-	-	2.2	-
Pot Cap-1 Maneuver	606	900	-	-	1448	-
Stage 1	823	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	603	900	-	-	1448	-
Mov Cap-2 Maneuver	603	-	-	-	-	-
Stage 1	819	-	-	-	-	-
Stage 2	762	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.3	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	636	1448	-
HCM Lane V/C Ratio	-	-	0.101	0.004	-
HCM Control Delay (s)	-	-	11.3	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	28	12	16	74	103	48
Future Vol, veh/h	28	12	16	74	103	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	78	78	81	81	91	91
Heavy Vehicles, %	42	21	38	4	13	23
Mvmt Flow	36	15	20	91	113	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	271	140	166	0	-	0
Stage 1	140	-	-	-	-	-
Stage 2	131	-	-	-	-	-
Critical Hdwy	6.82	6.41	4.48	-	-	-
Critical Hdwy Stg 1	5.82	-	-	-	-	-
Critical Hdwy Stg 2	5.82	-	-	-	-	-
Follow-up Hdwy	3.878	3.489	2.542	-	-	-
Pot Cap-1 Maneuver	641	860	1221	-	-	-
Stage 1	798	-	-	-	-	-
Stage 2	805	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	630	860	1221	-	-	-
Mov Cap-2 Maneuver	630	-	-	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	805	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	1.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1221	-	685	-	-
HCM Lane V/C Ratio	0.016	-	0.075	-	-
HCM Control Delay (s)	8	0	10.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	19	4	9	105	127	31
Future Vol, veh/h	19	4	9	105	127	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	50	74	74	73	73
Heavy Vehicles, %	89	100	67	4	6	97
Mvmt Flow	38	8	12	142	174	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	361	195	216	0	-	0
Stage 1	195	-	-	-	-	-
Stage 2	166	-	-	-	-	-
Critical Hdwy	7.29	7.2	4.77	-	-	-
Critical Hdwy Stg 1	6.29	-	-	-	-	-
Critical Hdwy Stg 2	6.29	-	-	-	-	-
Follow-up Hdwy	4.301	4.2	2.803	-	-	-
Pot Cap-1 Maneuver	496	649	1048	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	690	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	490	649	1048	-	-	-
Mov Cap-2 Maneuver	490	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	690	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.7	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1048	-	512	-	-
HCM Lane V/C Ratio	0.012	-	0.09	-	-
HCM Control Delay (s)	8.5	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	9	74	0	5	116
Future Vol, veh/h	0	9	74	0	5	116
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	40	40	64	64	83	83
Heavy Vehicles, %	0	11	13	0	0	8
Mvmt Flow	0	23	116	0	6	140

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	268	116	0	0	116	0
Stage 1	116	-	-	-	-	-
Stage 2	152	-	-	-	-	-
Critical Hdwy	6.4	6.31	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.399	-	-	2.2	-
Pot Cap-1 Maneuver	726	912	-	-	1485	-
Stage 1	914	-	-	-	-	-
Stage 2	881	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	723	912	-	-	1485	-
Mov Cap-2 Maneuver	723	-	-	-	-	-
Stage 1	910	-	-	-	-	-
Stage 2	881	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	912	1485	-
HCM Lane V/C Ratio	-	-	0.025	0.004	-
HCM Control Delay (s)	-	-	9	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	14	12	107	20	12	103
Future Vol, veh/h	14	12	107	20	12	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	55	55	67	67	97	97
Heavy Vehicles, %	29	0	3	48	0	4
Mvmt Flow	25	22	160	30	12	106

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	305	175	0	0	190	0
Stage 1	175	-	-	-	-	-
Stage 2	130	-	-	-	-	-
Critical Hdwy	6.69	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.69	-	-	-	-	-
Critical Hdwy Stg 2	5.69	-	-	-	-	-
Follow-up Hdwy	3.761	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	634	874	-	-	1396	-
Stage 1	794	-	-	-	-	-
Stage 2	834	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	628	874	-	-	1396	-
Mov Cap-2 Maneuver	628	-	-	-	-	-
Stage 1	787	-	-	-	-	-
Stage 2	834	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.3	0	0.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	722	1396	-
HCM Lane V/C Ratio	-	-	0.065	0.009	-
HCM Control Delay (s)	-	-	10.3	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Int Delay, s/veh	1.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	17	13	8	134	118	15
Future Vol, veh/h	17	13	8	134	118	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	61	61	77	77	86	86
Heavy Vehicles, %	24	31	25	4	8	40
Mvmt Flow	28	21	10	174	137	17

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	340	146	154	0	-	0
Stage 1	146	-	-	-	-	-
Stage 2	194	-	-	-	-	-
Critical Hdwy	6.64	6.51	4.35	-	-	-
Critical Hdwy Stg 1	5.64	-	-	-	-	-
Critical Hdwy Stg 2	5.64	-	-	-	-	-
Follow-up Hdwy	3.716	3.579	2.425	-	-	-
Pot Cap-1 Maneuver	614	830	1297	-	-	-
Stage 1	830	-	-	-	-	-
Stage 2	789	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	608	830	1297	-	-	-
Mov Cap-2 Maneuver	608	-	-	-	-	-
Stage 1	823	-	-	-	-	-
Stage 2	789	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.6	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1297	-	688	-	-
HCM Lane V/C Ratio	0.008	-	0.071	-	-
HCM Control Delay (s)	7.8	0	10.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	3	2	86	103	7
Future Vol, veh/h	11	3	2	86	103	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	50	50	71	71	80	80
Heavy Vehicles, %	100	100	100	4	2	100
Mvmt Flow	22	6	3	121	129	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	261	134	138	0	-	0
Stage 1	134	-	-	-	-	-
Stage 2	127	-	-	-	-	-
Critical Hdwy	7.4	7.2	5.1	-	-	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	3.1	-	-	-
Pot Cap-1 Maneuver	559	708	1013	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	705	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	557	708	1013	-	-	-
Mov Cap-2 Maneuver	557	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	705	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1013	-	584	-	-
HCM Lane V/C Ratio	0.003	-	0.048	-	-
HCM Control Delay (s)	8.6	0	11.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

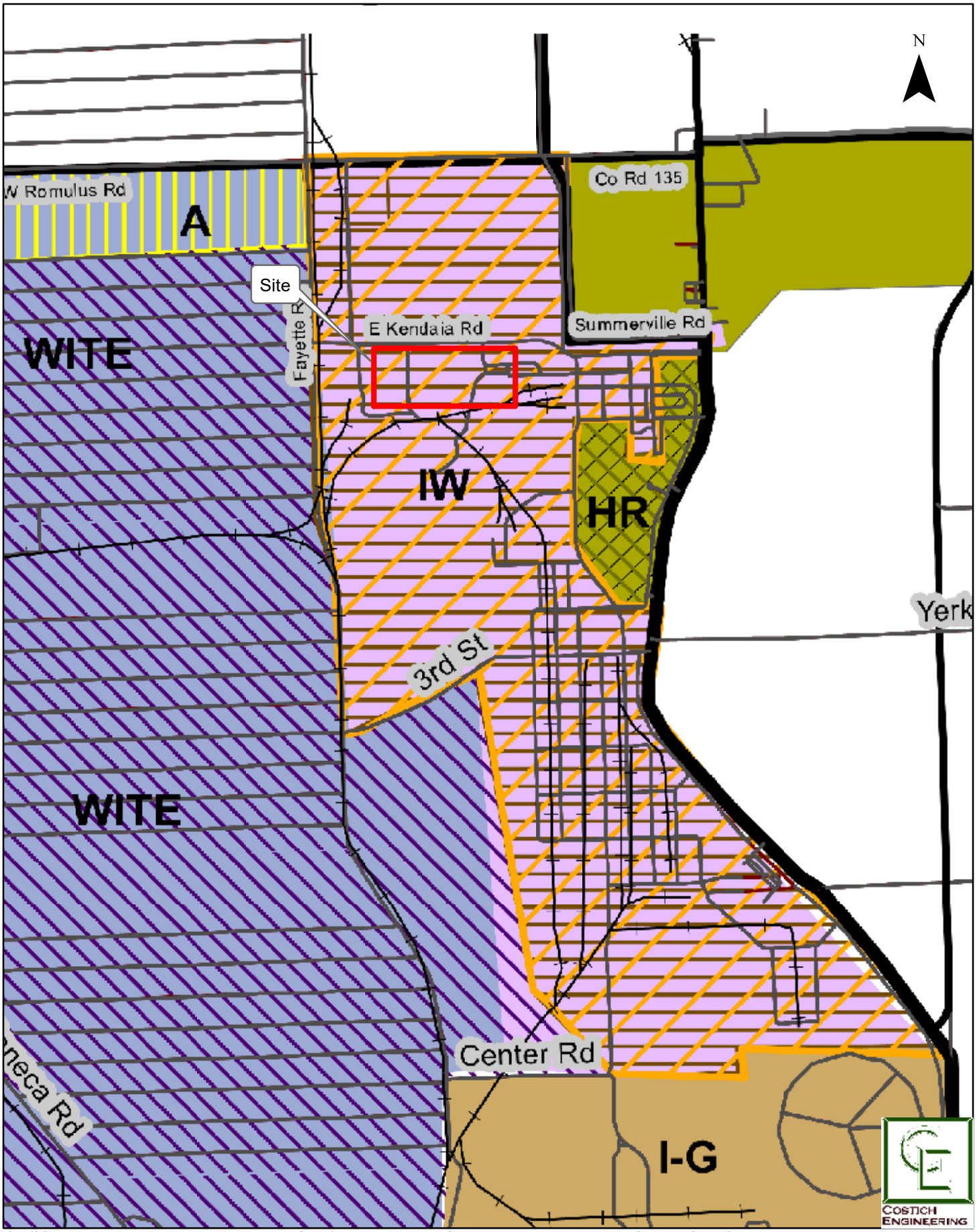
Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	6	87	1	3	97
Future Vol, veh/h	1	6	87	1	3	97
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	58	58	78	78	81	81
Heavy Vehicles, %	0	17	5	0	0	4
Mvmt Flow	2	10	112	1	4	120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	241	113	0	0	113	0
Stage 1	113	-	-	-	-	-
Stage 2	128	-	-	-	-	-
Critical Hdwy	6.4	6.37	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.453	-	-	2.2	-
Pot Cap-1 Maneuver	752	901	-	-	1489	-
Stage 1	917	-	-	-	-	-
Stage 2	903	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	750	901	-	-	1489	-
Mov Cap-2 Maneuver	750	-	-	-	-	-
Stage 1	914	-	-	-	-	-
Stage 2	903	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.2	0	0.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	876	1489	-
HCM Lane V/C Ratio	-	-	0.014	0.002	-
HCM Control Delay (s)	-	-	9.2	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-



CE#C3320

NOT TO SCALE

PER TOWN OF ROMULUS ZONING MAP DRAFT, DATED MAY 13, 2014
SITE IS ZONED IW - INDUSTRIAL/WAREHOUSE &
IS WITHIN THE ENVIRONMENTAL RESTRICTIONS OVERLAY

CIRCULAR ENERG RENEWABLE ENERGY PROJECT
TOWN OF ROMULUS, SENECA COUNTY
ZONING MAP

DISCLAIMER: This product is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and represents only the approximate relative location of property boundaries.

Town of Romulus
1435 Prospect Street
P.O. Box 177
Willard, New York 14588
March 16, 2017

Mr. Earl Martin
Seneca Dairy Systems
3236 N. Hoster Road
Seneca Falls, NY 13148

Mr. Michael Palumbo
Flaum Management
400 Andrews St #500
Rochester, NY 14604

Gentlemen:

You inquired whether a waste-to-energy facility (the "Facility") which, through combustion of solid waste, would use the resulting heat from the combustion process to generate steam to power a turbine to produce electric power, is an allowed use at the former Seneca Army Depot in the Town of Romulus. The Facility would generate slag, ash and flue gas, but would comply in all material respects with applicable environmental regulations, including air pollution and solid waste management standards enforced by the New York State Department of Environmental Conservation.

Please be advised that the Facility would be classified under Article IV, Section 1 of the Town of Romulus Zoning Law as "Renewable Energy Production (Solar, Wind, Biomass, Geothermal, etc.) – Utility scale." The former Seneca Army Depot is located in the Town's Warehouse, Industrial, Transportation, Energy District, the Facility would therefore be an allowed use if a special use permit was approved by the Romulus Planning Board. Furthermore, the Facility would not be prohibited under Article IV, Section 4(A) of the Romulus Zoning Law as a "noxious or injurious" use, provided it substantially complies with applicable environmental regulations.

This interpretation may be appealed, within 60 days of filing this letter with my office, to the Town of Romulus Zoning Board of Appeals.

Yours truly,

Adam Schrader
Town of Romulus Zoning Officer

Town of Romulus
1435 Prospect Street
P.O. Box 177
Willard, New York 14588

August 28, 2017

Mr. Earl Martin
Seneca Dairy Systems
3236 N. Hoster Road
Seneca Falls, NY 13148

Mr. Michael Palumbo
Flaum Management
400 Andrews St #500
Rochester, NY 14604

Gentlemen:

This letter supplements my letter to you dated March 16, 2017, by which I issued an interpretation that a waste-to-energy facility (the "Facility"), as described in that letter, would be classified under Article IV, Section 1 of the Town of Romulus Zoning Law as "Renewable Energy Production (Solar, Wind, Biomass, Geothermal, etc.) – Utility scale." I also stated that the Facility would not be prohibited under Article IV, Section 4(A) of the Romulus Zoning Law as a "noxious or injurious" use, provided it substantially complies with applicable environmental regulations.

While my letter noted that the former Seneca Army Depot is located in the Town's Warehouse, Industrial, Transportation, Energy (WITE) District, portions of the former Seneca Army Depot are located in Industrial/Warehouse (IW) District. For the reasons set forth in my March 16, 2017 determination, the Facility would be allowed at the former Seneca Army Depot in either the WITE District or the IW District if a special permit was approved by the Romulus Planning Board. Further, in addition to compliance with the applicable environmental regulations noted above, all uses within the WITE and IW Districts are subject to the Performance Standards contained in Article IV, Section 3.

Yours truly,

Adam Schrader
Town of Romulus Zoning Officer

Rev. 11/07/01

TOWN OF ROMULUS
COMPREHENSIVE PLAN
(Final Proposal)

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Rev. 6/03/98

I. FORWARD

On July 16, 1997, the Town Board of the Town of Romulus appointed its Planning Board to prepare a Comprehensive Plan to promote the health, safety and general welfare of the people of the Town.

The Town of Romulus, Seneca County is a fantastically beautiful, largely rural and agricultural area, nestled between two of the finest of New York's Finger Lakes – Seneca and Cayuga. Many panoramic views are to be had on highways crossing the Town, some affording views of both lakes from the same spot.

The hamlet of Willard, at the southwestern corner of the Town, is the location of the Town Municipal Building. Adjacent thereto is the Willard Drug Treatment Center, the northern portion of which is in Romulus that provides employment to some local residents. Parts of the village of Ovid on the south and the hamlet of Romulus on the north are shared with adjacent towns. There are two other semi developed residential areas. One in the southeastern quadrant is named Hayts Corners. The other near the northwest corner of the Town is named Kendaia.

Assets include access to the lakes as provided by the 1, 852 acre Sampson State Park on Seneca Lake and Deans Cove on Cayuga Lake. Both of these offer public boat launching facilities, thereby being of great value to visitors as well as residents. In addition the former has a swimming area, 122 boat slips, 245 electrified campsites, a Naval Museum, a potential NY State Veterans burial site, and receives visits from over 250,000 people per year. Only a dozen or so miles away to the north in Seneca Falls are six scattered sites of the Women's Rights National Historical Park. Among other assets are the Wineries in the Town and region, which, benefiting from the climate and soil of this area between the lakes, offer some of the country's finest wines. Also beautiful, deep undeveloped stream corridors course down off the hill to the lakes, and an abundance of local wildlife includes a herd of white deer on the Depot property.

The shores of the lakes, where not inhibited by high, steep, rocky cliffs, are dotted with both permanent and summer residences. The latter swell the summer population with the influx of vacationers, and in season our clear lakes buzz with boating, fishing, and water sport activities. Held during the summer are a number of fishing derbies that take good advantage of the superb fishing in both Seneca and Cayuga Lakes. Another competition is that of sailboat racing, as seen by frequent regattas on both lakes.

The many horse and buggy rigs of the local Amish farmers, which are seen along the highways, lend an interesting aspect to the landscape. These industrious people have come to this area in substantial numbers and appear to be thriving.

There is a large 10,600 acre area near the center of the Town which, due to the imminent departure of the Seneca Army Depot, is subject to a current, intensively active effort to attract activities which will be compatible with our lifestyle, yet provide new additional jobs and attract desirable new permanent residents. That area benefits from a rail connection as well as from excellent highways, particularly north and south, which connect with the New York Thruway on the north and the Southern Tier Expressway on the south. Not too distant are top-notch schools of higher learning, which are a potential source of highly skilled employees. To the south is the city of Ithaca and to the north, the larger metropolitan areas of Rochester and Syracuse.

Various activities are envisioned and being proposed for the Depot property. Among them is a large law enforcement-training center in the area of the 7000 ft. airport runway that is already included in the '97 –'98 State budget.

The purpose of this plan is to develop and lay forth a land-use concept that protects, yet takes advantage of and builds upon, current assets. The plan takes into account the current desirable aspects of the Town of Romulus and then goes on to attempt to formulate a path for economically sound and orderly growth, which preserves the rural, agricultural and residential nature of the area and directs growth in the most desirable directions. Incorporated herein is a Map of recommended land use illustrating where it is believed that each would be most appropriate. Among the concepts embraced was one, which fosters quality residential development in and around existing hamlets and directs commercial, business and industrial growth to the suggested corridors if not to the preferred locations in the Depot redevelopment area. Development would be restricted along scenic routes, wetlands and deep wooded ravines. Provision is made for the protection of any sites or structures deemed to be of substantial historical, architectural, or archaeological nature and value. Over 2000 residents value their present way of living here and are looking for ways to enhance and further develop the Town.

In addition to defining the Town's goals, advantages of having this plan include:

- Informing builders and developers of the type and pattern of land use desired by the Town's residents
- Encouraging consistent decision-making regarding new development
- Providing the legal basis for the adoption and implementation of land-use tools
- Helping the Town with the expansion and development of further infrastructure and municipal services

The greatest advantage will be the sense of accomplishment that the community can share in the knowledge that future residents will continue to enjoy a high quality of life.

Rev. 6/03/98

II. HISTORY

Before the first "settlers" arrived here, what is now the Town of Romulus was a wild and undeveloped land in the midst of Indian country, specifically that of the Iroquois Confederation, a "Nation" which included tribes such as the Cayuga's and the Seneca's. The first Europeans to come here were traders who roamed the area and dealt directly with those Indians. The influx of permanent residents, who migrated in to clear, develop and farm fertile land, didn't really begin until the late 1700's or after New York Revolutionary War soldiers had been awarded their Bounty Land (1782) in payment for their military service. This "military tract" was comprised of 1,500,000 acres in central New York and included what is now Romulus. Subsequently those veterans, or purchasers of their land, moved here from Pennsylvania, New England, and downstate New York to dwell permanently. The population quickly grew to about 2500 souls where it remains even until today. Purportedly Abram Brown was the first Romulus settler. Reportedly another of the very early settlers was Captain Abel Frisbee (1741-1823) who fought in the Revolutionary War, was a prisoner of the British for 7 years, and ended up as a tavern keeper and ferryman. Still another of the earliest settlers was Alda McMath who homesteaded just north of Rising (Indian) Creek but died only a few short years later. In years following 1791 they were joined in the area by many new residents, some with familiar names such as Covert, Kinne, Purdy, Seeley, Vorhees, Warne, Wilson, Wisner, and Wyckoff. The first white child born in Romulus was Elsie Fleming. Three Sutton children followed in 1793, 1803, and 1806.

The first task of the new settlers was the clearing of the land for agricultural purposes, although businesses such as saw mill, gristmill, distillery, blacksmith shop, store, and inn soon followed. Other vocations practiced were carpentry, cooper, and ferryman. Farming remains until today the primary occupation of Town residents, although a significant segment of the population now commutes to nearby cities to pursue their endeavors.

The Township of Romulus was formed in 1794 and has remained a Township until the present although much diminished in size and with hundreds of acres still owned by the State and Federal Governments.

The original housing was clearly primitive in nature and of the log cabin type. As years went by these accommodations were replaced by farmhouses of a more current construction. One of the earliest homes erected here, and still standing, is that of CAPTAIN ELIJAH KINNE, the original part of which was built in 1804. This home on Rt. 96A, owned in 1998 by Anne Getman, is a stately Greek revival house. It is believed that in 1842 Kinne built the large addition to the south that is now the main part of that house, all in the classic style of the period.

One of the four pillars on the front portico was removed because it obstructed view to the south, and, subsequently, the small south porch was enclosed and the pillars removed to make an extra room. Except for this, the structure remains largely unaltered. The CHAMBERLAIN home, now located at the corner of Wells Hollow and West Blaine Rds. was moved from Baptist Church Rd. when the Air force decided to build an airstrip for the then Sampson Airbase. Another home, one now owned by James McDonald and located on Seneca St. in the hamlet of Romulus, was reportedly once a "stop" on the "underground railroad". The original structure, which at first appears to be a wing on the two-story portion of the building, is believed to have been build in 1822. A Dutch oven-fireplace combination in it is in a remarkable state of preservation.

Some of the earliest settlements were Romulus Ville, Plymouth, Romulus Center, and Bailey town. Most of these consisted of only a few houses and quickly faded from the scene.

Records show that the first schoolhouse was built in 1799, the location being one mile northeast of Lancaster (now Willard). From this point there was gradual growth until Romulus contained nine school districts, each with a frame schoolhouse and a licensed teacher, offering education to 683 children. Currently the Town of Romulus is served by just two central schools. One of these is located in the hamlet of Romulus and in 1994 that school, the Romulus Central School, had an enrollment of 595 students, 49 teachers and approximately the same number in the support staff. The other school is in Ovid, and this district when originally formed in 1938 by absorbing the Willard, Hayts Corners, and other small school districts became the Ovid Central School. In 1968 when further combined with Interlaken the enlarged district became the South Seneca Central School.

The construction of the State Agricultural College at the location now known as Willard was begun in 1857 with the cornerstone laid in 1858 at a site on 686 acres of land partly in the Town of Ovid and partly in Romulus. Subsequently opened, this school lost favor shortly to the new Cornell Agricultural School which had thereafter been established in Ithaca by Ezra Cornell. In 1865, with the school having ceased operation, it was decided that the use of the facility be redirected toward care for the chronic insane, and in 1869 the **WILLARD ASYLUM FOR THE INSANE** was opened. This institution was named after Dr. Sylvester D. Willard who had investigated and reported on this need at the direction of the State. As late as the 1950's, there were over 3000 patients being cared for there. Recently the Willard Psychiatric Center has been totally shut down, and in its place the Willard Drug Treatment Center has been installed. That facility is intended to house up to 1000 inmates and operates as a modified shock facility; the inmates receive education, counseling, and physical activity during their 90 day treatment regimen.

It was in 1873 that the last spike was driven to complete the track connection at Romulus for the Geneva, Ithaca, and Syre, Pa. Railroad from the north with that of the Lehigh Valley from the south. Later in that decade the Lehigh Railroad gained full control of this whole segment. A 1907 map indicates that the Lehigh Railroad had its main north-south line near Willard, the route of the "Black Diamond" passenger train through Hayts Corners, and a spur from the latter hamlet through Ovid to Willard. These sections were reputedly abandoned as follows: the Willard spur somewhere around 1940, the Hayts Corners to Ovid section in 1957, and the NS track through Hayts Corners in the 1960's. The only remnant of these railroads is that portion of the Lehigh main line, which has become a little active spur from Geneva down into the Seneca Army Depot property operated by the Finger Lakes Railway Company.

Construction of what is now called the **SENECA ORDINANCE DEPOT** began in 1941. Approximately 500 "igloos" were built and 20 miles of fencing erected to seal off the property from unauthorized entry. Warehouses, housing, and administration buildings were added and ultimately the 5000 ft. airport runway, acquired from the Air force, was lengthened to 7000 ft. The peak civilian employment at the Depot was reached in July 1943 when 2511 people from 60 different communities were employed there. In Nov. 1946 civilian employment had sunk to 595. Then in 1956, a Special Weapons Project was initiated and established at what would ultimately be called the North Base. At this point, housing at the North Depot Activity became acute with 300 to 400 military personnel to be brought in, so in 1959 125 Capehart Housing units were constructed. In 1961 the North Base Activity became part of the Seneca Ordinance Depot, and in 1963 the whole Depot was transferred to the U.S. Army Maintenance Command and was renamed the **SENECA ARMY DEPOT**. Then in 1992 the Army announced that the Depot's work force would be further cut and the operation realigned. Today (1998) the Depot has only a skeleton crew working while awaiting its final complete closure in the next couple of years.

After the outbreak of **WW II**, quiet farm life along the shore of Seneca Lake was forced to give way to make for the 2nd largest **NAVAL TRAINING STATION** in the country. This installation called **SAMPSON** existed throughout the duration of that war. In the late 1940's Sampson State College was established, and it existed there on the main portion of the base until that activity was transferred to Plattsburgh. Subsequently, the US Air force took over the complex and operated a training center there until 1955 during which time the airfield (later transferred to the Army) was built. During much of these periods the south or hospital area of the old base had various State of NY functions addressing the needs of TB and then later mental patients. The last and current use of Sampson began in 1960 when the State of New York acquired it and converted it into the present State Park, which has many fine recreational facilities. A few of the original buildings have been reconditioned and among them is one containing a Naval Historical Museum.

Since its beginning, The Town of Romulus has had post offices in seven locations, namely Romulus, Baileytown, Romulus Centre, Kendaia, Hayts Corners, Willard, and Sampson. At the present time two of these remain active.

Fire protection was a concern of early residents and the organizations subsequently established for that purpose have evolved over the years into the currently remaining two fire districts.

On February 6, 1897, the businessmen of the hamlet of Romulus took action and the Romulus Protective consisting of 30 members was formed. Its first truck was a hand drawn hook and ladder. In 1913 a fire district was organized, and a two wheeled truck with chemical tanks mounted on it was purchased. Then in 1943 the department was again reorganized and incorporated under the name of Romulus Volunteer Fire Department, Inc. That Department has had a number of "firsts": In 1973 a woman firefighter, and in 1991 a school bus converted into a command post.

Despite its name, the Romulus Volunteer Fire Department does not provide protection for the entire Town. As a matter of fact about ¾ of it, all except the NE quarter and the Hamlet of Romulus, is under the protection of the Ovid Volunteer Fire Department. The latter organization was organized in 1844 and incorporated in 1938.

The **BAPTIST CHURCH** of Romulus, constituted in June 1795, was the first church organized in Seneca County. This church, of a square white frame Colonial style, was originally arranged with the communicants facing a high old-fashioned pulpit and the doors behind that. This was changed after the doors blew open in a south wind and livestock wandered in. The meetinghouse was remodeled in 1849 after as many as 100 new members had been added. The final service was in 1941 and in October the Federal government took possession of the church property, except for the Kendaia cemetery, for incorporation into the Depot being established there. The present **PRESBYTERIAN CHURCH** of Romulus is located in the hamlet of Romulus, although it is actually just over the Town line into Varick. It was organized in 1802 and was originally in the Town of Romulus until Varick was split off. It is the oldest Presbyterian organization in Seneca County and remains active. The current edifice was built in 1838. **CHRIST EPISCOPAL** Church was established in Willard in 1877, and the Rev. Charles W. MacNish held services house to house. After the schoolhouse was built in Willard in 1880, services were then held there. The cornerstone of the present church was laid on June 18, 1886, and on November 12, 1886 that church was consecrated. In July 1976 a number of families began meeting together with the announced intention of beginning another local church ministry in the hamlet of Romulus. The first service of this new **SENECA COMMUNITY CHURCH** was held on Nov. 21, 1976.

The oldest cemetery in the Town of Romulus, and possibly Seneca County, has been known by various names, first as the Bailey Town Burying Grounds and then as the Rising Cemetery. There are at least 80 graves there, and we have evidence that it had been deeded to the First Baptist Church and Society of Romulus. This cemetery is located in the southwest corner of the Town.

Early burials there were in 1796 and they continued to possibly 1865. VanVleet Cemetery lies just off Rt. 96A within the borders of Sampson State Park. The David Covert Cemetery is located on the eastern side of the Town just off Rt. 89 and not far from Cayuga Lake. Burials in the latter plot seem to have taken place between 1817 and 1873. The Willard Cemetery sits above Seneca Lake and the old East Lake Road. It was used for many years for burial of residents of the Willard Asylum who had no families nearby. The Kendaia Cemetery lies wholly within

The confines of the Seneca Army Depot. The first burials there were in 1816 with occasionally a few more in the recent past. Lastly, the Mount Green Cemetery is the largest serving this local area. It is located within the hamlet of Romulus on the west end of Seneca St., although actually in the Town of Varick.

The earliest Romulus settlers were attracted by inexpensive land, good soil, and plentiful water. Our vision for our future is one that seeks to retain and protect, possibly even enhance, the beauty and ambiance of this still largely rural between-the-lakes area that nonetheless has the advantages of being relatively close to metropolitan cities. The maintenance of sites and objects of a historical nature, as well as the scenic natural habitat of a variety of wildlife, is to be encouraged for the benefit of all, particularly visitors to our area.

III. SENECA ARMY DEPOT

In order to deal with the negative employment and economic impacts associated with the closure of the Depot, the Seneca County Board of Supervisors established (October 1995) the Seneca Army Depot Local Redevelopment Authority (LRA). The primary responsibility assigned to the LRA was the preparation of a plan for the redevelopment of the Depot.

After a seven month long comprehensive planning process initiated in March 1996 and assisted by outside organizations, a Reuse Plan and Implementation strategy was adopted by the LRA on October 8, 1996. The reuse plan was subsequently approved by the Seneca County Board of Supervisors on October 22, 1996 and then by the Romulus Town Board on July 16, 1997. This plan together with amendment #1 dated November 1997 serves as the comprehensive reuse plan for the depot area. It is this latter package, which is to be implemented by the LRAs successor group – the Seneca County Industrial Development Agency.

IV. OPEN SPACES/NATURAL RESOURCES

There are a number of special areas that are sensitive, or at least not well suited to new development, yet are important to the long-term economic viability of the Town. These include flood plains, steep slopes, species habitats, wetlands, stream corridors and ground water aquifers. Besides their ecological and economic functions, many of these add to the Town's natural beauty and provide areas for residents and visitors to enjoy the outdoors. To protect these resources, the Plan continues the Town's policy of allowing only the least possible development in the most sensitive areas.

V. ECONOMIC TRENDS AND DEVELOPMENT

During the past 50 plus years the Town of Romulus has been heavily dependent upon, and constrained by, government sector type facilities and employment. Subsequently, the economic health of the Township has encountered some big setbacks with the closing of all three of the large government employers – Sampson Naval Base (and its successors), the Willard Psychiatric Center, and the Seneca Army Depot – and these areas have remained off the tax rolls. The most recent closure, that of the Depot, will when completed, be highly detrimental, and it is coming just as the country is beginning to pull out of a downturn. Seneca County has also experienced the loss of manufacturing jobs at Phillips/Sylvania, although it has gained jobs in other areas.

This plan envisions the movement of the Town from a dependency on an economy which is government driven to one which is a more privately based. A limited economic impact of government agencies will remain, but it is thought that the Town will be strengthened by maintaining its strong agricultural base while diversifying through the attraction of other business activity primarily into the designated areas in the Depot. Guiding new

Development to the designated locations will also assist in protecting the Town's rural character and hopefully help by supporting costs of infrastructure now and in the future.

To the advantage of, and for support in, establishment of projected new endeavors is an excellent primary and secondary school system, many of whose graduates go on for advanced education. Also in proximity are sources of important technical support as well as graduates capable of filling employment needs. These are top-notch schools of higher education such as Cornell University, Ithaca College, and Hobart William Smith.

VI. RECOMMENDED LAND USE AREAS

1. HAMLET RESIDENTIAL (gray)

Concentrated areas of residential housing; small business enterprises; churches; and public buildings including hamlets, villages, and Elliot Acres on the Depot. Growth would be encouraged in these areas because of the ready availability of utilities. However, density would be dependent upon the existing capacity of the infrastructure.

2. CONSERVATION AND RECREATION (dark green)

Areas where development is prohibited to protect plant and/or animal life or to promote recreational activities for the public. All public places such as both the 2300-acre conservation area in the Depot and Sampson Park would be promoted for recreational purposes, i.e. biking, skiing, hiking, etc.

3. AGRICULTURAL (light green)

Areas now dedicated to the production of crops and to animal husbandry. Every effort would be undertaken to maintain the status quo of these areas in order to retain the rural character of our town and to comply with State and Federal Laws. If future development (i.e. residential) were proposed on a portion of these lands it would be carefully reviewed to determine the impact on the entire.

Town and County. Wineries are included in this agricultural category while noting that they also engage in the brewing process (industrial) as well as the direct retail sales to the public (commercial). Also included are small home businesses often related to agriculture.

4. LAKESHORE RESIDENTIAL (blue)

Residential areas along our Cayuga and Seneca Lake shorelines plus adjacent areas that might also be prone to similar development including the 120-acre Depot housing area long Seneca Lake.

It would also include associated business enterprises, i.e. marinas (including boat fueling), tackle shops, ect… and lakeside wineries that presently draws a substantial amount of tourist business. In truth wineries can exist in agricultural, commercial, as well as lakeshore areas. Any structure inappropriate to the area would be discouraged. Finally, additional public areas to the lakes would be promoted.

5. INDUSTRIAL/WAREHOUSE AREA (yellow/red)

Every type of legitimate small commercial or professional enterprise would be encouraged in designated areas. Large industrial or commercial businesses would be directed to appropriate areas within the depot, designated for warehouse and distribution activities. The IDA will be aggressively marketing this parcel with the intent to ease or convey as soon as the necessary environmental documentation is completed.

6. INSTITUTIONAL/GOVERNMENTAL (brown/med. green)

The IDA will be taking conveyance of this approximate 500-acre parcel. Current plans call for some type of law enforcement training presence at this location. The Coast Guard will be taking conveyance of this approximate 180-acre parcel via a Fed-to-Fed transfer.

A. TRANSPORTATION

The Town of Romulus enjoys an efficient and serviceable highway system that generally gives ready access to all parts of the Town as well as to nearby areas even though east and west travel into and out of the Township is inhibited by the presence of Seneca and Cayuga Lakes. The area is traversed by several high quality north/south highways maintained by the New York State Highway Department. These roads provide convenient access to the shopping areas in northern Seneca County and to the Ithaca and Elmira areas in the Southern Tier. The re-opening of a road from the hamlet of Romulus west to the Kendaia area is a desired eventuality.

All of the above areas can be reached in approximately one hour or less of travel time. In addition, the NY Thruway is located only about 25 miles north of the Town and Route 17 is only about 50 miles away to the south at Elmira. These north/south highways are suitable for heavy truck travel, and they are used regularly to reach the metropolitan areas of the larger cities to the north.

Not only are our highways well maintained and kept open in winter but they are virtually all paved – "dirt" roads being largely a thing of the past. The presence of a large stone quarry and blacktop plant in the middle of Seneca County facilitates the acquisition and hauling in of road building and maintenance material at a more reasonable cost than incurred by many other areas.

Railroad service has not been available locally for many years and most freight is hauled by truck. Insofar as commercial air service, that is available at Ithaca and in the Elmira area where there are connecting flights to larger cities. Or one may travel to Syracuse or Rochester for major airline connections. A smaller locally owned airport south of Seneca Falls serves industries and private interests.

B. UTILITIES

The following illustrates the current status and expansion possibilities of public utilities serving the Town of Romulus.

WATER

The hamlet of Romulus is now supplied by an 8" main from the Seneca Army Depot, which in turn obtains its water from Seneca Lake. A new 12" main has recently been installed by the Town of Varick to connect from an existing main to the Depot intake pump station on Seneca Lake. Upon completion of this work the water supply for the Depot will be transferred to the new main, which originates in the Waterloo water district.
The Hamlet of Willard is supplied from the Willard Corrections Complex through a 6" line.

That area of the Town of Romulus adjacent to and a part of the Village of Ovid is served by the Ovid Water District. Water is pumped from two sources, one being wells and the other being Seneca Lake. That Districts new water tower has a capacity of 75,000 gallons. The current average daily use is 70,000 gallons whereas the system has the capacity to deliver 200,000 gal./day.

All three of these water systems have more than adequate capacity for present and immediate future requirements.

The balance of the Town is supplied primarily by individual wells, although many lakeshore residents also pump water directly from their respective lakes.

SEWER:

South Depot has a 250,000 GPD system, which serves the Hamlet of Romulus and the southern end of the Depot. Average daily capacity is approximately 180,000 GPD.

District #1 operates a 700,000 tertiary facility within the Willard Corrections complex. It serves the Depot housing on the lake, Sampson State Park, the hamlet of Willard, and the villages of Ovid and Lodi.

ELECTRIC:

Electricity is available throughout the entire town. The service is above ground. Most roads within the Town have adequate aerial construction to accommodate extensions by NYSEG where necessary.

TELEPHONE:

The Town is within the Trumansburg Home Telephone Co. franchise area & Verizon franchise area. Adequate telephone service and capacity for expansion thereof is available with ability to link up to fiber optics.

GENERAL:

From a Utility standpoint it seems appropriate to recommend limiting growth to areas adjacent to the hamlets. Underground utility installations would definitely be the first option in any and all improvements and expansions of service.

THE FORMER

Seneca Army Depot

AVAILABLE SITES EAST

OVERVIEW

GET DOWN TO BUSINESS FASTER

The depot once contained a diverse inventory of 365 buildings containing approximately 3.7125 million square feet of space. Most of the buildings are one story and are constructed on a concrete foundation, slab and/or crawl space and feature masonry framed walls and steel, wood or reinforced concrete framed roofs. The exterior of many buildings were upgraded with an exterior insulated finish system over foam insulation.

MORE DETAILS

FEATURES

- Approximately 1,000 acres (400 hectares)
- Formerly home to 22 warehouses and other buildings
- Several 90,000-sq-ft (8,360-sq-meter) concrete pads
- Hardstand land
- Water/Sewer/Electric/Gas/Communications on site
- Rail access throughout
- Fiber optic cable junction at road
- Controlled by private developer

POTENTIALS

USE AND OPPORTUNITY

- Food processing
- Alternative energy
- Manufacturing
- Warehouse and distribution
- Logistics
- Outside storage

FEATURE

HISTORY

HISTORY OF AVAILABLE SITES EAST

When the Seneca Army Depot was originally created, the western portion was kept undeveloped property to act as a safety buffer between stored ammunition and the public. Railway loading platforms were established on the west side, a safe distance from ammunition storage. A rail class yard in the southern portion of this area enabled rail cars to be switched and turned around.

Seneca County Environmental Conservation Plan

June 2014

Preserving and protecting the best in our environment, while recognizing the need for change

Prepared by
Seneca County Planning and Community Development Department
with assistance from Tony Favro

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Introduction

Seneca County is at the geographic center of the world-renowned Finger Lakes Region. The County's environment is highly prized by residents and non-residents alike, and its protection and maintenance are priorities.

Bookended by the largest and longest Finger Lakes—Seneca Lake and Cayuga Lake—and endowed with fertile soils, steep slopes, forests, wildlife corridors, historic communities, and many other natural and cultural resources, the County's environment is a delicately-balanced system. For example, the County's lakes, streams, wetlands, floodplains, and groundwater supplies are so interconnected that nutrient runoff from agricultural and residential lands can threaten, not just the waterway it immediately enters, but the entire water ecosystem.

Seneca County residents also have direct evidence of their connections to global ecosystems. Worldwide, wastes are produced at a rate that exceeds the capacity of the environment to absorb them, and so we need landfills for solid wastes. Landfills are the result of humans' use of natural resources over the past 200 years to create wealth, while not fully understanding how ecosystems work. The industrialized world is moving towards a future of less waste generation and more sustainable development, but, in the meantime, Seneca County is dependent on revenues from a large landfill that processes and stores waste from long distances.

Seneca County's residents express a deep desire to preserve and protect the best in their environment. At the same time, they recognize the need for change. Change is needed to create employment, keep property taxes at a reasonable level, provide better infrastructure and community facilities, increase recycling, revitalize communities, generate renewable energy, and improve public health and education.

Change is also needed in the environment. Protecting an historic building, for example, may require finding a contemporary use for it. Protecting an irreplaceable landscape may require attracting tourists. Seneca County's responsibility to the environment is not to choose between keeping things as they are or changing things, but to manage the County's special natural and cultural resources with understanding and humility.

This means providing leadership to help residents define the change they want to see, to tap the vast potential of businesses to contribute to desired change, to support communities in providing better places and having a strong sense of who they are and what they want to protect, and to work in partnership with local, state, and regional groups to address environmental management issues.

All of these responsibilities overlap, creating an integrated and mutually-reinforcing approach to environmental protection, economic prosperity, and social and cultural well-being. It's a path to a sustainable future for Seneca County.

This section of the comprehensive plan details some of the important natural resources in Seneca County and their inter-relationships. The information comes from a variety of sources, most notably the New York State Department of Environmental Conservation, United States Environmental Protection Agency, *A Green Print for Seneca County* (Finger Lakes Land Trust: 2010), and the *Seneca County Comprehensive Plan* (1995). Other references are noted.

Water Resources

Lakes, streams, and wetlands are an integral part of Seneca County's heritage. They have important social and economic values including drinking, irrigation, industrial uses, fishing, recreation and leisure, and scenic and aesthetic importance. During public input sessions for the comprehensive plan, residents and other stakeholders identified a range of vital values embodied by the County's water resources:

Table 1. Water Resource Values

Environmental	Economic	Social
• Water quality maintenance (filtering, sedimentation, etc.) • Natural land drainage • Flood water conveyance and storage • Wildlife habitat (migratory birds, fish) • Ecological corridors • Biodiversity maintenance/ threatened species protection • Scientific research • Uniqueness	• Drinking water supply • Water use (crop lands, dairy, industrial) • Tourism • Sport fishing • Public infrastructure • Water quality	• Aesthetic/landscape • Recreation • Heritage • Conservation • Education and awareness

Surface Waters

Surface water resources—lakes, river, and streams—form an integral part of the natural resource base of Seneca County; indeed, they are perhaps the defining element of the County's environment. They strongly influence the physical development of the County and immeasurably enhance its aesthetic quality and economic potential. Seneca Lake and Cayuga Lake; several smaller lakes and ponds, especially the Junius Ponds; the Seneca River and Cayuga-Seneca Canal; ten major streams with numerous tributaries; and about fifty waterfalls constitute focal points of water-related recreational activities; supply water for drinking and irrigation; attract tourists; provide a desirable setting for properly planned residential development; and create an environmental aesthetic quality in Seneca County that is second-to-none.

There are no "impaired" surface waters in Seneca County. Section 303(d) of the federal Clean Water Act requires states to develop a list of waters, commonly referred to as the *303(d) list*, that are not meeting federal water quality standards. States are required to submit a list of impaired waters to EPA for approval every two years. The New York State Department of Environmental Conservation's latest 303(d) list, issued in 2012, includes no waterways from Seneca County, though impairment in Pond Brook from agricultural runoff is suspected, but not verified.

This does not mean that Seneca County can relax its vigilance of its water resources. Most stream corridors are on private property and thus susceptible to development pressures. While many stream corridors provide opportunities for passive recreation, especially fishing and hiking, while protecting wildlife habitats and stream water quality, they are not public open space. The County's surface waters are especially susceptible to degradation through improper land use development and management. Water quality can be degraded by excessive pollutant loads, including nutrient loads that result from malfunctioning and improperly-sited septic sewage systems; runoff from impervious surfaces; runoff from construction sites; less-than-careful agricultural practices; and the filling of adjacent wetlands, which serve to contain and remove plant nutrients in runoff. According to research scientists from Hobart and William Smith Colleges, summer algae blooms are increasing in both Seneca and Cayuga Lakes, a sign of declining water quality.

New York State offers a voluntary Agricultural Environmental Management program to help farmers implement best management practices to control runoff, recycle nutrients,

and conserve soil. The program, which is delivered by the Seneca County Soil and Water District, offers customized farm-by-farm assessments. About 60 farms in Seneca County are currently enrolled. In recent years, the program has expanded to help connect farmers with new opportunities including the production of renewable energy and reduction of greenhouse gas emissions.

Seneca County has about 72 miles of lake shoreline, divided roughly equally between Seneca and Cayuga Lakes. Most lakefront property is privately-owned and used for single-family homes. The trend is for more lakeside housing and for larger permanent homes to replace seasonal cottages. Almost all of these residences are serviced by on-site sewage systems. New septic systems are regulated to ensure installation and operation; however, many older systems leak. About 11 miles of lakefront property is privately owned, but remains undeveloped, mostly because of steep slopes and other environmental constraints.

The state and federal governments also own important lake frontage, with public access to the lakes at four state parks: Seneca Lake, Sampson, Lodi Point, and Cayuga Lake. There is also limited public access to Cayuga Lake at the federally-owned Montezuma National Wildlife Refuge.

The properties fronting Seneca Lake and Cayuga Lake, private and public, are designated as Coastal Management Areas by New York State, and the property bordering the Seneca River is designated as an Inland Waterway Area. Cities, towns, and villages on these waterfronts are eligible for assistance from the State to create Local Waterfront Revitalization Programs. Communities with Local Waterfront Revitalization Programs essentially create waterfront management strategies which identify current and anticipated problems of waterfront degradation, establish policies to address those problems, and determine opportunities for economic development—all consistent with community goals. No waterfront communities in Seneca County have become LWRP communities.

Groundwater

Groundwater from wells is the only source of drinking water for a third of Seneca County's residents. Groundwater is a critical resource, not only because it is used by residents as their source of water, but also because surface waters depend on it for recharge.

Groundwater can be contaminated through both point and non-point source pollution. The US Environmental Protection Agency defines point source pollution as "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, or vessel or other floating craft, from which pollutants are or may be discharged." Examples include an industry or a municipal treatment plant discharging wastes directly into a waterway.

Non-point source pollution is defined by the EPA as "Pollution caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and groundwaters." These pollutants include excess pesticides from agricultural lands and residential areas; oil, grease, and toxic chemicals from runoff from parking lots and other impervious surfaces; sediment from improperly managed construction sites, crop lands, forests, and eroding stream banks; salt from roads; and bacteria and nutrients from animal wastes and faulty septic systems.

According to the EPA, groundwater is most susceptible to contamination by non-point source pollution in areas within:

- 250 feet of a private well or 1,000 feet of a municipal well.
- 300 feet from streams and 1,000 feet from lakes and rivers.
- A delineated wetland or floodplain.
- Where soil depths to groundwater or bedrock are less than 2 feet.

Watersheds

What is done on the land ends up in the waterways. Thus the whole catchment, or watershed, needs to be considered, and therefore everyone who lives in the watershed has a stake in its health. A watershed can be defined as an interconnected area of land draining to a common point such as a lake from surrounding higher elevations. Notable uplands in Seneca County include the Finger Lakes National Forest and the former Seneca Army Depot. Essentially, watersheds—streams, wetlands, floodplains, and upland areas acting together—are a sort of crossroads for the interaction of water, energy, and organisms. They perform a critical function in the environment, especially the protection of drinking water.

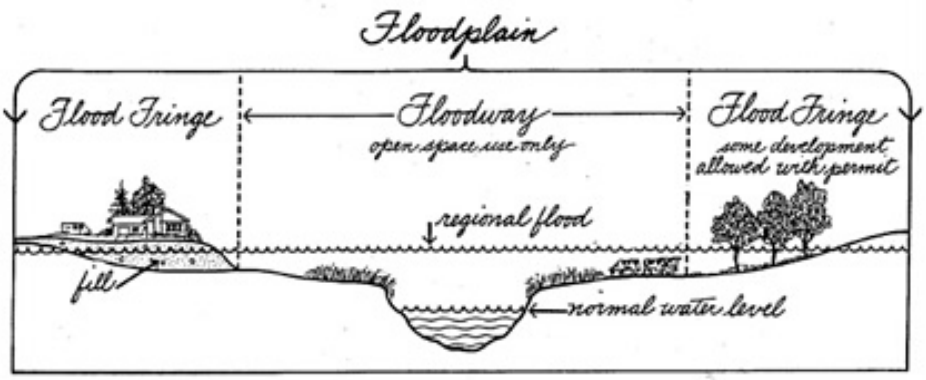
There are two watersheds in Seneca County, associated with Seneca Lake and Cayuga Lake. Watershed protection is vital to the well-being of the residents in Seneca County since the lakes provide the majority of the drinkable/usable water. Both

lakes have watershed management plans, which are the basis of cooperative public and private efforts to consider and mitigate the impacts development and human activities play on the lakes and watersheds. On Seneca Lake, the Seneca Lake Area Partners in Five Counties (SLAP-5) leads efforts to limit pollution, increase awareness, and adopt best-management practices related to watershed protection. The Cayuga Lake Intermunicipal Watershed Organization provides the same advocacy role for Cayuga Lake.

The Seneca Lake Watershed Management Plan is in the process of being updated.

Floodplains

Floods are Seneca County's most common and most expensive natural disaster, and therefore sound floodplain management is critically important. A floodplain is the area inundated by a flood. A floodplain includes a floodway, flood fringe, and other flood-affected areas.



According to the Federal Emergency Management Agency, a floodway is the channel of a river or stream and the adjoining land needed to carry the waters from a major flood that can be expected to occur once in a hundred years; or, said another way, a floodway is an area that has a one percent or greater chance of experiencing a major flood in any single year. During such a major flood—commonly known as a 100-year, one-percent, base, or regional flood—the entire floodplain, or Special Flood Hazard Area, is inundated to a height called the Regional Flood Elevation. Because the floodway is characterized by rapidly moving and often treacherous water, development is severely restricted in a floodway. In New York State, all development within Special Flood Hazard Areas is subject to floodplain development regulations. Essentially, most or all development within a floodway is prohibited, and development in the flood fringe, which stores excess floodwater until it can infiltrate or discharge back into the channel, must be elevated above the Regional Flood Elevation.

FEMA designates and maps 100-year and 500-year floodplains. The National Flood Insurance Program is available to property owners in many floodplains. In Seneca County, several municipalities administer the insurance program.

A potential benefit under the National Flood Insurance Program allows local policyholders in communities that participate in a Community Rating System to receive lower premiums. CRS communities agree to implement effective flood-plain management measures to reduce flood and erosion damage. No municipalities in Seneca County participate in the CRS.

Both floodplains and watersheds provide significant environmental benefits:

- **Flood control**
- **Protection of public health**
- **Filtration of runoff through vegetation**
- **Supply of water for various uses**
- **Provision of unique habitats for flora and fauna**

Beyond safeguarding property values, proper floodplain management provides other important benefits. Healthy and intact floodplains reduce and filter sediments into surface waters, store floodwaters during major storms, and providing habitat for fish and wildlife.

In Seneca County, floodplains contain important elements of the natural resource base, including woodlots, wetlands, and wildlife habitat. They, therefore, constitute prime locations for parks, recreation, and open space. Seneca County is committed to making every effort to discourage incompatible development of floodplains and to encourage compatible park, recreation, and open space uses.

Wetlands

Wetlands are essentially transition zones between land and water. They generally occur in low-lying areas and near the bottom of slopes, particularly along lakeshores and stream banks, and on large land areas that are poorly drained. For many years, wetlands were considered wastelands that needed to be eliminated, and parts of many communities are built on drained and filled wetlands. Today, the multiple benefits of wetlands are recognized, including:

- Stabilization of lake levels and stream flows.
- Capture and storage of plant nutrients in runoff, thus reducing the rate of nutrient enrichment of surface waters and associated weed and algae growth.
- Contribution to atmospheric oxygen and water supplies.
- Reduction in stormwater runoff by providing storage areas for floodwater.
- Protection of shorelines from erosion.
- Reduction in stream sedimentation by capturing soil particles suspended in runoff.
- Provision of areas for groundwater recharge and discharge.

- Provision of habitat for a wide variety of plants and animals.
- Source of educational and recreational activities.

Seneca County is endowed with some of the most productive, attractive, and best-conserved wetlands in the world. The Montezuma Wetlands Complex, Junius Ponds, Seneca Meadows Wetlands, and Canoga Marsh are national models for conservation practices and wildlife management, offering opportunities for both passive observation of striking vistas of flora and fauna, especially migratory birds, and active sport hunting and fishing.

Wetlands are not conducive to economical residential, commercial, or industrial development. Generally, wetland soils are characterized by high compressibility and instability, low bearing capacity, high shrink-swell potential, and high erodability. This drives up the costs of development, particularly for roads, foundations, and public utilities. If the limitations of wetland soils are ignored, likely results may include flooding, wet basements, unstable foundations, failing pavement, and excessive infiltration of clear water into sanitary sewers.

Almost all wetlands in Seneca County are protected by state and federal law. Disturbances within a state-regulated wetland or its 100-foot buffer require a permit from the NYS Department of Environmental Conservation. Disturbances of more than one acre of federal wetlands require permitting through the US Army Corp of Engineers. Both the NYSDEC and the US Army Corp of Engineers require mitigation when natural wetland sites are destroyed.

Seneca County recognizes the important natural functions of wetlands and will continue efforts to protect these areas by discouraging costly—monetarily and environmentally—wetland draining, filling, and development.

Hydrofracking

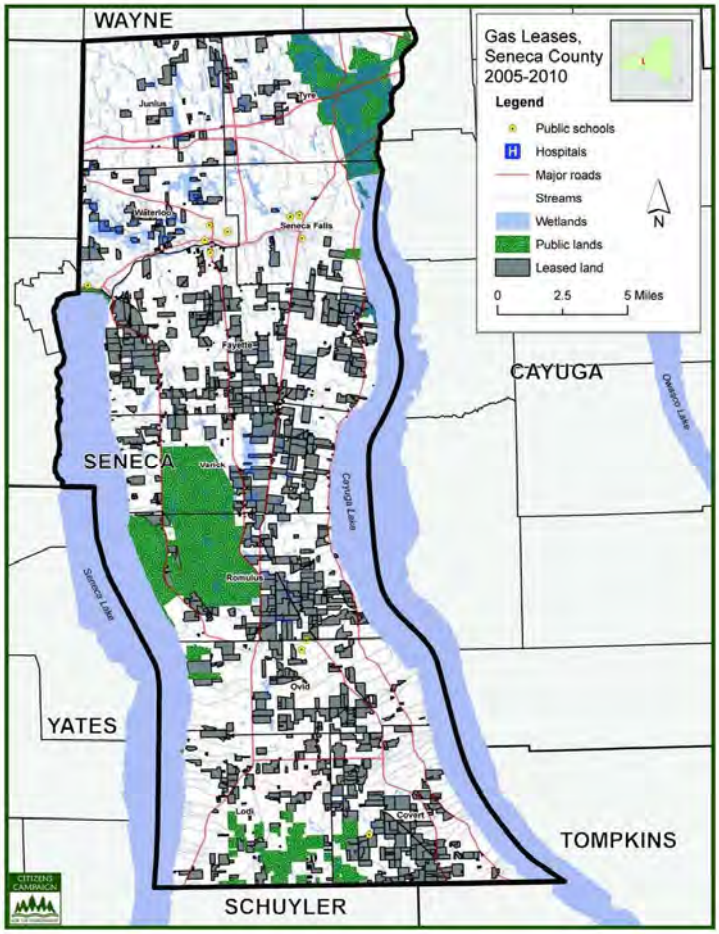
Weighing the risks of hydrofracking against the opportunities is not always simple. Most of the opportunities are economic, immediate, and accrue to individuals; many of the risks are environmental, longer-term, and cost-shared by the community.

The process of pumping water, sand, and chemicals two miles into the ground to release gas reserves from shale, threatens to contaminate surface waters and groundwater supplies—a risk that is fiercely disputed by energy companies. Chemicals must be transported and stored before and after drilling, and residential drinking wells are often close to drill pads.

A 2011 study by Duke University scientists of 19,000 homes in Pennsylvania near hydrofracking wells found that homes that used local groundwater for drinking lost 19.7% of their value up to 1.25 miles from a drill site. Homes with public water appreciated up to 11%. In 2012, Nationwide Insurance Company announced that it will no longer cover hydrofracking-related damage. Most other insurance carriers add numerous "exceptions" to homeowners' policies strictly limiting hydrofracking damage claims.

The residential real estate markets and the home insurance industry appear to be betting that more damage may be done by as-yet unknown or unproven long-term problems associated with shale gas extraction.

According to the Citizens Campaign for the Environment, a nonprofit environmental advocacy group, many property owners in Seneca County have leased their properties for natural gas extraction.



Map 1. Gas Leases Seneca County, 2005-2010 >>>

Natural Features

Steep Slopes

The hills of Seneca County were formed when the area deglaciated approximately 20,000 years ago. Steep slopes fairly encircle Seneca and Cayuga Lakes, and ravines crisscross much of the County.

The New York State Department of Environmental Conservation's *Stormwater Design Manual* defines steep slopes as 15% or greater. The manual says that "development on slopes with a grade of 15% or more should be avoided, if possible," to minimize erosion, soil loss, degradation of surface water, and excessive storm water runoff. A recent analysis by the Finger Lakes Land Trust of private vacant lands in Seneca County along Seneca and Cayuga Lakes reveals that the majority contain slopes of 15% or greater.

Basically, steep slope development can magnify the erosion and water quality problems posed by general development. The removal of vegetation during construction exposes the soil, leading to increased surface runoff and erosion. If not properly contained, the erosion and runoff can increase sedimentation in streams and lakes and thus reduce water quality. The potential impact on water quality is especially critical for Seneca County given the significance of its surface waters.

Beyond erosion and water quality, there are many other important reasons to protect the integrity of steep slopes. Steep slopes can become public safety hazards and can cause property damage when slope failures occur near development. Moreover, removal of vegetation, especially trees, can destabilize slopes due to the eventual loss of root systems.

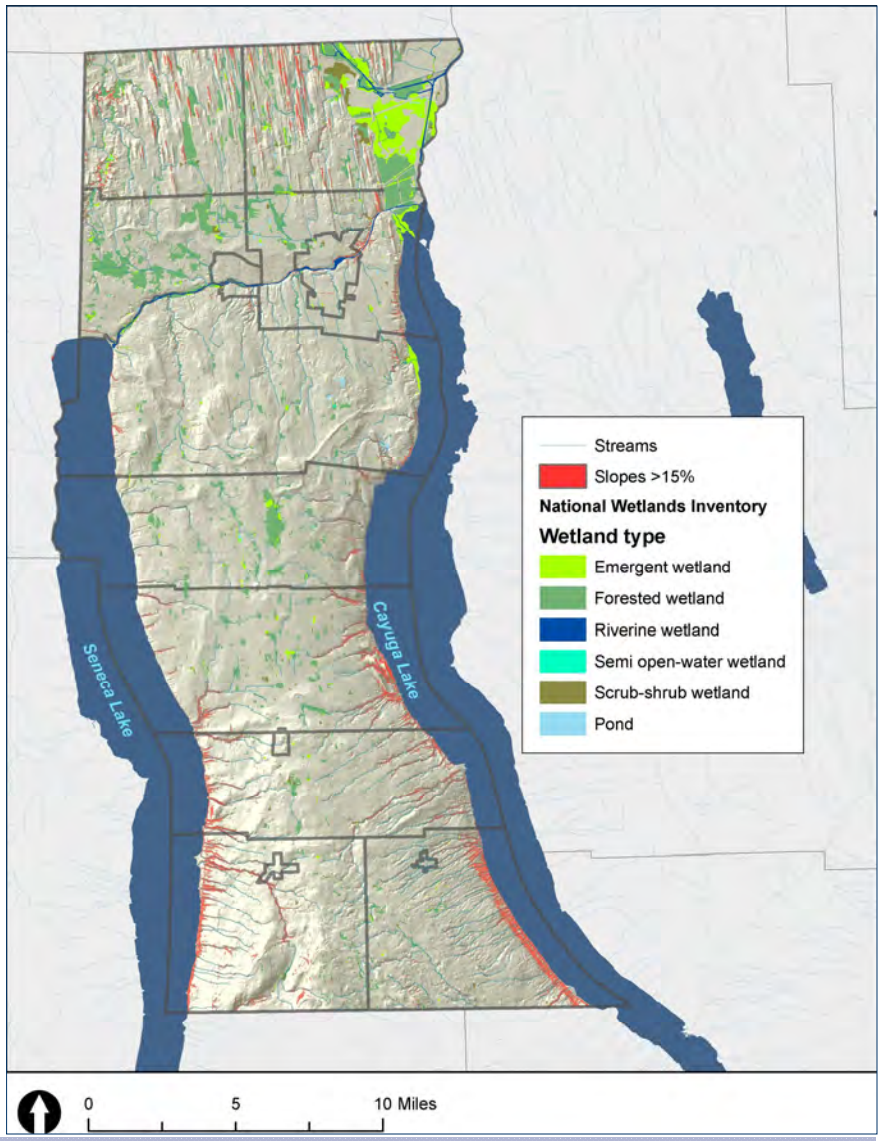
And septic systems and swimming pools located in steep slope areas can malfunction and potentially lead to slope failure.

In addition to safety concerns, steep slopes can be valued for aesthetic and economic qualities, which can influence property values. Steep slopes in Seneca County provide vantage points for scenic views and are themselves scenic resources. Ravines between the slopes provide safe habitats and travel corridors for wildlife and act as natural boundaries between property uses. They also provide specialized growing conditions for ferns and many other plants. The lakeside slopes, in particular, are cultivated for wine vineyards. The slopes and water help moderate winter temperatures providing an ideal microclimate for grape production, a mainstay of the County's agricultural and tourism industries.

For all of these reasons, Seneca County is committed to valuing and protecting steep slope areas.

Map 2. Steep Slopes, Streams, Wetlands >>>

Source: Karen Edelstein



Forests and Woodlands

About 18% of Seneca County is forested. The largest managed forested areas include approximately 1,600 acres of swamp woods in the Montezuma Wildlife Refuge and 5,200 acres of the Finger Lakes National Forest. Most of the forested land in the County is scattered woodlots, interspersed with homes, farms, and other developments. The County's woodlands contribute to clean air and water, regulate surface water runoff, maintain of a diversity of plant and animal life, offer scenic and recreational opportunities, and provide jobs in timber and grazing.

With good management, forests and woodlands can serve a multitude of beneficial functions virtually forever. Unfortunately, woodlands, which require a century or more to develop, can be destroyed through mismanagement in a comparatively short time. The destruction and degradation of woodlands, particularly on slopes, can contribute to stormwater runoff, the siltation of lakes and streams, and the destruction of wildlife habitat.

The Finger Lakes National Forest plays a vital role in deterring forest fragmentation and maintaining large blocks of forested land in Seneca County. Recreation and tourism profit from the Interloken Trail and No-Tan-Takto Trail, part of the Finger Lakes Trial System, within these public lands. The forest is open to public hunting, fishing, and camping, as well. The forest provides habitat for a large number of plants and animals, including a significant number of threatened and endangered species. It is one the state's most important nesting and breeding areas for songbirds and raptors. The forest is also important to the County economy. Commercial timber harvesting and animal grazing are permitted.

The US Forest Service manages the lands in its care not just for economic benefits, like timber production, or social values, like recreation, but also for the ecological services they provide, including water and soil quality, wildlife habitat, and native biological diversity.

Private lands surrounding the forest have traditionally been devoted to compatible uses, especially agriculture and hunting. In recent years, however, residential development has been increasing. The US Forest Service projects that a third of the land surrounding the Finger Lakes National Forest will succumb to residential development by 2030. The forest ecosystem and the amenities that can be offered can be altered when new houses are built on private property near a forest.

Table 2. Finger Lakes National Forest-Area Residential Development, 2000-2030

Finger Lakes National Forest, 2000-2030			
percentage of adjacent private land projected to experience housing density increase			
distance from forest boundary (miles)			
0 to 0.5	**0.5 to 3**	**3 to 10**	**0 to 10**
28%	31%	25%	27%

Source: US Forest Service. *National Forests on the Edge*, 2007.

The most recent Land and Resource Management Plan for the Finger Lakes National Forest was adopted in 2006. The plan addresses land management, recreation facilities management, and proposed boundary expansion. The last issue has elicited controversy locally. Expansion of the forest has removed private land from local tax rolls, causing concern in some communities.

In order to protect and conserve private forests and woodlands, New York offers property tax savings through its Section 408-a program. Individuals, corporations, estates, or any other private entities that own 50 or more contiguous acres of woodlands may qualify. In order to receive a tax exemption, property owners must agree to manage the land for forest crop production, forest recreation, and/or watershed management for ten years. Owners must also prepare a land management plan for approval by the New York State Department of Environmental Conservation. The overall goals of the Section 408-a program are to encourage commercial forestry and thereby encourage good forest management practices and reduce incentive to sell forest lands for other purposes.

Seneca County is committed to supporting the maintenance of its forests and woodlands for their total values: scenery, wildlife habitat, open space, education, recreation, air and water quality protection, and job creation.

Carbon Sink

According to data produced for the Finger Lakes Regional Sustainability Plan, Seneca County emits about 552,000 metric tons of greenhouse gases each year, but stores 7.7 million metric tons in its forests, waterways, and agricultural lands. Seneca County is what's known as a "carbon sink"; that is, it absorbs more carbon gases than it releases each year.

To mitigate climate change and reduce greenhouse gas emissions, there are many proposals to create national and international carbon trade markets. When such a market or markets are formed and policies are available, the carbon credits generated by Seneca County's forests and woodlands, lakes, and farms may be able to be traded by communities or individual landowners in the carbon market. The County and its residents could thus benefit financially from its forest and water ecosystem and sound environmental management.

Seneca County's woodlands, waterways, and farmlands remove and store large quantities of carbon from the atmosphere.

Seneca County will remain alert to the potential of carbon credits.

Recreational Facilities

The abundance of public parks and trails in Seneca County attracts hundreds of thousands of visitors each year. Combined with wineries, historic sites, lakes, and other natural resources, the County's recreational facilities form the heart of a tourist industry that employs close to 900 workers and encourages visitors to spend $50 million in the County each year.

New York State maintains five state parks and one golf course in the County. For many residents and visitors, the parks provide the main point of access to the water.

Table 3. State Parklands

State Parks in Seneca County		
Name	**Size (acres)**	**Public Water Access/Amenities**
Cayuga Lake	188	Beach; marina; boat launch; camping
Lodi Point	10.8	Boat launch; marina
Sampson	1552	Beach; marina; boat launch; camping; maritime museum
Seneca Falls Urban Cultural		Marina; pedestrian promenade
Seneca Lake	141	Beach; boat launch; camping; spray ground

New York State also owns and operates several wildlife management areas in Seneca County at Cayuga Lake/Canoga Marsh, Willard, and Montezuma. They are open to the public for fishing, hunting, hiking, and observing wildlife. In addition, the state owns and operates the Junius Ponds Unique Natural Area. The New York State Natural Heritage Program considers this site unique for its rare plant and animal species, including one of the top three examples of rich graminoid fern in the state.

Other unique assets available to the public in Seneca County include the world's largest herd of white-tailed deer at the Seneca Army Depot, which attracts tourists and scientists from all over the world. The former army depot is also considered an Important Bird Area by the National Audubon Society. The Montezuma National Wildlife Refuge and Finger Lakes National Forest are prime, nationally-significant, bird habitats and attract numerous bird watchers. Because of its lakes, agricultural land, and large open spaces, Seneca County has become a magnet for migrating and nesting birds, and a center of grassland bird conservation efforts in New York State.

The Seneca Meadows Recreation and Education Center, created by the operators of the Seneca Meadows Landfill as mitigation for filling wetlands, provides public environmental education and recreation on a 600-acre site.

Multi-use trails are found in the state parks and wildlife management areas, Montezuma National Wildlife Refuge, Seneca Meadows Complex, and Finger Lakes National Forest. Efforts are underway to link many of these trails into a Countywide network that would be connected to other trails in the Finger Lakes Region. For example, the County continues development of the Cay-Sen Trail along the Cayuga-Seneca Canal, which is envisioned to cross the width of the County and connect to the Erie Canalway Trail. The County is also planning, in coordination with Cayuga and Tompkins Counties, a trail that will encircle Cayuga Lake. Seneca County is committed to soliciting grant funds for the implementation, expansion, and maintenance of trails to serve multiple users.

Visual Resources

The Cayuga Scenic Byway and the proposed Route 414/Seneca Lake Scenic Byway are the only officially designated or nominated scenic roads in Seneca County, but they by no means exhaust the County's visual assets.

Seneca County's visual and aesthetic resources are matchless. The rolling hills, vineyards, agricultural and pastoral landscapes, two finger lakes, historic structures, and traditional settlement patterns provide views and vistas which are all but impossible to replicate.

At public meetings for the comprehensive plan, residents frequently expressed their desire for economic development, but not at the expense of the County's visual and aesthetic resources.

Vulnerable areas often provide not only beautiful vistas but also some of the last refuges for rare plants and animals. More than 90% of the plants and 75% of the animals on New York's list of endangered and threatened species are protected on state management areas.

Vulnerable Natural Lands

Together, surface waters, groundwater, floodplains, wetlands, steep slopes, forests, woodlands, parks, recreational facilities, and visual resources represent environmentally sensitive areas that deserve special consideration in local planning. Individually, all of these resources are important spaces for natural resource activity. They become even more functional when they can be linked together as environmental corridors. Wildlife, plants, and water all depend on the ability to move freely within the environment from space to space. Seneca County is committed to promoting and maintaining contiguous environmental corridors in order to maintain the quality and quantity of the natural ecosystem.

Site protection and corridor enhancement can be accomplished by several means, including land acquisition from willing sellers, donations, conservation easements, conservation subdivisions, and cooperative agreements.

Cultural Resources

Historic markers identify and honor the important people, places, and events that have contributed to Seneca County's history and heritage. There are 41 historical markers registered with the New York State Education Department in Seneca County. The state registry is not a comprehensive list of all the historic assets in the County. Due to budget cutbacks, the state maintains the marker database, but cannot fund the installation of new markers. In any event, designation of a property with a historical marker conveys no special status, rights, or benefits to the owners, many of which are private individuals who keep their properties closed to the public.

The New York State Office of Parks, Recreation, and Historic Preservation notes many Archaeological Sensitive Areas in Seneca County. These include archeological sites, unmarked cemeteries, marked cemeteries, and cultural sites throughout the County. Similar to the registry of historic sites, the collection of archaeological sensitive areas is not a comprehensive or complete list; it only includes sites reported to the state, and some listed sites may be altered or no longer exist. By some estimates, less than 1% of the archaeological sites in the state have been identified.

Some resources are deemed so significant that they are listed as part of the National Register of Historic Places. The National Register is the official national list of historic properties in America worthy of preservation, maintained by the National Park Service, and includes the Women's Rights National Park in Seneca Falls. Other sites of national interest in Seneca County, include the Peter Whitmer Farm, birthplace of the founder of the Mormon Church

and a sacred landmark of the Church of Latter Day Saints, and the National Women's Hall of Fame in the Seneca Falls Historic District.

A community with a historic preservation ordinance may apply for Certified Local Government status with the NYSORHP. The establishment of a historical preservation ordinance is one of the most proactive methods a community can take to preserve cultural resources and maintain its character. Once a community is certified, it becomes eligible for technical assistance and dedicated preservation grants from the state. There are currently about 75 Certified Local Governments in New York State, including the Village of Seneca Falls.

Cultural resources—and programs and special events associated with them—are very effective methods of bringing people of a community together. Not only do these special resources, programs, and events build community spirit—what has become known as social capital—but they are proven to give communities of all sizes a creative edge to face new and difficult challenges. Arts and cultural experiences can also be important to the local economy. They can act as magnets to draw people into communities and regions and to extend visitor stays.

Unfortunately, there are many threats to the County's cultural resources. The quality and integrity of many historic sites, as well as traditionally-designed streets and neighborhoods, are vulnerable. Development pressures, private ownership, rehabilitation and maintenance costs, and the effects of time often make it difficult to preserve these important cultural resources. Moreover, New York State has concentrated on high yield tourism strategies based around natural resources in Seneca County, yet these are the most fragile and least renewable resources. It has largely been up to local communities and the federal government to preserve and exploit cultural resources.

Cultural resources can be protected through preservation ordinances and tax credits, as well as attention to high-quality building and site design.

Seneca County is committed to planning with municipalities to minimize negative effects on important cultural resources in order to preserve community character and support the economy.

Renewable Energy Facilities

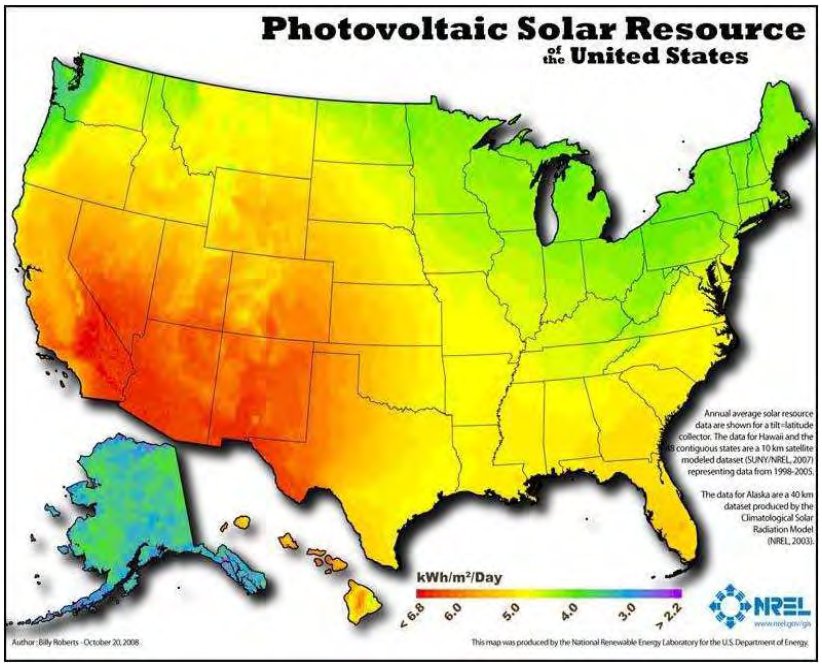
To manage rising energy costs, promote local economic development, and protect the natural environment, many local governments and property owners in New York State are looking at renewable energy resources to meet community energy demands. The following section provides a broad-level discussion of some of the local and renewable energy resources available for Seneca County residents, businesses, and communities. Additional information can be obtained from the New York State Energy Research and Development Agency.

The focus on renewable energy practices and systems will continue and is likely to increase over time. Seneca County is committed to supporting renewable and sustainable energy sources.

Solar

Two types of solar energy systems are well-suited to Seneca County communities: solar electric photovoltaic and solar hot water systems. The map shows the solar PV potential across the United States. How much energy a PV or solar hot water system produces depends on the size and orientation of the collecting surface and site characteristics, such as overshadowing. As a general rule of thumb, PV systems require a minimum solar radiation of 3.5 kWh/m^2/day to be economically viable.

Map 3. Solar PV Potential in the US



A public solar energy system is in use in Seneca County at the County Law Enforcement Center.

Geothermal

Geothermal power uses the natural sources of heat inside the earth to produce heat or electricity. In essence, a geothermal heat pump transfers heat stored in the ground to a building during the winter, and then transfers it out of the building and back into the ground during the summer. Most geothermal power is generated using steam or hot water from underground. There are no commercial or public geothermal systems in use in Seneca County.

Wind

Wind energy production is optimized when wind turbines are located at the place with the highest, steadiest wind speeds (the energy produced is related to the cube of the wind speed). As the figure on this page illustrates, most of Seneca County is not particularly well-suited for commercial-scale wind systems, which are typically installed between 80 and 100 meters high, and require average annual wind speeds around 6.5 meters per second at that height.

However, this is a generalized assumption, and there may be opportunities for small and commercial scale wind systems in the County. NYSERDA provides free online tools and reports to help evaluate the feasibility of generating wind power on a particular site. Currently, there are no commercial or public wind energy systems in use in Seneca County. Nevertheless, the County monitors draft ordinances to regulate such use should a wind farm be proposed.

Map 4.
NYS Average Wind Speeds
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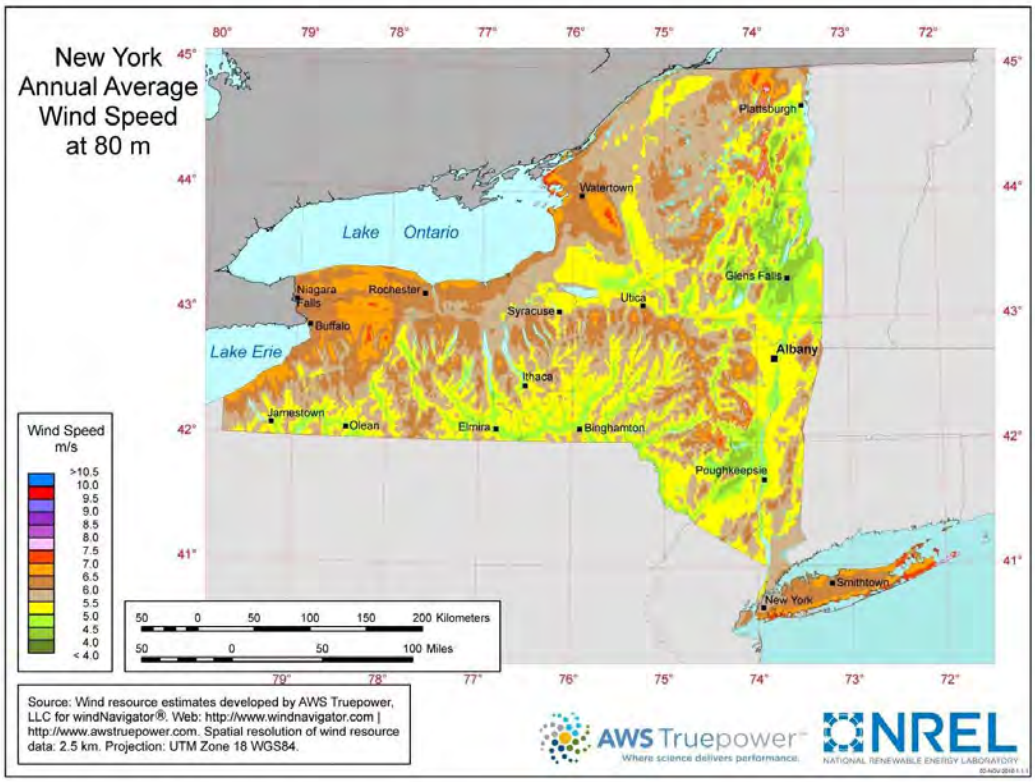
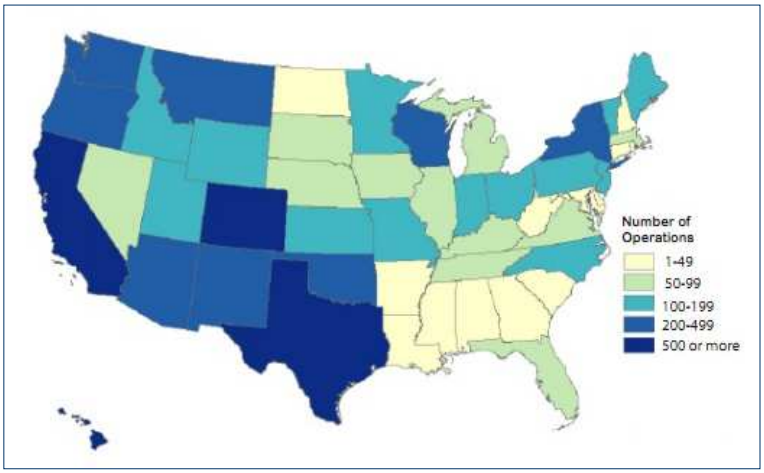


Biofuels

Biofuels offer an alternative energy source provided by fuels that can be grown or produced locally through agricultural or waste resources. Biofuels are derived from biomass and can be used for liquid biofuel or biogas production. Crops and crop residues are the main sources of biomass for the production of liquid biofuels.

The primary food crops used for biofuel production in Upstate New York are corn for ethanol production and soybeans for biodiesel production. Several farmers in Seneca County grow crops for ethanol. Corn stalks, hay, wood pulp, and even grape seeds are also used for biofuels.

Map 5. US Farms Producing Renewable Energy



Renewable energy generation is becoming an important part of farm management.

Source: USDA Census of Agriculture, 2009

The main sources of biomass for biogas (methane) production are animal wastes and landfills. Animal wastes are continuous and unavoidable on farms. Interest in the use of digesters to produce methane from animal waste is growing in Seneca County, both as a supplementary energy source and as a way of managing waste. The Seneca Meadows landfill converts gas to energy directly for heat and by generating electricity for public consumption. One private company in the Seneca Army Depot is dedicated to biofuel production.

Hydropower

Water was the first natural resource used to generate electricity, and hydropower remains the primary form of renewable energy. Commercial hydroelectricity is no longer produced at Seneca Falls or elsewhere in Seneca County. The potential energy from a water source is determined by the distance the water travels vertically and the quantity of water flowing past a given point. More water falling or flowing faster produces more energy.

In Seneca County, relative calm waters and competing uses for those waterways, such as recreation, tourism, and industry preclude most commercial hydroelectric generation. However, a micro-hydro system can produce enough electricity for a home or farm and may be feasible on many streams and waterfalls in the County.

Solid Waste Planning

Landfills

In 1988, the US Environmental Protection Agency issued new federal standards for landfills to better protect humans and the environment from contaminated groundwater, soils, and air, and from diseases spread by scavengers. Compliance with the new regulations was expensive, and, as a result, over 10,000 small landfills closed and were replaced by about 3,000 "megafills". It was at this time that Seneca Meadows Landfill began to expand. Seneca Meadows Landfill operations now cover about 400 acres, store and process over 6,000 tons of waste each day from several US states and Canada, and employ over 150 workers. The landfill is permitted to operate until 2023 and has plans to expand.

The new, larger landfills are safer than the pre-1988 facilities, yet bring their own set of concerns. These include a negative public perception of imported garbage and environmental justice issues since most megafills are located in rural and economically-poor counties, as well as concerns about truck traffic and air, water, visual, and noise pollution. Existing EPA regulations have been in place for 25 years, not enough time in the opinion of some observers to definitively judge their effectiveness in preventing landfill failures and in protecting human and environmental health.

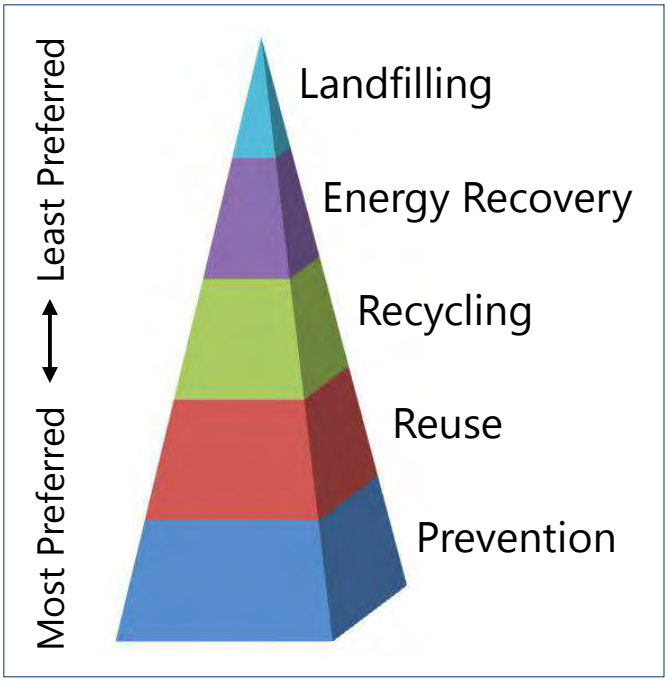
Megafills can be a major financial boon to the counties that host them. Seneca County receives over $2 million each year as a result of landfill operations, which helps pay for County services.

Waste to Sustainability

The Finger Lakes Regional Sustainability Plan notes an opportunity to "shift perceptions from 'waste management' to 'sustainable materials management'." The idea is that nature doesn't recognize waste, only various resources to be used as effectively and efficiently as possible. It's also the idea that nature is a circular system, in which wastes serve as the raw materials for the next generation of products.

Around the world, there is a shift to what is called the "zero waste" model, where everything is recycled and reused, and nothing is landfilled. Super Materials Recycling Facilities are opening as alternatives to landfills with business models predicated on reusing close to 100% of waste. Waste material is weighed and sorted, separated into its various constituent parts, inspected for consistency, re-sorted, and reprocessed, or baled for specialist reprocessing and re-manufacture or energy recovery. The goal is to transform everything into something of value, and not landfill anything unnecessarily.

Table 4. Solid Waste Management Hierarchy



Source: Adapted from European Union Solid Waste Management Hierarchy

For example, waste paper is recovered and recycled back into paper or paper-based products, plastics are reprocessed into pellets or substitute timber, and all recovered metals are likewise extracted and reprocessed. What can't be reduced, reused, or recycled at the Super Materials Recycling Facility is sent to partner businesses for special processing. Converting energy to waste is considered only after all other strategies have been considered. Landfilling waste is the last and least-desirable option. The European Union, for example, utilizes a waste management hierarchy as a decision-making tool to achieve zero waste.

In addition, former landfills around the world have been converted to a variety of public uses, including nature reserves, sports complexes, golf courses, ski slopes, and sculpture gardens.

Local Solid Waste Management

Residential and commercial trash collection and recycling are the core of solid waste management in Seneca County. The idea is to divert products from the waste stream and recycle more, and this can be influenced by public policies. The table on the following page summarizes some of the best solid waste management practices from counties and other local governments around the country. These best practices are intended to contribute to higher waste diversion/recycling levels in communities and thus reduce the amount of household and municipal waste going to landfills.

Table 5. Local Government Solid Waste Management Best Practices

Local Government Solid Waste Management Best Practices
Residential • Mandatory recycling participation and/or mandatory provision of recycling service. • Variable rate system where garbage charges are based on the size of subscribed container and recycling and composting collection are free (i.e., the less garbage you produce, the less you pay - also called Pay-As-You-Throw or PAYT). • Food waste collection program (usually combined with yard waste). • Ban on disposal of recyclable and compostable items in the garbage container (garbage is not picked up if recyclable or compostable items are in trash or a fine is levied).
Multi-family • Recycling service required with garbage either free with garbage service or at an extra charge. • Mandatory recycling requirement. • Some communities have food waste collection for multi-family.
Commercial • Mandatory recycling. • Mandatory food waste (some absolute; others if food waste generating business). • Free collection. • Styrofoam ban for restaurants. • Food-service containers must be recyclable or compostable (local govt. approves containers). • Recycling plan.
Construction/Demolition • Mandatory recycling percentage. • Economic incentive – fee required with permit, fee returned if recycling quota met (50-65%). • Disposal bans. • Materials must be taken to a certified facility with mandated recycling percentage requirements. • Waste management plans submitted with construction and/or demolition permit application (this is used in conjunction with mandatory or deposit fee), and final reporting after project completion.
Waste Reduction (Reduce, Reuse) • Green purchasing (buy recycled, lower toxicity). • Product reuse centers/exchanges. • PAYT. • Educational partnerships. • Opt-out of yellow pages and junk mail. • Extended producer responsibility.
Event Recycling • Recycling requirement. • Styrofoam ban. • Municipality or local waste hauler provides containers or collection services. • Recyclable or compostable food/beverage packaging requirement.

Source: Adapted from *Best Practices for Local Government Solid Waste Recycling, Diversion from Landfill and Waste Reduction* (Mecklenberg County Land Use and Environmental Services Agency: 2011).

Environmental Conservation Goals and Strategies

The preceding overview of the many distinct—but highly integrated—elements that comprise Seneca County's natural and cultural environment offers several considerations for moving forward:

- In many important ways, Seneca County embodies what it means to be sustainable. While there are clear challenges and vulnerabilities, communities in the County exist without overly degrading the natural environment; the economy has proven more resilient than in most rural Upstate counties; and the County is culturally diverse. Generally, Seneca County is a very green county between two very blue lakes.

- Seneca County has not leveraged the power of sustainability to its advantage. By consciously incorporating sustainability into its decision-making processes, the County could better tap into the growing pool of financial and other resources available for sustainable development.

- Many of the natural, scenic, and cultural resources that County residents value are privately owned. The application of public policies, regulations, and investment is thus justified to protect that public interest in private places.

- Everyone must be able to participate in conserving and sustaining the environment, since people's everyday decisions, over time, often do the most harm to the environment.

- One doesn't have to be an expert to protect the environment. Everyone in the County should have the opportunity to contribute his or her knowledge of the value of places and to participate in decisions about their future.

- Change in the natural and cultural environment is inevitable, caused by natural processes; normal wear and tear; people's decisions regarding jobs, housing, and leisure; and technological change.

- Environmental conservation means managing change in ways that best sustain community values.

- Decisions about change must be reasonable, transparent, and consistent; for this to happen, decisions must be guided by public policy.

The following goals and strategies were developed with these considerations in mind.

Goal 1. Protect and enhance the integrity and economic viability of Seneca County's natural resources for current and future residents.

Strategy 1A. Create and maintain an inventory of significant natural resources and vulnerable lands, including, but not limited to, farmland, groundwater, surface waters, wetlands, woodlands, steep slopes, scenic resources, open space networks, grassland habitats, and wildlife corridors.

Strategy 1B. Work with local land conservancies, property owners, and other stakeholders to establish requirements for the sustainability of vulnerable lands and to prioritize and protect those of highest value.

Strategy 1C. Periodically assess the change in significant natural resources and vulnerable lands.

Strategy 1D. Establish a program of significant vulnerable land acquisition by public and private land conservation organizations for the purpose of restoration and protection from inappropriate development.

Strategy 1E. Collaborate with towns and villages to suggest and agree upon appropriate incentives to preserve agricultural lands, open space networks, ecological corridors, cultural and historic assets, and other natural resources, such as purchase of development rights, transfer of development rights, conservation easements, cluster development regulations, and other best practices.

Strategy 1F. Educate communities on the full potential of SEQR to protect community resources, including use of the guiding principles in the Seneca County Economic Development Plan.

Strategy 1G. Encourage landowner participation in the NYS Real Property Tax Law 480-a Program to encourage stewardship of private woodlands.

Strategy 1H. Ensure that resource extraction and production activities are at world best practice level.

Strategy 1I. Educate the public about the environmental, economic, cultural, and historic value of natural systems for sustainability.

Strategy 1J. Educate policymakers about true fiscal costs of development, including operations and maintenance.

Goal 2. Ensure the long-term preservation of surface and groundwater resources in Seneca County.

Strategy 2A. Continue to support the development, update, and implementation of watershed management plans, including identifying and evaluating the interrelated components of the local watersheds, and protecting and/or restoring the natural function of the components of the local watersheds.

Strategy 2B. Establish riparian buffers on both sides of major streams.

Strategy 2C. Support programs that prevent the spread of exotic species, restore natural areas to their native state, and reduce non-point and point source pollution into local waterways.

Strategy 2D. Encourage compliance with best practice agricultural performance standards for surface and groundwater protection.

Strategy 2E. Establish and enforce performance and maintenance standards for on-site disposal systems.

Strategy 2F. Develop model land use regulations, and encourage their adoption by local governments, to control erosion, including:

- Requiring soils suitable to the permitted property use.
- Defining standards for tree buffering, preservation, and coverage in new developments.
- Establishing a process for regular on-site inspections of erosion, sediment, and other pollution control practices during development.
- Establishing limits for grading to minimize the impact of development footprints, maintain existing topsoil onsite, and protect existing vegetation and habitat.
- Avoiding, where feasible, development on slopes greater than 15%.
- Encouraging shared driveways for adjoining properties, as appropriate.

Strategy 2G. Discourage development in areas with documented threatened and endangered species, and in wetlands, floodplains, and streams in order to protect the benefits and functions they provide.

Strategy 2H. Limit development on roads prone to flooding.

Strategy 2I. Work with municipalities to regularly maintain roadside ditches and drainage swales.

Strategy 2J. Encourage waterfront communities to develop a joint Local Waterfront Revitalization Program to identify and support appropriate water-dependent and water-enhanced uses, as well as public access, on the County's waterfronts.

Goal 3. Promote sustainable waste management.

Strategy 3A. Create a county government program of green procurement, increased recycling, and reduced energy and resource use.

Strategy 3B. Encourage all local governments to reduce resource use and undertake energy audits.

Strategy 3C. Educate the public and municipal officials on the benefits of alternative energy generation and address the potential negative impacts.

Strategy 3D. Develop and promote the adoption of local policies that accommodate domestic and community alternative and renewable energy generation and use.

Strategy 3E. Develop and promote the adoption of codes and policies that promote energy conservation and efficiency.

Strategy 3F. Hold an annual Sustainable Living Festival, and encourage residents and communities to fully participate in achieving a sustainable future.

Strategy 3G. Examine how the landfill levy can better reflect the environmental and social costs of waste disposal.

Strategy 3H. Work with the landfill owner/operator, New York State, regional organizations, and regional universities to create research and economic development opportunities focused on a zero-waste model.

Strategy 3I. Encourage the deployment of pilot projects in the County to validate technology and eventual commercialization of resource- and energy-efficient technologies, including net zero waste.

Seneca County
Nothing Wasted

Goal 4. Continue to identify and promote the preservation of cultural, historic, and scenic resources that celebrate Seneca County's heritage.

Strategy 4A. Improve knowledge of the County's heritage to promote a wider appreciation of the value of cultural heritage, including knowledge of the economic benefits of heritage and landscape conservation.

Strategy 4B. Work with tourism, business, and community groups to prepare a heritage tourism strategy.

Strategy 4C. Continue to promote local festivals, fairs, farm tours, history tours, winery tours, foodie tours, and so on that celebrate the County's heritage.

Strategy 4D. Promote high quality site and building designs throughout the County to uphold property values and reinforce community character.

Strategy 4E. Encourage the practice of developing a design that fits the site rather than manipulating a site to fit the design in order to minimize the amount of land disturbance.

Strategy 4F. Encourage development that adheres to the principles of smart growth and green building.

Strategy 4G. In conjunction with local communities, maintain site and building design guidelines based on sound planning principles for all new development, in order to reinforce the rural and village character of the County.

Strategy 4H. Enhance the existing character of village and rural areas of the County by protecting existing investment and lifestyle choices.

Strategy 4I. Support programs, such as home-care, respite care and assistance with home modifications that facilitate aging in place.

Strategy 4J. Encourage innovative concepts in housing designs and architecture, especially universal design, which requires structures to be designed and built to be accessible to all members of the community, ultimately reducing costs for modifications as the population ages.

Strategy 4K. Work with nonprofit housing organizations to provide programs, such as home repair assistance, tool libraries, housing education, and weatherization and energy-efficiency programs, to enable lower income homeowners to stay in their homes and maintain them in good condition.

Strategy 4L. Strive to preserve the rural and village character and minimize the visual impact of large scale development. Maximize the amount of natural vegetation preserved on each site.

Strategy 4M. Protect and improve scenic routes and other viewsheds along transportation corridors.

Strategy 4N. Improve the visibility and amenities of existing multi-use trails.

Strategy 4O. Enhance and expand the bicycle and pedestrian infrastructure to close gaps and create connections between destinations, mindful of the rights of private property owners.

Strategy 4P. Develop a system of Blueways, or water trails, to link shoreline sites and commercial venues.

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Seneca County Economic Development Plan

Prepared by the Seneca County Planning and Community Development Department with assistance from Tony Favro

June 2014

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Community Values

Public Engagement

Seneca County recognizes that one of its major responsibilities is to create the right conditions to support local businesses and to attract new economic opportunities. To this end, Seneca County is committed to planning and implementing economic development activities in a manner consistent with community needs and expectations.

Seneca County, like any government, can provide infrastructure and incentives. Businesses, for their part, provide goods and services. But neither of these is about the direction and purpose of development. The community is the major provider of the values which set the direction and purpose of economic development.

As part of the comprehensive planning process, Seneca County solicited citizen and business involvement by means of a countywide survey of residents, focus group discussions, and public meetings. Subsequent engagements between citizens, businesses, and local government officials garnered additional public input.

Three focus groups were dedicated specifically to economic development. Each group identified strengths, weaknesses, opportunities, and threats. Their findings are summarized on the following page and discussed in more detail within this plan.

Table 1. Summary of Economic Development Focus Groups' SWOT Analyses

Strengths	Weaknesses
• Route 5 & 20 Corridor • Deer Run Industrial Park • Wineries/Wine Trails • Ag/Tourism • Thruway Access • Airport • Skilled Labor • Water Access • "Triangle" of Education (Rochester, Ithaca, Syracuse) • Fiber Optics/Broadband Partners • Cost of Living • Highway Grid • Natural Resources • Scenic Beauty • State/National Parks • Water Resources • Recreational Opportunities • Open Land • Cheap Land • Retail Opportunities/Outlet Center • History/Heritage Resources	• Loss of Youth • Landfill • High Taxes • High Cost of Energy • Lack of Distributed Broadband • Inconsistent Zoning • Redundant Municipal Services • Lack of Living Wage/Professional Jobs • Shortage of Housing • Limited Art/Cultural Amenities • Government Agency Disconnect • Lack of Collaboration • Viability of Downtowns • Demand for Social Services • Poverty • Lack of a Medical Facility • Seasonality of Tourism
Opportunities	**Threats**
• 318/414 Corridor • Depot • Tourism Development • Business Assistance Program • Power for Jobs Program • Downtowns • Green Industry • Small Business Development • Setting for Films • Collaboration in County • Focused Economic Development • Smart Business Growth • Industrial Parks/Warehousing • Foreign Trade	• Lack of Employment Diversity • Resistance to Business Expansion • Aging Infrastructure • Decreasing Public Funding for Tourism • National/State Economy • American Indian Land Claim • Loss of Rural Atmosphere • Lack of Local Ownership of Major Businesses • Lack of Agricultural Workforce • Insufficient NYS Funds for Business Development

Guiding Principles

Public input comes from all directions, and distilling it into principles to guide the formulation of workable policies can be a challenge. Fortunately, Seneca County residents seem to agree on several important themes regarding economic development:

Table 2. Economic Development Guiding Principals

ECONOMIC DEVELOPMENT GUIDING PRINCIPLES	
	• Develop a strong, growing, diversified economy. • Integrate both short- and long-term economic, environmental, and social considerations into decision making. • Allow for broad community involvement on decisions and actions that affect them. • Avoid serious or irreversible damage to the environment. • Assess the risk-weighted consequences of various options. • Make those who generate pollution, waste, and damage bear the costs of containment, avoidance, abatement, or repair. • Build these principals into regulatory approaches.

In essence, Seneca County residents want County government and County businesses to consider economic, environmental, and social factors together, and find a mutual benefit in all three areas. This is a sustainable approach to economic development. While sustainability is a relatively new trend globally, it has been a fact of life in Seneca County for generations. The agriculture-centered economy necessarily follows natural rhythms and fosters environmental integrity; modest population growth supports economic well-being without undue degradation of resources; and close-knit town, village, and rural communities engender a sense of interdependence and common good.

A robust local economy with sustainable economic growth is vital to residents and businesses. Sustainable economic growth is fundamental to the availability of community services, recreational opportunities, the work and services of nonprofits, and cultural amenities.

The foundation of sustainability is community values. Residents are clear they do not want to lose their cherished values, as expressed in the guiding principles. Rather, they want change and development to be considered in terms of these principles.

Economic Indicators: Workforce

Small businesses play a vital role in Seneca County by employing a majority of the workforce. All but one of the more that 700 private firms in the County have fewer than 500 employees and are categorized as small businesses by the U.S. Small Business Administration. Seneca County's diverse base of small businesses include health services, eating and drinking establishments, special trade contractors, boutique agricultural producers, small-scale specialty manufacturing, veterinary clinics, business services, retailers, automotive dealers, and service stations.

The New York State Department of Labor maintains an up-to-date economic profile of the County. Unless otherwise noted, the economic indicators in the Workforce section of this plan are from the NYSDOL.

Retail and Service Sectors

Typical of most of the country, growth in retail and service businesses has been a leading factor in local economic growth, and small businesses provide virtually all private sector retail and service based jobs. In 2012, retail trade and health care and social assistance accounted for more than 42% of total private jobs in Seneca County.

When examining the County's retail sector, it must be understood that the retail impact is far more extensive than the Waterloo Premium Outlets. Hotels, restaurants, winery stores, and many other specialty shops are supported by tourist dollars. Retail trade employed an estimated 2,100 workers in 2012. These same retailers paid local workers over $43.4 million in wages and salaries. The accommodation and food services industry, meanwhile, paid $12.3 million to about 850 workers in the County.

Government units are also major service providers. Collectively, they represent the largest employment and wage categories in the County, with nearly 3,000 local, state, and federal workers earning $152.4 million in wages and salaries in 2012.

Industrial and Wholesale Sectors

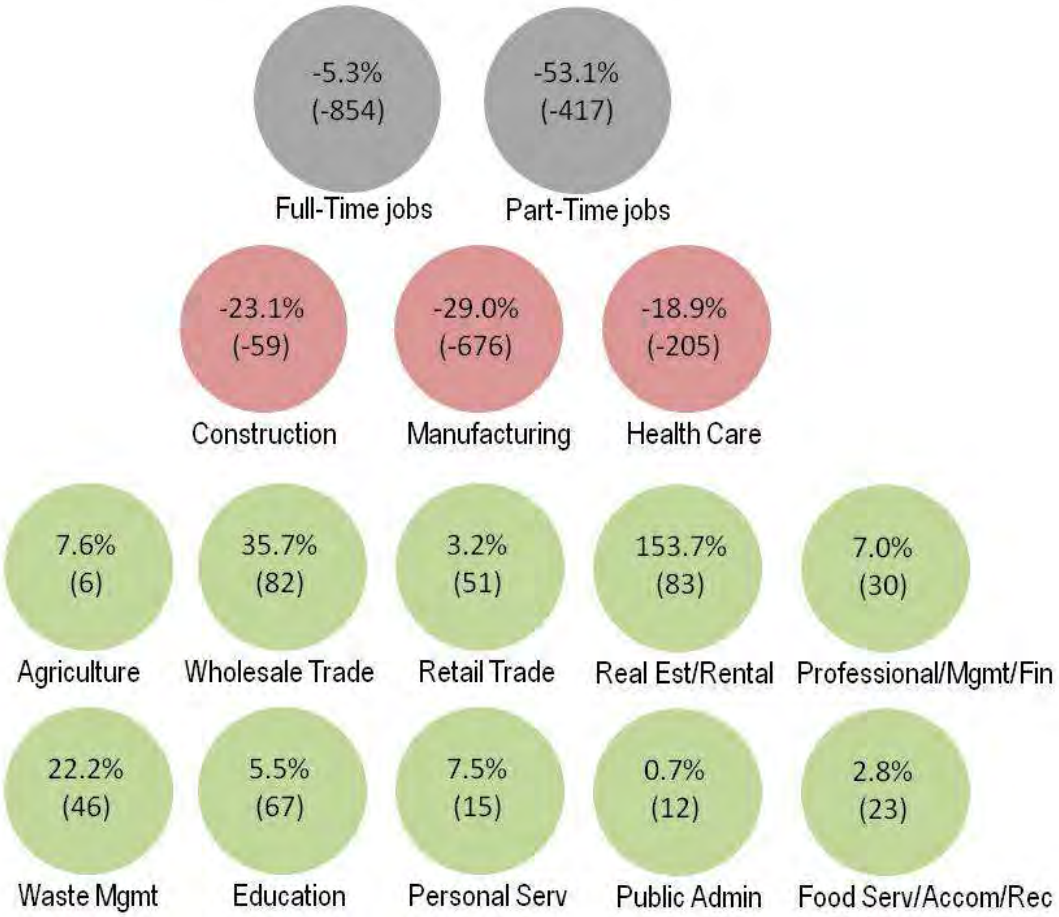
Manufacturing continues to decrease both in total jobs and as a percentage of total employment, yet it remains a key part of Seneca County's industrial base.

In 2012, manufacturers and wholesalers employed 2,350 workers and paid $150.5 million in wages and salaries.

Workforce by Occupation

The following table looks at Seneca County's overall economic base in 2002 and 2012 in terms of changes in employment in major job categories. Employment changes are presented by percentages and absolute numbers (in parenthesis). Workforce increases in most categories were not enough to offset decreases in manufacturing, construction, and health care. Job changes in each of the categories reflect only full-time jobs.

Table 3. Seneca County Employment Change by Job Category, 2002-2012



Source: US Census Bureau. OnTheMapApplication

Workforce and Commuting

The Seneca County workforce includes residents of adjacent counties. The most recent available US Census Bureau statistics indicate that in 2011 the total workforce in Seneca County was 9,931. The number of workers who lived and worked in Seneca County was 4,399, while the number of workers who lived outside of the County but were employed in Seneca County was 5,532, or approximately 56% of the total workforce.

In 2002, the total workforce in Seneca County was 10,485. The number of workers who lived and worked in Seneca County was 5,722, while the number of workers who lived outside the County but were employed in Seneca County was 4,763, or approximately 45% of the total workforce.

Of Seneca County residents who worked outside the County in 2011, most were employed in Ontario County (16%), followed by Tompkins County (9%); Monroe County (7%); Cayuga County (6%); and Wayne County (4%).

In 2011, Seneca County workers who lived outside the County's boundaries often resided in neighboring counties, especially Ontario County (11%); Cayuga (7%); Wayne County (6%); Onondaga County (4%); Monroe County (3.4%); and Tompkins County (3%).

The numbers in this section refer to wage earners' primary jobs, but not second jobs. Almost all primary jobs are full-time. An additional 1,400 jobs in Seneca County were second or third jobs, and most of these were part-time.

Table 4. Seneca County Commuting Profile, 2011

Seneca County Commuting Profile 2011	
Workers	**Primary Jobs**
Number of people who live in Seneca County and are employed (implied resident labor force)	17,921
Number of people who live AND work in Seneca County	4,399
Total number of people who work in Seneca County (implied workforce)	9,931
Commuters	**Primary Jobs**
Number of people who live in Seneca County but work outside the County	13,522
Number of people who live in another county (or state) but work in Seneca County	5,532

Source: US Census Bureau. OnTheMapApplication

Income and Poverty

In 2012, the total per capita personal income for County residents was $35,696. Total personal income tallies income received from all sources, including wages, dividends, interest, social security, pensions, etc. It is thus a good indicator of personal buying power and investment potential. Total personal income in Seneca County was slightly lower (1.5%) than the per capita figure of $36,245 for the nonmetro (rural) areas of New York State. It was also lower than the figures for the Rochester metro area (18.5% lower), Syracuse metro area (14.5%), and Ithaca metro area (8.8%).

Table 5. Total Per Capita Personal Income, 2012

Total Per Capita Personal Income 2012				
Seneca County	Ithaca MSA	Rochester MSA	Syracuse MSA	NYS Nonmetro Counties
$35,696	$38,852	$43,780	$41,774	$36,245

Source: Bureau of Economic Analysis

Coupled with personal income data is the percentage of Seneca County residents living at or below the poverty level. In 2012, 11.9% of the individuals residing in Seneca County were living at or below the poverty level, considerably below both the state and national rates.

Table 6. Seneca County Persons Below Poverty, 2012

Persons Living Below Poverty Level 2012		
Seneca County	New York State	USA
11.9%	14.9%	14.9%

Source: US Census Bureau

Education

Adult educational attainment lags behind the state and nation for both high school and college graduation rates. There are four public school districts in the County, and three are classified by the New York State Educational Department as High Needs Rural Districts. The County also has two BOCES services. The New York Chiropractic College is the sole higher education institution in Seneca County.

Most jobs in the County do not appear to require a college degree. According to Census data, 57% of all employed workers in Seneca County do not have a college degree and 20% have a Bachelor's degree or higher. Educational attainment for the remaining 23% of workers is undetermined.

Table 7. Seneca County Adult Educational Attainment, 2012

Educational Attainment 2012, Persons Ages 25+			
	Seneca County	**New York State**	**USA**
High School or Higher	83.6%	84.9%	85.9%
Bachelor's Degree or Higher	18.6%	32.8%	28.5%

Source: US Census Bureau

Employment Projections

The New York State Department of Labor projects occupation and industry growth for each region of the state. The following table identifies which occupations are expected to experience the most growth in the Finger Lakes Region, which includes Seneca County, between 2010 and 2020.

Table 8. Finger Lakes Region Occupational Growth, 2010-2020

Fastest Growing Occupations 2010-2020	Change
Personal Care Aides	50.5%
Meeting, Convention, and Event Planners	42.9%
Veterinary Technologists and Technicians	41.2%
Helpers--Brickmasons, Blockmasons, Stonemasons, Tile Setters	40.0%
Health Educators	39.3%
Marriage and Family Therapists	37.5%
Helpers--Carpenters	36.4%
Interpreters and Translators	33.3%
Prosthodontists	33.3%
Commercial Pilots	33.3%
Diagnostic Medical Sonographers	32.0%
Medical Scientists, Except Epidemiologists	31.6%
Home Health Aides	30.8%
Market Research Analysts and Marketing Specialists	29.9%
Emergency Medical Technicians and Paramedics	29.8%
Hazardous Materials Removal Workers	29.0%
Athletic Trainers	28.6%
Automotive and Watercraft Service Attendants	28.6%
Security and Fire Alarm Systems Installers	27.3%
Nonfarm Animal Caretakers	27.0%
Fitness Trainers and Aerobics Instructors	26.9%
Coaches and Scouts	26.7%
Medical Secretaries	25.7%
Mental Health Counselors	25.0%
Political Science Teachers, Postsecondary	25.0%
Occupational Therapy Assistants	25.0%
Glaziers	25.0%
Farm Equipment Mechanics and Service Technicians	25.0%
Self-Enrichment Education Teachers	24.3%
Personal Financial Advisors	24.1%
Obstetricians and Gynecologists	23.1%
Outdoor Power Equipment and Other Small Engine Mechanics	23.1%
Veterinarians	22.9%
Database Administrators	22.7%
Physical Therapist Assistants	22.7%
Medical Equipment Repairers	22.7%

Economic Indicators: Infrastructure

In recent years, Seneca County has commissioned or participated in several significant economic development studies which identify transportation, land use, and environmental impacts, including the *Route 318 Corridor Study Sewer Study* (2013); *Route 318 Corridor Economic Impact Analysis* (2013); *Finger Lakes Regional Sustainability Plan* (2013); *CenterState Agenda for Economic Opportunity* (2013); *Finger Lakes Regional Airport Master Plan Update* (2012); *Routes 5 & 20/414 Corridors Management Plan* (2010); and the *Routes 96 & 318 Rural Corridor Study* (2009). Seneca County also contributes to the Genesee-Finger Lakes Region's annual *Comprehensive Economic Development Strategy* and the Finger Lakes Regional Economic Development Council's *Strategic Plan* and annual updates;

Most of the economic indicators in the Infrastructure section of this plan are from these studies.

Transportation

Roads. A well-planned and well-maintained transportation network is necessary to carry residents, visitors, and commercial traffic throughout the County. Despite increasingly limited resources, Seneca County has approximately 525 miles of local roads, maintained by the County and the Towns and Villages.

In addition to the locally-maintained roads, the State maintains about 160 miles of highways in Seneca County, including the main north-south Routes 96, 96A, 414, and 89. Interstate 90 crosses the northern section of Seneca County, providing access to Rochester and points west and Syracuse and points east. Exit 41 on State Route 414 connects the County to the Thruway.

The transportation corridor encompassing State Route 318, between SR 414 and the Waterloo Factory Outlet Center, and SR 414, from the Thruway to Waterloo, is identified by Seneca County as a location for potential major economic development.

Improving the Route 318/414 corridor is an economic development priority for the County. Enhancing economic development opportunities in the SR 5 & 20 corridor is also a priority, as are roadway improvements to increase access from the Thruway to the 10,500 acre Seneca Army Depot.

Hydrofracking. Horizontal drilling to extract natural gas from underground shale formations may create significant jobs and economic activity in Seneca County, if permitted by the State and unopposed by local governments. It could also have a major impact on surface transportation. Hydrofracking requires significant heavy truck traffic that can result in safety concerns and premature deterioration of road surfaces. Even if hydrofracking is prohibited, Seneca County could become a staging area for resource extraction in adjacent counties, with a potentially massive impact on existing infrastructure.

Rail. The Finger Lakes Railway operates in Seneca County. The mainline from Geneva to Syracuse parallels Route 5 & 20, and connects to Norfolk Southern and Canadian Pacific in Geneva and CSX in Syracuse. Rail infrastructure has recently been improved to the Seneca Army Depot. Further rail improvements could potentially facilitate the construction of an intermodal transportation hub at the Depot to ship regionally-produced agricultural products. Construction of a rail spur to the Seneca Meadows Landfill has also been proposed. The rail spur could potentially reduce truck traffic.

Air. The Finger Lakes Regional Airport is a general aviation airport, offering a 4,600 foot runway, automated weather observation system, and Global Positioning System (GPS) technology. The airport currently serves as a base for 28 aircraft. Most flights accommodate business travelers, tourists, and agricultural spraying.

The Federal Aviation Administration and New York State have funded significant capital improvements over the past decade and more are planned. The FAA and NYS consider the County-owned airport a key facility within the federal and state airport systems.

Walking and Bicycling. In an effort to provide transportation alternatives to the car and improve health outcomes, Seneca County supports the Genesee Transportation Council's Priority Trails Plan. This plan is a long range plan of interconnected bicycle and pedestrian trails throughout the region, including Seneca County. The County has also received, and continues to solicit, grant funds to promote the health benefits of active transportation, particularly in the villages, which generally have well-developed sidewalk networks. Seneca County is committed to coordinating intermunicipal efforts to make the area even more attractive for residents and visitors to utilize a county alternative transportation system, as local, state, and federal opportunities become available.

Transit. The Seneca Transit Service provides limited fixed-route, dial-a-ride, and para-transit services. Seneca County and nonprofit organizations provide transportation for elderly, disabled, and low-income County residents to get to work, medical appointments, banks, grocery shopping, visiting relatives in nursing homes or hospitals, etc. The County actively pursues opportunities to increase personal mobility and access to transportation options for those who do not own or operate a personal motor vehicle.

Utilities and Services

Energy Services. New York State Electric and Gas Corporation provides electricity and natural gas to homes and businesses in Seneca County.

The lack of sufficient electric capacity and distribution at the Seneca Army Depot inhibits its growth as a job and business center, and Seneca County is committed to supporting necessary upgrades. Renewable energy may offer at least a partial solution to the Depot's energy problems. Seneca County is committed to supporting the development and use of green energy sources. The Seneca County IDA helps promote green energy projects at the Depot. The IDA also is working with the owners of the Seneca Meadows Landfill to create a renewable energy industrial park to capture methane gas releases and convert them to low cost energy opportunities.

The County works with farmers to construct biodigesters to convert animal waste to biogas and then to electricity, which can be used on the farm or sold back to the power grid. A solar installation powers the County Law Enforcement Center, and more projects relying on alternative energy sources are under consideration throughout the County.

Sanitary Sewers. Although Seneca County is primarily rural, the villages and many rural areas are served by adequate public sanitary sewers. The existing wastewater treatment plants generally have excess capacity. However, any significant new economic development in the Route 318/414 corridor will require municipal sewer service improvements, including new sewer lines and pump stations, as well as treatment plant upgrades. The County is pursuing funds for these improvements. Portions of the infrastructure at the Seneca Army Depot are deteriorated, including sewers, and repairs and upgrades are a priority of the County.

On-Site Sewage Disposal Systems. The proper treatment and disposal of wastewater is vitally important to the health and well-being of the residents of Seneca County. Seneca County works with property owners to ensure the proper installation, maintenance, and replacement of septic systems. The County also promotes the use of "grey" water for irrigation to keep it out of treatment tanks, as well as the use of green septic systems.

Water Service. There are thirteen municipal water providers in the County, all of which draw their supplies from Seneca and Cayuga Lakes. Areas within and immediately surrounding the villages and Seneca Army Depot generally have potable water service and sufficient water

pressure for firefighting. Future development of both the Route 318/414 corridor and the Depot will depend on improving water service.

Fiber Optics / Broadband. High-speed internet access is available throughout the County for residences and businesses. National and countywide trends suggest that digital technology may soon become a bigger part of people's lives, especially for health care and medicine, quality learning and workforce development, and banking and financial services. Seneca County will continue to look for opportunities to promote and support digital technologies that reduce dependency and increase independence, prosperity, and cooperation.

Protective Services. There are three village police forces in Seneca County; the balance of the County is served by the Sheriff's Department and the New York State Police. Fire protection is provided by 14 volunteer fire departments. There are three volunteer ambulance companies. Recruiting an adequate number of volunteers is a challenge throughout the County.

There are no acute care medical facilities in the County. Residents are a 40 minute drive from the nearest hospital. Seneca County remains alert for, and supportive of, efforts to enhance medical care, including the use of telemedicine and other technologies.

Economic Indicators: Places

Development Patterns

Development, if not properly planned, can result in increased and unnecessary pressure on natural resources, environmental quality, public infrastructure, and public services. A balance must be struck to ensure a healthy economic and natural environment that will continue to attract employers and workers. Striking the proper balance demands that special attention is paid to the places in which people live, work, and play.

Villages and Hamlets. Seneca County supports the sensitive and appropriate redevelopment of existing properties, neighborhoods, and downtowns in historic villages and hamlets. The County believes such regeneration is inseparably linked with economic development, quality of life, waste reduction, lower infrastructure costs, lower taxes, and social cohesion.

Targeted Business Corridors. Seneca County recognizes the Route 318/414 Corridor, the Route 5 & 20 Corridor, and the Seneca Army Depot as areas for focused investment and development. Although they will require continued investments in roads, sewers, water service, and new communications technology, they offer the County's best locations for employment uses that require immediate, high-volume transportation access; visibility; large, flat sites; and high-capacity utilities. The potential economic opportunities in these areas will benefit the entire County, north and south, through the creation of jobs and a tax base to support public infrastructure and services countywide.

Vulnerable Lands. Vulnerable lands are sensitive to degradation and destruction by human activities. They include steep slopes, shorelines, riparian zones, public property devoted to tourism or timber, the best agricultural land, pastures, forests, and floodplains, as well as traditional and historic built sites. Seneca County supports using these lands in ways that protect and sustain their underlying vulnerable features in order to make sure they are not exploited in the future as they have sometimes in the past.

Tourist-Oriented Places. With its scenic beauty, two Finger Lakes, historic resources of national importance, and more than 30 wineries, Seneca County's tourism-related employment

is significant. Visitors enjoy a wide range of leisure and recreational activities. Hunting, hiking, camping, picnicking, snowmobiling, and touring wineries and historic places draw tens of thousands of visitors to Seneca County who contribute to the local economy. The new Samson Veterans Memorial Cemetery, which the County took the lead in developing, is expected to attract additional thousands of visitors each year. Sustaining a vibrant tourism sector requires thoughtful attention to the placement of economic development activities to avoid causing a decline in the County's high recreational, ecological, and visual quality.

Seneca County is committed to sustaining or enhancing the intrinsic beauty and tourism value of an area through proper design, landscaping, and buffering. The County will work with local, State, and Federal agencies to promote responsible economic development, taking into account the impacts on the surrounding ecology, residents, and existing tourism resources.

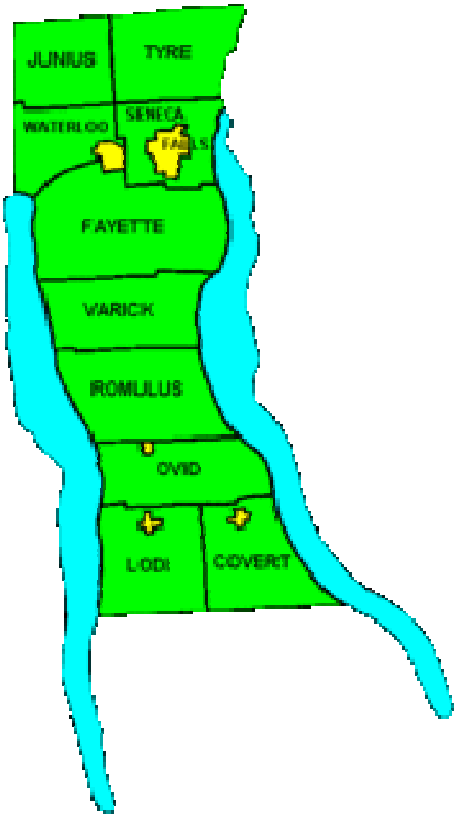
Community Cultural Places. Seneca County also supports the expansion of tourism-related activities, such as music festivals, art fairs, and sports tournaments. Such activities attract outside dollars to the County and provide more cultural and recreational options for residents. Seneca County recognizes that sports, art, and recreation are critical to creating networks and trust between business, government, and community, which are totally intermixed and integrated when people participate in cultural and recreational activates. Besides furnishing the glue of economic activity, such activities provide the physical and mental health that enables people to be economically active. Ill health is a major drain on an economy.

Home-Based Businesses. The biggest business incubator is the home. Throughout Seneca County, residents employ themselves in home-based businesses, such as child care, personal services, business services, and craft studios. A home workplace helps minimize business overhead expenses. According to Census data, two of the fastest growing population groups in Seneca County are married couples without children and single adults under the age of 55. These are the demographic groups most likely to start a business. The Affordable Care Act is also expected to encourage small business creation.

Home-based businesses are a vital component of a healthy local economy, and Seneca County will support home-based businesses. It will also work with local communities to limit the impact home-based businesses may have on their neighbors, and to help businesses relocate when they outgrow the home.

Indian Lands. In 2005, the Cayuga Indian Nation applied to the Bureau of Indian Affairs to transfer title of property it owned in Seneca County from the Nation to the U.S. Federal government, which would hold the land in trust for the Nation. This would effectively give the Nation the right to exercise sovereignty over the property. The land claim is still pending; if successful, the Cayuga Indian Nation has expressed interest in building a gaming casino on its properties. At the time of the 2005 land claim, the Cayuga Nation owned two parcels of land in the Town of Seneca Falls with a total area of just under 14 acres. Since 2005, the Nation has purchased other lands and now owns more than 50 properties in the Town of Seneca Falls and three in the Town of Varick, with a combined area of 1,136 acres.

North / South Perceptions. Some County residents perceive economic and cultural differences between the northern and southern parts of Seneca County. While there is no exact line between these two halves of the County, the generalization is that residents in the northern-most part of the County, with more convenient access to the New York State Thruway and the bulk of commercial development and jobs, have different concerns than residents of the balance of the County, which is primarily rural, agricultural, and oriented to tourism around the lakes and wineries. In addition, the southern and central parts of the County enjoy sizable and growing Amish and Mennonite populations.



Any generalization is highly dependent on the categories chosen for evaluation. Average home prices may be higher in the north, but overall land prices are higher in the south. Public and private investment in industrial infrastructure may be higher in the north, but total investment in tourism is higher in the south. Health and educational outcomes are generally even throughout the County. Different parts of the County may have different assets, but all are equally important to the County's well-being.

Even though perceptions may be the result of selective data, Seneca County government considers it a major responsibility to take any perceived differences seriously and prevent two counties from developing geographically and unevenly. The County is committed to improving social and economic mobility for all County residents.

Land Use Regulations

Economic development requires land and buildings, and land use and construction regulations guide development. This chapter of the comprehensive plan is not intended to recommend specific land uses or zoning ordinances. In keeping with the public's desire to encourage development in villages and hamlets where public services are readily available, to target major new development in strategic corridors, and to conserve vulnerable lands and rural lifestyles, Seneca County will work with local communities to draft and adopt regulations to:

- Promote, in villages and hamlets, relatively higher development densities, more intense uses, more housing choice, and designs that respect tradition.
- Preserve, in rural areas, large areas of sparse and low density residential.
- Protect and enhance vulnerable lands, throughout the County.

Seneca County will always consider individual property rights and individual private property values as it encourages the use of planning and zoning to maximize the utility of scarce public resources from which all residents and businesses benefit.

Economic Development Goals and Strategies

The dynamic context presented above raises several considerations for Seneca County planners and economic developers:

- While the County has produced several excellent studies related to infrastructure, there appears to be little information generated that is targeted to attracting or retaining specific businesses or business sectors.

- The New York State Thruway is an economic resource that Seneca County hasn't fully leveraged.

- When a County resident works in a neighboring county, the resident's wages are essentially a transfer payment from the neighboring county to Seneca County, and this is positive. In other words, it is not as important where residents work as long as they have decent-paying jobs and, vitally important, Seneca County remains their home of choice.

- Diversified economies tend to perform best, and, therefore, manufacturing cannot be ignored. However, trying to retain or attract manufacturing with low wages and tax incentives will likely have very limited overall economic benefits.

- Clearly, economic development efforts must also include identifying, generating, and supporting local entrepreneurs.

- The Seneca Army Depot is enormous, and it is questionable whether the entire facility can ever be developed exclusively for industrial or commercial purposes.

- Economic development is labor intensive, and a team effort will likely be necessary in Seneca County, requiring more coordination of the impressive capacities of the organizations in the County already devoted to economic development.

- Preparing the County workforce for employment in growing industries, both certain types of high-tech manufacturing and services, must be an ongoing effort.

- Small changes can diminish the long-term economic value of vulnerable lands, and restoration or recovery of what is lost can be costly.

- Because growth in one sector of the economy impacts other sectors, either positively or negatively, potential secondary economic impacts should be identified when making economic development policy decisions.

While there is no "one size fits all" approach to economic development for an area as large and diverse as Seneca County, the dynamic economic context in the County and the values expressed by the community suggest there are certain key goals and ways to attain them that can structure a prosperous and sustainable economic future.

Goal 1. Research, analyze, and publish data on County economic trends and economic indicators.

Strategy 1A: Collect and maintain business/economic data on the needs of County businesses of all sizes and types, including workforce, infrastructure, property, and financial needs, and on the requirements of businesses the County wants to attract.

Strategy 1B: Continue to administer economic development programs at the county level, and monitor the success of businesses utilizing the programs.

Strategy 1C: Maintain an itemization of economically significant natural resources and vulnerable lands including, but not limited to, prime farmland, forestland, shale deposits, waterways, ground water, and steep slopes.

Strategy 1D: Publish trend and indicator data in an annual report for use by elected and appointed officials, citizens, and business interests.

Strategy 1E: Develop programs to meet un- or under-served business needs.

Goal 2. Encourage greater collaboration with New York State, municipalities, economic development organizations, and private and nonprofit partners to advance the goals and strategies of this plan.

Strategy 2A: Strengthen connections between regional colleges and universities and County businesses to create vocational and professional programs—traditional and online—to meet Seneca County's current and future workforce needs.

Strategy 2B: Encourage local communities to specialize in economic development approaches that take advantage of their respective assets.

Strategy 2C: Assist communities in creating energy/sustainability plans as frameworks for economic development.

Strategy 2D: Work with communities to ensure local zoning follows best practices and supports new economic development, ranging from small business incubator facilities to larger business organizations.

Strategy 2E: Work with local economic development organizations on short- and long-range programs of public works projects for the purpose of stabilizing industry and employment.

Strategy 2F: Investigate additional revenue sources and mechanisms, including private sector options, to provide for maintenance of County infrastructure.

Strategy 2G: Be an active and aggressive advocate for Seneca County's interests in regional organizations devoted to economic development, environmental sustainability, workforce development, planning, tourism, and transportation.

Strategy 2H: Work with New York State and private real estate developers to develop shovel-ready industrial sites in the County.

Strategy 2I: Partner with profit and nonprofit developers to create more housing choice in the County, especially for seniors.

Strategy 2J: Coordinate and expand efforts with local and regional organizations to promote economic development successes and opportunities in the County.

Strategy 2K: Create a County water district to take advantage of a larger customer base to lower unit costs, improve customer service, and improve maintenance.

Goal 3. Seek and support local and nonlocal businesses that strengthen and diversify the economic base, expand and enhance the tax base, improve wage and salary levels, and utilize the resident workforce, without diminishing the quality of natural, historical, or cultural resources in the County.

Strategy 3A: Focus economic development to existing areas with adequate public facilities; specifically:

- Villages and hamlets.
- Existing business and industrial parks.
- Existing areas with adequate public facilities.

Strategy 3B: Support and coordinate efforts to provide adequate infrastructure and targeted County investment in areas best suited for future and unmet employment opportunities; specifically:

- Route 318/414 corridor.
- Route 5 & 20 corridor/Seneca Army Depot.

Strategy 3C: Maintain agriculture, agriculture-related businesses, cottage industries, and tourism as the major economic development industries in rural portions of the County.

Strategy 3D: Support new and existing businesses that utilize local agricultural products or that provide important agricultural inputs, such as farm equipment, new farm technologies, and so on.

Strategy 3E: Encourage the development of "niche" farm-based businesses focused on food for local and regional markets (small-scale food processing, specialty foods and beverages, organics, etc.).

Strategy 3F: Enhance connections with a variety of markets for Seneca County's agricultural products, with a focus on markets that allow a greater portion of the profit from agricultural products to remain in the County.

Strategy 3G: Initiate a countywide "buy-local" program that focuses on purchasing products and materials from local businesses.

Strategy 3H: Enable alternative and renewable energy production, including, but not limited to, solar, hydro, biogas, and wind resources.

Strategy 3I: Adopt standards and seek funding to incorporate green infrastructure into new or renovated public facilities, including, at a minimum, low impact development and design elements.

Strategy 3J: Enable non-automotive and other transportation opportunities to expand options for personal and group travel, especially for those who cannot drive or afford to own a car.

Strategy 3K: Further increase opportunities for small business by introducing or enhancing home-based business zoning ordinance language, including standards to minimize noise, traffic, and other disturbances to adjacent land uses.

Strategy 3L: Identify strategies to continue providing access to financial capital for business retention and expansion.

Strategy 3M: Increase business attraction marketing outside of the County and State.

Strategy 3N: Invest in industrial parks, infrastructure, and business incubators in collaboration with the State and economic development associations.

Goal 4: Enhance tourism as a vital aspect of the County's economy and quality of life.

Strategy 4A: Maintain and enhance existing recreational and cultural activities, and help create new ones, to support both industry employers and quality of life.

Strategy 4B: Support the development of tourist-supportive businesses and events (hotels, specialty retail stores, historic buildings, conferences, festivals) as a means of increasing tourism.

Strategy 4C: Work in collaboration with the tourism bureaus and local businesses to market tourism by including more links to tourist events and attractions on the County's website.

Strategy 4D: Collaborate with the tourism industry and the State to position the County as a four season tourism experience and setting for films.

Strategy 4E: Encourage the establishment of use districts and environmental preservation requirements as necessary to preserve the County's existing tourism and cultural assets.

Strategy 4F: Encourage the establishment of use provisions, as necessary, to accommodate art, festivals, and other forms of tourist attractions.

Strategy 4G: Expand the system of recreational trails and greenways near, or serving, employment areas.

Strategy 4H: Protect and preserve scenic historic routes in Seneca County by creating a Scenic Roads program that preserves scenic and historic or rustic characteristics of such routes through rural landscapes and village streetscapes.

Strategy 4I: Design and install gateway treatments at the major entrances to the County, with special attention to signage, landscaping, setbacks, and orientation to main roads.

Strategy 4J: Require the landfill operator to submit a perimeter beautification plan, including fencing, landscaping, and public art, which must be implemented as a condition for expanded activities or closure.

Goal 5: Minimize land use conflicts.

Strategy 5A: Use the guiding principals of this plan as a basis for evaluating the merits of proposed developments and major land use changes.

Strategy 5B: Establish a mechanism for valuing both the direct cost of development to the developer and the direct and indirect costs to property owners in the vicinity of a proposal.

Strategy 5C: Make sure landfill tipping fees take into account all externalities.

Strategy 5D: Carefully consider whether proposals for commercial or industrial business development will interfere with surrounding existing uses and whether they can be supported with the existing road system, other infrastructure, and available services.

Strategy 5E: Ensure that new businesses do not detract from rural and/or village character.

Strategy 5F: Create an overlay district(s) for potential mineral extraction operations.

Strategy 5G: Protect the County's road network from unsafe conditions and premature wear by protecting the integrity and service of the current public infrastructure through the fair allocation of resources among vested users.

Strategy 5H: In conjunction with the villages, create site and building design guidelines for new developments and renovations to uphold property values and reinforce community character.

Strategy 5I: Create model design guidelines for businesses that address landscaping, aesthetics, lighting, noise, parking, and access in order to assure compatible, neighborly, high value, safe, and lasting developments.