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September 18, 2015

VIA HAND-DELIVERY

Mr. Robert Stein, Chairman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Re: Petition of SolarCity Corporation for a Declaratory Ruling for the Location and Construction of an Approximately 2.74 Megawatt Solar Electric Generating Facility on Rogers Road, Norwich, Connecticut

brownrudnick.com

Dear Chairman Stein:

On behalf of SolarCity Corporation ("SolarCity"), we are submitting an original and fifteen (15) copies of the above-captioned Petition of SolarCity Corporation for a Declaratory Ruling ("Petition"), together with a filing fee of $625.

In the Petition, SolarCity requests that the Connecticut Siting Council approve the location and construction of an approximately 2.74 megawatt solar electric generating facility to be on Rogers Road in Norwich, Connecticut. One copy of Exhibit 4 (the electrical plans) and one copy of Exhibit 5 (the Stormwater Management Plan) are being bulk filed. We have also enclosed a disk with an electronic copy of the filing. Please contact me at 860-509-6575 with any questions or if you need additional information.

Very truly yours,

BROWN RUDNICK LLP

By: _____
Philip M. Small
Counsel for SolarCity Corporation

Enclosures

62082982 v1-WorksiteUS-031819/0001

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL

PETITION OF SOLARCITY CORPORATION FOR A DECLARATORY RULING FOR THE LOCATION AND CONSTRUCTION OF AN APPROXIMATELY 2.74 MEGAWATT SOLAR ELECTRIC GENERATING FACILITY AT ROGERS ROAD, NORWICH, CONNECTICUT	:	PETITION NO. ____
	:	SEPTEMBER 18, 2015

PETITION OF SOLARCITY CORPORATION
FOR A DECLARATORY RULING

Pursuant to Conn. Gen. Stat. §§ 4-176 and 16-50k(a) and Conn. Agencies Regs. § 16-50j-38 *et seq.*, SolarCity Corporation ("SolarCity") requests that the Connecticut Siting Council ("Council") approve by declaratory ruling SolarCity's location and construction of an approximately 2.74 megawatt ("MW") solar electric generating facility (the "Facility") on two parcels located on Rogers Road (collectively referred to as the "Site") in Norwich, Connecticut. One of the parcels encompasses the City of Norwich's (the "City") current transfer station and two closed landfills. The other parcel is an undeveloped, cleared parcel located across the street from the transfer station. Both parcels are owned by the City of Norwich.

Conn. Gen. Stat. § 16-50k(a) provides that:

> "Notwithstanding the provisions of this chapter or title 16a, the council shall, in the exercise of its jurisdiction over the siting of generating facilities, approve by declaratory ruling... (B) the construction or location ... of any customer-side distributed resources project or facility or grid-side distributed resources project or facility with a capacity of not more than

sixty-five megawatts, as long as such project meets air and water quality standards of the Department of Energy and Environmental Protection...."

As discussed fully in this petition, the Facility will be a "grid-side distributed resources" facility, as defined in Conn. Gen. Stat. §16-1(a)(38) (revised to January 1, 2015),[1] under 65 MW that complies with the air and water quality standards of the Connecticut Department of Energy and Environmental Protection ("DEEP"). Additionally, the Facility will not have a substantial adverse environmental effect in the State of Connecticut.

I. COMMUNICATIONS

Correspondence and other communication regarding this petition should be directed to the following parties:

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Elmsford, NY 10523
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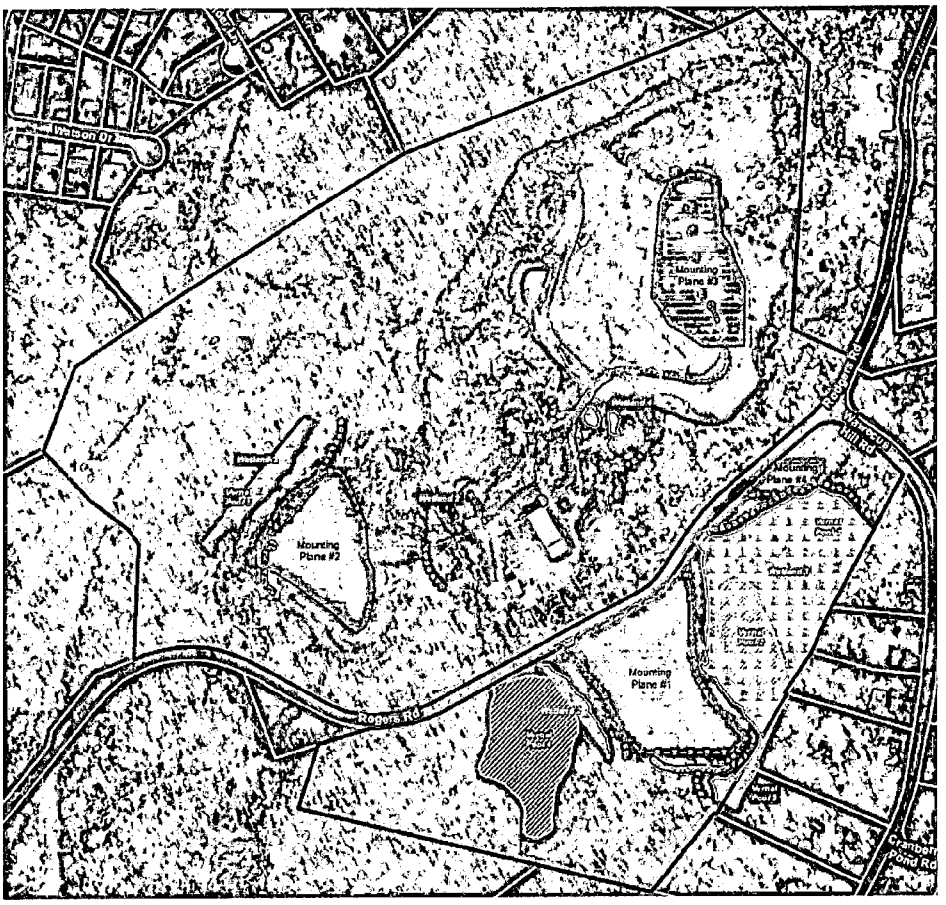
Fax: (914) 592-2189
Email: eschecter@solarcity.com

[1] Formerly Conn. Gen. Stat. § 16-1(a)(43).

II. DISCUSSION

A. Background

SolarCity's solar arrays will consist of approximately 8,854, 310 Watt Canadian Solar panels with a total output of approximately 2.74 MW (see Site Plan, **Exhibit 1**). The solar arrays will occupy approximately 10.8 acres (the "Project Area") of the total 98.3 acre Site. The Project Area consists of four areas of solar arrays (referred to as Mounting Planes 1 through 4) as seen below.



Source: Environmental Assessment, p. 25 (**Exhibit 2**).

SolarCity, Norwich Public Utilities ("NPU"), the City and the Connecticut Municipal Electric Energy Cooperative ("CMEEC") have partnered together to develop this Facility. Once the Facility is completed, solar power will be available to every NPU customer without any premium charge. An estimated 80 percent of NPU customers cannot own or lease solar systems because their roofs are physically unsuitable due to shading or because they do not control them (e.g., renters and people living in large apartment buildings). The Facility will offer a way for every NPU customer to have access to "green energy" without incurring a premium cost or having complex equipment installed on their roofs. Additionally, the Facility will benefit the community at large by improving electrical service for existing and future development in Norwich through enhanced capacity.

Prior to filing this petition, SolarCity's development partner, Brightfields Development, LLC ("Brightfields") met with the City's Mayor, Deb Hinchey, on July 25, 2014, at Norwich City Hall to introduce the project team and concept. Also present at that meeting were Alan Bergren, (City Manager at the time) and John Bilda (General Manager of NPU[2]). Attendees were provided with a preliminary layout drawing of the Facility. On August 4, 2014, John Hanselman (Managing Principal, Brightfields) and Mike Singer (Principal, Brightfields) gave a general presentation to the City Council to discuss the company's experience, community shared solar facilities in general, the specifics of this Facility and its partnership with CMEEC.

On April 20, 2015, the City Council voted unanimously to approve a Site Lease Agreement with SolarCity and on April 29, 2015, the Site Lease Agreement was signed. On

[2] John Bilda is now Acting Norwich City Manager.

August 10, 2015, representatives from SolarCity, Brightfields, Boundaries LLC, Weston & Sampson, and the City met with DEEP to discuss the Facility and review permitting requirements. On August 25, 2015, Brightfields met with Peter Davis (City Planner) regarding the specifics of this Site and Facility. On September 11, 2015, representatives from Brightfields, NPU, the City, Boundaries LLC and Weston & Sampson completed a Site walk and reviewed the Site Plan.

Although this Facility is not subject to the City's land use application processes, SolarCity has designed the Facility to meet the intent of the City's Zoning Ordinances' performance standards[3] for dust (construction dust will be addressed by watering the disturbed areas of the Site during construction in accordance with the erosion and sedimentation control plan), odors (no odors, gases or fumes will be produced by the solar installation), noise (the only anticipated noise source following construction will be from the electrical equipment used for power processing and none of the power production equipment is closer than 300 feet to a residence), vibration (the Facility will not produce any vibration), glare and heat (the solar panels should not result in an increase in heat outside of the Site boundaries and the glare from the solar panels - which is less than that of typical glare from water or steel - will be mitigated by the existing vegetated buffer/wooded areas between the Facility and neighboring residences), fire and explosion hazards (the Facility will comply with all applicable fire safety codes and the solar arrays are comprised of silica-based panels, concrete and metal and will not combust in the event of a brush fire), ionizing radiation and radioactive materials (there are no

[3] Specifically, Sections 3.17.1-3.17.9 of City of Norwich Zoning Ordinances.

sources of radiation or radioactive materials at the Facility) electromagnetic interference (there will be no sources of electromagnetic interference at the Facility) or the production of injurious wastes (there will be no production of injurious wastes at the Facility). Finally, notice of this filing has been provided to the City officials and abutters (see Notice List, **Exhibit 3**).

B. Description of the Site and the Facility

1. The Site

The proposed Facility is located on two parcels, one to the north of Rogers Road (no street number - map 73, block 1, lot 31) and one to the south of Rogers Road (82 Rogers Road – map 81, block 1, lot 3) both owned by the City. The Rogers Road parcel (to the north of Rogers Road) is a 75 acre parcel within the ROS (residential open space) zone containing the City's active transfer station, a closed bulky waste landfill and a closed solid municipal waste landfill. There are a number of structures and paved/concrete areas on this parcel associated with the transfer station. The 82 Rogers Road parcel (to the south of Rogers Road) is a 23.3 acre undeveloped, cleared parcel located in the R80 (residential) zone. The majority of the Project Area consists of open and actively managed land that has experienced historic disturbances associated with landfill activities or cultivation of crops.

DEEP has been involved with the operation and subsequent closure of the two landfills on the Rogers Road parcel since the mid-1970's. DEEP authorized the closure of the municipal solid waste landfill in June 1996 with final closure approval in September 1997. DEEP authorized the closure of the bulky waste landfill in May 1999 with final closure approval in April 2000. The City is responsible for regular post-closure maintenance and

monitoring of both landfills on a regular basis for 30 years post-closure. Groundwater, surface water and certain well water is currently monitored on a yearly basis in accordance with Consent Order SW-405 (which applies to both landfills and was issued in July of 1998), a September 2001 Revised Water Quality Monitoring Program and subsequent 2013 modifications to the Water Quality Monitoring Program approved by DEEP.

The solar arrays on the two former landfills (Mounting Planes 2 and 3) will utilize a ballasted, surface-mounted racking system to ensure that the landfill cap/cover systems are not adversely affected in any way. The ballasted system will be placed directly on the vegetative cover, mitigating any impact on the cap construction. The arrays will be installed using landfill-specific low ground pressure equipment to make sure that the 7 PSI cap/cover loading limit is adhered to at all times. Licensed engineers will inspect the field work regularly to ensure that the construction methodology does not impact the cap/cover system. Additionally, due to the fact that the solar arrays and the associated wiring will be installed on top of the landfill cover/caps, all of the conduit runs will be installed on ballast blocks located above the vegetative surface. This will require that all of the electrical wiring is installed within rigid conduit or cable trays and placed on concrete or rubber ballasts.

Upon completion of the Facility, SolarCity will assume responsibility for the maintenance of the landfill cap and inspection (as required by DEEP) within the limits of the solar field area (Mounting Planes 2 and 3). SolarCity must obtain from DEEP a Disruption Permit and approval for its Post Closure Use Plan for the Facility. SolarCity and the City are working together to develop documentation to satisfy DEEP's requirements. SolarCity will

submit all inspection reports required by the DEEP as a condition of the Disruption Approval to the City and DEEP.

Four wetland areas (see Environmental Assessment ("EA"), **Exhibit 2**) were identified at the Site, three on the transfer station parcel (Wetlands 2, 3 and 4) and two on the 82 Rogers Road parcel (Wetlands 1 and 2). These four wetlands consist primarily of seasonal intermittent and perennial stream channels, depressional forested, emergent, and scrub/shrub wetlands.

Wetland 1 is a broad forested wetland located on the eastern portion of the southern parcel (82 Rogers Road) and has a cover of red maple with an understory of pepperbush. It is the largest of the four wetlands. Wetland 1 has a number of artificially constructed channels and drains to the southwest. Three vernal pools were identified within Wetland 1. Vernal Pool 1 consists of a wind-thrown tree depression, Vernal Pool 2 is a broad 'cryptic' style vernal pool habitat, and Vernal Pool 3 is in one of the man-made channels which contains evidence of vernal pool breeding. Vernal Pool 3 is located just off-Site to the south.

Wetland 2 is on the transfer station parcel toward the center and south of the parcel and continues to the center of the 82 Rogers Road parcel. Wetland 2 consists of a diverse compilation of varying wetland types including a broad scrub/shrub swamp with bordering forested wetland draining to a perennial stream system with complexes of forested, scrub/shrub habitats. Wetland 2 drains under Rogers Road via a partially sediment-filled box culvert restricting and impounding flows to the south. A large portion of Wetland 2 is occupied by Vernal Pool 4. Vernal Pool 4 is characterized as a large pool with a dense scrub/shrub component in its interior.

Wetland 3 is located on the western side of the transfer station parcel. Wetland 3 is a hillside seep wetland system feeding a narrow intermittent stream channel. The entire wetland is forested with red maple dominant forest cover type and has sufficient hydrology to support vernal pool breeding habitat. Within Wetland 3 is Vernal Pool 5, a small tree wind-thrown depression adjacent to, but physically isolated from, the channelized intermittent watercourse feature within Wetland 3.

Wetland 4 is located on the eastern portion of the transfer station parcel. Wetland 4 consists of a complex of historically altered and artificially constructed emergent wetland areas and intermittent watercourse drainage swales. An existing access road crossing currently provides entry to the rear of the former landfill area from the transfer station. Two emergent wetland areas were delineated and consist of broad depressional areas with seasonal shallow ponding (insufficient hydrology for supporting vernal pool habitat).

A vernal pool survey was conducted on May 7, 2015 (see EA, **Exhibit 2**). A total of five vernal pools were identified. Vernal pool habitats include both cryptic and classic style vernal pools. Several of the pools have undergone historical anthropogenic influences. More information on the vernal pools is provided in the EA (**Exhibit 2**).

There are no public water supply wells proximate to the Site and the Site is not located within an Aquifer Protection Area. The Site also lies in a minimal flooding area according to the United States Federal Emergency Management Agency's mapping. Based on DEEP's Natural Diversity Database mapping no threatened, endangered, or special concern species or critical habitats are located at, or in the vicinity of, the Site (see Appendix C to the EA, **Exhibit**

2). SolarCity believes that no historic districts, features or structures exist at the Site or in the vicinity of the Site. The State Historic Preservation Office ("SHPO") was contacted for its comments on the Facility. SHPO responded on August 19, 2015, requesting a professional cultural resource assessment and reconnaissance survey be completed prior to construction (the letter is included as Appendix D to the EA, **Exhibit 2**). SolarCity intends to complete the requested assessment prior to the start of construction.

2. The Facility

The solar arrays will consist of approximately 8,854 Canadian Solar, 310 Watt solar panels. Collectively, the solar panels will generate approximately 2.74 MW and will cover approximately 10.8 acres (the Project Area). The Facility will include four separate solar arrays, identified as Mounting Planes 1 through 4. A six-foot tall chain link fence will surround Mounting Planes 1 and 4. For Mounting Planes 2 and 3 (at the transfer station) no fencing is required due to the steep slopes and the heavily wooded surroundings. For Mounting Planes 2 and 3 SolarCity will install a gate across each access road with 30-foot side panels to restrict access which will, for all practical purposes, restrict access to the landfills and solar arrays.

Mounting Plane 1 is the largest array (approximately 3,781 modules) and is located centrally on the 82 Rogers Road parcel in a former crop field. Mounting Plane 4 is the smallest array (approximately 266 modules) and is located on the eastern side of the 82 Rogers Road parcel, also in a former crop field. Mounting Planes 2 and 3 are of similar size (Mounting Plane 2 has approximately 2,489 modules and Mounting Plane 3 has approximately

2,318 modules) and are located on the caps for the two former landfills on the Rogers Road parcel. None of SolarCity's equipment will be located within 10 feet of the passive gas vents on the former landfills.

Mounting Planes 1 and 4 will use an RBI Solar post-driven mounting system. The mounting assemblies holding the modules are built on I-beam foundations that are pounded into the ground with a pile driving machine and then the rack is constructed on the posts. Mounting Planes 2 and 3 will use the Game Change rack mounting system. For the Game Change system, the rack is built inside large plastic tubs that are then filled with concrete and allowed to set. These serve to anchor the panels to the ground. For both mounting systems, after the rack is installed, the solar panels will be mounted to the rack and placed at a fixed 25° tilt to the south. Wiring runs within the facility would be a mix of underground wiring and above-ground conduit.

The Facility will include four Solectria SGI utility scale inverters ((2) 500 KW and (2) 750 KW). The inverters convert the DC power supplied by the panels into AC power that can be connected to the electric grid. The inverters will be mounted on three, small concrete pads (one near Mounting Plane 2, one near Mounting Plane 3 and one near Mounting Plane 1) with transformers which are connected to the grid via switch gear. The pads near Mounting Plane 2 and 3 each have one inverter and one transformer, while the pad near Mounting Plane 1 has

two inverters and one transformer. Details on the electrical equipment are provided on the Equipment Plans[4] which are attached as **Exhibit 4**.

Access to Mounting Planes 1 and 4 (at 82 Rogers Road) will be right off of Rogers Road with no access road needed. There will be two paved aprons off of Rogers Road near each Mounting Plane that during construction will lead to a small anti-tracking pad. For Mounting Plane 4, a small portion of an existing stone wall will be removed to allow access to Mounting Plane 4. A buried electrical conduit will connect Mounting Plane 1 and Mounting Plane 4.

Access to the two Mounting Planes on the former landfills will be via existing grass access roads. SolarCity will repair the access roads it uses on this parcel to meet or exceed pre-construction conditions. For Mounting Plane 2, SolarCity will need to construct approximately 140 feet of new access road at the end of the existing access road as well as a 30-foot in diameter gravel turnaround. For Mounting Plane 3, SolarCity will also need to construct 40 feet of new gravel access road and a 30-foot in diameter gravel turnaround.

The Facility will not consume any raw materials, will not produce any byproducts and will not be staffed during normal operating conditions. In addition, the Facility has been designed to meet the intent and performance standards of local land use regulations where possible as detailed above. A construction schedule for the Facility is included as Appendix E

[4] Please note there are separate electrical drawings for each parcel and they do not use the same Mounting Plane numbers as used here and in the EA. Also, due to their size, they have been bulk filed.

to the EA (**Exhibit 2**). SolarCity plans to work 7 days a week, 7:00am – 7:00pm to complete installation of the Facility. The work hours may be modified based on discussions with the City.

C. The Facility Complies with DEEP's Air and Water Quality Standards and Will Not Have a Substantial Adverse Environmental Effect

The construction and operation of the Facility will comply with DEEP's air and water quality standards and will not have a substantial adverse environmental effect. In addition, all construction on the former landfills (Mounting Plane 2 and 3) will comply with any protective requirements outlined in the DEEP Disruption Permit and Post Closure Use Plan. Furthermore, the Facility will not have any air emission sources and therefore, will not have any effect on air quality. There are no public water supply wells located in the vicinity of the Site and no liquid fuels are associated with the operations of the Facility.

The solar panels will be located across both parcels in four areas, collectively comprising approximately 10.8 acres. The Project Area is within existing open fields and/or former landfill areas and therefore no tree or mature vegetation clearing will be required. The Project Areas have relatively moderate slopes and any area where regrading is necessary can be accomplished without significant cuts and/or fills.

None of the four wetlands at the Site will be directly impacted by the Facility. The fence line and electrical conduit routes come in close proximity to wetlands, but will not encroach into the wetlands. The electrical conduit between Mounting Planes 1 and 4 on the 82 Rogers Road parcel crosses Wetland 1. This crossing will be completed using horizontal

directional drilling ("HDD") to eliminate any impacts to the wetland. Other than the proposed HDD crossing of Wetland 1, the closest construction activities to wetlands or watercourses are associated with two electrical conduit routes within existing travel ways in proximity to Wetlands 2 and 4 on the transfer station parcel. For Wetland 2, where the existing travel way physically crosses a perennial stream, the electrical conduit to Mounting Plane 2 will be routed underground within the edge of roadbed where there is sufficient room to install this conduit and not encroach into the wetland/watercourse. The existing travel way that leads towards Mounting Plane 3 passes within approximately 15 feet of Wetland 4, the electrical conduit near Wetland 4 would also be routed along the ground surface in this area. The resulting activities will have no direct impact to wetland resources. Where the fence line will be near the wetlands buffers have been established (see the EA for details, **Exhibit 2**).

There will be minor short term, temporary impacts associated with the construction activities at the Site due to the proximity to wetland and watercourse resources. A proposed Wetland Protection Plan is included as Appendix G to the EA (**Exhibit 2**) which will provide additional measures to avoid temporary wetland impacts. Any long term secondary impacts to wetland resources possibly associated with operation of the Facility will be minimized by the fact that the Facility is unstaffed and generates minimal traffic. SolarCity will minimize the creation of impervious surfaces with the use of gravel additions to the access drive and with the majority of the surface treatment around the solar installation consisting of native

grasses/vegetation. A Stormwater Management Report is included as **Exhibit 5**[5]. The stormwater will be handled in accordance with the 2004 *Connecticut Stormwater Quality Manual.*

The Project Area is entirely within existing non-forested areas of the Site and therefore these areas are considered overall to have low habitat value for wildlife in general, as well as vernal pool species. Therefore, utilizing the four Mounting Plane locations for the Facility will collectively minimize potential impacts to wildlife. SolarCity did not commission a Carbon Debt Analysis for this Site as no trees will be cut down during construction of the Facility.

As previously discussed, five vernal pools were found on the Site. Vernal Pools 2 and 4 have the highest species diversity and abundance coupled with the most undeveloped and forested landscape surrounding the pool whereas the remaining three (Vernal Pools 1, 3, 5) have the lowest. There will be no direct impacts to any vernal pool. While construction activity will take place near Vernal Pools 1, 2, 3 and 4 which is discussed in further detail in the EA (**Exhibit 2**).

A breeding bird assessment was conducted in July 2015 which focused on high conservation priority species (see Breeding Bird Inventory Table, Appendix B to the EA, **Exhibit 2**). The Inventory includes one "Important" species; eleven "Very Important" species and two "Most Important" species. The inventory also includes two state-listed species as potentially present (although not observed at the Site): the Brown Thrasher and Broad-winged Hawk. The Site's old field habitat represents suitable breeding habitat for the Brown Thrasher.

[5] Due to its size, one copy of the Stormwater Management Report has been bulk filed.

However, due to the small size of the old field habitat available (12± acres) the Site would be capable of supporting only a small number of thrasher pairs, as the average territory size is 1.6 acres. The Broad-winged Hawk is considered a habitat generalist and therefore the Site's forest edges coupled with a large forested wetland represent suitable habitat for this species.

The solar arrays, gravel and grass surfaces associated with the construction of the Facility will solely alter the Cool-Season Grassland habitat type present on the Site. Some edge effect impacts may occur as a result of the Facility in proximity to the Old Field habitat type associated with limited slopes on the sides of landfill areas, but this will be de minimus.

The landfill cover systems are generally comprised of a vegetative support layer, a sand drainage layer and a low permeability flexible membrane liner or soil cap. SolarCity will take all necessary precautions to not disrupt the landfill cap or to damage the low permeability flexible membrane liner. If any staking is required, hand dug test holes will be performed to confirm the depth to the liner or soil cap. All work will be subject to DEEP's permit approval and is subject to the Connecticut solid waste regulations and any requirements outlined in the DEEP landfill disruption authorization. SolarCity will have a health and safety plan in place while working on the landfill and the Norwich Fire Department will be trained for emergency response at the Facility. In addition, a licensed engineer will review and approval all equipment working on the landfill to ensure the ground pressure exerted does not exceed the threshold for the safety of the liner. Excavations will be performed with the guidance of a laborer or "spotter" at all times. The laborer will identify the depth of the liner and ensure that

the operator maintains a safe separating distance. A smooth bucket excavator will be used in lieu of a bucket with teeth for excavations in the vicinity of the landfills.

Prior to construction equipment being brought on the landfill caps, SolarCity will dig test pits to determine existing access road thickness and will improve the access road as required for construction equipment use.

The visibility of the Facility will be extremely limited and only a small percentage of incidental light will reflect off the panels (less than typically reflects off of common materials such as steel and water). The two solar arrays (Mounting Planes 2 and 3) on the transfer station parcel will not be visible from surrounding areas beyond the transfer station due to their distance from the road and abutting properties and the existing, dense mature vegetation. The two solar arrays on the 82 Rogers Road parcel (Mounting Planes 1 and 4) will be visible for short stretches from the intersection of Rogers Road and North Wawecus Hill Road as well as the frontage along Rogers Road. Residents to the south/southeast of the Site along North Wawecus Hill Road will not have any direct views of the Facility because the Project Area is buffered by mature vegetation as well as a proposed vegetative berm.

Traffic to the Facility after construction is complete will be minimal. Four times per year the Site will be mowed. Annual maintenance of the electrical equipment will occur once per year. Any equipment that breaks down will be repaired on an as needed basis. Annual maintenance will typically be two technicians for a day.

SolarCity has developed a Decommissioning Plan to prepare for the eventual permanent closure of the Facility. The Decommissioning Plan describes the process for

removal and disposal or recycling of the equipment and anticipated land-restoration activities. The Decommissioning Plan is attached as **Exhibit 6**.

III. NOTICE

SolarCity has provided notice of this petition to all persons and appropriate municipal officials and governmental agencies to whom notice is required to be given pursuant to Conn. Agencies Regs. § 16-50j-40(a).[6] A copy of the notice letter and the list of recipients are attached as **Exhibit 3**.

IV. BASIS FOR GRANTING OF THE PETITION

Under Conn. Gen. Stat. § 16-50k(a), the Council is required to approve by declaratory ruling the construction or location of a grid-side distributed resources project or facility with a capacity of not more than 65 MW, as long as the facility meets DEEP air and water quality standards. The proposed Facility meets both of these criteria. First, the Facility is a "grid-side distributed resources" project, as defined in Conn. Gen. Stat. § 16-1(a)(38), because the Facility is "a unit with a rating of not more than sixty-five megawatts that is connected to the transmission or distribution system...." Second, as demonstrated above and in the EA, the Facility will meet DEEP air and water quality standards and will not have an adverse environmental impact. In addition, all construction on the former landfills will comply with any protective requirements outlined in the DEEP Disruption Permit and Post Closure Use

[6] Conn. Agencies Regs. § 16-50j-40(a) requires that "[p]rior to submitting a petition for a declaratory ruling to the Council, the petitioner shall, where applicable, provide notice to each person other than the petitioner appearing of record as an owner of property which abuts the proposed primary or alternative sites of the proposed facility, each person appearing of record as an owner of the property or properties on which the primary or alternative proposed facility is to be located, and the appropriate municipal officials and government agencies [listed in Section 16-50*l* of the Connecticut General Statutes]."

Plan. Therefore, as demonstrated above, the construction and operation of the Facility will not have a substantial adverse environmental effect in the State of Connecticut.

V. CONCLUSION

For the reasons stated above, SolarCity respectfully requests that the Council approve the location and construction of the Facility by declaratory ruling.

Respectfully submitted,

SolarCity Corporation

By: _____

Philip M. Small, Esq.
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185 Asylum Street, 38th Floor
Hartford, CT 06103
Telephone: (860) 509-6500
Facsimile: (860) 509-6501
Electronic Mail: psmall@brownrudnick.com

EXHIBITS

Exhibit 1 – Site Plan

Exhibit 2 – Environmental Assessment

Exhibit 3 – Notice

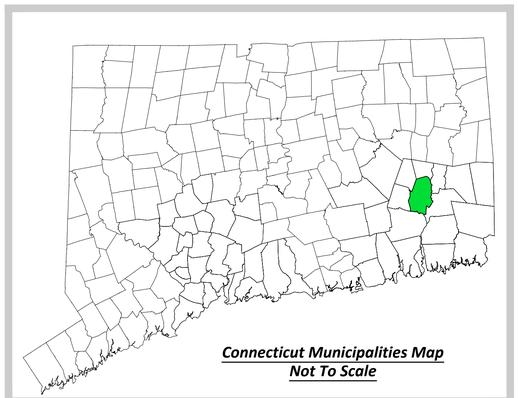
Exhibit 4 – Electrical Plans (1 copy, bulk filed)

Exhibit 5 – Stormwater Management Report (1 copy, bulk filed)

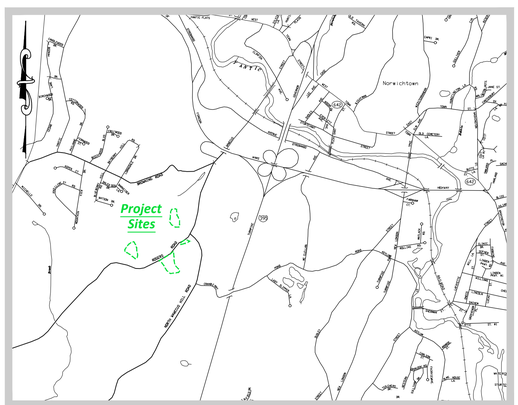
Exhibit 6 – Decommissioning Plan

62039190-WorkSiteUS

ROGERS ROAD LANDFILL SOLAR PROJECT
SOLAR PHOTOVOLTAIC (PV) SYSTEM
Prepared For
SolarCity Corporation
82 Rogers Road - Norwich, Connecticut
September 2015



Connecticut Municipalities Map
Not To Scale



Site Location Map
Scale: 1"=2000'



Site Location Aerial View
Not To Scale

Project Information	
Developed By:	***Electrical Engineer:***
Brightfields Development, LLC *41 Walnut Street, Suite 301* *Wellesley, MA 02481*	*SolarCity Corporation* *714 Brook Street* *Rocky Hill, CT 06067*
SolarCity Corporation *714 Brook Street* *Rocky Hill, CT 06067*	***Host:*** *City of Norwich* *100 Broadway* *Norwich, CT 06360*
Civil Engineer: *Boundaries LLC* *179 Pachaug River Drive* *Griswold, CT 06351*	***Utility:*** *Connecticut Municipal Electric Energy Cooperative* *30 Stott Avenue* *Norwich, CT 06360*

Index To Drawings

Sheet	*Sheet Title*
1	*Cover Sheet*
	Mounting Plane #1 and Mounting Plane #4
2	*Topographic Survey-Existing Conditions*
3	*Site Development Plan*
	Mounting Plane #2
4	*Topographic Survey-Existing Conditions*
5	*Site Development Plan*
	Mounting Plane #3
6	*Topographic Survey-Existing Conditions*
7	*Site Development Plan*
8	*Overall Site Utility Plan*
9	*Erosion & Sediment Control Narrative and Details*
10	*Site Details*
11	*Site Details*

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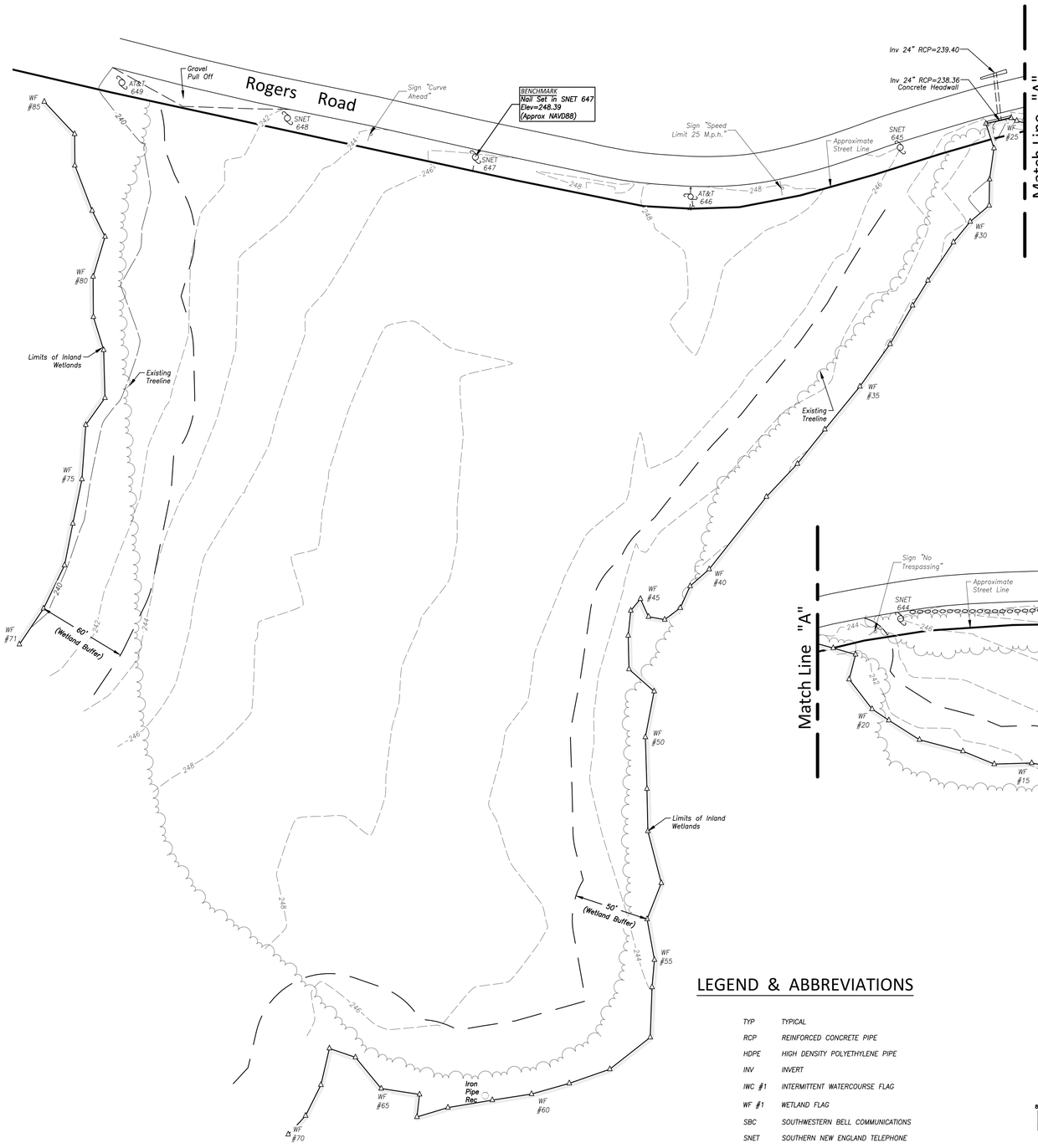

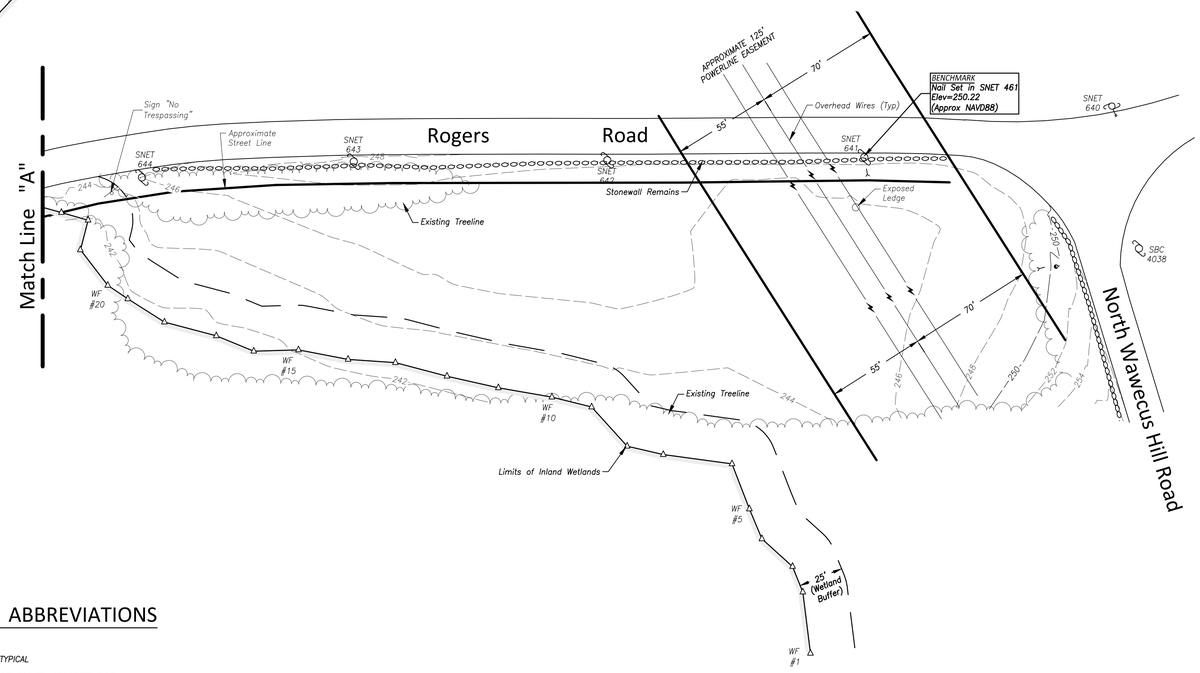

SURVEY NOTES

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4. THE FIELD SURVEY WAS COMPLETED ON OCTOBER 07, 2014
5. LIMITS OF INLAND WETLANDS DEPICTED HEREON WERE DELINEATED BY DEMIAN A. SORRENTINO, C.S.S., BOUNDARIES LLC. BUFFER AREAS DEPICTED HEREON ARE PREDICATED ON RECOMMENDED SETBACKS PROVIDED BY ALL POINTS TECHNOLOGY CORPORATION BASED EVALUATION OF SAID INLAND WETLANDS. THE CITY OF NORWICH INLAND WETLAND REGULATIONS REQUIRES AN UPLAND REGULATED AREA OF 100'.
6. THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE BASED ON THE LOCATION OF ABOVEGROUND STRUCTURES AND RECORD DRAWINGS PROVIDED TO THE SURVEYOR. LOCATIONS OF UNDERGROUND UTILITIES MAY VARY FROM LOCATIONS SHOWN HEREON. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL UTILITY LOCATIONS AND ELEVATIONS AND CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EARTHWORK OPERATIONS.

REFERENCE MAPS

1. AS-BUILT CONDITIONS, PREPARED FOR NUTMEG SAND AND GRAVEL COMPANY, NORWICH BULKY WASTE SITE, ROGERS ROAD, NORWICH, CONNECTICUT, SCALE: 1"=40', DATED: 10/26/99 SHEET No. 1 OF 1, PREPARED BY: ANCHOR ENGINEERING SERVICES, INC.
2. CONSTRUCTION PLANS FOR NORWICH LANDFILL CLOSURE, TOWN OF NORWICH, ROGERS ROAD, NORWICH, CONNECTICUT DATED: APRIL 1996, SHEETS 1 - 7, PREPARED BY: FUSS & O'NEILL

LEGEND & ABBREVIATIONS

TYP	TYPICAL
RCP	REINFORCED CONCRETE PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
INV	INVERT
IWC #1	INTERMITTENT WATERCOURSE FLAG
WF #1	WETLAND FLAG
SBC	SOUTHWESTERN BELL COMMUNICATIONS
SNET	SOUTHERN NEW ENGLAND TELEPHONE
CL&P	CONNECTICUT LIGHT AND POWER
AT&T	AMERICAN TELEPHONE AND TELEGRAPH
248	EXISTING CONTOUR
	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG

GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
1 inch = 40 ft.

I HAVE CONDUCTED AN ON-SITE SOIL INVESTIGATION OF THE PARCEL OF LAND DEPICTED HEREON. THE INTERMITTENT WATERCOURSES AND INLAND WETLAND BOUNDARIES AS PORTRAYED ARE AN ACCURATE REPRESENTATION OF THE DELINEATION PERFORMED IN THE FIELD.

DEMIAN A. SORRENTINO, C.S.S. DATE

"TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON."

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JOHN U. FAULISE JR. L.S. LICENSE NO. DATE

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SCALE: 1" = 40'
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JOB I.D. NO. 14-2302
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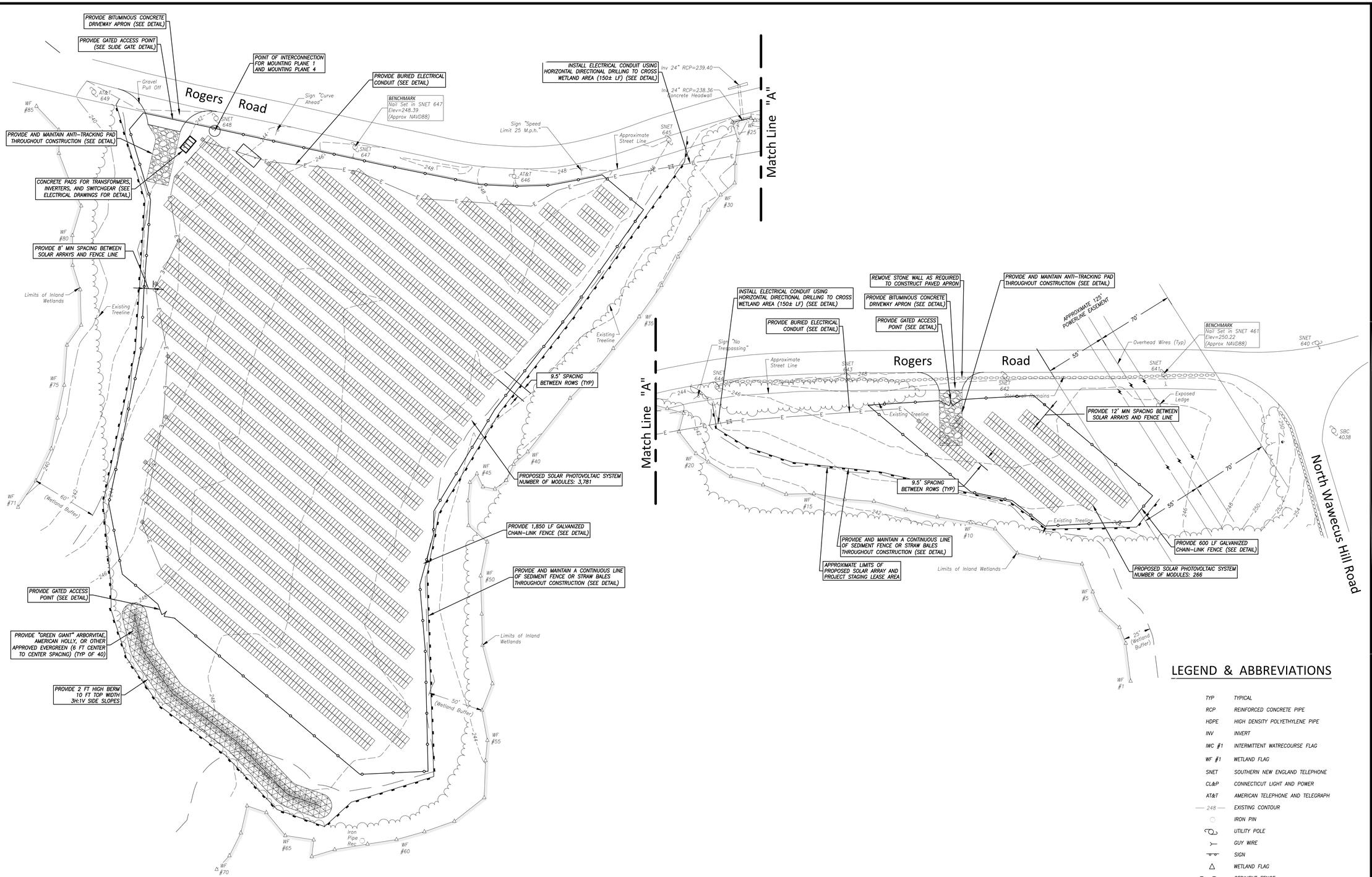

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	SIGN
	WETLAND FLAG
	SEDIMENT FENCE
	STRAW WATTLE
	CHAIN LINK FENCE
E	ELECTRICAL CONDUIT

29102
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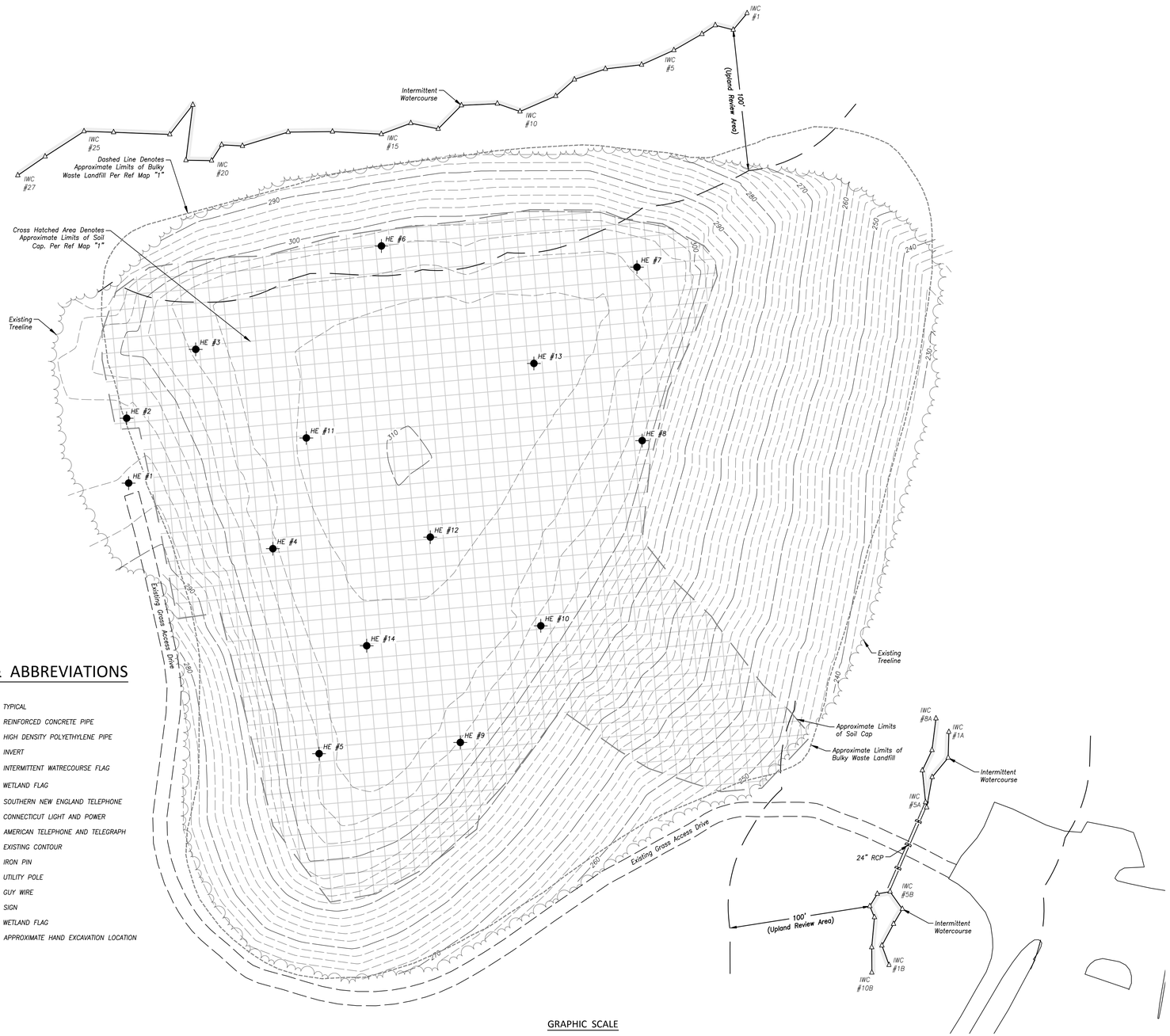

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	UTILITY POLE
	GUY WIRE
	SIGN
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HE #1	APPROXIMATE HAND EXCAVATION LOCATION

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HAND EXCAVATION RESULTS

HAND EXCAVATION LOCATIONS ARE APPROXIMATE ONLY. HAND EXCAVATIONS WERE PERFORMED BY WESTON & SAMPSON ENGINEERS, INC. ON JULY 9, 2015.

HAND EXCAVATION #1

SURFACE	COMPACTED SAND/GRAVEL AT BEGINNING OF PROPOSED GRAVEL ACCESS DRIVE
0" - 11"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, SOME SMALL TO LARGE GRAVEL; MOIST. APPEARED TO BE DENSE TO VERY DENSE BASED ON HAND EXCAVATION EFFORT. COULD NOT EXCAVATE BEYOND 11" BELOW GROUND SURFACE.

END OF EXCAVATION AT 11" BELOW GROUND SURFACE.

HAND EXCAVATION #2

SURFACE	TALL FIELD GRASS ALONG PROPOSED GRAVEL ACCESS DRIVE AT BASE OF LANDFILL SLOPE
0" - 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" - 12"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, SOME MEDIUM TO LARGE GRAVELS. APPEARED TO BE MEDIUM DENSE TO DENSE BASED ON HAND EXCAVATION EFFORT.
12" - 19"	GRAY, GRAVEL FILL (UP TO 4 IN. DIAMETER) WITH FINE TO MEDIUM SILTY SAND; MOIST. APPEARED TO BE VERY DENSE BASED ON HAND EXCAVATION EFFORT. COULD NOT EXCAVATE BEYOND 19" BELOW GROUND SURFACE.

END OF EXCAVATION AT 19" BELOW GROUND SURFACE.

HAND EXCAVATION #3

SURFACE	TALL FIELD GRASS ALONG PROPOSED GRAVEL ACCESS DRIVE AT TOP OF LANDFILL
0" - 2"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS.
2" - 18"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 18" BELOW GROUND SURFACE, END OF EXCAVATION AT 18" BELOW GROUND SURFACE.

HAND EXCAVATION #4

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 3"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
3" - 23"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE BRICK DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 23" BELOW GROUND SURFACE, END OF EXCAVATION AT 23" BELOW GROUND SURFACE.

HAND EXCAVATION #5

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" - 15"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE BRICK DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 15" BELOW GROUND SURFACE, END OF EXCAVATION AT 15" BELOW GROUND SURFACE.

HAND EXCAVATION #6

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 3"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
3" - 17"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 17" BELOW GROUND SURFACE, END OF EXCAVATION AT 17" BELOW GROUND SURFACE.

HAND EXCAVATION #7

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" - 9"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 9" BELOW GROUND SURFACE, END OF EXCAVATION AT 9" BELOW GROUND SURFACE.

HAND EXCAVATION #8

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" - 15"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE PLASTIC DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 15" BELOW GROUND SURFACE, END OF EXCAVATION AT 15" BELOW GROUND SURFACE.

HAND EXCAVATION #9

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 6"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
6" - 15"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE PLASTIC DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 15" BELOW GROUND SURFACE, END OF EXCAVATION AT 15" BELOW GROUND SURFACE.

HAND EXCAVATION #10

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 5"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
5" - 14"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 14" BELOW GROUND SURFACE, END OF EXCAVATION AT 14" BELOW GROUND SURFACE.

HAND EXCAVATION #11

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 2"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
2" - 27"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. SMALL COBBLES AT APPROXIMATELY 15" BELOW GROUND SURFACE. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 27" BELOW GROUND SURFACE, END OF EXCAVATION AT 27" BELOW GROUND SURFACE.

HAND EXCAVATION #12

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" - 17"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 17" BELOW GROUND SURFACE, END OF EXCAVATION AT 17" BELOW GROUND SURFACE.

HAND EXCAVATION #13

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 6"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
6" - 21"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 21" BELOW GROUND SURFACE, END OF EXCAVATION AT 21" BELOW GROUND SURFACE.

HAND EXCAVATION #14

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" - 3"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
3" - 25"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE PLASTIC DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 25" BELOW GROUND SURFACE, END OF EXCAVATION AT 25" BELOW GROUND SURFACE.

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"TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON."

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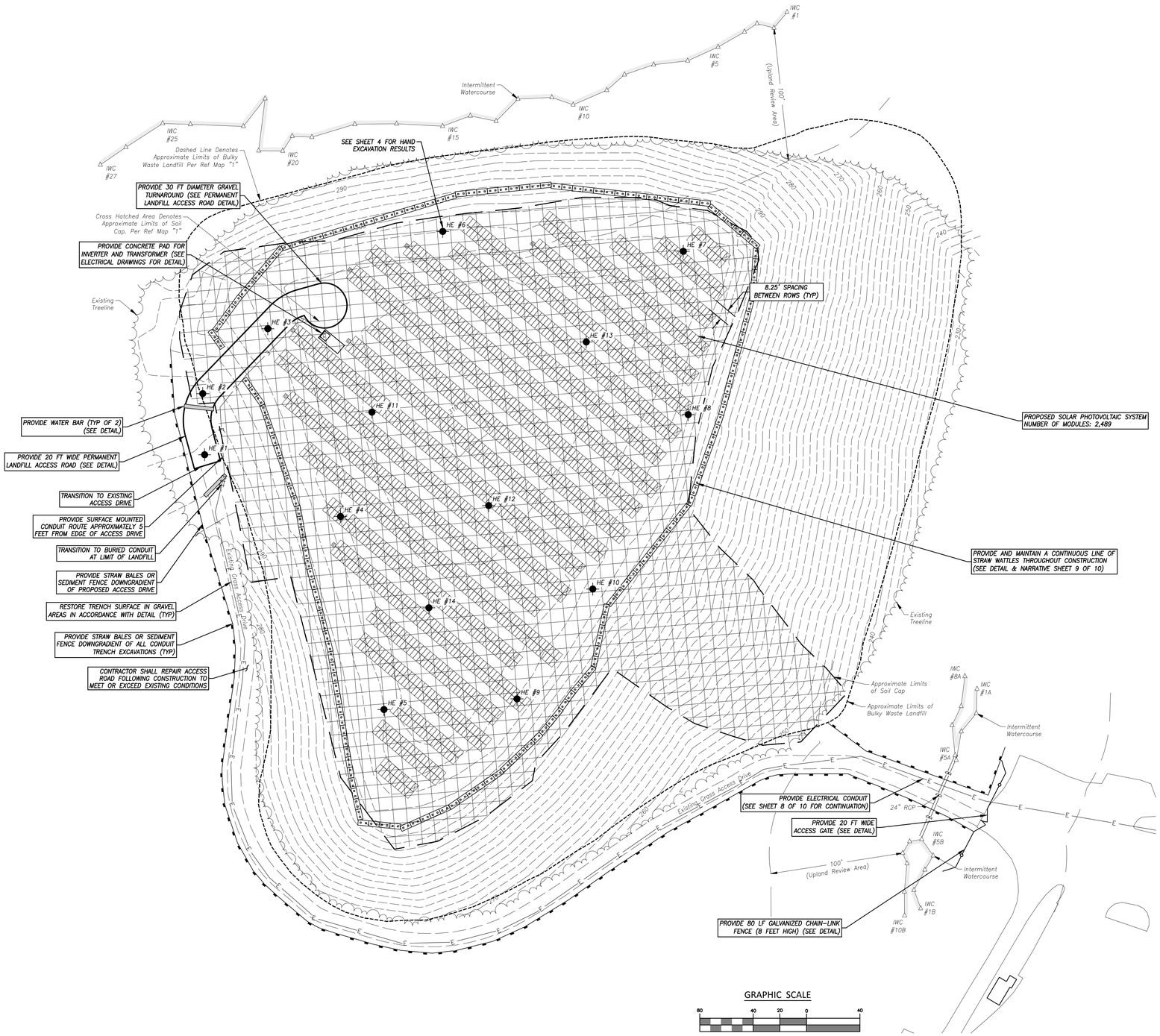

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HE #1	APPROXIMATE HAND EXCAVATION LOCATION

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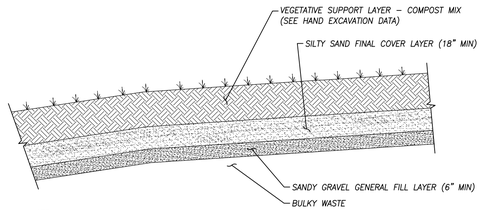

NOTE:
1. NO EXCAVATION WITHIN THE 18" SILTY SAND COVER LAYER.
2. CROSS SECTION DEVELOPED FROM LANDFILL CLOSURE REPORT PREPARED BY OTHERS AND MAY NOT REFLECT ACTUAL CONDITIONS.

BULKY WASTE LANDFILL SOIL CAP CROSS SECTION

NOT TO SCALE

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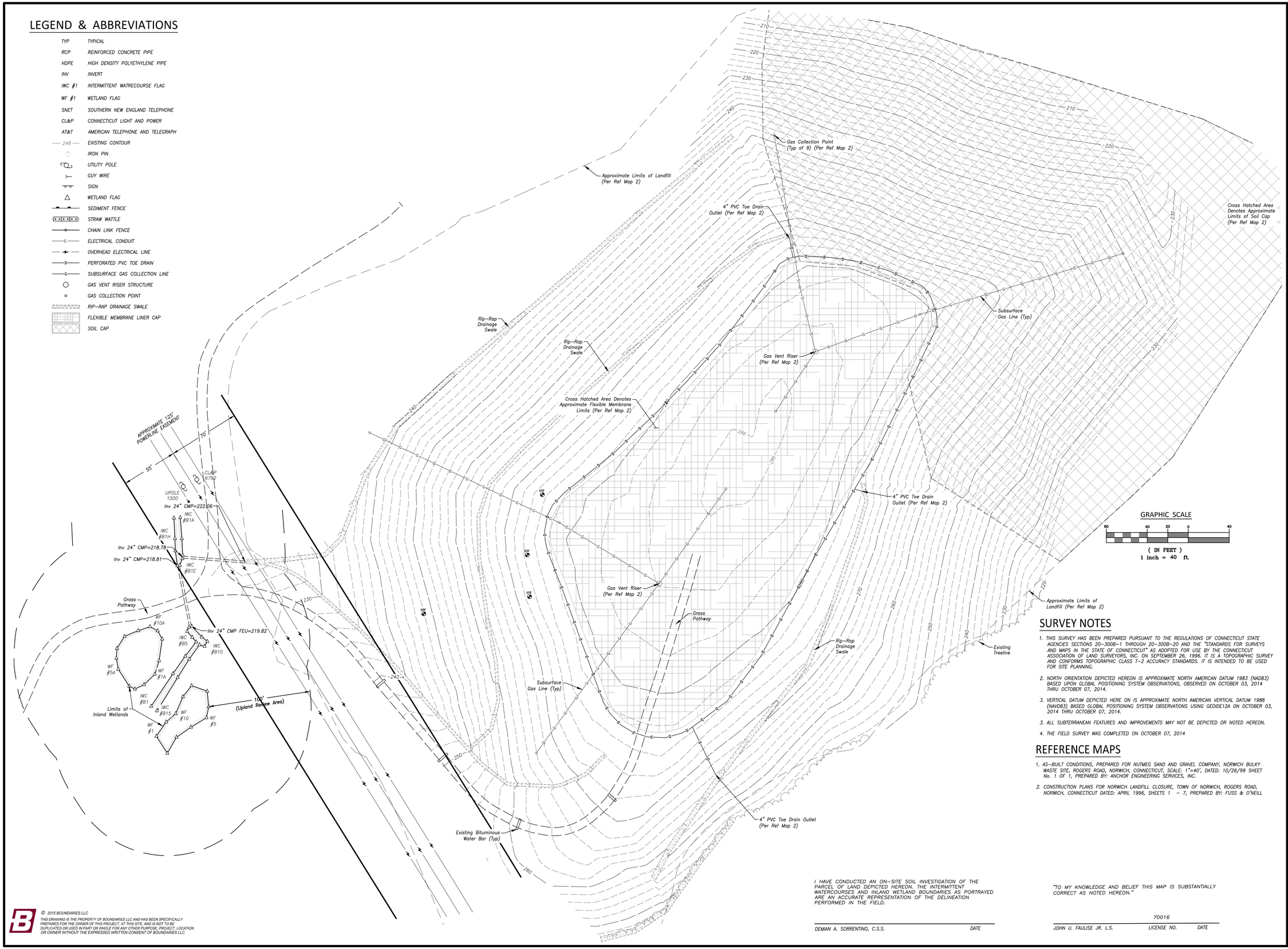
E	ELECTRICAL CONDUIT
	OVERHEAD ELECTRICAL LINE
D	PERFORATED PVC TOE DRAIN
G	SUBSURFACE GAS COLLECTION LINE
	GAS VENT RISER STRUCTURE
	GAS COLLECTION POINT
	RIP-RAP DRAINAGE SWALE
	FLEXIBLE MEMBRANE LINER CAP
	SOIL CAP



GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
1 inch = 40 ft.

SURVEY NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300B-1 THROUGH 20-300B-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED FOR USE BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996. IT IS A TOPOGRAPHIC SURVEY AND CONFORMS TOPOGRAPHIC CLASS T-2 ACCURACY STANDARDS. IT IS INTENDED TO BE USED FOR SITE PLANNING.
2. NORTH ORIENTATION DEPICTED HEREON IS APPROXIMATE NORTH AMERICAN DATUM 1983 (NAD83) BASED UPON GLOBAL POSITIONING SYSTEM OBSERVATIONS, OBSERVED ON OCTOBER 03, 2014 THRU OCTOBER 07, 2014.
3. VERTICAL DATUM DEPICTED HERE ON IS APPROXIMATE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD83) BASED GLOBAL POSITIONING SYSTEM OBSERVATIONS USING GEOID12A ON OCTOBER 03, 2014 THRU OCTOBER 07, 2014.
3. ALL SUBTERRANEAN FEATURES AND IMPROVEMENTS MAY NOT BE DEPICTED OR NOTED HEREON.
4. THE FIELD SURVEY WAS COMPLETED ON OCTOBER 07, 2014

REFERENCE MAPS

1. AS-BUILT CONDITIONS, PREPARED FOR NUTMEG SAND AND GRAVEL COMPANY, NORWICH BULKY WASTE SITE, ROGERS ROAD, NORWICH, CONNECTICUT, SCALE: 1"=40', DATED: 10/26/99 SHEET No. 1 OF 1, PREPARED BY: ANCHOR ENGINEERING SERVICES, INC.
2. CONSTRUCTION PLANS FOR NORWICH LANDFILL CLOSURE, TOWN OF NORWICH, ROGERS ROAD, NORWICH, CONNECTICUT DATED: APRIL 1996, SHEETS 1 - 7, PREPARED BY: FUSS & O'NEILL

I HAVE CONDUCTED AN ON-SITE SOIL INVESTIGATION OF THE PARCEL OF LAND DEPICTED HEREON. THE INTERMITTENT WATERCOURSES AND INLAND WETLAND BOUNDARIES AS PORTRAYED ARE AN ACCURATE REPRESENTATION OF THE DELINEATION PERFORMED IN THE FIELD.

DEMIAN A. SORRENTINO, C.S.S. DATE

"TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON."

70016
JOHN U. FAULISE JR. L.S. LICENSE NO. DATE

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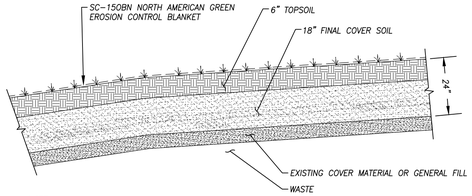
www.solarcity.com

SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Plane 3 - Landfill
Topographic Survey - Existing Conditions

SCALE: 1" = 40'
DATE: September 2015
JOB I.D. NO. 14-2302
Revisions

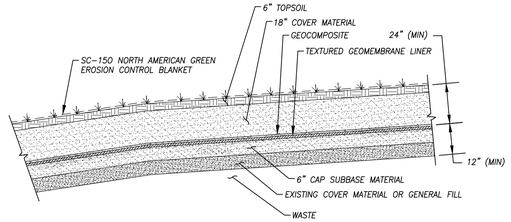
SHEET NO.
6
11



NOTE:
1. NO EXCAVATION WITHIN THE ORIGINAL COVER MATERIAL/GENERAL FILL LAYER.
2. CROSS SECTION DEVELOPED FROM LANDFILL CLOSURE PLANS PREPARED BY OTHERS AND MAY NOT REFLECT ACTUAL CONDITIONS.

NORWICH LANDFILL SOIL CAP CROSS SECTION

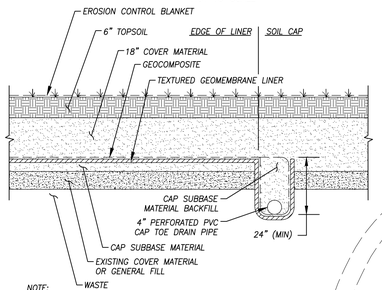
NOT TO SCALE



NOTE:
1. NO EXCAVATION WITHIN THE COVER MATERIAL LAYER.
2. CROSS SECTION DEVELOPED FROM LANDFILL CLOSURE PLANS PREPARED BY OTHERS AND MAY NOT REFLECT ACTUAL CONDITIONS.

NORWICH LANDFILL FLEXIBLE MEMBRANE LINER CAP CROSS SECTION

NOT TO SCALE



NOTE:
1. NO EXCAVATION WITHIN THE COVER MATERIAL LAYER.
2. CROSS SECTION DEVELOPED FROM LANDFILL CLOSURE PLANS PREPARED BY OTHERS AND MAY NOT REFLECT ACTUAL CONDITIONS.

FML CAP AND SOIL CAP INTERFACE CROSS SECTION

NOT TO SCALE

LEGEND & ABBREVIATIONS

TYP	TYPICAL
RCP	REINFORCED CONCRETE PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
INV	INVERT
IWC #1	INTERMITTENT WATRECOURSE FLAG
WF #1	WETLAND FLAG
SNET	SOUTHERN NEW ENGLAND TELEPHONE
CL&P	CONNECTICUT LIGHT AND POWER
AT&T	AMERICAN TELEPHONE AND TELEGRAPH
248	EXISTING CONTOUR
	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG
	SEDIMENT FENCE
	STRAW WATTLE
E	CHAIN LINK FENCE
E	ELECTRICAL CONDUIT
	OVERHEAD ELECTRICAL LINE
D	PERFORATED PVC TOE DRAIN
G	SUBSURFACE GAS COLLECTION LINE
	GAS VENT RISER STRUCTURE
	GAS COLLECTION POINT
	RIP-RAP DRAINAGE SWALE
	FLEXIBLE MEMBRANE LINER CAP
	SOIL CAP

GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
1 inch = 40 ft.

29102
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SolarCity Corporation
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82 Rogers Road - Norwich, Connecticut
Mounting Plane 3 - Landfill
Site Development Plan

SCALE: 1" = 40'
DATE: September 2015
JOB I.D. NO. 14-2302
Revisions

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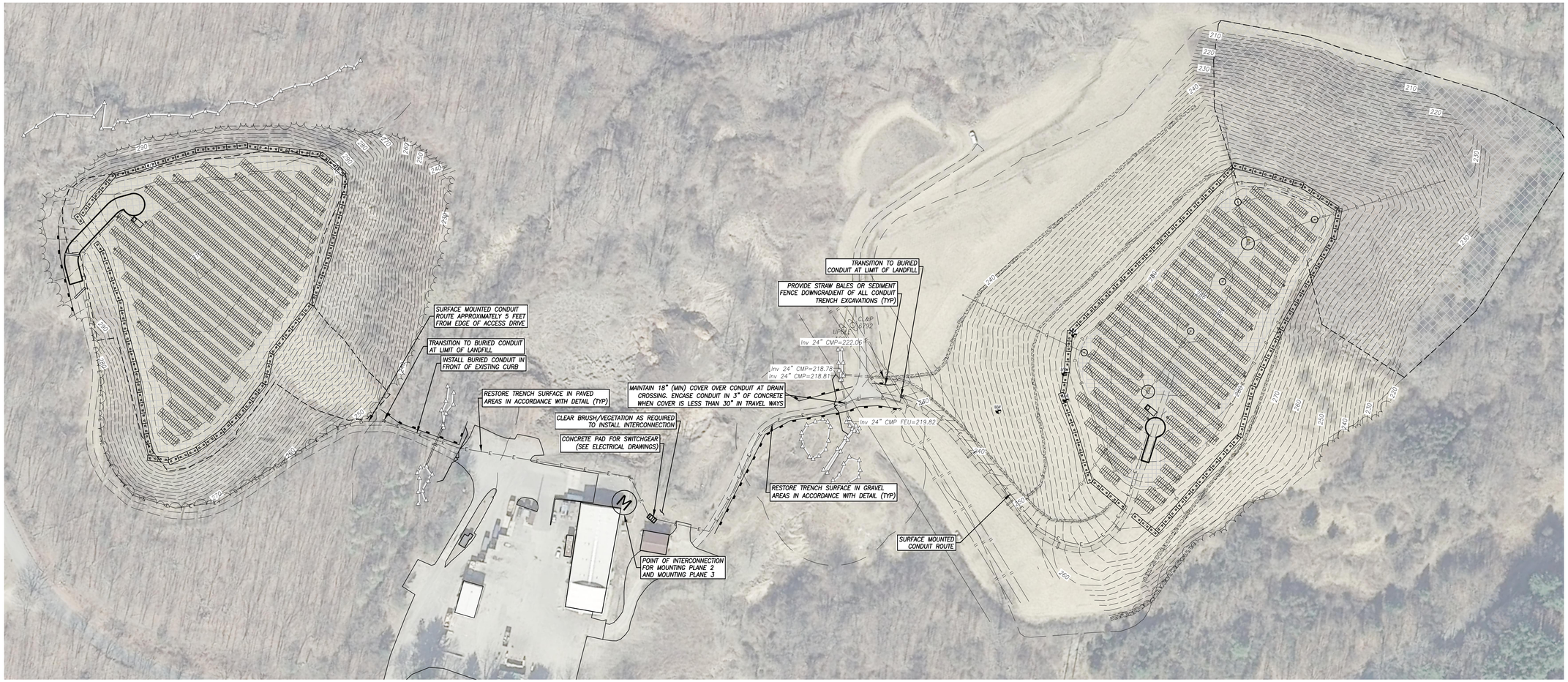

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	GUY WIRE
	SIGN
	WETLAND FLAG
	SEDIMENT FENCE
	STRAW WATTLE
	CHAIN LINK FENCE
E	ELECTRICAL CONDUIT
U	OVERHEAD ELECTRICAL LINE

GRAPHIC SCALE

160 80 40 0 80

(IN FEET)
1 inch = 80 ft.

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SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Planes 2 & 3
Overall Site Utility Plan

SCALE: 1" = 80'
DATE: September 2015
JOB I.D. NO. 14-2302
Revisions

SHEET NO.
8
11

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL CALL BEFORE YOU DIG AT 811 OR 1-800-922-4455 AT LEAST 72 HOURS, SATURDAY, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATION AT ANY LOCATION. A COPY OF THE CALL BEFORE YOU DIG PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
2. LOCATIONS OF EXISTING PIPES, CONDUITS, UTILITIES, FOUNDATIONS AND OTHER UNDERGROUND OBJECTS ARE NOT WARRANTED TO BE CORRECT AND THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT SHOULD THEY BE OTHER THAN THAT SHOWN.
3. STONE WALLS, FENCES, CURBS, ETC. SHALL BE REMOVED AND REPLACED AS NECESSARY TO PERFORM THE WORK. UNLESS OTHERWISE INDICATED, ALL SUCH WORK SHALL BE INCIDENTAL TO CONSTRUCTION OF THE PROJECT.
4. ALL OTHER DISTURBED BY THE CONTRACTOR BEYOND PAYMENT LIMITS SHALL BE RESTORED AT NO ADDITIONAL COST TO THE OWNER.
5. IF SURVEY CONTROL STAKING AND EROSION CONTROL MEASURES ARE REQUIRED, HAND DUG TEST HOLES WILL BE PERFORMED TO CONFIRM THE DEPTH TO THE LINER OR SOIL CAP, PRIOR TO INSTALLATION. ALL TEST HOLES SHALL BE VERIFIED BY THE ON-SITE ENGINEER.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH OSHA REQUIREMENTS AND THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THESE REQUIREMENTS. IN ADDITION, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ANY EXCAVATION SAFEGUARDS, NECESSARY BARRICADES, FLAGMEN, ETC. FOR TRAFFIC CONTROL AND SITE SAFETY.
7. ALL EROSION & SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION.
8. ALL FUEL, OIL, PAINT OR OTHER HAZARDOUS MATERIALS USED DURING CONSTRUCTION SHOULD BE STORED IN A SECONDARY CONTAINER AND REMOVED TO A LOCKED INDOOR AREA WITH AN IMPERVIOUS FLOOR DURING NON-WORK HOURS.
9. NO WASTE MATERIALS (SUCH AS STUMPS) ARE ALLOWED TO BE BURIED ON SITE. ALL WASTE MATERIALS SHALL BE DISPOSED OF OFF-SITE AT AN APPROPRIATE LOCATION IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.

SPECIFICATIONS FOR WORK ON LANDFILL:

GENERAL:

1. THE CONTRACTOR SHALL BE AWARE THAT WORK IS LOCATED ON A LANDFILL AND IS SUBJECT TO THE CONNECTICUT SOLID WASTE REGULATIONS AND ANY REQUIREMENTS OUTLINED IN THE CT DEEP LANDFILL DISRUPTION AUTHORIZATION.
2. THE CONTRACTOR SHALL BE AWARE THAT THE WORK IS TO TAKE PLACE ABOVE A LANDFILL COVER SYSTEM, GENERALLY COMPRISED OF A VEGETATIVE SUPPORT LAYER, A SAND DRAINAGE LAYER, AND A LOW PERMEABILITY FLEXIBLE MEMBRANE LINER OR SOIL CAP. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO NOT DISRUPT THE LANDFILL CAP PROFILE OR TO DAMAGE THE LOW PERMEABILITY FLEXIBLE MEMBRANE LINER OR SOIL CAP.
3. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION'S PERMIT APPROVAL.
4. THE CONTRACTOR SHALL HAVE A HEALTH AND SAFETY PLAN WHILE WORKING ON THE LANDFILL.

EQUIPMENT:

1. THE CONTRACTOR SHALL PROVIDE A LIST OF ALL EQUIPMENT PROPOSED TO BE WORKING ON THE LANDFILL. THE LIST SHALL INCLUDE THE EQUIPMENT WEIGHT, GROUND PRESSURE, AND ANY RESTRICTIONS THAT WILL BE IMPOSED ON THE VEHICLE (I.E. LIMITED TO EXISTING ACCESS ROADS, LIMITED TO CARRYING ½ LOADS, ETC.)
2. ALL EQUIPMENT IS SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. AS A GENERAL RULE, EQUIPMENT SHALL ADHERE TO THE FOLLOWING REQUIREMENTS:

Equipment Ground Pressure		Minimum Lift Thickness	
KPa	psi	meter	inches
<70	<10	0.30	12
70-140	10-20	0.60	24
>140	>20	0.90	36

SOURCE: GEOMEMBRANE PROTECTION DESIGN MANUAL, GSE; DHANI MAREJO, PH.D. AND GREG CORCORAN, P.E., FIRST EDITION.

EXCAVATIONS:

1. THE CONTRACTOR SHALL PROVIDE AN EXCAVATION PLAN DETAILING HOW THE CONTRACTOR WILL COMPLY WITH ALL PERTINENT PROVISIONS OF THE CONTRACT DOCUMENTS INCLUDING SITE RESTRICTIONS, WORK PROTOCOLS, TEMPORARY ROADS, ON-SITE PARKING AND STORAGE AREAS.
2. EXCAVATIONS ON THE LANDFILL AREA SHALL BE PERFORMED WITH THE GUIDANCE OF A LABORER OR "SPOTTER" AT ALL TIMES. THE LABORER SHALL IDENTIFY THE DEPTH OF THE LINER AND ENSURE THAT THE OPERATOR MAINTAINS A SAFE SEPARATING DISTANCE.
3. IT IS REQUIRED TO USE A SMOOTH BUCKET EXCAVATOR IN LIEU OF BUCKET WITH TEETH FOR EXCAVATIONS IN THE VICINITY OF THE LANDFILLS.

TEMPORARY EROSION CONTROL MEASURES:

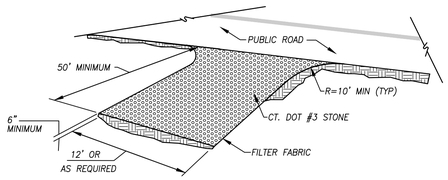
1. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AS DETERMINED BY THE ON-SITE ENGINEER.
2. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME.
3. SEDIMENT/EROSION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON PLANS. EROSION CONTROL BARRIERS ARE TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE BEEN ADEQUATELY STABILIZED.
4. FILL MATERIAL SHALL BE FREE FROM STUMPS, WOOD, ROOTS, ETC.
5. THE TEMPORARY AND PERMANENT STORMWATER CONTROLS SHALL BE PERIODICALLY CLEANED OF SEDIMENT, AS REQUIRED BY THE ENGINEER. THE SEDIMENT WILL BE REMOVED TO A SECURE LOCATION SO AS TO PREVENT SILTATION OF NATURAL WATER WAYS.
6. STRAW WATTLES MUST BE A MINIMUM TUBE DIAMETER OF 12 INCHES (300MM) FOR SLOPES UP TO 50 FEET (15.24M) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPS OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
7. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
8. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.
9. EROSION CONTROL MEASURES SHALL BE REMOVED WHEN DISTURBED AREA IS STABILIZED. DISTURBED AREA RESULTING FROM THE SILT FENCE REMOVAL OPERATION SHALL BE SEEDED IN ACCORDANCE WITH THE SPECIFICATIONS.
10. EROSION CONTROLS OTHER THAT AS SHOWN (I.E. HAY BALES) MUST BE APPROVED BY THE ENGINEER.

EROSION CONTROL NOTES:

1. THE RESPONSIBLE PARTY FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES IS ROBERT MILLER AT SOLARCITY AT 914-584-6894.
2. THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" BY THE CONNECTICUT COUNCIL ON SOIL AND WATER CONSERVATION IN COOPERATION WITH THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION, DEP BULLETIN 34, SHALL BE USED FOR INSTALLING AND MAINTAINING ALL EROSION CONTROL MEASURES. THE CONTRACTOR SHALL INSTALL ADDITIONAL MEASURES AS NECESSARY IF DIRECTED BY THE ENGINEER.
3. SEEDING FOR PERMANENT STABILIZATION SHALL BE DONE BETWEEN APRIL 15 THROUGH JUNE 15 OR BETWEEN AUGUST 15 THROUGH SEPTEMBER 15. IF SEEDING CANNOT BE DONE WITHIN THESE TIMES, APPLY TEMPORARY MULCH UNTIL NEXT SEEDING TIME. SEED MIXTURE SHALL BE AS FOLLOWS:

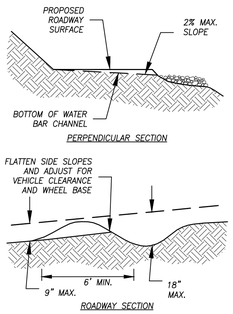
ALL 2:1 SLOPE AREAS			
CROWN VETCH	15 LBS/ACRE	OR	0.35 LBS/1,000 SF
PERENNIAL RYEGRASS	10 LBS/ACRE	OR	0.25 LBS/1,000 SF
ALL OTHER GRASSED AREAS			
CREEPING RED FESCUE	20 LBS/ACRE	OR	0.45 LBS/1,000 SF
REDTOP	2 LBS/ACRE	OR	0.05 LBS/1,000 SF
CROWN VETCH	15 LBS/ACRE	OR	0.35 LBS/1,000 SF

4. MULCH SHALL BE A GOOD QUALITY HAY OR STRAW AND SHALL BE APPLIED AT A RATE OF 2 BALES/1,000 SF.
5. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED WITHIN 24 HOURS AFTER RAIN EVENTS AND REPAIRED OR REPLACED AS NECESSARY TO INSURE COMPLIANCE WITH THE APPROVED SOIL EROSION AND SEDIMENT CONTROL PLAN.
6. DUST CONTROL MEASURES WILL BE IMPLEMENTED DURING DRY CONDITIONS AND INCLUDE WATERING WITH A TANK TRUCK ON AN AS-NEEDED BASIS IN ORDER TO INSURE THAT NO AMBIENT DUST CONDITIONS ARE GENERATED FROM THE PROJECT.
7. THE ANTI-TRACKING PAD SHALL BE INSPECTED ON A WEEKLY BASIS AND MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION FOR THIS PROJECT. WHEN THE ANTI-TRACKING PAD IS NO LONGER FUNCTIONING EFFICIENTLY OR ACCUMULATED SEDIMENT IS TO A DEPTH OF 2" BELOW THE STONE SURFACE, THE ANTI-TRACKING PAD SHALL BE REMOVED AND REPLACED AS PER THE DETAIL INDICATED ON THESE PLANS.



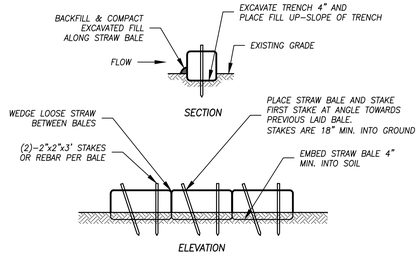
ANTI-TRACKING PAD

NOT TO SCALE



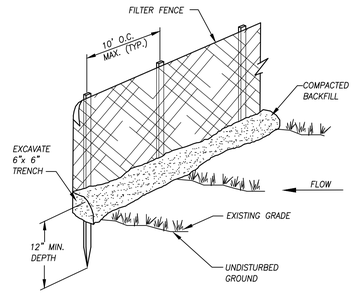
WATER BAR DETAIL

NOT TO SCALE



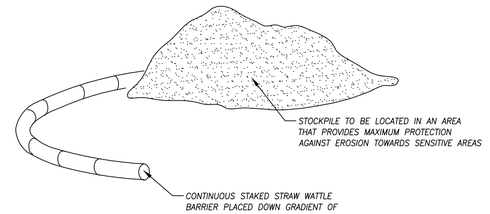
STRAW BALE BARRIER DETAIL (OFF CAP)

NOT TO SCALE



SEDIMENT FENCE DETAIL (OFF CAP)

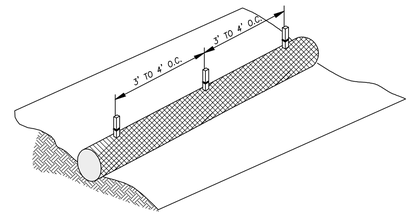
NOT TO SCALE



NOTE: LONG AXIS OF STOCKPILE TO BE PERPENDICULAR TO CONTOUR.

TEMPORARY STOCKPILE BARRIER DETAIL

NOT TO SCALE

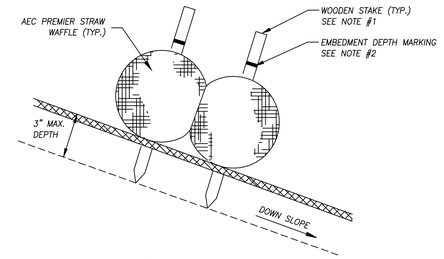


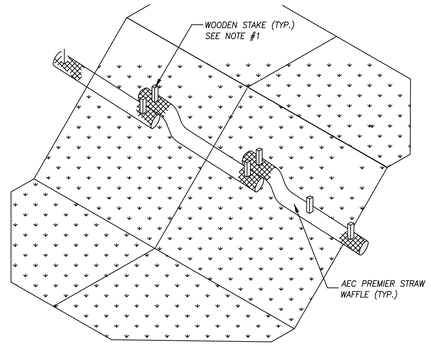
STRAW WATTLE INSTALLATION DETAIL (ON CAP)

NOT TO SCALE

NOTES:

1. PRIOR TO INSTALLATION OF WATTLES OR OTHER APPROVED EROSION CONTROL MEASURES, THE CONTRACTOR MUST PERFORM HAND DUG TEST HOLES UNDER THE SUPERVISION OF THE ON-SITE ENGINEER. IF SUFFICIENT CLEARANCE IS NOT FOUND, CONCRETE BLOCKS WILL BE USED AS A SUBSTITUTE FOR STAKES.
2. WATTLES CAN BE STAKED ON THE LANDFILL PROVIDED THE STAKES DO NOT EXCEED 3 INCHES INTO THE VEGETATIVE SUPPORT LAYER. STAKES SHALL BE CLEARLY MARKED 16 INCHES FROM THE TIP OF THE STAKE (3" MAX. EMBEDMENT DEPTH + 12" WATTLE) AND SHALL BE CLEARLY VISIBLE.





STRAW WATTLE SLOPE INSTALLATION DETAIL (ON CAP)

NOT TO SCALE

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P:\CIVIL 3D PROJECTS\2014\14-2302 - BRIGHTFIELDS-NORWICH\DWG\DESIGN\(9) EROSION & SEDIMENT CTRL NARRATIVE & DETAILS.DWG

CIVIL ENGINEERING LAND SURVEYING LAND DEVELOPMENT SOLAR DESIGN
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SolarCity Corporation
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82 Rogers Road - Norwich, Connecticut
Mounting Planes 1-3
Erosion & Sediment Control Narrative and Details

SCALE:

DATE: September 2015

JOB I.D. NO. 14-2302

Revisions

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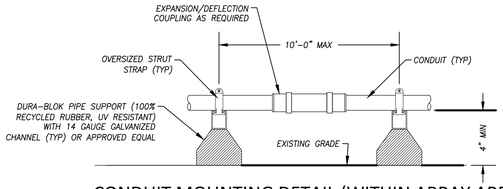
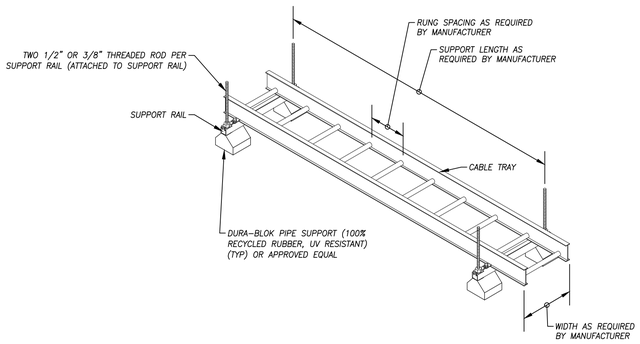


CONDUIT MOUNTING DETAIL (WITHIN ARRAY AREA)

NOT TO SCALE



CABLE TRAY DETAIL (WITHIN ARRAY AREA)

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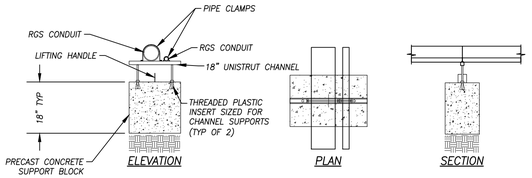
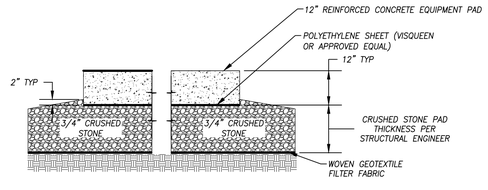


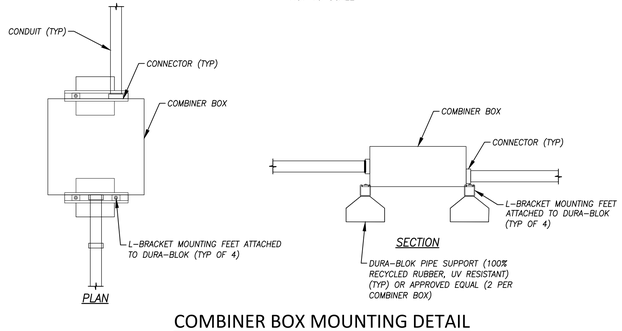
CONCRETE BLOCK RACEWAY DETAIL (ON LANDFILL CAP)

NOT TO SCALE



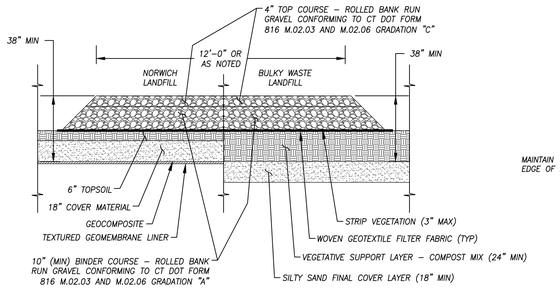
ELECTRICAL EQUIPMENT PAD DETAIL (ON LANDFILL CAP)

NOT TO SCALE



COMBINER BOX MOUNTING DETAIL

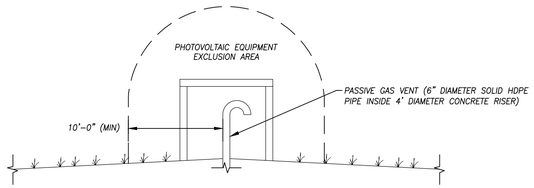
NOT TO SCALE



NOTE:
1. TEST PITS TO DETERMINE EXISTING ACCESS ROAD THICKNESS SHALL BE COMPLETED PRIOR TO UTILIZATION FOR CONSTRUCTION EQUIPMENT. IMPROVE AS REQUIRED FOR CONSTRUCTION EQUIPMENT USE.
2. ACCESS ROAD TO COMPLY WITH H-20 WHEEL LOADING.
3. TEST PITS TO DETERMINE CAPPING SYSTEM AND CONFIRM LAYER THICKNESS SHALL BE PERFORMED PRIOR TO INSTALLATION OF THE ACCESS ROAD.
4. ROADWAY DESIGN TO COMPLY WITH LOCAL EMERGENCY SERVICE REQUIREMENTS.
5. COMPACT PERMANENT ACCESS ROAD TO 95% MAXIMUM DENSITY IN LIFTS NOT TO EXCEED 12".

PERMANENT/TEMPORARY LANDFILL ACCESS ROAD

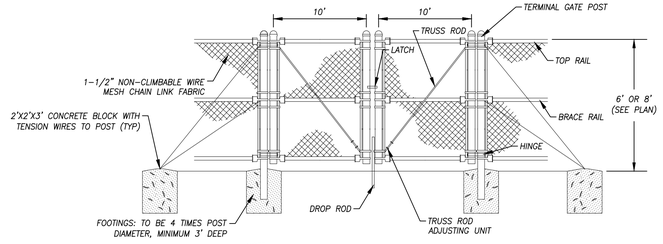
NOT TO SCALE



NOTE:
1. NO EQUIPMENT ASSOCIATED WITH THE PHOTOVOLTAIC SYSTEM SHALL BE LOCATED WITHIN A 10' EXCLUSION AREA OF PASSIVE GAS VENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE EXISTING GAS VENTS FROM DAMAGE FROM CONSTRUCTION EQUIPMENT/VEHICLES. ANY DAMAGE TO EXISTING GAS VENTS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER AND REPAIRED AT NO COST TO THE OWNER/DEVELOPER.

PASSIVE GAS VENT (EQUIPMENT FREE AREA) DETAIL

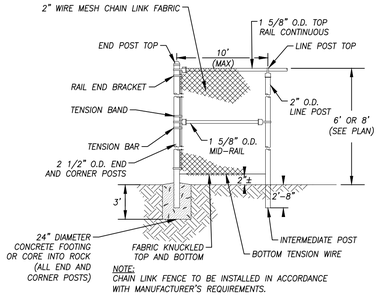
NOT TO SCALE



NOTE:
SWING GATES TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

OFF CAP GALVANIZED SWING GATE DETAIL MOUNTING PLANE #1

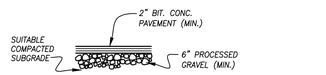
NOT TO SCALE



NOTE:
CHAIN LINK FENCE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

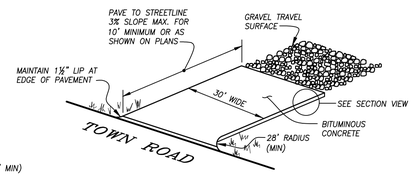
OFF CAP GALVANIZED CHAIN LINK FENCE DETAIL

NOT TO SCALE



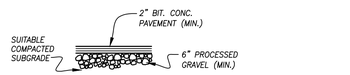
SECTION VIEW

NOT TO SCALE



TYPICAL DRIVEWAY APRON MOUNTING PLANE #1

NOT TO SCALE



SECTION VIEW

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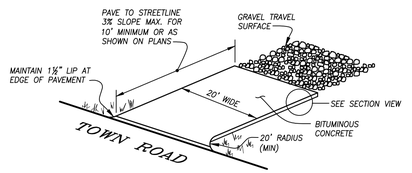
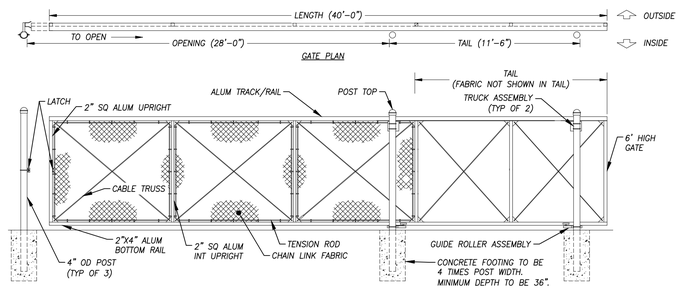


TYPICAL DRIVEWAY APRON MOUNTING PLANE #4

NOT TO SCALE



NOTES:
1. SLIDE GATE BY MASTER HALCO OR APPROVED EQUAL.
2. SLIDE GATE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

ALUMINUM SINGLE-TRACK CANTILEVERED SLIDE GATE DETAIL

NOT TO SCALE



NOTE:
1. SIGNS MOUNTED ON GATES AT ALL ENTRANCES.
2. SIGNS TO BE RATED FOR OUTDOOR ENVIRONMENTS.

IDENTIFICATION SIGNAGE

NOT TO SCALE

29102

DAVID C. McKAY, P.E. LICENSE NO. DATE

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P:\CIVIL 3D PROJECTS\2014\14-2302 - BRIGHTFIELDS-NORWICH\DWG\DESIGN\(10-11) SITE DETAILS.DWG

CIVIL ENGINEERING LAND SURVEYING LAND DEVELOPMENT SITE DESIGN
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BRIGHTFIELDS DEVELOPMENT LLC
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Rocky Hill, CT 06067
www.solarcity.com

SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Planes 1-3
Site Details

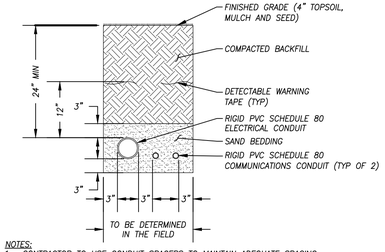
SCALE:

DATE: September 2015

JOB I.D. NO. 14-2302

Revisions

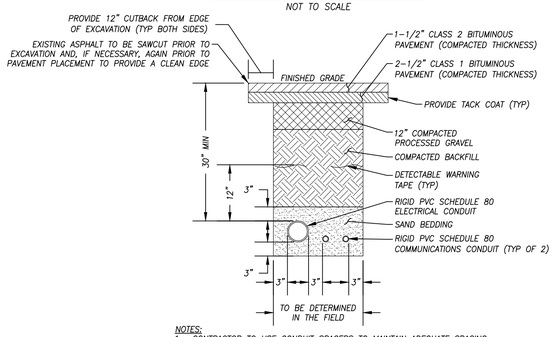
SHEET NO. 10 / 11



NOTES:
1. CONTRACTOR TO USE CONDUIT SPACERS TO MAINTAIN ADEQUATE SPACING.
2. MAINTAIN 3" SPACING BETWEEN OUTER WALLS OF CONDUITS.

OFF CAP TYPICAL MEDIUM VOLTAGE CONDUIT TRENCH DETAIL

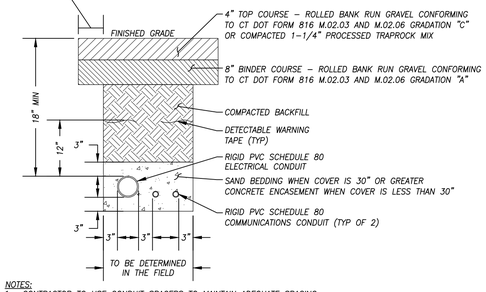
NOT TO SCALE



NOTES:
1. CONTRACTOR TO USE CONDUIT SPACERS TO MAINTAIN ADEQUATE SPACING.
2. MAINTAIN 3" SPACING BETWEEN OUTER WALLS OF CONDUITS.

TYPICAL MEDIUM VOLTAGE CONDUIT TRENCH (IN PAVED AREAS) DETAIL

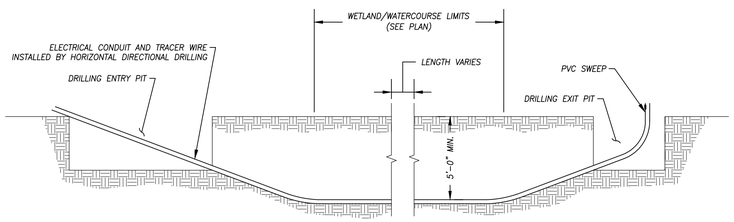
NOT TO SCALE



NOTES:
1. CONTRACTOR TO USE CONDUIT SPACERS TO MAINTAIN ADEQUATE SPACING.
2. MAINTAIN 3" SPACING BETWEEN OUTER WALLS OF CONDUITS.

TYPICAL MEDIUM VOLTAGE CONDUIT TRENCH (IN PAVED AREAS) DETAIL

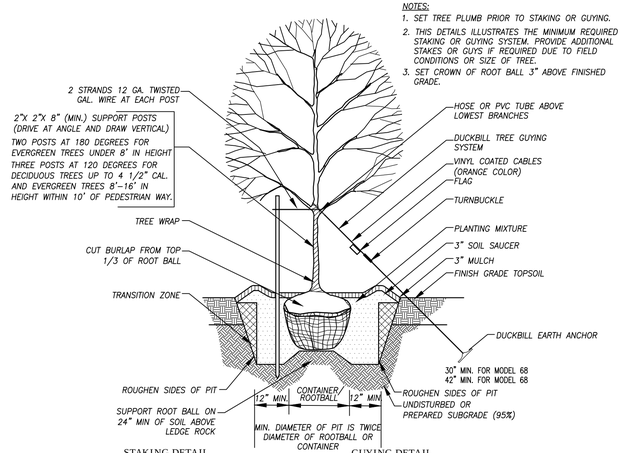
NOT TO SCALE



NOTES:
1. 5' DRILL DEPTH TO BE MAINTAINED EXCEPT WHERE ELEVATION CHANGES ARE REQUIRED TO AVOID OBSTACLES.
2. REFER TO ELECTRICAL PLANS AND WIRE SCHEDULE FOR ACTUAL NUMBER AND LOCATION OF CONDUITS.

TYPICAL HORIZONTAL DIRECTIONAL DRILLING DETAIL

NOT TO SCALE



NOTES:
1. SET TREE PLUMB PRIOR TO STAKING OR GUYING.
2. THIS DETAILS ILLUSTRATES THE MINIMUM REQUIRED STAKING OR GUYING SYSTEM. PROVIDE ADDITIONAL STAKES OR GUYS IF REQUIRED DUE TO FIELD CONDITIONS OR SIZE OF TREE.
3. SET CROWN OF ROOT BALL 3" ABOVE FINISHED GRADE.

STAKING DETAIL

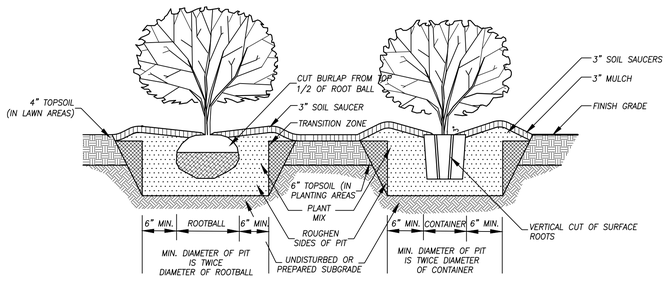
FOR USE WITH:
A. DECIDUOUS TREES UNDER 3" CALIPER.
B. DECIDUOUS TREES 3"–4 1/2" CALIPER WHEN PLANTED WITHIN 10' OF PEDESTRIAN WAYS.
C. EVERGREEN TREES UNDER 8' IN HEIGHT.
D. EVERGREEN TREES 8'–16' IN HEIGHT WHEN PLANTED WITHIN 10' OF PEDESTRIAN WAYS.

GUYING DETAIL

FOR USE WITH:
A. DECIDUOUS TREES 3"–4 1/2" CALIPER WHEN PLANTED GREATER THAN 10' OUTSIDE OF PEDESTRIAN WAYS.
B. DECIDUOUS TREE OVER 4 1/2" CALIPER.
C. EVERGREEN TREES 8'–16' IN HEIGHT WHEN PLANTED GREATER THAN 10' OUTSIDE OF PEDESTRIAN WAYS.
D. EVERGREEN TREES OVER 16' IN HEIGHT.

TREE PLANTING DETAIL

NOT TO SCALE



BALLED AND BURLAPPED MATERIAL

CONTAINER GROWN MATERIAL

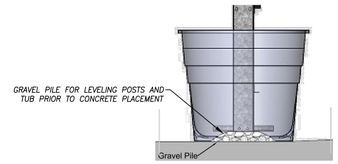
NOTES:
1. SET CROWN OF ROOTBALL 2" ABOVE FINISH GRADE.
2. FOR CONTAINER GROWN STOCK USE FINGERS OR A SHARP KNIFE TO LOOSEN ROOTS OUT OF THE OUTER LAYER OF POTTING SOIL; THEN CUT OR PULL APART ANY ROOTS CIRCLING THE PERIMETER OF THE CONTAINER.
3. AT PLANTING THOROUGHLY SOAK THE ROOT MASS AND ADJACENT SOIL. REPEAT SEVERAL TIMES DURING THE FIRST MONTH AND THROUGHOUT THE FOLLOWING TWO SUMMERS.

SHRUB PLANTING DETAIL

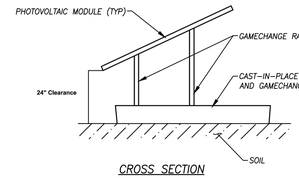
NOT TO SCALE

PLANTING SPECIFICATIONS:

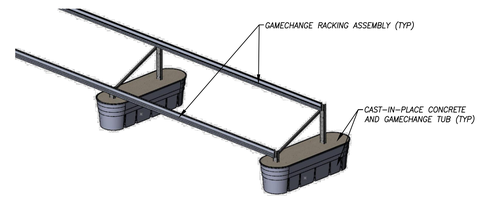
1. All materials and construction methods shall conform to the requirements of the Connecticut Association of Landscape Contractors Specification. All plants shall be nursery grown and conform to the latest edition of ANSI 260.1, AMERICAN STANDARD FOR NURSERY STOCK and also the minimum guidelines established for nursery stock published by the American Association of Nurserymen, Inc.
2. No substitution of plant materials will be allowed without the prior written consent of the Project Owner. Where a plant size range is provided at least 50% of the plants shall be of the larger size.
3. All lawn and planting area soil preparation shall be fertilized and amended according to recommendations of a soil analysis provided by an approved soil testing laboratory.
4. All exterior ground areas disturbed by construction and not covered by buildings, structures, paving, continuous planting beds or other site improvements shall be graded, topsoiled to a minimum depth of 4" and grass seeded. Provide lawn development in all areas of selective clearing as directed.
5. All plant pits must be free draining. Break up the bottom of the hole by fork if necessary to ensure plant has proper drainage.
6. Set all plants in center of plant pits, plumb and straight and as detailed on the drawing. All plant material shall bear the same relationship to finished grade as to original planting grade prior to digging. Trees shall be planted with the junction of roots and stem level with finished grade.
7. Handle balled and burlapped plants from the ball only. Once positioned in the hole, remove the top 1/3 of the burlap from the root ball without disturbing the roots.
8. Face each plant to give the best appearance. Final location of plant material should be approved by the Project Owner in the field.
9. Fill plant pits 2/3 their depth with prepared planting mixture, water thoroughly and allow to settle. Complete back-filling, water thoroughly to eliminate any voids and air pockets. Provide additional back-fill as necessary to conform to required elevation and as detailed.
10. Form saucer and install mulch over entire plant pit and saucer area as detailed.
11. All tree staking or guying shall be completed immediately after planting, but in no instance more than 24 hours after planting. See staking/guying detail. At the completion of the maintenance period remove all stakes, flags, guys, tree wrap, and anchors.
12. Mulch all new shrub beds and plant pits to achieve a 3" depth after settlement. Mulch all ground cover beds to achieve a 2" depth after settlement. Mulch for saucers and planting areas to be a double shredded bark mulch.
13. All plants shall be guaranteed for a period of one full year after inspection and acceptance by the Owner's representative, and shall have at least 80% healthy growth at the end of the guarantee period.
14. Landscape planting materials as proposed by this plan are Connecticut native and/or non-invasive species. This landscape plan has been designed to incorporate species which are prolific in USDA plant hardiness zone 6b and which require minimal energy input for upkeep and maintenance. References utilized for Connecticut native and non-invasive species selection include the Connecticut Botanical Society, the Connecticut agricultural experiment station, the U.S. Department of Transportation Federal Highway Administration, 2004 Connecticut Stormwater Quality Manual, New England Wetland Plants, Inc., and other sources.



GAMECHANGE TUB CROSS SECTION



CROSS SECTION



ISOMETRIC

NOTES:
1. GAMECHANGE RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
2. SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION AND INSTALLATION SEQUENCE.

ON-CAP SOLAR ARRAY AND RACKING SYSTEM

NOT TO SCALE

NOTES:
SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION REGARDING RACKING SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES. RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

TYPICAL POST MOUNTED RACKING SYSTEM DETAIL (OFF-CAP)

NOT TO SCALE

29102

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www.solarcity.com

SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Planes 1-3
Site Details

SCALE:

DATE: September 2015

JOB I.D. NO. 14-2302

Revisions

SHEET NO.

11

11

ENVIRONMENTAL ASSESSMENT

SOLAR FACILITY INSTALLATION

82 ROGERS ROAD

NORWICH, CONNECTICUT

NEW LONDON COUNTY

Prepared for:

SolarCity Corporation
c/o Brightfields Development, LLC
40 Walnut Street, Suite 301
Wellesley, MA 02481

Prepared by:

All-Points Technology Corporation, P.C.
3 Saddlebrook Drive
Killingworth, CT 06419

September 2015

Table of Contents

PROJECT INTRODUCTION **1**

EXISTING CONDITIONS **3**

Project Location 3
Site Access 3
Wetlands and Watercourses 5
Vernal Pools 7
Vegetation and Wildlife 11
Bird Inventory 11
Methodology 11
Results 12
Habitat Types and Their Importance to Wildlife 13
Rare Species 18
Water Supply Areas 18
Water Quality 19
Scenic Areas 19
Historic and Archaeological Resources 19
Geology and Soils 20
Floodplain Areas 20
Recreational Areas 21
Noise 21
Lighting 21
Coastal Zone Management Areas 21
Other Surrounding Features 21

EFFECTS ON THE ENVIRONMENT **24**

Proposed Project Development 24
Public Health and Safety 26
Local, State and Federal Land Use Plans 27
Existing and Future Development 27
Roads 28
Wetlands 28
Vernal Pools 29
Vegetation and Wildlife 32
Wildlife Habitat Enhancement Measures 33
Rare Species 33
Water Supply Areas 33
Water Quality 33
Air Quality 34
Scenic Areas 34
Historic and Archaeological Resources 34
Geology and Soils 34
Floodplain Areas 34
Recreational Areas 34

NOISE 35
LIGHTING 35
COASTAL ZONE MANAGEMENT AREAS 35
OTHER SURROUNDING FEATURES 35
VISIBILITY 35
CONCLUSION 36

Figures

Figure No. Title

FIGURE 1 PROJECT LOCATION MAP 2
FIGURE 2 EXISTING CONDITIONS MAP 4
FIGURE 3 HABITAT COVER MAP 14
FIGURE 4 SURROUNDING FEATURES MAP 23
FIGURE 5 PROPOSED CONDITIONS MAP 25
FIGURE 6 VERNAL POOL ANALYSIS MAP 31

Tables

Table No. Title

TABLE 1: AMPHIBIANS AND REPTILES OBSERVED DURING VERNAL POOL SURVEY 10
TABLE 2: EGG MASS AND LARVAL SURVEY RESULTS FOR VERNAL POOL INDICATOR SPECIES 10
TABLE 3: NON-RESIDENTIAL FEATURES WITHIN TWO MILES OF THE SITE 22

Appendices

Appendix Title

APPENDIX A WETLAND DELINEATION REPORT
APPENDIX B BREEDING BIRD INVENTORY TABLE
APPENDIX C CTDEEP NDDB LETTER
APPENDIX D STATE HISTORIC PRESERVATION OFFICE LETTER
APPENDIX E CONSTRUCTION SCHEDULE
APPENDIX F CONSTRUCTION WORK HOURS/DAYS LETTER
APPENDIX G WETLAND PROTECTION PLAN
APPENDIX H NOISE EVALUATION REPORT
APPENDIX I PHOTO-DOCUMENTATION AND SIMULATIONS

Project Introduction

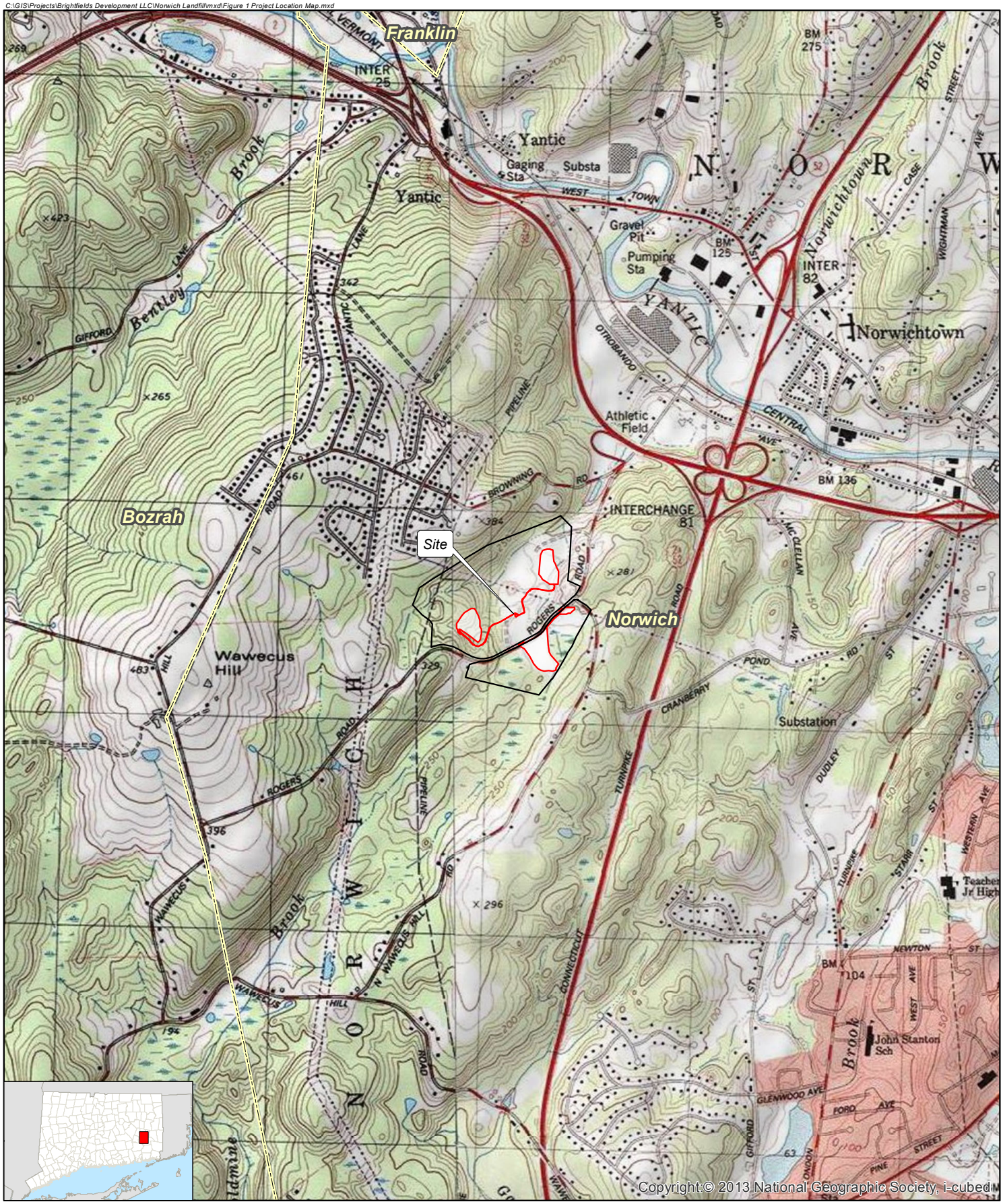
All-Points Technology Corporation, P.C. ("APT") prepared this Environmental Assessment ("EA") on behalf of SolarCity Corporation ("SolarCity") c/o Brightfields Development, LLC for the proposed installation of an approximately 2.74 megawatt ("MW") solar-based electric generating facility in the City of Norwich, Connecticut (the "Project").

This EA has been completed to support SolarCity's submission of a petition for declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the construction, maintenance, and operation of the Project.

The Project would be located at 82 Rogers Road, Norwich, Connecticut ("Site"). The Site is comprised of two (2) separate parcels that lie on the north and south sides of Rogers Road. Combined, the Site parcels encompass approximately 98.3 acres. Figure 1, *Project Location Map*, depicts the location of the Site and surrounding area.

The Site is the location of the City's transfer station and former landfills, situated approximately 0.25 mile southwest of Interchange 21 off of Interstate 395 and State Routes 32 and 2. The Site vicinity is characterized by surrounding forest and agricultural land, with rural homes generally to the south and denser residential development farther to the northwest.

The Project would occupy approximately 10.8 acres of the Site ("Project Area"), the majority of which is comprised of closed landfills and open, actively managed land. The proposed solar array ("facility") would be comprised of approximately 8,854 Canadian Solar 310 watt modules, four (4) Solectria inverters, and three (3) transformers. The facility would utilize a combination of two types of mounting systems: cast-in-place concrete ballasts located on the former landfill areas and post-driven mounts in undeveloped areas located on the south side of Rogers road. Individual panels would be placed at a 25° tilt to the south.



Legend

- Project Area
- Site Boundary

Figure 1
Project Location Map

Proposed Solar Facility
82 Rogers Road
Norwich, Connecticut

Map Notes:
Base Map Source: USGS 7.5 Minute Topographic Quadrangle Maps, Fitchville (1983) and Norwich (1983), CT
Project Located on the Norwich, CT Quadrangle
Map Scale: 1:24,000
Map Date: September 2015

1,000 500 0 1,000 Feet

BRIGHTFIELDS DEVELOPMENT LLC

ALL-POINTS TECHNOLOGY CORPORATION

Existing Conditions

The purpose of this section is to describe current conditions of the Site. A detailed discussion of the proposed Project's effects on the environment is provided in following sections of this document.

Project Location

The Site consists of two (2) separate, City-owned parcels located on the north and south sides of Rogers Road encompassing a total of approximately 98.3 acres. The parcels are identified in City of Norwich Tax Assessor records as:

- 82 Rogers Road – Map 81, Block 1, Lot 3 (23.3 acres in size), an undeveloped parcel located within an R80 (residential) Zone south of Rogers Road; and,
- Rogers Road (no numerical designation provided) – Map 73, Block 1, Lot 31 (75 acres) located within an ROS (residential open space) Zone. This parcel encompasses the City's transfer station and two closed former landfills both located on the north side of Rogers Road.

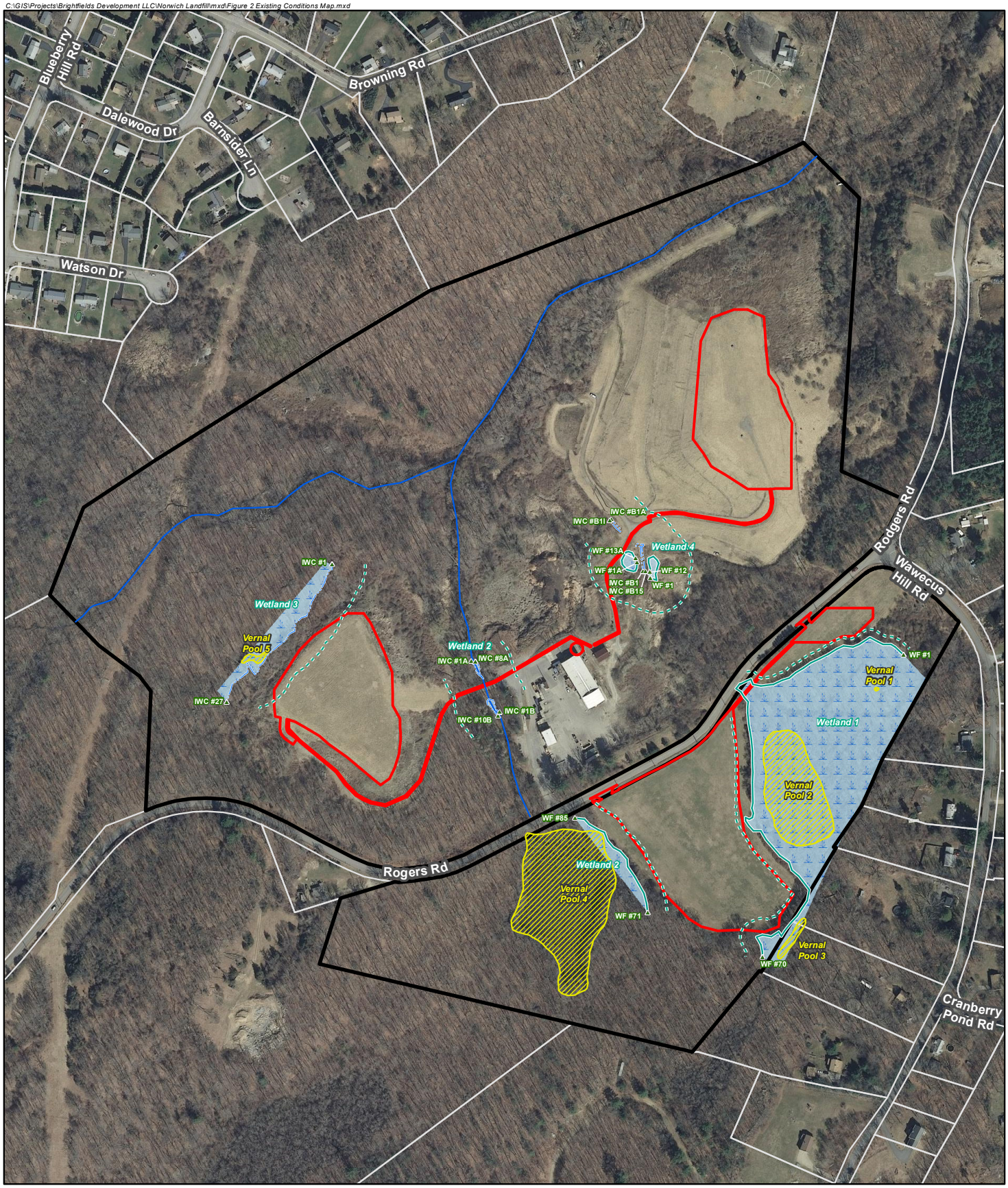
The transfer station houses a number of structures and paved/concrete areas. The remainder of the Site is undeveloped, but the majority of the Project Area consists of open and actively managed land that has experienced historic disturbances associated with landfill activities or cultivation of crops.

Site Access

Access to the northern portion of the Site can be gained via the existing transfer station entrance off Rogers Road which connects to access roads that lead to each of the landfill properties. Access to the southern portion of the Site can also be gained directly from Rogers Road, although no formal roadway exists today.

Figure 2, *Existing Conditions Map*, depicts current conditions on the Site, its access, abutting properties, and several key features discussed herein.

C:\GIS\Projects\Brightfields Development LLC\Norwich Landfill\mxd\Figure 2 Existing Conditions Map.mxd



Legend

- Project Area
- Site Boundary
- Approximate Assessor Parcel Boundary (CTDEEP)
- Start/End Wetland Flag
- Wetland Boundary
- Intermittent Watercourse
- Perennial Stream
- Upland Review Area Buffer
- Wetland Area
- Vernal Pool

Figure 2
Existing Conditions Map

Proposed Solar Facility
82 Rogers Road
Norwich, Connecticut

Map Notes:
Base Map Source: 2012 Aerial Photograph (CTECO)
Map Scale: 1 inch = 400 feet
Map Date: September 2015

400 200 0 400 Feet

N W E S

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Wetlands and Watercourses

Four (4) wetland areas are located on the Site including: two (2) on the parcel south of Rogers Road (Wetlands 1 and 2) and two (2) on the north side parcel (Wetlands 3 and 4). These resources consist primarily of complexes of seasonal intermittent and perennial stream channels, depressional forested, emergent, and scrub/shrub wetlands formed in flat to moderately sloping, dense glacial till.

Matthew Gustafson, a Connecticut registered Soil Scientist with APT, conducted an inspection of the Site on May 5, 2015 to review and confirm wetland boundaries identified during a previous inland wetlands investigation/delineation performed in October of 2014 (and supplemented in August of 2015) by Demian A. Sorrentino of Boundaries LLC. The review determined that Mr. Sorrentino's delineation was substantially correct. A copy of the 2015 *Wetland Delineation Report* prepared by Mr. Sorrentino is included as Appendix A. The wetland resources are summarized below and depicted on the *Existing Conditions Map* provided as Figure 2.

Wetland 1 is a broad forested wetland located in the southeast portion of the Site. The dominant vegetative cover in the overstory is red maple (*Acer rubrum*) with an understory of primarily pepperbush (*Clethra alnifolia*). The overstory canopy is primarily closed while still maintaining a very dense understory shrub layer component in most areas. Wetland areas with more permanent saturation (including vernal pool habitats) are characterized by hummock/hollow topography with a less significant understory component. The wetland is characterized by a number of artificially constructed channels that focus the hydrology of the wetland. Wetland 1 generally drains southwest, with the drainage channels oriented northeast to southwest. A drainage divide appears to occur in the northeast corner of the wetland system as it crosses Wawecus Road. Three (3) vernal pool resources were identified within Wetland 1 consisting of a wind-thrown tree depression (Vernal Pool 1), a broad 'cryptic' style vernal pool habitat (Vernal Pool 2), and one of the man-made channels containing evidence of vernal pool breeding (Vernal Pool 3) just off-site to the south. This wetland system is isolated from Wetland 2, located to the southwest, by an intercepting upland ridge.

Wetland 2 consists of a diverse compilation of varying wetland types including a broad scrub/shrub swamp with bordering forested wetland draining to a perennial stream system with complexes of forested, scrub/shrub habitats. This wetland originates in the southwest portion

of the Site as a large scrub/shrub wetland with large interior vernal pool habitat. Water depths in accessible areas (scrub/shrub vegetation within the interior of the system is too dense to penetrate) ranged from 12 to 16 inches. This wetland generally drains north under Rogers Road via a partially sediment-filled box culvert restricting and impounding flows to the south. The outlet north of Rogers Road consists of a narrow perennial stream system that feeds a larger perennial stream system farther north on the Site. An existing crossing structure provides access from the main transfer station facilities to a portion of the former landfill to the west. This stream system eventually crosses an electrical transmission line to the north of the existing access road crossing. Within the maintained utility right-of-way, the habitat type shifts from forested to scrub/shrub. Wetland 2 eventually drains north and east off-site.

Wetland 3 is a complex of a hillside seep wetland system feeding a narrow intermittent stream channel in the northwest portion of the Site. The intermittent stream channel originates as a natural bank and streambed with sinuous flow paths that transition to an artificially straightened channel with perched and stagnant flows. A wind-thrown tree depression located adjacent to the artificial stream channel maintains stagnant water flow due to the presence of a restricted outlet to the north where stone/soil piles have filled in the channel. The resulting backwater condition provides sufficient hydrology to support vernal pool breeding habitat. The entire wetland is forested with red maple dominant forest cover type. The understory consists of a sparse herbaceous or scrub/shrub layer as a result of the closed canopy condition. Wetland 3 is characterized by little to no bordering vegetated wetlands outside the confined intermittent stream channel. This wetland system is isolated from Wetland 2, which extends to the north and east.

Wetland 4, located in the northeast portion of the Site, consists of a complex of historically altered and artificially constructed emergent wetland areas and intermittent watercourse drainage swales. An existing access road crossing currently provides entry to the rear former landfill area from the transfer station. Two emergent wetland areas were delineated and consist of broad depressional areas with seasonal shallow ponding (insufficient hydrology for supporting vernal pool habitat). These emergent wetland areas appear to currently receive and treat Site stormwater. The wetland generally drains north and west into an artificially constructed rip/rap armored drainage swale that also receives stormwater generated by the

landfill. This drainage swale eventually drains into a 'wet' basin on the west side of the landfill area.

Soils encompassing the Site and surrounding area were field classified as a mix of upland and wetland soil units consisting of the following: Udorthents-urban land complex, Hollis-Chatfield complex, Canton and Charlton soils, Charlton and Chatfield complex, Sutton fine sandy loam, Ridgebury, Liecester and Whitman soils, and Walpole sandy loam and are generally consistent with digitally available soil survey information obtained from the Natural Resources Conservation Service ("NRCS")[1].

Vernal Pools

During the May 5, 2015 wetland investigation, a number of areas of standing water were observed to support vernal pool habitats, prompting APT to conduct surveys to identify and assess vernal pools within the wetland resources at the Site.

Calhoun and Klemens (2002) provide the following operational definition of vernal pools:

> *Vernal pools are seasonal bodies of water that attain maximum depths in the spring or fall, and lack permanent surface water connections with other wetlands or water bodies. Pools fill with snowmelt or runoff in the spring, although some may be fed primarily by groundwater sources. The duration of surface flooding, known as hydroperiod, varies depending upon the pool and the year; vernal pool hydroperiods range along a continuum from less than 30 days to more than one year. Pools are generally small in size (<2 acres), with the extent of vegetation varying widely. They lack established fish populations, usually as a result of periodic drying, and support communities dominated by animals adapted to living in temporary, fishless pools. In the region, they provide essential breeding habitat for one or more wildlife species including Ambystomid salamanders (Ambystoma spp., called "mole salamanders" because they live in burrows), wood frogs (Rana sylvatica), and fairy shrimp (Eubranchipus spp.).*

Vernal pool physical characteristics can vary widely while still providing habitat for indicator species. "Classic" vernal pools are natural depressions in a wooded upland with no hydrologic connection to other wetland systems. Manmade depressions such as quarry holes, old farm ponds and borrow pits can also provide similar habitat. Often, vernal pools are depressions or

[1] NRCS Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/, accessed on September 9, 2013.

impoundments within larger wetland systems. These vernal pool habitats are commonly referred to as "cryptic" vernal pools.

Several species of amphibians depend on vernal pools for reproduction and development. These species are referred to as indicator vernal pool species and their presence in a wetland during the breeding season helps to identify that area as a vernal pool.

This vernal pool assessment makes an important distinction between wetlands in which indicator species may breed and those wetlands where they breed *and* successfully develop. A common phenomena is for breeding (i.e., mating and egg laying) to occur in bodies of water such as road ruts or temporary puddles where development and metamorphosis of larvae is unsuccessful. Such areas are referred to as "decoy vernal pools" as reproductive efforts are unsuccessful. In their guidance on best development practices for conserving pool breeding amphibians, Calhoun and Klemens (2002) specifically note the negative impact associated with ruts: "*Site clearing can cause water-filled ruts. These ruts intercept amphibians moving toward the vernal pool and may induce egg deposition. Often these ruts do not hold water long enough to allow development of amphibians and therefore acts as "sinks" that result in populations declines.*"

A vernal pool survey was conducted on May 7, 2015 by APT. A total of five (5) vernal pools were identified within the noted wetland resources. Vernal pool habitats include both cryptic and classic style vernal pools. Several of the pools have undergone historical anthropogenic influences.

Vernal Pool 1 consists of a small tree wind-thrown depression within a forested wetland area (Wetland 1). This pool is relatively small and isolated from any larger contiguous vernal pool habitat. The maximum water depth was recorded at 4". No egg masses were observed within the pool. Numerous wood frog larvae were observed. Green frog was also observed within this pool.

Vernal Pool 2 consists of a large area of cryptic style habitat formed in the west side of forested Wetland 1. The pool is characterized by hummock/hollow topography with water depths recorded at a maximum depth of 8 inches. This pool was found to be the second most productive pool within the Project Area with high densities of wood frog larva throughout the resource area, and six (6) spotted salamander egg masses.

Vernal Pool 3 is a small oval shaped pool located within the southern portion of Wetland 1, extending just off-site. The pool is a result of an artificially constructed channelized stream with a constricted outlet. The resulting backwater condition has provided habitat suitable for vernal pool breeding. However, a lack of indicator species utilization (in the form of observed egg masses or larvae) was observed. Maximum water depth was recorded at 12 inches.

Vernal Pool 4 occupies a large portion of Wetland 2, consisting of a broad scrub/shrub wetland system with edge forested wetland habitat. This pool is characterized as a large pool with a dense scrub/shrub component in its interior (too dense to penetrate for interior investigation). The interior portions of the pool are primarily open water broken by sphagnum with winterberry (*Ilex verticillata*) and pepperbush hummocks. Edges of the resource are primarily forested hummock hollow topography. The box culvert outlet to the north under Rogers Road is filled with sediment restricting flows, and represents the northern extent of this vernal pool. Vernal Pool 4 is the most productive pool within the Site with dense wood frog larvae and well over 60 spotted salamander egg masses observed within accessible areas. Maximum water depth was observed at 14 inches.

Vernal Pool 5 is a small tree wind-thrown depression adjacent to, but physically isolated from, the channelized intermittent watercourse feature within Wetland 3. A restricted outlet has created a backwater condition that inundates the stream channel, resulting in little to no flows. While no evidence of vernal pool breeding activity was observed within the intermittent watercourse channel, marbled salamander larvae was observed within the tree wind-thrown depression. Maximum water depth within the tree wind-throw was observed at 10 inches.

See Tables 1 and 2 for an inventory of observations within the vernal pools.

Table 1: Amphibians and Reptiles Observed During Vernal Pool Survey

Common Name	Scientific Name	Status
Amphibians		
marbled salamander	*Ambystoma opacum*	IM, IS
green frog	*Rana clamitans*	
wood frog	*Rana sylvatica*	IM, IS
pickerel frog	*Rana palustris*	
spotted salamander	*Ambystoma maculatum*	IM, IS
spring peeper	*Pseudacris crucifer*	
two-lined salamander	*Eurycea bislineata*	
Reptiles		
garter snake	*Thamnophis sirtalis*	
Status: IS – vernal pool Indicator Species; FS – vernal pool Facultative Species Wildlife Action Plan Conservation Status (CS)[2]: VI – Very Important; MI – Most Important; IM – Important		

Table 2: Egg Mass and Larval Survey Results for Vernal Pool Indicator Species

Pool	Total Egg Masses		Larvae Observed		
	Wood Frog	Spotted Salamander	Wood Frog	Spotted Salamander	Marbled Salamander
1	0	0	Y	N	N
2	0	6	Y	N	N
3	0	2	N	N	N
4	0	>60	Y	N	N
5	0	0	N	N	Y
KEY: "Y"- Yes; "N" – No "NO" – Not Observed. Note that the timing of our initial survey was after the egg mass development stage for wood frog and near the end for spotted salamander.					

[2] Please refer to the next section, Vegetation and Wildlife, for a discussion of the Connecticut Wildlife Action Plan and these designations.

Vegetation and Wildlife

The following is a discussion of habitat community types present on the Site and the associated wildlife observed and likely to be utilizing these areas. This section discusses those species that are most likely to be associated with the habitat types present on the Site.

Bird Inventory

Davison Environmental, LLC conducted a breeding bird assessment of the Site on behalf of APT, Inc. on July 22, 2015. This assessment focuses on species considered to be of high conservation priority in Connecticut as designated in the 2015 Connecticut Wildlife Action Plan[3] ("WAP", hereinafter). The WAP was created to establish a framework for proactively conserving Connecticut's fish and wildlife, including their habitats. The WAP identifies Species of Greatest Conservation Need ("GCN") that fall into three categories in descending order of significance from *Most Important* to *Very Important* and finally *Important*.

Methodology

A Breeding Bird Inventory was developed that represents a list of birds that potentially breed on the Site, based on the presence of suitable habitat and available data sources. This list was generated from a database that was developed by reviewing information on the habitat utilization of Connecticut's breeding birds. The primarily resource for habitat utilization data was Bevier (Ed., 1994), with A. Poole (1995) and DeGraaf and Yamasaki (2001) utilized as secondary resources. The initial inventory, generated solely based on the presence of suitable habitat, was refined by considering such factors as bio-geographical distribution, the presence or absence of critical habitat features and minimum patch size requirements. The inventory is subdivided by habitat type. A species is listed under the habitat(s) which occupy the species typical home range. However, given that habitats are generally connected by transitional ecotones, a species should be considered to be potentially present within the ecotones associated with their primary habitat(s).

All birds seen or heard during the July Site assessment were noted as observed in the *Breeding Bird Inventory Table* provided in Appendix B. While these bird observations do not constitute a

[3] The Wildlife Action Plan, formerly Connecticut's Comprehensive Wildlife Conservation Strategy (July 2015) is currently in preparation by DEEP for release later this year.

detailed breeding bird survey, these species were observed within the typical breeding season for the majority of Connecticut's birds (i.e., April through August) and are therefore considered possible Site breeders as defined by Bevier (1994)[4].

Results

A total of 67 birds are identified in the *Breeding Bird Inventory Table* (see Appendix B). This list includes 14 GCN (20.9%): one (1) *Important* species; eleven (11) *Very Important* species; and, two (2) *Most Important* species.

The inventory includes two state-listed species as potentially present (although not observed at the Site): the Brown Thrasher and Broad-winged Hawk. Brown Thrasher typically inhabit thickets, brushy hillsides and woodland edges in suburban and rural areas (Bevier, 1994). Maturation of forest and other factors causing loss of early successional habitat are driving the decline in this species. The Site's old field habitat (see discussion in the following section) represents suitable breeding habitat for thrasher. However, due to the small size of the old field habitat available (12± acres) the Site would be capable of supporting only a small number of thrasher pairs, as the average territory size is 1.6 acres (DeGraaf and Yamasaki, 2001).

The Broad-winged Hawk is considered a habitat generalist, inhabiting deciduous or mixed forest types often near a lake, pond or wetland. Bevier (1994:102) noted that "the Broad-winged Hawk exhibits a diversified nest site habitat selection". Due to the non-specific nature of the habitat requirements for this species, it is commonly listed in a habitat-based based bird inventory. The Site's forest edges coupled with a large forested wetland represent suitable habitat for this species.

[4] A "possible" breeder as defined by Bevier (1994) includes observation of bird (male, female or singing male) within suitable habitat during the breeding season. The majority of observed birds were singing males.

Habitat Types and Their Importance to Wildlife

Seven (7) habitat types are present on the Site, these include: (1) mixed hardwood forest; (2) cool-season grassland; (3) old field (including the open fields and utility ROW); (4) forested wetland; (5) perennial stream; (6) developed; and, (7) emergent/scrub-shrub wetlands. The characteristics of these habitat types are described below and depicted on Figure 3, *Habitat Cover Map*.

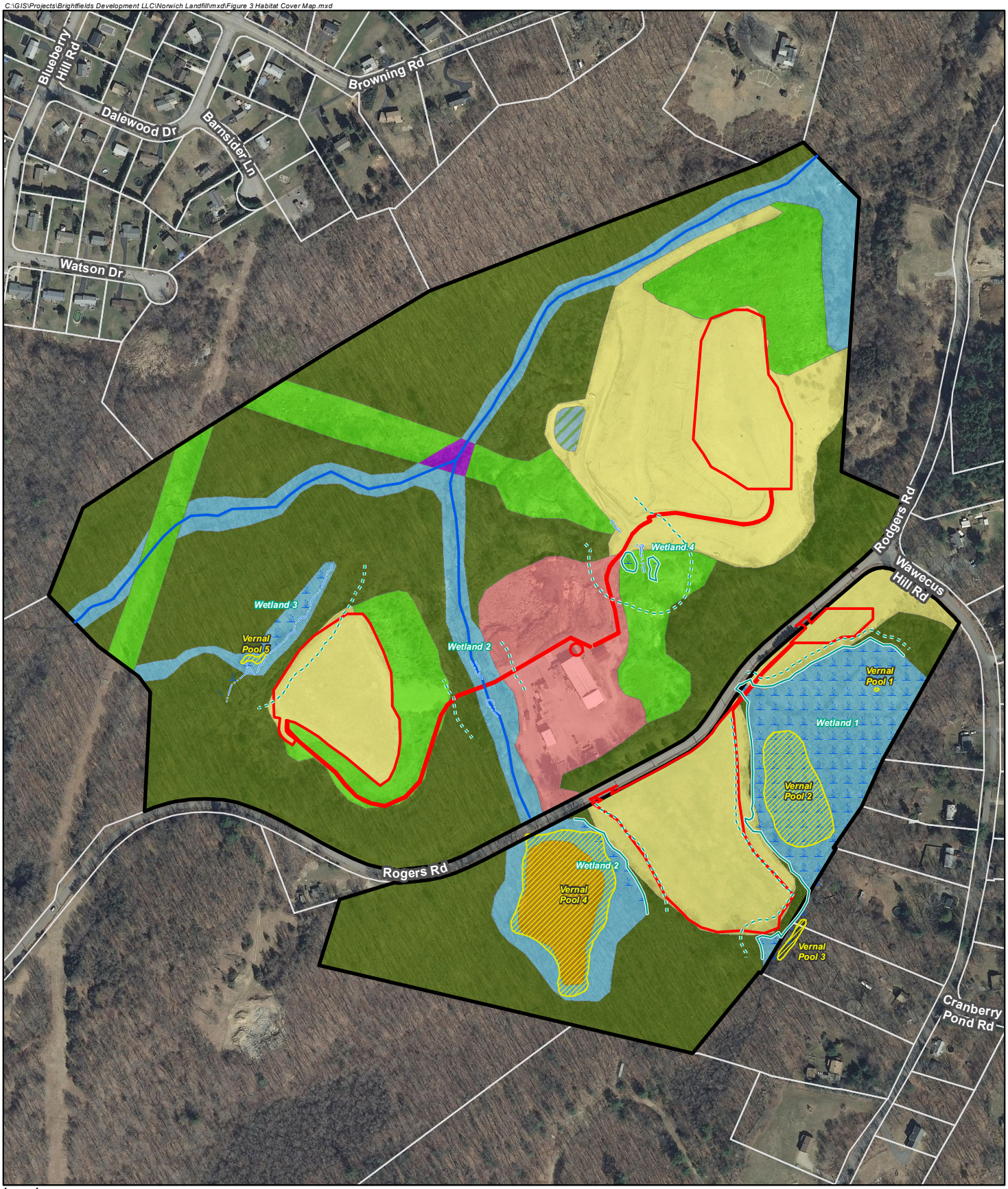
Mixed Hardwood Forest

This habitat type represents the largest ecological community on the Site (43± acres), with disjunct patches present both north and south of Rogers Road. Mixed hardwood forest is an important habitat for native bird species in the State. The forest varies from xeric to mesic, and the vegetative structure varies from open in the under- and mid-story to sparse herbaceous and/or scrub/shrub. Areas of well-developed herbaceous, shrub and mid-story vegetative layers which include high stem and foliage densities are present, representing good quality nesting sites for ground and shrub nesting forest birds.

The mixed hardwood habitat is generally consistent with a Mesic Oak/Hickory forest cover type. Some areas of richer soils can be found within this habitat type resulting in inclusions of red maple and sugar maple (*Acer saccharum*). Generally, the dominant overstory species are red oak (*Quercus rubra*), white oak (*Quercus alba*), and pignut hickory (*Carya glabra*). Areas to the northwest are characterized as younger forest blocks with inclusions of trembling aspen (*Populous trembloides*). The canopy is primarily closed with small pocket opening in areas. This has resulted in a sparse understory dominated by high bush blueberry (*Vaccinium corymbosum*), maple leaf viburnum (*Viburnum acerfolium*), and low bush blueberry (*Vaccinium angustifolium*). The mixed hardwood cover type areas are primarily devoid of an herbaceous stratum, though some small isolated areas do contain pockets of warm season grasses under the canopy where gaps occur.

Forest metric data was collected within the Mixed Hardwood habitat. Approximately 90 trees per acre were recorded ranging in diameter at breast heights of 12 to 18 inches. The forested blocks associated with this Site are segmented by various forms of development and clearing (roads, transmission corridors, residential and municipal development etc.).

C:\GIS\Projects\Brightfields Development LLC\Norwich Landfill\mxd\Figure 3 Habitat Cover Map.mxd



Legend

- Project Area
- Site Boundary (+/-98.3 acres)
- Approximate Assessor Parcel Boundary (CTDEEP)
- Wetland Boundary
- Intermittent Watercourse
- Upland Review Area Buffer
- Wetland Area
- Vernal Pool

Habitat Cover Type

- Perennial Stream (+/- 4,000 linear feet)
- Cool-Season Grassland (+/-21 acres)
- Old Field (+/-12 acres)
- Mixed Hardwood Forest (+/-43 acres)
- Forested Wetland (+/-15 acres)
- Developed (+/-5.5 acres)

Emergent/Scrub-Shrub Wetlands:

- Immature Forest with Scrub-Shrub (+/-1.4 acres)
- Emergent Wetland (stormwater basin - +/-0.2 acre)
- Scrub-Shrub Wetland (+/-0.2 acre)

400 200 0 400 Feet

N W E S

Figure 3
Habitat Cover Map

Proposed Solar Facility
82 Rogers Road
Norwich, Connecticut

Map Notes:
Base Map Source: 2012 Aerial Photograph (CTECO)
Map Scale: 1 inch = 400 feet
Map Date: September 2015

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Forest-interior birds are GCN species that are suffering from range-wide population declines. Forest-interior birds favor the interior of the forest or "forest core" away from non-forested "edge" habitat. Forest interior birds generally avoid edge habitat for nesting as it creates conditions favorable to predators such as raccoons and nest parasites such as brown-headed cowbird.

The Site's forest habitat is highly fragmented, and is not part of a large contiguous or core forest. Review of the Center for Land Use Education and Research's (CLEAR) Forest Fragmentation Study[5] mapping for the Town of Norwich confirms this fact, illustrating that the majority of the Site's forest is classified as edge or patch forest. While two small core (<250 acres) forest blocks overlap the Project Area (one in the northwest corner of the northern property and one in the southwest corner of the southern property), both blocks contain less than 50 acres of interior forest. Therefore, the Site's forest habitat is more suitable for generalist species associated with edge forest or deciduous tree cover, as opposed to forest-interior specialists. While several forest-interior birds are listed in the inventory (e.g., wood thrush) as they may be present, the Site's represent sub-optimal habitat and potentially a population "sink".

Similarly, since the small core forest has been fragmented, larger species wildlife habitat is not ideal. Generalist wildlife species that are tolerant of human disturbance would be expected, such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), grey squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphus virginiana*), and eastern chipmunk (*Tamias striatus*). Larger species such as coyote (*Canis latrans*), grey fox (*Urocyon cinereoargunteus*), white tailed deer (*Odocoileus virginianus*) and fisher (*Martes pennant*) also potentially take advantage of forested habitat at the Site. However, the fragmented nature of the forested habitat within the local landscape (both upland and wetland forest) is a limiting factor for forest-dwelling wildlife.

Cool-Season Grassland

This habitat type comprises the second largest area on the Site (21± acres) and includes four distinct hay field areas consisting of cool-season grassland, dominated predominately by Eurasian feed grasses such as quackgrass and orchard grass. The bulk of this habitat type is

[5]CLEAR's Forest Fragmentation Study can be found at: http://clear.uconn.edu/projects/landscape/forestfrag/forestfrag_public%20summary.pdf

situated on the two areas of capped landfill north of Rogers Road. The other two areas lie immediately south of Rogers Road, and consist of what appears to be former crop fields now vegetated with grasses and forbs. The management regimes for these areas differ in that the former fields are regularly cut for the harvesting of hay. The landfill areas are cut on an annual rotation to maintain the open grassland condition and prevent a conversion to "old field" habitat. Identifiable species included milk thistle (*Silybum marianum*), common milkweed (*Asclepias syriaca*), red clover (*Trifolium pratense*), quackgrass (*Elymus repens*), orchard grass (*Dactylis glomerata*), mugwort (*Artemisia vulgaris*), and birdfoot trefoil (*Lotus corniculatus*).

Due to the fact that these four habitat units are disjunct as opposed to connected, and individual units do not exceed approximately 10 acres, they are most suitable for the more common grassland-associated birds as opposed to the rarer suite of area-sensitive grassland specialists.

Old Field (including shrublands and rights-of-way)

The Site contains a number of small patches of successional habitats in the "old field" stage (totaling 12± acres), dominated by shrubs and small trees interspersed with herbaceous vegetation. The most valuable area is located north of Rogers Road within the managed utility ROW that extends off the Site to the west. Dominant vegetation includes staghorn sumac (*Rus typhina*), autumn olive (*Elaeagnus umbellata*), Morrow's honeysuckle (*Lonicera morrowii*), Asiatic bittersweet (*Celastrus orbiculatus*), mugwort, and sapling-size honey locust (*Gleditsia triacanthos*). Due to the fragmented nature of this habitat overall, the majority provides habitat for "edge" species and common shrubland-associated birds as opposed to the rarer area-sensitive shrubland specialists. In addition to birds, wildlife species with small home ranges including various butterflies, dragonflies, and small mammals that are tolerant of variable habitat conditions may utilize this habitat patch for foraging and cover. However, the lack of sapling and small tree stem density in this cover type provides little protection to wildlife from predation.

Forested Wetland

This habitat type comprises forested areas that occur within wetland resources located throughout the Site, but which are primarily focused to the south, southeast, and north. Totaling 15± acres, the forested wetlands on the Site include well-developed herbaceous, shrub

and mid-story vegetative layers which include high stem and foliage densities. These Forested Wetland areas are generally small patches with the largest Site area consisting of approximately 7.5 acres. The dominant forest cover type is composed of a red maple overstory. Southern Forested Wetland areas are characterized by a dense understory of pepperbush. Forested areas to the north and west associated with intermittent and perennial watercourses do not contain this same density of understory vegetation. Such conditions provide high-quality nesting habitat for forest-dwelling birds that favor moist conditions including the very, brown creeper and hermit thrush. However, the fragmented nature of this habitat within the local landscape is a limiting factor for rarer area-sensitive forest-dwelling species.

Perennial Stream

Two headwater perennial streams occur on the northern portion of the Site. These streams are embedded within Wetland 2 and upland forest. The number of bird species associated specifically with headwater streams is low, as the bird species that favor flowing streams are typically associated with larger, lower order stream systems. Generally, the species found utilizing the areas within or immediately adjacent to a headwater stream are associated with the habitat in which the stream is embedded; in this case forested uplands and wetlands.

Developed

The Site includes the City's active transfer station, with a number of associated structures, paved/concrete surfaces and material/refuse storage areas. This land-use is capable of supporting several disturbance-tolerant urban-suburban species such as the house finch, house sparrow and eastern phoebe. In addition, the temporary storage of household waste, yard waste and recyclables likely attracts scavenging species such as gulls, crows and vultures typically found feeding at landfills and waste transfer stations.

Emergent/Scrub-Shrub Wetlands

These habitat types consist of early-successional wetland plant communities dominated by herbaceous species (e.g., grasses) intermixed with shrubs and small trees. Given the very small size of these habitat units, it can be expected that the species utilizing these areas are associated with the larger habitat units in which these types are embedded.

Rare Species

The Connecticut Department of Energy and Environmental Protection ("CTDEEP") Natural Diversity Data Base ("NDDB") program performs hundreds of environmental reviews each year to determine the impact of proposed development projects on state listed species and to help landowners conserve the state's biodiversity. State agencies are required to ensure that any activity authorized, funded or performed by a state agency does not threaten the continued existence of endangered or threatened species. Maps have been developed to serve as a pre-screening tool to help applicants determine if there is a potential impact to state listed species.

The NDDB maps represent approximate locations of endangered, threatened and special concern species and significant natural communities in Connecticut. The locations of species and natural communities depicted on the maps are based on data collected over the years by CTDEEP staff, scientists, conservation groups, and landowners. In some cases an occurrence represents a location derived from literature, museum records and/or specimens. These data are compiled and maintained in the NDDB. The general locations of species and communities are symbolized as shaded (or cross-hatched) areas on the maps. Exact locations have been masked to protect sensitive species from collection and disturbance and to protect landowner's rights whenever species occur on private property.

APT reviewed the most recent CTDEEP NDDB mapping (December 2014) to determine if any such species or habitats occur within the vicinity of the Site. Based on the NDDB mapping, no Threatened, Endangered, or Special Concern species or critical habitats are known to occur at or in the general vicinity of the Site.

APT also submitted a review request to the CTDEEP NDDB with respect to this Project to confirm no Threatened, Endangered, or Special Concern species or critical habitats exist at the Site. The CTDEEP responded in writing (letter dated July 29, 2015) that the agency does "not anticipate negative impacts to State-listed species (RCSA Sec. 26-306)" resulting from the Project. See Appendix C, *CTDEEP NDDB Letter*.

Water Supply Areas

There are no public water supply wells proximate to the Site. The Site is not located within an Aquifer Protection Area.

Water Quality

Groundwater underlying the majority of the Site is classified by the CTDEEP as "GA, GAA may not meet current standards". This classification of the Site indicates that groundwater within these areas may not meet GA, GAA standards and may not be suitable for human consumption without treatment. This designation is likely a result of the presence of the former landfills. Extreme western portions of the Site (west of the pipeline ROW) and southern portions of the Site (south of Rogers Road) are classified as "GA". This classification indicates groundwater within the area is presumed to be suitable for human consumption without treatment. Designated uses in GA-classified areas include existing private and potential public or private supplies of drinking water and base flow for hydraulically-connected surface water bodies.

Based upon CTDEEP mapping, the Site is located in Major Drainage Basin 3 (Thames River), Regional Drainage Basin 39 (Yantic River), Subregional Drainage Basin 3900 (Yantic River), and Local Drainage Basin 3900-00.

Two (2) small unnamed streams are located on the Site. The unnamed streams flow northeastward into Browning Pond which is located approximately 600' northeast and downgradient from the Site. The unnamed streams and Browning Pond are classified by the CTDEEP as Class A surface water bodies. Designated uses for Class A surface water bodies include habitat for fish and other aquatic life and wildlife; potential drinking water supplies; recreation; and water supply for industry and agriculture.

Scenic Areas

No State or locally-designated scenic roads are located proximate to the Site.

Historic and Archaeological Resources

APT reviewed relevant historic and archaeological information to determine whether the Site holds potential cultural resource significance. No reported historical resources or archaeological sites exist at the Site. There are no districts, features or structures listed on the National Register of Historic Places within one (1) mile of the Site. APT submitted Project information to the State Historic Preservation Office ("SHPO") for agency review and comment. The SHPO responded in writing on August 19, 2015, requesting a professional cultural resource

assessment and reconnaissance survey be completed prior to construction. As discussed below, SolarCity intends to complete this assessment as requested prior to the start of construction.

A copy of the *SHPO Letter* is included in Appendix D.

Geology and Soils

Surficial materials on the Site are comprised of deposits of thin glacial till and coarse deposits of sand and gravel. Soils located on the Site vary but include predominantly areas identified as the following; Hollis-Chatfield-Rock outcrop complex, Charlton-Chatfield complex, Dumps and engineered landfill caps, Catden and Freetown soils, Agawam fine sandy loam, and Walpole sandy loam.

Bedrock geology beneath the extreme northwestern portion of the Site appears to include an area identified as the Yantic Member of the Tatnic Hill Formation of the Upper and/or Middle Ordovician. Yantic Member of the Tatnic Hill Formation is described as a medium to dark-gray, fine to medium-grained schist, composed of quartz, oligoclase, biotite, and muscovite, some layers with garnet, staurolite, and kyanite or garnet and sillimanite, local epidote, or K-feldspar with some layers of rusty-weathering graphitic, pyrrhotitic, two-mica schist. Areas beneath the remaining portions of the Site are identified as Fly Pond Member of the Tatnic Hill Formation of the Upper and/or Middle Ordovician. Fly Pond Member of the Tatnic Hill Formation of the Upper and/or Middle Ordovician is described as a light gray, medium-grained, layered to massive calc-silicate gneiss, composed of andesine, quartz, hornblende or actinolite, epidote, and commonly diopside, biotite, and scapolite; some layers are calcitic.

Floodplain Areas

APT reviewed the United States Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Map ("FIRM") for the Site. A FIRM is the official map of a community on which FEMA has delineated both the special hazard areas and risk premium zones applicable to the community. The area of the Site is mapped on FIRM PANEL #09011 C0211 G, dated July 18, 2011. Based upon the reviewed FIRM Map, the Site is designated as Zone X, which is defined as an area of minimal flooding.

Recreational Areas

The nearest recreational area to the Site are the Norwich Little League fields, located approximately 0.4 mile to the northwest.

Noise

A Noise Evaluation Study was prepared for the Project by HMB Acoustics LLC of Avon, Connecticut[6]. Based on sound measurements obtained at the Site and adjacent locations, the average levels range from 35 to 40 dBA[7].

Lighting

Lighting exists at the transfer station today.

Coastal Zone Management Areas

The City of Norwich is not located within the Coastal Area or Coastal Boundary, as defined by the Coastal Management Act, CGS § 22a-94(a).

Other Surrounding Features

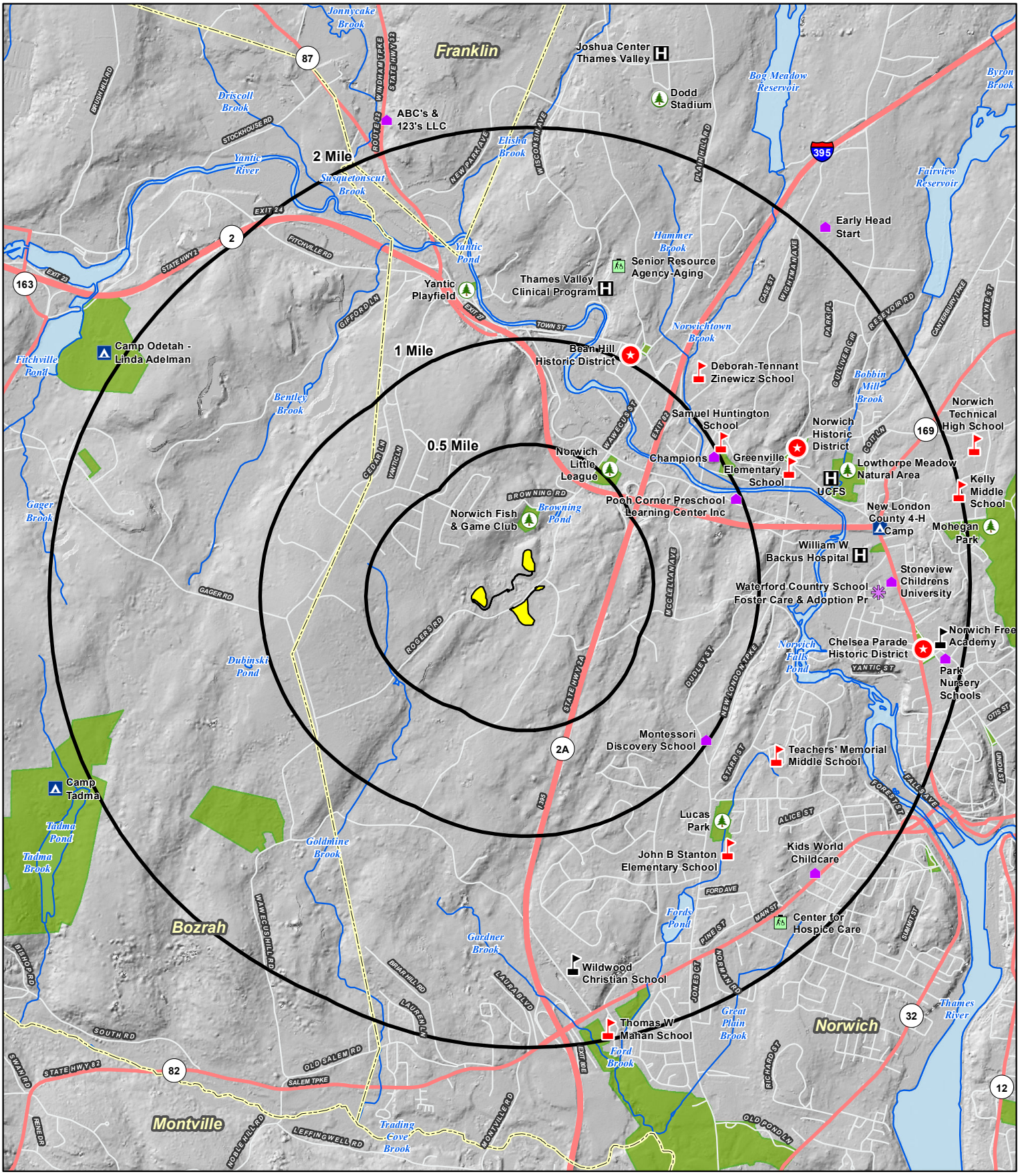
The locations of non-residential development and other resources within two miles of the Site are listed in Table 3. Figure 4, *Surrounding Features Map*, depicts these locations relative to the Site.

[6] The HMB report is provided in Appendix H. See also the Noise discussion in Effects on Environment section of this document

[7] Sound measurements obtained on July 11, 2015 by HMB Acoustics LLC, of Avon, Connecticut.

Table 3: Non-Residential Features within Two Miles of the Site

Type	Name	Address	Town	Distance to Site
Recreational/Parks	Norwich Little League	170 Otrobando Ave	Norwich	0.45 miles NE
	Yantic Playfield	147 Yantic Rd	Norwich	1.2 miles NW
	Lucas Park	132 Newton St	Norwich	1.2 miles SE
	Lowthorpe Meadow Natural Area		Norwich	1.4 miles NE
	Mohegan Park	65 Mohegan Rd	Norwich	1.9 miles E
	Norwich Fish & Game Club	44 Browning Rd	Norwich	475 feet N
Youth Camps	New London County 4-H Camp	335 Washington St	Norwich	1.6 miles NE
	Camp Tadma	Bishop Rd	Bozrah	1.7 miles SW
	Camp Odetah - Linda Adelman	38 Bozrah St Ext.	Bozrah	1.8 miles NW
Hospitals	United Community & Family Svcs	47 Town Rd	Norwich	1.4 miles NE
	Thames Valley Clinical Program	1 Ohio Ave	Norwich	1.1 miles SW
	William W. Backus Hospital	326 Washington St	Norwich	1.5 miles NE
Child Day Cares	Montessori Discovery School	218 Dudley St	Norwich	1 mile SE
	Pooh Corner Preschool Learning Center, Inc.	55 Otrobando Ave	Norwich	1.1 miles NE
	Champions	80 West Town St	Norwich	1 mile NE
	Stoneview Children's University	294 Washington St	Norwich	1.7 miles E
	Kids World Childcare	465 W Main St	Norwich	1.8 miles SE
	Park Nursery Schools	283 Broadway	Norwich	1.9 miles W
Community Center	None within 2 miles of the Site			
Senior Facilities	Senior Resource Agency-Aging	19 Ohio Ave	Norwich	1.4 miles NE
	Center for Hospice Care	227 Dunham St	Norwich	1.8 miles SE
Schools	Deborah-Tennant Zinewicz School	30 Case St	Norwich	1.1 miles NE
	Samuel Huntington School	80 West Town St	Norwich	1 mile NE
	Teacher's Memorial Middle School	15 Teachers Dr	Norwich	1.3 miles SE
	Greenville Elementary School	90 Town St	Norwich	1.2 miles NE
	John B. Stanton Elementary School	386 New London Tpk	Norwich	1.4 miles SE
	Wildwood Christian School	35 Wawecus Hill Rd	Norwich	1.6 miles S
	Waterford County School Foster Care & Adoption Program	2 Clinic Program	Norwich	1.6 miles E
	Norwich Free Academy	305 Broadway	Norwich	1.9 miles E
	Kelly Middle School	25 Mahan Dr	Norwich	2 miles NE
	Thomas W. Mahan School	94 Salem Tpk	Norwich	2 mile SE
National Register of Historic Places	Bean Hill Historic District		Norwich	1 mile NE
	Norwich Historic District		Norwich	1.3 miles NE
	Chelsea Parade Historic District		Norwich	1.9 miles E



Legend

- Project Area
- 0.5-2-Mile Radii
- Municipal and Private Open Space
- Open Water

Surrounding Features

- Licensed Child Day Care
- Foster Care
- Hospital
- National Register of Historic Places
- Private School
- Public School
- Recreation / Park
- Senior Facility
- Youth Camp

Base Map Source: ESRI & CTECO Shaded Relief
Map Date: September 2015

1,000 500 0 1,000 Feet

N W E S

Figure 4
Surrounding Features Map

Proposed Solar Facility
82 Rogers Road
Norwich, Connecticut

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Effects on the Environment

The Project would not have any significant adverse effects on the existing environment and ecology, nor would it affect the scenic, historic and recreational resources of the vicinity.

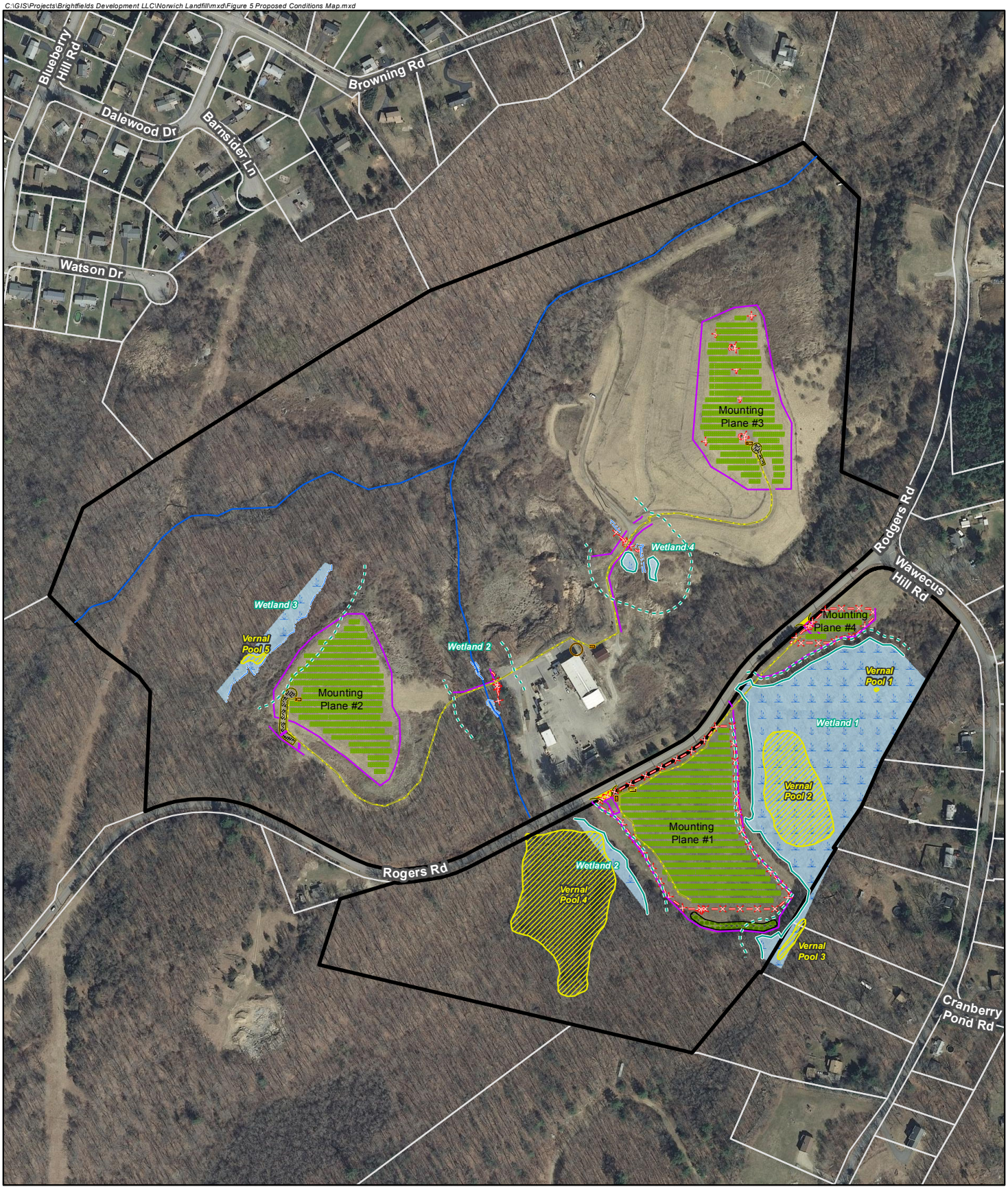
Proposed Project Development

The Project will include four (4) separate solar fields (identified as Mounting Plane 1 through 4) on the Site, two (2) each located north and south of Rogers Road. Figure 5, *Proposed Conditions Map*, depicts the proposed Project layout. The Project Area in totality includes approximately 10.8 acres of the 98.3-acre Site. The Project Area is open, previously disturbed land. New soil disturbances will be minimized to facilitate the installation of the solar arrays and associated equipment. The Project Area includes relatively moderate slopes and areas where regrading can be generally accomplished without significant cuts and/or fills.

The proposed solar array ("facility") would be comprised of approximately 8,854 Canadian Solar 310 watt modules, four (4) Solectria inverters, and three (3) transformers. The facility would utilize a combination of cast-in-place concrete ballasts and GameChange racking system in former landfill areas and an RBI Solar post-driven mounting system within the former crop fields. Individual solar panels will be placed at a fixed 25° tilt to the south. Wiring runs within the facility would be a mix of underground wiring and above-ground conduit.

On the two (2) solar fields located to the north of Rogers Road on the former landfill areas (Mounting Planes #2 and #3), system installation will begin with site preparation as detailed on the Site plans (please see Exhibit 1 of the Petition). The Game Change rack that will be utilized is a surface ballasted system. The rack is built inside large plastic tubs that are then filled with concrete and allowed to set. These serve to anchor the panels to the ground. After the rack is installed, solar modules are mounted to the rack. Each row will have panels mounted in portrait, two panels high. Next the panels are wired together in groups of "strings" of 18 modules. These strings are then combined into the inverters. Inverters are mounted centrally on concrete slab foundations. The inverters convert the DC power supplied by the panels into AC power that can be connected to the Grid. The AC Power lines will be installed along with

C:\GIS\Projects\Brightfields Development LLC\Norwich Landfill\mxd\Figure 5 Proposed Conditions Map.mxd



Legend

- Site Boundary
- Intermittent Watercourse
- Perennial Stream
- Wetland Boundary
- Upland Review Area Buffer
- Wetland Area
- Vernal Pool
- Proposed Fence
- Proposed Silt Fence
- Proposed Solar Modules
- Proposed Access Drive
- Proposed Underground Electric Power
- Proposed Electrical Equipment
- Proposed Gravel Drive Improvements
- Proposed Paved Apron
- Proposed Landscaping
- Approximate Assessor Parcel Boundary (CTDEEP)

Figure 5
Proposed Conditions Map

Proposed Solar Facility
82 Rogers Road
Norwich, Connecticut

Map Notes:
Base Map Source: 2012 Aerial Photograph (CTECO)
Map Scale: 1 inch = 400 feet
Map Date: September 2015

400 200 0 400 Feet

N W E S

BRIGHTFIELDS DEVELOPMENT LLC

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the inverters. All power will be brought together at the utility switch gear located adjacent to the transfer station buildings, where it will be metered and connected to the utility power lines.

Similarly, on the two (2) solar fields to the south of Rogers Road, which were not used as landfills (Mounting Planes #1 and #4), system installation will begin with site preparation as detailed on the Site plans (please see Exhibit 1 of the Petition). The racking assemblies that will hold the modules are built on I-beam foundations that are driven into the existing ground with a pile-driving machine. The rack is constructed on the driven posts forming the frame for the solar panels. Once the rack is complete, the modules are bolted on to the rack. The wires for each module are plugged together in groups or "strings" of 19 panels. These strings are combined in the DC combiner boxes, and the combiners are wired to the inverters. Inverters are installed on concrete pads with transformers which will be located adjacent to Rogers Road. Transformers are then connected via switch gear to the grid.

Public Health and Safety

The Project would be designed to applicable industry, State, and local codes and standards and would not pose a safety concern or create undue hazard to the general public. The facility would not consume any raw materials, would not produce any by-products and would be unstaffed during normal operating conditions. The individual modules of the facility will be secured behind fenced access roads or inside chain link fence enclosures.

Overall, the Project will meet or exceed all health and safety requirements applicable to electric power generation. Each employee working on Site will:

- Receive required general and Site specific health and safety training;
- Comply with all health and safety controls as directed by local and state requirements;
- Understand and employ the Site health and safety plan while on the Site;
- Know the location of local emergency care facilities, travel times, ingress and egress routes; and
- Report all unsafe conditions to the construction manager.

Construction equipment will be required to access the Site during normal working hours. Please refer to the *Construction Schedule* and *Construction Work Hours/Days Letter* provided in Appendix E and Appendix F, respectively. After construction is complete and the facility (unstaffed) is operable, traffic at the Site will be minimal. Four times per year the site will be

mowed. Annual maintenance of the electrical equipment will occur once per year. Any equipment that breaks down will be repaired on an as needed basis. Annual maintenance will typically be two technicians for a day. The solar modules are designed to absorb incoming solar radiation and minimize reflectivity, such that only a small percentage of incidental light will be reflected off the panels. This incidental light is significantly less reflective than common building materials, such as steel, or the surface of smooth water. The panels will be tilted up toward the southern sky at a fixed angle of 25 degrees, further reducing reflectivity.

Local, State and Federal Land Use Plans

The Project is consistent with local, State, and Federal land use plans, including the Southeast Connecticut Council of Government's 2007 Regional Plan of Conservation and Development, which outlines the need for utility infrastructure to support the region's development. The Project also supports the State's energy policy by developing a renewable energy resource while not having a substantial adverse environmental effect. Although local land use jurisdiction over the Project is preempted by the Siting Council, the Project has been designed to meet the intent of local land use regulations to the extent feasible.

SolarCity and the City of Norwich are currently developing documentation to satisfy CTDEEP's requirements for a Disruption Permit and an approved Post Closure Use Plan. These plans will include all relevant details pertaining to installation of the solar panels and racking on the landfills as well include a detailed phasing and constructability plan.

Existing and Future Development

SolarCity, Norwich Public Utilities ("NPU") and Connecticut Municipal Electric Energy Cooperative ("CMEEC") have partnered together to redevelop the Site into a 2.74 MW DC Community Shared Solar facility. Once the Project is completed, solar power will be available to every NPU customer without any premium charge. The Community Shared Solar Project will provide power to the estimated 80 percent of NPU customers who can neither own nor lease systems because their roofs are physically unsuitable for solar or because of shading or due to the fact that they do not control them — like renters and people living in large apartment buildings. The Project will offer a way for every NPU Customer to have access to "green energy" without incurring a premium cost or having complex equipment installed on their roofs. Additionally, the Project

would benefit the community by improving electrical service for existing and future development in the City through enhanced capacity.

Roads

The existing transfer station entrance originating on Rogers Road and interior road systems will provide access into solar field locations on the north side of the Site (Mounting Planes 2 and 3). The southern portion of the Site will be accessed directly from Rogers Road, with new paved aprons to be installed at the entrances to Mounting Planes 1 and 4.

Wetlands

No wetlands or watercourses will be directly impacted by the proposed Project. The Project's proposed fence line and electrical conduit routes come in close proximity to wetland resources, but will not encroach into the wetlands. The closest construction activities to wetlands or watercourses are associated with two electrical conduit routes proposed within existing travel ways in proximity to Wetlands 2 and 4 on the north side of the Site. In the case of Wetland 2, where the existing travel way physically crosses a perennial stream, the proposed electrical conduit to Mounting Plane #2 will be routes underground within the edge of roadbed; there is sufficient room to install this conduit and not encroach into the wetland/watercourse. The existing travel way that leads towards Mounting Plan #3 passes within approximately 15 feet of Wetland 4; electrical conduit would also be routed along the ground surface in this area. The resulting activities will have no direct impact to wetland resources.

The proposed facility occurs in proximity to Wetlands 1, 2, and 3. Buffers have been established to these various wetland resources ranging from: 25 feet north of Wetland 1 (associated with Module 4); 50 feet west of Wetland 1 and 60 feet east of Wetland 2 (for Module 1); and, 100 feet southeast of Wetland 3 (Module 2). No tree or mature vegetation clearing is proposed as part of the Project with all development proposed to occur within existing open fields.

Potential short term temporary impacts associated with the Project's construction activities will be minimized provided sedimentation and erosion controls are designed, installed and maintained during construction activities in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. SolarCity is committed to implementing a wetland

protection plan during construction to provide additional measures to avoid potential temporary wetland impacts. A proposed *Wetland Protection Plan* is included in Appendix G. Long term secondary impacts to wetland resources possibly associated with the operation of this facility are minimized by the fact the development is unmanned, it minimizes the creation of impervious surfaces with the use of a gravel access drive with the majority of the surface treatment around the solar installation consisting of native grass/vegetation and it generates minimal traffic. Based on a review of the Project plans, engineering documents, and the Stormwater Management Report (please see Exhibit 5 of the Petition), the stormwater generated by the proposed development will be properly handled and treated in accordance with the 2004 *Connecticut Stormwater Quality Manual*. Provided these protective measures are implemented, the proposed Project development will not result in an adverse impact to wetland or intermittent watercourse resources.

Vernal Pools

As previously introduced, five (5) vernal pools exist on the Site. In order to assess these pools qualitatively, the methodology described in *Best Development Practices, Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States* (Calhoun and Klemens, 2002, a.k.a. the BDP) was used. This assessment methodology utilizes a three-tiered rating system, with the tier designation determined by examining the biological value of the pool in conjunction with the condition of the habitat surrounding the pool, which is the area used by vernal pool amphibians during the non-breeding season. The higher the species diversity and abundance coupled with an undeveloped and forested landscape surrounding the pool, the higher the tier rating. Tier 1 pools are considered the highest quality pools, while Tier 3 pools are the lowest.

Based on field observations (May 7, 2015), Pools 1, 3 and 5 are Tier 3 pools while Pools 2 and 4 are Tier 1 pools. Species diversity and/or abundance were the limiting factors affecting the tier ratings for Pools 1, 3 and 5 as the condition of the *Vernal Pool Envelope* ("VPE", within 0 to 100 feet) and the *Critical Terrestrial Habitat* ("CTH", 100 to 750 feet) conservation zones met the landscape criteria for Tier 1 pools (less than 25% development in the VPE and less than 50% development within the CTH).

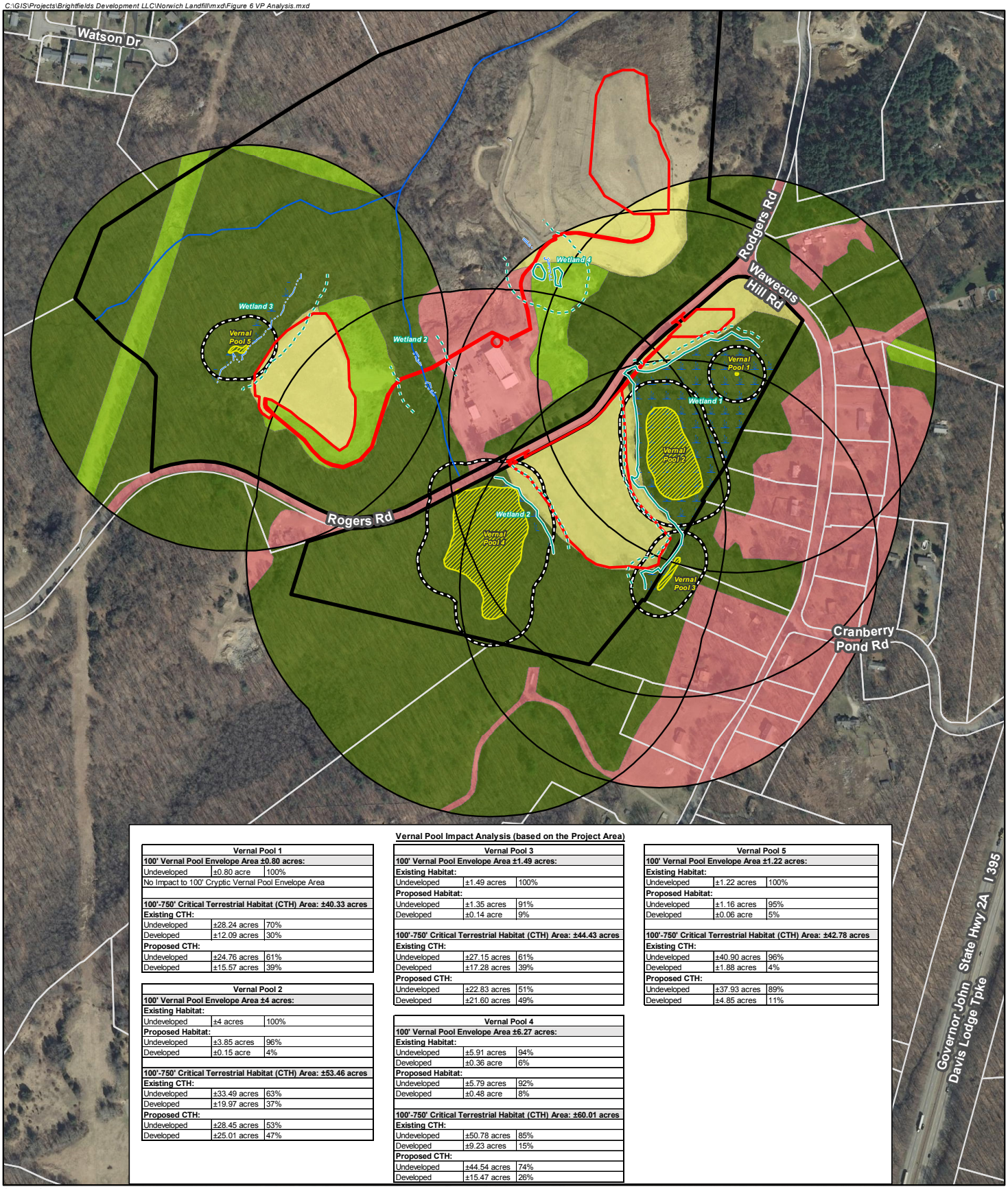
With respect to landscape connectivity, an important factor affecting vernal pool function at a meta-population scale, the existing landscape association between pools 1, 2, 3 and 4 is relatively intact (i.e., free of roads or other development). Vernal Pool 5 is separated from these other pools in the Project Area by Rogers Road although it may have connectivity with pools located off-site to the west.

An analysis of the post-development conditions using the BDP methodology was conducted and is illustrated in Figure 6, *Vernal Pool Analysis Map*. No direct impacts to any vernal pool are proposed. Activity is proposed within the VPE conservation zone of Pools 1, 2, 3 and 4 as depicted and summarized in Figure 6.

The Project Area is sited entirely within existing non-forested areas of the Site. These areas were considered overall to have low habitat value for wildlife in general, as well as vernal pool species. Therefore, utilizing these locations for the proposed development will collectively minimize potential impacts to wildlife. Nonetheless, these areas lie within the VPE and CTH conservation zones of the Site's vernal pools and therefore development in these areas cannot be done in a manner that complies with the BDP Manual. However, in looking beyond the allowable development thresholds at the forested areas important for vernal pool wildlife and their distribution within the vernal pool conservation zones, we note that the proposed Project configuration is sited entirely within open areas and avoids any loss of existing forest habitat. As a result, we believe the Project will not adversely affect vernal pool wildlife. This conclusion is based on the fact that these habitats consist of cool-season grasses situated on the capped landfill as well as within a sparsely vegetated fallow crop fields; areas which offer little habitat for vernal pool amphibians. Furthermore, the landscape connectivity between pools will not be reduced by roads, development or other fragmentary features in any significant manner.

It should be noted that not all vernal pool species entirely avoid such open, grassy habitats. Wood frog for example are known to utilize herbaceous sunny ecotones within or adjacent to forested areas. However, use of such habitats is relatively transient and would be expected to be confined predominately to the field edges, with little or no use expected to occur within the central portions of these habitat units, where the facility will be located. In order to mitigate the impacts of the loss of ecotone habitats, an early-successional ecotone management zone will be established along the forest edge where a cleared area is required around the perimeter

C:\GIS\Projects\Brightfields Development LLC\Norwich Landfill\mxd\Figure 6 VP Analysis.mxd



Vernal Pool Impact Analysis (based on the Project Area)

Vernal Pool 1		
100' Vernal Pool Envelope Area ±0.80 acres:		
Undeveloped	±0.80 acre	100%
No Impact to 100' Cryptic Vernal Pool Envelope Area		
100'-750' Critical Terrestrial Habitat (CTH) Area: ±40.33 acres		
Existing CTH:		
Undeveloped	±28.24 acres	70%
Developed	±12.09 acres	30%
Proposed CTH:		
Undeveloped	±24.76 acres	61%
Developed	±15.57 acres	39%

Vernal Pool 2		
100' Vernal Pool Envelope Area ±4 acres:		
Existing Habitat:		
Undeveloped	±4 acres	100%
Proposed Habitat:		
Undeveloped	±3.85 acres	96%
Developed	±0.15 acre	4%
100'-750' Critical Terrestrial Habitat (CTH) Area: ±53.46 acres		
Existing CTH:		
Undeveloped	±33.49 acres	63%
Developed	±19.97 acres	37%
Proposed CTH:		
Undeveloped	±28.45 acres	53%
Developed	±25.01 acres	47%

Vernal Pool 3		
100' Vernal Pool Envelope Area ±1.49 acres:		
Existing Habitat:		
Undeveloped	±1.49 acres	100%
Proposed Habitat:		
Undeveloped	±1.35 acres	91%
Developed	±0.14 acre	9%
100'-750' Critical Terrestrial Habitat (CTH) Area: ±44.43 acres		
Existing CTH:		
Undeveloped	±27.15 acres	61%
Developed	±17.28 acres	39%
Proposed CTH:		
Undeveloped	±22.83 acres	51%
Developed	±21.60 acres	49%

Vernal Pool 4		
100' Vernal Pool Envelope Area ±6.27 acres:		
Existing Habitat:		
Undeveloped	±5.91 acres	94%
Developed	±0.36 acre	6%
Proposed Habitat:		
Undeveloped	±5.79 acres	92%
Developed	±0.48 acre	8%
100'-750' Critical Terrestrial Habitat (CTH) Area: ±60.01 acres		
Existing CTH:		
Undeveloped	±50.78 acres	85%
Developed	±9.23 acres	15%
Proposed CTH:		
Undeveloped	±44.54 acres	74%
Developed	±15.47 acres	26%

Vernal Pool 5		
100' Vernal Pool Envelope Area ±1.22 acres:		
Existing Habitat:		
Undeveloped	±1.22 acres	100%
Proposed Habitat:		
Undeveloped	±1.16 acres	95%
Developed	±0.06 acre	5%
100'-750' Critical Terrestrial Habitat (CTH) Area: ±42.78 acres		
Existing CTH:		
Undeveloped	±40.90 acres	96%
Developed	±1.88 acres	4%
Proposed CTH:		
Undeveloped	±37.93 acres	89%
Developed	±4.85 acres	11%

Legend

- Project Area
- Site Boundary
- Approximate Assessor Parcel Boundary (CTDEEP)
- Wetland Boundary
- Intermittent Watercourse
- Upland Review Area Buffer
- Wetland Area
- Perennial Stream (+/- 4,000 linear feet)
- Vernal Pool
- 100' Vernal Pool Envelope
- 100'-750' Critical Terrestrial Habitat Area

100'-750' Critical Terrestrial Habitat Type

Undeveloped
- Cool-Season Grassland
- Old Field
- Forested

Developed
- Developed

Map Notes:
Base Map Source: 2012 Aerial Photograph (CTECO)
Map Scale: 1 inch = 500 feet
Map Date: September 2015

500 250 0 500 Feet

N W E S

Figure 6
Vernal Pool Analysis Map

Proposed Solar Facility
82 Rogers Road
Norwich, Connecticut

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of the facility. These areas should be mowed on a four (4) to seven (7) year rotation outside of the principal growing season (mowing should occur between October 1st and March 1st).

In consideration of re-designing the Project strictly to meet the BDP development threshold guidelines we considered several scenarios, including: (1) reducing the amount of development within non-forested habitats to fall within the conservation zone development thresholds (25% in the CTH and no development within the VPE); and/or (2) relocating all development from the VPE zones to forested areas within the CTH zones. However such scenarios would not result in greater protection of terrestrial forest habitat critical to vernal pool wildlife. For example, Pool 5 could be made compliant with the BDP by shifting the loss of 5% VPE habitat into the adjacent forest within the CTH while still complying with the 25% CTH development threshold. However, such a scenario would be more impactful to vernal pool wildlife as it would result in loss of forested as opposed to non-forested habitat.

Vegetation and Wildlife

The proposed Project will consist of approximately 10.8 acres of development, all of which is currently cleared and maintained land, resulting in minimal new ground disturbances. The solar arrays and gravel and grass surfaces associated with the construction of the Project will solely alter the Cool-Season Grassland habitat type present on the Site. Some edge effect impacts may occur as a result of the Project in proximity to the Old Field habitat type associated with limited slopes on the sides of landfill areas, but this will be *de minimus*. Provided below is an analysis of sole habitat impacted on the Site.

Cool-Season Grassland

The Site contains four (4) small managed hay field areas of this habitat type, which is classified as a WAP *key habitat* within the *Upland Herbaceous* category, sub-habitat *cool-season grassland*. Hayfield habitat on the Site totals approximately 21 acres (of which 10.6[8] acres is proposed as part of the Project), but is distributed in small patches which minimizes interior grassland (which is favored for nesting by grassland specialists) and maximizes grassland edge. Patch size is a critical limiting factor for grassland birds, many of which require a minimum

[8] The remaining 0.2 acres associated with the Project consists of the existing access roads.

patch size of 25 acres or more. Given the small size of these fields, it is capable of supporting species with a smaller minimum area requirement. Due to the size and configuration of the hayfields at this Site, this habitat is not capable of supporting abundant or diverse populations of grassland birds.

Wildlife Habitat Enhancement Measures

Once constructed, a narrow strip of land (generally 25 feet in most areas with an expansion to 50 feet or greater for developed areas bordering vegetated community types) between the solar arrays and the existing forest edge will need to remain clear (non-forested) to prevent shading of the solar arrays. This area can be managed for wildlife by restricting mowing to a rotation basis of every four (4) to seven (7) years outside of the principal growing season (mowing should occur between October 1st and March 1st). This will allow the area to revert to late old field and create a "soft" ecotone that will provide cover and habitat for a number of "edge" nesting birds and some vernal pool species.

Rare Species

Based on APT's Site evaluation and the CTDEEP's July 29, 2015 letter, the Project would not have a negative impact on State-listed species. The *CTDEEP NDDB Letter* is provided in Appendix C.

Water Supply Areas

There are no public water supply wells located in the vicinity of the Site. No liquid fuels are associated with the operations of the Project. Therefore, the Project would have no adverse environmental effect on water resources.

Water Quality

The facility will be unstaffed and no potable water uses or sanitary discharges are planned.

Prior to and throughout the duration of construction, sedimentation and erosion controls will be installed and maintained in accordance with the 2002 *Connecticut Guidelines for Soil Erosion and Sediment Control*. Once operative, the stormwater generated by the proposed development will be properly handled and treated in accordance with the 2004 *Connecticut*

Stormwater Quality Manual. Therefore, the proposed Project development will not result in an adverse impact to wetlands or intermittent watercourse resources.

Air Quality

No emission sources are associated with the operations of the Project. Therefore, no impacts to air quality are anticipated as part of the proposed Project.

Scenic Areas

No scenic areas would be physically or visually impacted by development of the solar Project.

Historic and Archaeological Resources

APT consulted with the SHPO for concurrence that no historic or archaeological resources would be affected by the Project. The SHPO responded in writing on August 19, 2015, requesting a professional cultural resource assessment and reconnaissance survey be completed prior to construction. SolarCity intends to complete this assessment as requested prior to the start of construction.

A copy of the *SHPO Letter* is included in Appendix D.

Geology and Soils

No adverse effects are anticipated on natural resources occurring at and/or nearby the Site. Limited vegetative clearing and earthwork is required for construction of the Project. However, no impacts to forested areas, wetlands, water courses or significant habitat would occur.

Floodplain Areas

The Site is located entirely outside of the 100-year and 500-year floodplains. Therefore, no special design elements are necessary with respect to flooding concerns. In addition, no impacts to floodplains are associated with the proposed Project.

Recreational Areas

No recreational areas would be impacted by the Project.

Noise

The only equipment proposed for the Project that would generate noise consists of the fans associated with the inverters. The Noise Evaluation Study prepared by HMB Acoustics LLC of Avon, Connecticut, determined that after the Project is constructed and in service, the combined noise levels will comply with CTDEEP criteria for Commercial Emitter and Residential Receiver Zones.

After the Project is constructed and in service, the highest noise levels at adjacent properties are anticipated to be 40 dBA, which is well below the most conservative criteria of 45 dBA for nighttime and 55 dBA for daytime, as established by the State of Connecticut Noise Control regulations (CGS *22a/22a-69-1 through 7*). The inverters are inactive at night. During those times the inverters are operative, noise levels at nearby property lines and/or residences would be well below applicable criteria.

Please refer to the *Noise Evaluation Report* provided in Appendix H.

Lighting

No lighting is planned for the facility.

Coastal Zone Management Areas

No Coastal Zone Management Areas would be affected by the Project.

Other Surrounding Features

No adverse effects are anticipated to the facilities identified in Figure 3, primarily because of their sufficient distances from the Project.

Visibility

Covering approximately 10.8 acres in total, the solar arrays will consist of approximately 8,854 Canadian Solar panels, each measuring approximately 64.95 inches by 39.05 inches by 1.37 inches. The Facility will include four separate solar array areas, identified as Mounting Planes 1 through 4. Mounting Plane 1 is the largest array (approximately 3,781 modules) and is located centrally on the southern parcel in a former crop field. Mounting Plane 4 is the smallest array (approximately 266 modules) and is located on the eastern side of the southern parcel, also in a

former crop field. Mounting Planes 2 and 3 are of similar size (Mounting Plane 2 has approximately 2,489 modules and Mounting Plane 3 has approximately 2,318 modules) and are located on the caps for the two former landfills on the northern parcel.

Once constructed, the northern Mounting Plane (#2 and #3) will not be visible from surrounding areas beyond the transfer station due to their remote locations from the road and abutting properties and the existing, dense mature vegetation that surrounds the former landfill.

The two southern Mounting Planes (#1 and #4) will be visible for short stretches from the intersection of Rogers Road and Wawecus Road, as well as the frontage along Rogers Road. Residents to the south/southeast of the Site along Wawecus Road will not have any direct views of the facility because the Project Area is buffered by intervening mature vegetation.

Appendix I provides *Photo-Documentation and Simulations* of the Project.

Conclusion

As demonstrated in this EA, the Project will comply with CTDEEP air and water quality standards and will not have a substantial adverse effect on the environment.

APPENDIX A Wetland Delineation Report

Prepared by Boundaries LLC

August 5, 2015

John U. Faulise Jr. L.S.
James McNally, Jr., L.S.

David C. McKay, P.E.
Demian A. Sorrentino AICP, C.S.S.

CIVIL ENGINEERING LAND SURVEYING LAND USE PLANNING SOIL SCIENCE
BOUNDARIES

Boundaries LLC
179 Pachaug River Drive
P.O. Box 184
Griswold, CT 06351
T 860.376.2006 | F 860.376.5899

www.boundariesllc.net

August 8, 2015

Michael Singer
Brightfields Development, LLC
40 Walnut Street, Suite 301
Wellesley, MA 02481

RE: Delineation Report - Revised 8-5-15
Property Location: Multiple Properties - Rogers Road, Norwich, Connecticut
Client: Brightfields Development, LLC

Dear Mr. Singer-

Per your request, the following is a cursory description of a previously performed wetland delineation for three (3) distinct project areas located on Rogers Road in Norwich, Connecticut. The three (3) distinct project areas are identified within this report as: Area 1 - East Field Area (Smaller Field) and South Field Area (Larger Field); Area 2 - West Landfill Area (Smaller Landfill); and Area 3 - North Landfill Area (Larger Landfill), and are depicted upon a survey plan set entitled "Topographic Survey – Site Locations, Prepared for Brightfields Development, Rogers Road, Norwich , Connecticut, Scale: 1"=100', Date: October 2014, Job I.D. No. 14-2302, Sheet No. 1/4 through 4/4, as prepared by Boundaries LLC.

In early October of 2014, the undersigned was requested to investigate the three (3) distinct project areas identified above for presence of regulated inland wetland and watercourse resources. The limits of on-site investigation for regulated resources were as follows: Area 1 - within 100 linear feet of the existing treeline of both fields; Area 2 - within 100 linear feet of the top of slope of the landfill and within 50' of the existing access drive; and Area 3 - within 100 linear feet of the top of slope of the landfill and within 50 linear feet of the existing access drive.

Inland wetlands and intermittent watercourses on the subject property were delineated in accordance with the State of Connecticut statutory definitions as described in Section 22a-38(15) and 22a-38(16) of the Connecticut General Statutes, a/k/a the Inland Wetlands & Watercourses Act, and are as follows:

(15) "Wetlands" means land, including submerged land, not regulated pursuant to sections 22a-28 to 22a-35, inclusive, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey, as may be amended from time to time, of the Natural Resources Conservation Service of the United States

Department of Agriculture;

(16) "Watercourses" means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon this state or any portion thereof, not regulated pursuant to sections 22a-28 to 22a-35, inclusive. Intermittent watercourses shall be delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: (A) Evidence of scour or deposits of recent alluvium or detritus, (B) the presence of standing or flowing water for a duration longer than a particular storm incident, and (C) the presence of hydrophytic vegetation.

Where encountered, regulated resources were demarcated by pink plastic ribbon (flagging) with the works “Wetland Delineation” printed thereon. These flags were sequentially numbered as the delineation was performed and were located by the Boundaries LLC survey field crew for inclusion on the herein referenced survey plan.

Soil Types Present

According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey for the State of Connecticut, the soils located in the vicinity of the three (3) project areas are as follows:

Area 1 - East Field Area (Smaller Field) and South Field Area (Larger Field)

13 Walople sandy loam, 0-3% slopes
17 Timakwa and Natchaug soils
18 Catden & Freetown soils
29B Agawam fine sandy loam, 3-8% slopes
73C Charlton-Chatfield Complex, 3-15% slopes, very rocky

Area 2 - West Landfill Area (Smaller Landfill);

73C Charlton-Chatfield Complex, 3-15% slopes, very rocky
73E Charlton-Chatfield Complex, 15-45% slopes, very rocky
75C Hollis-Chatfield-Rock outcrop complex, 3-15% slopes
75E Hollis-Chatfield-Rock outcrop complex, 15-45% slopes
302 Udorthents Urban Land Complex

Area 3 - North Landfill Area (Larger Landfill)

34B Merrimac sandy loam, 3-8% slopes
73C Charlton-Chatfield Complex, 3-15% slopes, very rocky
73E Charlton-Chatfield Complex, 15-45% slopes, very rocky
302 Udorthents Urban Land Complex

It is noted that the map units as depicted on the web soil survey are generally accurate except for in the East Field of Project Area 1. More particularly, the limit of the inland wetland characterized by map unit 13 (Walpole Sandy Loam, 0-3% slopes), extends significantly further to the northwest than depicted, actually encompassing a portion of the cultivated field.

A copy of the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey for the State of Connecticut is attached to this report.

Description of Wetlands & Watercourses

Based upon field investigation and subsequent delineation of regulated resources, the following is a description of delineated resources encountered within the specified limits of investigation:

Area 1 - East Field Area (Smaller Field) and South Field Area (Larger Field)

Flag Series WF#1-WF#70 & WF#71-WF#85

This flag series encompasses the northeasterly, northerly, northwesterly and westerly limits of one delineated inland wetland area, and the northeasterly limit of a separate inland wetland area, all of which are adjacent to two agricultural fields on the southeasterly side of Rogers Road. These fields are bisected by a watercourse flowing northwesterly under Rogers Road through a 24" reinforced concrete culvert pipe.

East Field Area (Smaller Field – WF#1 – WF#25)

The beginning of this series is adjacent to the small agricultural field, and delineates the limits of a palustrine forested wetland (red maple swamp). This wetland appears to have had a channel excavated through it, presumably to aid in dewatering the adjacent agricultural field, the terminus of which is the 24" culvert under Rogers Road in the vicinity of wetland flag #25. This inland wetland has very minimal topographic relief, perhaps due to previous regrading, and has an interesting area of tussock sedges and abundant wild chive occurring at the edge of the field. Several varieties of grasses are present, and also skunk cabbage, multiflora rose and spicebush.

South Field Area (Larger Field – WF#26-WF#70 & WF#71 – WF#85)

The wetlands adjacent to the large agricultural field are broken by a section of upland soils to the south, creating a drainage divide between the two distinct wetland areas. The northeasterly delineation line represents the limit of the same palustrine forested wetland (red maple swamp) discussed in the paragraph above. This deciduous forest is dominated by red maple, with very dense multiflora rose and autumn olive occurring at the field edge. Skunk cabbage is also present. This wetland area drains northerly and northwesterly, and eventually under Rogers Road through the 24" culvert previously mentioned.

The northeasterly line of the wetlands located to the southwest of the larger field again represents the limit of a palustrine forested wetland (red maple swamp), with skunk cabbage present throughout and dense multiflora rose at the field edge. Slightly further to the southwest, interior to the larger red maple swamp, there appears to be a area of scrub/shrub wetland

predominantly populated by highbush blueberry, though I did not personally investigate this area. This wetland drains westerly and northwesterly to a culvert under Rogers Road, and forms the intermittent watercourse partially delineated by IWC#1A-IWC#8A & IWC#1B – IWC#10B as described below.

Area 2 - West Landfill Area (Smaller Landfill);

Flag Series IWC#1 – IWC#27

This flag series represents the southeasterly limit of an intermittent watercourse on the northwesterly side of Area 2, which watercourse flows in a generally northerly direction past the smaller landfill. The watercourse channel is well defined, and portions of the watercourse channel contain soils which are classified as inland wetlands (organic and/or alluvial). During the initial investigation and delineation in early October 2014, this watercourse was completely dry, but during a more recent site visit performed on May 5, 2015, the upper portions of the watercourse contained flowing and/or stagnant water. Surface water was present between IWC#27 and IWC#11. Downgradient of IWC#11 the channel was dry.

This watercourse flows through a deciduous forest with oak, red maple, and hornbeam trees, multiflora rose, autumn olive, and lilac shrubs and skunk cabbage, various ferns and other small herbaceous plants. Amphibians were witnessed in the algae filled stagnant pools during the May visit.

It is worth noting that the watercourse channel and the immediate surrounding area is littered with large refuse, such as bicycles, automobile parts and plastic pipes.

Flag Series IWC#1A-IWC#8A & IWC#1B – IWC#10B

These two flag series represent the limits of an intermittent watercourse flowing from southeast to northwest and under the primary access road to Area 2 via a 24” reinforced concrete culvert. The watercourse channel is well defined, and portions of the watercourse channel contain soils which are classified as inland wetlands (organic and/or alluvial). During the initial investigation and delineation in early October 2014, this watercourse was completely dry, but during a more recent site visit performed on May 5, 2015, the watercourse contained flowing water.

This watercourse flows through a primarily deciduous forest with trees such as beech and maple, with eastern white pines present on the far southeasterly side of the crossing. Shrubs include multiflora rose, with autumn olive in the vicinity. Although difficult to identify without leaves, it would appear that a few ornamentals have taken hold, specifically burning bush and lilac, most likely originating from the brush dump immediately adjacent to the northeast.

Area 3 - North Landfill Area (Larger Landfill)

The areas of inland wetlands delineated in the vicinity of Project Area 3 should first and foremost be classified as marginal. It is very apparent that these areas are the result of grading activity which left topographic depressions, within which water collects seasonally and in response to precipitation events. Determining the limitations of these wetlands was particularly difficult, as it

was very dry during the initial site investigation and delineation. The two delineated areas are bisected by a stone lined drainage channel, and another stone lined drainage channel is present immediately to the northeast. These channels are approximately 3 feet deep and were dry during October 2014, but both contained water on May 5, 2015.

In this area the presence of phragmites does not seem to be an indicator of hydrology, as it appears to be equally prolific in depressions, on slopes and hilltops on both sides of the access drive.

WF#1-WF#11

This area would be characterized as a man-made palustrine emergent wetland occurring in a mild topographic depression. Vegetation is dominated by grasses, sedges, common rush and phragmites. It is noted that there are likely other inland wetland areas to the south, but were outside of the specified delineation area.

WF#1A-WF#13A

This area would again be characterized as a man-made palustrine emergent wetland occurring in a mild topographic depression adjacent to the main landfill access drive. Vegetation is dominated by grasses, sedges, common rush, young highbush blueberry and phragmites. It is noted that there are likely other inland wetland areas across the access drive to the northwest, but were outside of the specified delineation area.

IWC#B1 – IWC#B15 *(added 8/5/15)*

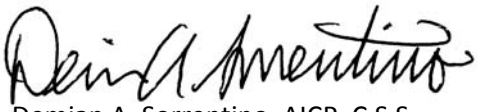
At the request of Matthew Gustafson of All-Points Technology Corporation, the undersigned was asked to include specified portions of the above-mentioned stone lined drainage channels in the delineation for Area 3 - North Landfill Area. This flag series defines the portion of said channel that is located on the inlet side of the 24" CMP culvert pipe which crosses under the main access drive to the North Landfill, and bisects the two inland wetland areas described above. An 18" CPP culvert pipe outlets in the vicinity of flag IWC#B10, carrying stormwater under what appears to be a former access drive from another stone lined drainage channel to the north. It is noted that the undersigned does not consider this drainage improvement a "resource" worthy of protection, but rather a stormwater management improvement that marginally meets definitive characteristics for classification an intermittent watercourse.

IWC#B1A – IWC#B1I *(added 8/5/15)*

This flag series defines a stone lined drainage channel beginning at the outlet side of the 24" CMP culvert pipe that crosses under the main access drive to the North Landfill Area. A 24" CMP culvert pipe outlets in the vicinity of flag IWC#B1E, which carries stormwater under an access drive from another stone lined channel to the east. It is again noted that the undersigned does not consider this drainage improvement a "resource" worthy of protection, but rather a stormwater management improvement that marginally meets definitive characteristics for classification an intermittent watercourse.

If you have any questions regarding this report, please contact the undersigned at your convenience.

Sincerely,



Demian A. Sorrentino, AICP, C.S.S.
Certified Planner & Soil Scientist
Boundaries LLC

C: Dean E. Gustafson, All-Points Technology
File

APPENDIX B Breeding Bird Inventory Table

Breeding Bird Inventory Table

Common Name	Scientific Name	Observed	Status	Habitat Type
American Goldfinch	*Carduelis tristis*	OB		CG, OF
American Redstart	*Setophaga ruticilla*			OF, MHF
American Robin	*Turdus migratorius*	OB		OF, MHF, DV
American Woodcock	*Scolopax minor*		MI	OF, ESS
Barred Owl	*Strix varia*			CG, MHF
Black-and-white Warbler	*Mniotilta varia*		IM	MHF
Black-billed Cuckoo	*Coccyzus erythropthalmus*		VI	OF, MHF
Black-capped Chickadee	*Parus atricapillus*	OB		MHF, OF
Blue Jay	*Cyanocitta cristata*	OB		MHF, DV
Blue-gray Gnatcatcher	*Polioptila caerulea*			MHF, OF
Blue-winged Warbler	*Vermivora pinus*		MI	OF
Broad-winged Hawk	*Buteo platypterus*		SC, VI	MHF, OF
Brown Creeper	*Certhia americana*		I	FW
Brown-headed Cowbird	*Molothrus ater*			MHF, OF
Brown Thrasher	*Toxostoma rufum*		SC, VI	OF
Carolina Wren	*Thryothorus ludovicianus*			OF, ESS
Cedar Waxwing	*Bombycilla cedrorum*			OF
Chimney Swift	*Chaetura pelagica*		VI	OF, CG
Chipping Sparrow	*Spizella passerina*			CG, OF, MHF
Common Yellowthroat	*Geothlypis trichas*	OB		OF
Downy Woodpecker	*Picoides pubescens*			MHF
Eastern Bluebird	*Sialia sialis*			OF, CG
Eastern Kingbird	*Tyrannus tyrannus*		IM	OF, CG
Eastern Phoebe	*Sayornis phoebe*			DV
Eastern Screech-Owl	*Otus asio*			MHF
Eastern Wood-Pewee	*Contopus virens*	OB	IM	MHF
European Starling	*Sturnus vulgaris*			DV, CG
Field Sparrow	*Spizella pusilla*		VI	OF
Gray Catbird	*Dumetella carolinensis*	OB		OF
Great Crested Flycatcher	*Myiarchus crinitus*			MHF, OF
Great Horned Owl	*Bubo virginianus*			MHF, CG
Hairy Woodpecker	*Picoides villosus*			MHF
Hermit Thrush	*Catharus guttatus*			MHF
Hooded Warbler	*Wilsonia citrina*			MHF
House Finch	*Carpodacus mexicanus*			DV, OF
House Sparrow	*Passer domesticus*			DV, OF
House Wren	*Troglodytes aedon*	OB		DV, OF
Indigo Bunting	*Passerina cyanea*	OB	VI	OF
Louisiana Waterthrush	*Seiurus motacilla*		VI	PS, MHF
Mourning Dove	*Zenaida macroura*	OB		DV, CG

Common Name	Scientific Name	Observed	Status	Habitat Type
Northern Cardinal	*Cardinalis cardinalis*			MHF, DV
Northern Flicker	*Colaptes auratus*		VI	MHF, OF
Northern Mockingbird	*Mimus polyglottos*			OF
Northern Oriole	*Icterus galbula*		IM	MHF
Northern Waterthrush	*Seiurus noveboracensis*		IM	FW
Ovenbird	*Seiurus aurocapillus*		IM	MHF, FW
Pileated Woodpecker	*Dryocopus pileatus*			MHF
Red-bellied Woodpecker	*Melanerpes carolinus*			MHF
Red-eyed Vireo	*Vireo olivaceus*			MHF
Red-shouldered Hawk	*Buteo lineatus*	OB		MHF, FW, CG
Red-tailed Hawk	*Buteo jamaicensis*			MHF, CG, OF
Red-winged Blackbird	*Agelaius phoeniceus*	OB		CG
Rose-breasted Grosbeak	*Pheucticus ludovicianus*		IM	MHF, FW
Ruby-throated Hummingbird	*Archilochus colubris*			CG, OF, DV
Rufous-sided Towhee	*Pipilo erythrophthalmus*		VI	OF, MHF
Scarlet Tanager	*Piranga olivacea*		VI	MHF
Song Sparrow	*Melospiza melodia*	OB		OF
Tree Swallow	*Tachycineta bicolor*	OB		CG, OF
Tufted Titmouse	*Parus bicolor*	OB		MHF
Turkey Vulture	*Cathartes aura*	OB		DV, CG, MHF
Veery	*Catharus fuscescens*		IM	MHF, FW
White-breasted Nuthatch	*Sitta carolinensis*			MHF
Wild Turkey	*Meleagris gallopavo*			MHF, OF, CG
Wood Thrush	*Hylocichla mustelina*			MHF, FW
Yellow Warbler	*Dendroica petechia*	OB		OF, CG, MHF
Yellow-billed Cuckoo	*Coccyzus americanus*		VI	OF
Yellow-throated Vireo	*Vireo flavifrons*			MHF, OF

KEY
OB – species was observed on the site on 7-22-15
OH – species was observed soaring overhead
WAP Conservation Status: IM – Important; VI – Very Important; MI – Most Important
SC – State-listed species of special concern
Habitat Types (observed and potential use): CG – cool-season grassland; MHF – mixed hardwood forest; FW – forested wetland; OF – old field; ESS – emergent/scrub-shrub wetlands; PS – perennial stream; DV - developed

APPENDIX C CTDEEP NDDB Letter

Connecticut Department of

ENERGY &
ENVIRONMENTAL
PROTECTION

July 29, 2015

Dean Gustafson
All-Points Technology Corporation, P.C.
3 Saddlebrook Dr
Killingworth, CT 06419
dgustafson@allpointstech.com

Project: Construction of Solar Array, Connecticut Municipal Electric Energy Cooperative at 82 Rogers Road, Norwich
NDDB Determination No.: 201504789

Dear Dean Gustafson,

I have reviewed Natural Diversity Data Base (NDDB) maps and files regarding the area delineated on the map provided for the proposed Construction of Solar Array, Connecticut Municipal Electric Energy Cooperative at 82 Rogers Road, Norwich, Connecticut. I do not anticipate negative impacts to State-listed species (RCSA Sec. 26-306) resulting from your proposed activity at the site based upon the information contained within the NDDB. The result of this review does not preclude the possibility that listed species may be encountered on site and that additional action may be necessary to remain in compliance with certain state permits. This determination is good for one year. Please re-submit an NDDB Request for Review if the scope of work changes or if work has not begun on this project by July 29, 2016.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at (860) 424-3592, or dawn.mckay@ct.gov . Thank you for consulting the Natural Diversity Data Base.

Sincerely,

Dawn M. McKay

Dawn M. McKay
Environmental Analyst 3

APPENDIX D State Historic Preservation Office Letter

August 19, 2015

Ms. Nicole Castro
All-Points Technology Corporation, PC
3 Saddlebrook Drive
Killingworth, CT 06419

Subject: Brightfields Development, LLC – Solar City
0 and 82 Rogers Road
Norwich, Connecticut

Dear Ms. Castro:

The State Historic Preservation Office (SHPO) is in receipt of your request for our comments on the potential effects of the referenced project on historic properties. SHPO understands that Brightfields Development, LLC plans to construct a 5.02 MW photovoltaic renewable energy system amongst two separate parcels comprised of both cleared and wooded land. The proposed project will be situated on approximately 10.33 acres within the 98.3 acres of the combined parcels. The proposed activities are under the jurisdiction of the Connecticut Siting Council.

SHPO notes that the project parcels are situated within a gently rolling rural section of Norwich the majority of the project area is on level to very gently sloping terrain in close proximity to perennial sources of water. This type of environmental setting is associated with pre-contact Native American settlement. SHPO has been informed that avocational archeologists have collected Native American artifacts from the fields encompassed by the project parcels. The nature and distribution of these resources, however, is not known. As a result, it is SHPO's opinion that intact and relatively well-drained soils within the Area of Potential Effect have an elevated potential to contain significant archeological resources. We are therefore requesting that a professional cultural resources assessment and reconnaissance survey be completed prior to construction. Subsurface testing should assess all areas of anticipated ground disturbance that are considered to have a moderate/high sensitivity for containing significant archeological deposits, unless sufficient research or fieldwork documents that this level of effort is unwarranted. All work should be in compliance with our *Environmental Review Primer for Connecticut's Archaeological Resources.* The assessment survey should also consider the effects of the proposed project on above ground cultural resources. The historic maps submitted with the review request suggest that structures older than 50 years in age may be located within or immediately adjacent to the project parcels. SHPO requests that no construction or other project-related ground disturbance be initiated until our office has had an opportunity to review and comment upon the requested survey.

This office appreciates the opportunity to review and comment upon this project. These comments are provided in accordance with the Connecticut Environmental Policy Act. For additional information, please contact Catherine Labadia, Environmental Reviewer, at (860) 256-2764 or catherine.labadia@ct.gov.

Sincerely,

Mary B. Dunne

Mary B. Dunne
Deputy State Historic Preservation Officer

APPENDIX E Construction Schedule

Construction Schedule for Norwich - Rogers Road
Solar Array

Activity	**Prerequisites to construction start**
Siting Council approval	x
Norwich Building Permit	x
State Permits	x

		Week 1	**Week 2**	**Week 3**	**Week 4**	**Week 5**	**Week 6**	**Week 7**	**Week 8**	**Week 9**	**Week 10**	**Week 11**	**Week 12**
Mow array areas		x											
Install erosion control		x											
Install chain link fence and access gates			x	x									
Install tracking pads and paved aprons, roads on landfill				x	x								
Install racking posts and solar panels - southern array					x	x	x						
Install ballast rack and modules on landfill.							x	x	x	x			
Install concrete equipment pads and conduit									x	x			
Install inverters, transformers,										x	x		
Complete MV wiring and interconnecton											x	x	
Final landscaping												x	x

APPENDIX F Construction Work Hours/Days Letter

8-27-2015

Connecticut Siting Council

10 Franklin Sq.

New Britain, CT 06051

RE: SolarCity Corporation Petition – Norwich – Rogers Rd.

Work hours on site

To whom it may concern:

For the construction of the solar array at 82 Rodgers Rd. Norwich, CT 06360 we plan to us the following work schedule.

7am to 7pm

7 days per week.

Best regards,

Robert Miller

Project Manager

SolarCity

APPENDIX G Wetland Protection Plan

ALL-POINTS TECHNOLOGY CORPORATION

WETLAND PROTECTION PROGRAM

Portions of the proposed Project are located in close proximity to wetlands. As a result, the following protective measures shall be followed to help avoid degradation of the nearby wetland system.

It is of the utmost importance that the Contractor complies with the requirement for the installation of protective measures and the education of its employees and subcontractors performing work on the project site. These measures will also provide protection to a nearby wetland system. This protection program shall be implemented regardless of time of year the construction activities occur. All-Points Technology Corporation, P.C. ("APT") will serve as the Environmental Monitor for this project to ensure that wetland protection measures are implemented properly. The Contractor shall contact Dean Gustafson, Senior Environmental Scientist at APT, at least 5 business days prior to the pre-construction meeting. Mr. Gustafson can be reached by telephone at (860) 663-1697 ext. 201 or via email at dgustafson@allpointstech.com.

The wetland protection program consists of several components: use of appropriate erosion control measures to control and contain erosion while avoiding/minimizing wildlife entanglement; periodic inspection and maintenance of isolation structures and erosion control measures; education of all contractors and sub-contractors prior to initiation of work on the site; protective measures; and, reporting.

1. **Erosion and Sedimentation Controls**

    a. Plastic netting used in a variety of erosion control products (i.e., erosion control blankets, fiber rolls [wattles], reinforced silt fence) has been found to entangle wildlife, including reptiles, amphibians, birds and small mammals. No permanent erosion control products or reinforced silt fence will be used on the project. Temporary Erosion control products will use either erosion control blankets and fiber rolls composed of processed fibers mechanically bound together to form a continuous matrix (net less) or netting composed of planar woven natural biodegradable fiber to avoid/minimize wildlife entanglement.

    b. Installation of erosion control measures shall be performed by the Contractor prior to any earthwork. The Environmental Monitor will inspect the work zone area prior to and following barrier installation to ensure erosion controls are properly installed.

    c. In addition to required daily inspection by the Contractor, the fencing will be inspected for tears or breeches in the fabric following installation periodically by the Environmental Monitor throughout the course of the construction project.

    d. The extent of the erosion controls will be as shown on the site plans. The Contractor shall have additional erosion control materials should field conditions warrant extending the fencing as directed by the Environmental Monitor.

    e. All silt fencing and other erosion control devices shall be removed within 30 days of completion of work and permanent stabilization of site soils. If fiber rolls/wattles, straw bales, or other natural material erosion control products are used, such devices will not be left in place to biodegrade and shall be promptly removed after soils are stable so as not to create a barrier to migrating wildlife. Seed from seeding of soils should not spread over fiber rolls/wattles as it makes them harder to remove once soils are stabilized by vegetation.

ALL-POINTS TECHNOLOGY CORPORATION, P.C.
☒ 3 SADDLEBROOK DRIVE · KILLINGWORTH, CT 06419 · PHONE 860-663-1697 · FAX 860-663-0935
☐ P.O. BOX 504 · 116 GRANDVIEW ROAD · CONWAY, NH 03818 · PHONE 603-496-5853 · FAX 603-447-2124

2. Contractor Education

a. Prior to work on site, the Contractor shall attend an educational session at the pre-construction meeting with the Environmental Monitor. This orientation and educational session will consist of an introductory meeting with the Environmental Monitor to understand the environmentally sensitive nature of the development site and the need to follow these protective measures.

3. Petroleum Materials Storage and Spill Prevention

a. Certain precautions are necessary to store petroleum materials, refuel and contain and properly clean up any inadvertent fuel or petroleum (i.e., oil, hydraulic fluid, etc.) spill due to the project's location in proximity to sensitive wetlands.

b. A spill containment kit consisting of a sufficient supply of absorbent pads and absorbent material will be maintained by the Contractor at the construction site throughout the duration of the project. In addition, a waste drum will be kept on site to contain any used absorbent pads/material for proper and timely disposal off site in accordance with applicable local, state and federal laws.

c. The following petroleum and hazardous materials storage and refueling restrictions and spill response procedures will be adhered to by the Contractor.

i. Petroleum and Hazardous Materials Storage and Refueling

1. Refueling of vehicles or machinery shall occur a minimum of 100 feet from wetlands or watercourses and shall take place on an impervious pad with secondary containment designed to contain fuels.

2. Any fuel or hazardous materials that must be kept on site shall be stored on an impervious surface utilizing secondary containment a minimum of 100 feet from wetlands or watercourses.

ii. Initial Spill Response Procedures

1. Stop operations and shut off equipment.

2. Remove any sources of spark or flame.

3. Contain the source of the spill.

4. Determine the approximate volume of the spill.

5. Identify the location of natural flow paths to prevent the release of the spill to sensitive nearby waterways or wetlands.

6. Ensure that fellow workers are notified of the spill.

iii. Spill Clean Up & Containment

1. Obtain spill response materials from the on-site spill response kit. Place absorbent materials directly on the release area.

2. Limit the spread of the spill by placing absorbent materials around the perimeter of the spill.

3. Isolate and eliminate the spill source.

4. Contact appropriate local, state and/or federal agencies, as necessary.

5. Contact a disposal company to properly dispose of contaminated materials.

iv. Reporting

1. Complete an incident report.

2. Submit a completed incident report to appropriate local, state and/or federal agencies, as necessary.

4. Herbicide and Pesticide Restrictions

a. In the event herbicides and/or pesticides are required at the proposed facility, their use will be used in accordance with Integrated Pest Management ("IPM") principles with particular attention to minimize applications within 100 feet of wetland or watercourse resources. No applications of herbicides or pesticides are allowed within actual wetland or watercourse resources.

5. Reporting

a. Any incidents of sediment release into the nearby wetland will be reported to the Connecticut Siting Council.

APPENDIX H Noise Evaluation Report

HMB

HMB Acoustics LLC 3 Cherry Tree Lane, Avon, CT 06001 860-677-5955

Noise Evaluation Study

Proposed Solar Farm Facility
SolarCity Corporation
82 Rogers Road
Norwich, CT

August 26,2015

Prepared For:
All-Points Technology Corporation
3 Saddlebrook Drive
Killingworth, CT 06419

Prepared By:
Allan Smardin
HMB Acoustics LLC
3 Cherry Tree Lane
Avon, CT 06001

Introduction

I have reviewed site plans and specifications for equipment that is being proposed for the Solar Farm. The Solar Farm is to be located at 82 Rogers Road, Norwich, CT. The site location is residential in nature. On July 11, 2015 existing background noise measurements were taken near the proposed site and in adjacent areas. The average levels were 35-40 dBA.

The purpose of this noise evaluation is to determine whether the proposed equipment will comply with the State of CT Noise Regulations. This report and the noise regulations utilize a dBA scale. This scale is used because it closely approximates the response characteristic of the human ear to loudness, and is the scale most commonly used in the measurement of community noise.

Noise Regulations

The State of CT has enacted regulations which limit the amount of noise which may be transferred from one property to another. In pertinent part, the Regulations provide as follows:

Daytime hours - The hours between 7 a.m. and 10 p.m. local time.

Nighttime hours - The hours between 10 p.m. and 7 a.m. local time.

(Sec. 22a-69-1.1 (h & n).

The allowable noise level from a Class “B” Commercial Zone Emitter to a Class “A” Residential Zone Receptor’s property line is 55 dBA (daytime) and 45 dBA (nighttime). (Sec. 22a-69-3.5 (b)).

Noise Evaluation

The noise levels listed in TABLE 1 take into account the effect of acoustical shielding provided by other structures on the property. The noise levels have been projected to the nearest residential property lines in the directions listed.

TABLE 1

The combined acoustical effect of inverters projected to the nearest Residential property lines.

Direction	Residential Property Line	dBA Level
North	Browning Road	40
Northwest	Browning Road	34
West	Barnsider Lane	28
West	Watson Drive	25
Northeast	Rogers Road	34
East	Rogers Road	39
Southeast	Wawecus Road	37
Southeast	Cranberry Pone Road	35

Noise Evaluation Results

The noise level data shown in TABLE 1 demonstrates that the noise levels meet the conditions for compliance as set forth in the State of CT Noise Regulations at residential property lines.

APPENDIX I

Photo-Documentation and Simulations

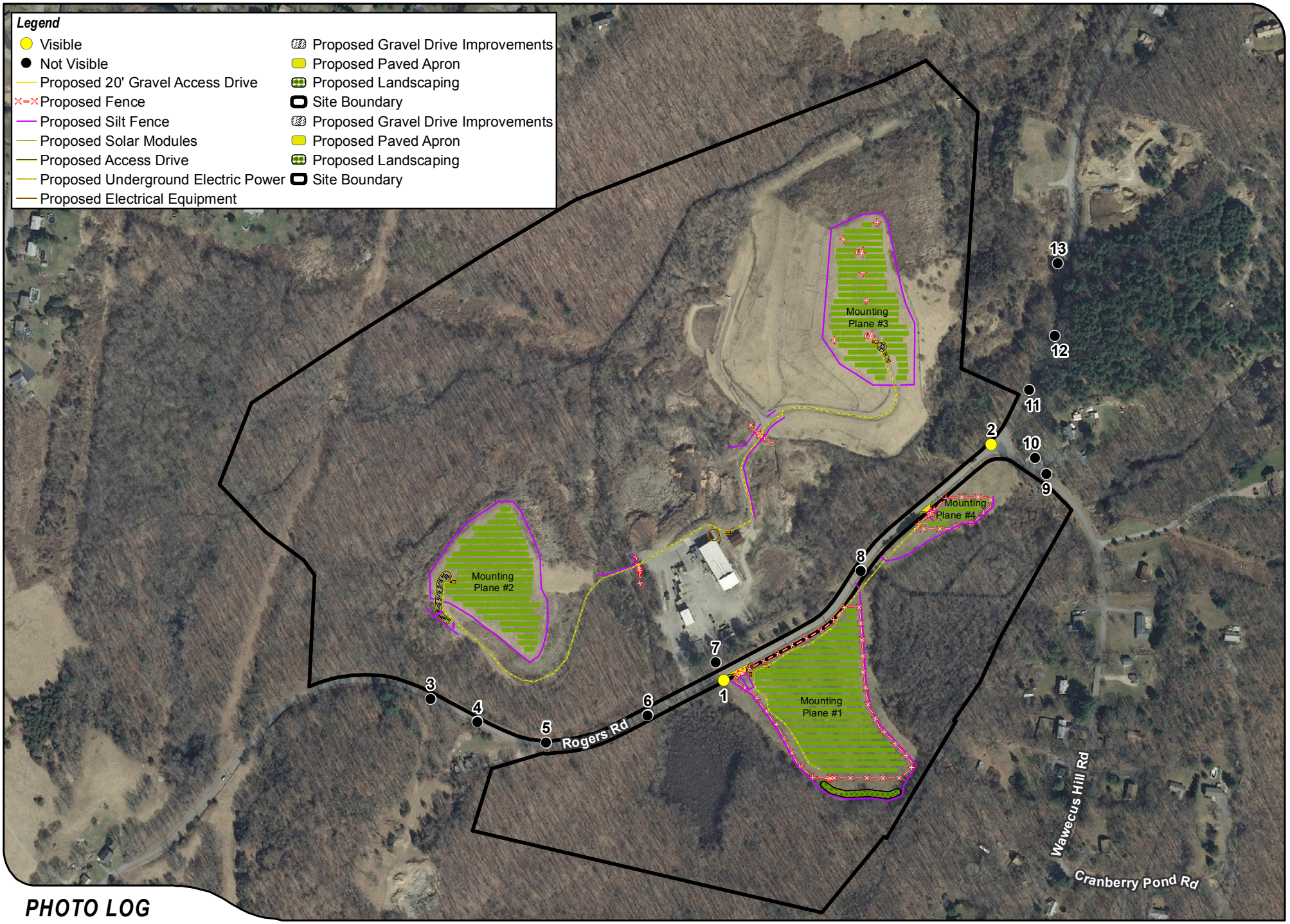


PHOTO LOG

400 200 0 400 Feet

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
1	**ROGERS ROAD**	**SOUTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PROPOSED

PHOTO	LOCATION	ORIENTATION
1	**ROGERS ROAD - MOUNTING PLANE #1**	**SOUTHEAST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
2	**ROGERS ROAD AT NORTH WAWECUS HILL ROAD**	**SOUTHWEST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PROPOSED

PHOTO	LOCATION	ORIENTATION
2	**ROGERS ROAD AT NORTH WAWECUS HILL ROAD – MOUNTING PLANE #4**	**SOUTHWEST**



PHOTO	LOCATION	ORIENTATION
3	**ROGERS ROAD**	**SOUTHEAST**

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BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
4	**ROGERS ROAD**	**NORTHEAST**

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BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
5	**ROGERS ROAD**	**NORTH**

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BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
6	**ROGERS ROAD**	**NORTHWEST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
7	**ROGERS ROAD**	**WEST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
8	**ROGERS ROAD**	**NORTH**



PHOTO	LOCATION	ORIENTATION
9	**WAWECUS HILL ROAD**	**NORTHWEST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
10	**WAWECUS HILL ROAD**	**SOUTHWEST**

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BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
11	**ROGERS ROAD**	**WEST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
12	**ROGERS ROAD**	**WEST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC



PHOTO	LOCATION	ORIENTATION
13	**ROGERS ROAD**	**WEST**

ALL-POINTS TECHNOLOGY CORPORATION

BRIGHTFIELDS DEVELOPMENT LLC

PHILIP M. SMALL
direct dial: (860) 509-6575
psmall@brownrudnick.com

185 Asylum
Street
Hartford
Connecticut
06103
tel 860.509.6500
fax 860.509.6501

September 16, 2015

VIA FIRST CLASS MAIL

Notice List Recipients

RE: SolarCity Corp.'s Petition to the Connecticut Siting Council for Declaratory Ruling

Dear Sir/Madam:

Pursuant to Section 16-50j-40 of the Connecticut Siting Council's (the "Council") regulations, we are notifying you that SolarCity Corporation intends to file on or shortly after September 18, 2015, a Petition for Declaratory Ruling with the Council. The petition will request the Council's approval of the location and construction of an approximately 2.74 megawatt ("MW") solar-based electric generating facility (the "Facility"). The Facility will be located on two parcels on Rogers Road in Norwich, Connecticut (the "Site"). One parcel (Map 73, Block 1, Lot 31) is the location of the City of Norwich's transfer station and two closed landfills. The other parcel (Map 81, Block 1, Lot 3) is located across Rogers Road from the transfer station and is undeveloped. The Facility will be a "grid-side distributed resources" facility (as defined in Connecticut General Statute Section 16-1(a)(37)), under 65 megawatts ("MW") that complies with the air and water quality standards of the Connecticut Department of Energy and Environmental Protection ("DEEP") and will have no adverse environmental effect in the State of Connecticut. Electricity generated by the Facility will be exported to the electric grid.

If you have any questions regarding the proposed Facility, please contact any of the following:

Elie Schecter
SolarCity Corporation
203 Ridgewood Drive
Elmsford, NY 10523
Telephone: (914) 924-6450
Fax: (914) 592-2189
Email: eschecter@solarcity.com

Philip M. Small, Esq.
Brown Rudnick LLP
185 Asylum Street, 38th Floor
Hartford, CT 06103
Tel: (860) 509-6575
Fax: (860) 509-6501
E-mail:psmall@brownrudnick.com

Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051
Tel: (860) 827-2935
Fax: (860) 827-2950
E-mail: siting.council@ct.gov

Sincerely,

BROWN RUDNICK LLP

Philip M. Small

62042682

brownrudnick.com

NOTICE LIST

This is to certify that on the 16th day of September 2015, the foregoing notice was sent via first class mail to the following:

MUNICIPAL OFFICIAL/AGENCY	*NAME/ADDRESS*
Chief Executive Officer Plan of Conservation & Development Committee (Ms. Hinchey is member)	Deb Hinchey, Mayor Norwich City Hall 100 Broadway Norwich, CT 06360
Planning Commission	Ralph Page, Chairman Commission of the City Plan City of Norwich 23 Union Street Norwich, CT 06360
Planning Commission	Peter Davis, Director Planning & Neighborhood Services City of Norwich 23 Union Street Norwich, CT 06360
Inland Wetlands, Water Courses & Conservation Commission	Richard Morell, Chairman Inland Wetlands, Water Courses & Conservation Commission City of Norwich 23 Union Street Norwich, CT 06360
Regional Planning Agency	James S. Butler, Executive Director Southeastern Connecticut Council of Government 5 Connecticut Avenue Norwich, CT 06360
State Senator	Cathy Osten, State Senator Legislative Office Building, Room 2100 300 Capitol Avenue Hartford, CT 06106

MUNICIPAL OFFICIAL/AGENCY	*NAME/ADDRESS*
State Representative – 46th District	Emmett D. Riley, State Representative Legislative Office Building, Room 4037 300 Capitol Avenue Hartford, CT 06106
State Representative – 47th District	Doug Dubitsky, State Representative Legislative Office Building, Room 4200 300 Capitol Avenue Hartford, CT 06106
State Representative – 139th District	Kevin Ryan, State Representative Legislative Office Building, Room 4012 300 Capitol Avenue Hartford, CT 06106
Connecticut Attorney General	George Jepsen, Attorney General Office of the Attorney General 55 Elm Street Hartford, CT 06106
State Department of Energy and Environmental Protection	Rob Klee, Commissioner Department of Energy and Environmental Protection 79 Elm Street Hartford, CT 06106-5127
State Public Utilities Regulatory Authority	Arthur House, Chairman Public Utilities Regulatory Authority Department of Energy and Environmental Protection 10 Franklin Square New Britain, CT 06051
State Department of Public Health	Dr. Jewel Mullen, Commissioner Department of Public Health 410 Capitol Avenue P.O. Box 340308 Hartford, CT 06134
State Council on Environmental Quality	Susan D. Merrow, Chair Council on Environmental Quality 79 Elm Street Hartford, CT 06106

MUNICIPAL OFFICIAL/AGENCY	*NAME/ADDRESS*
State Department of Agriculture	Steven K. Reviczky, Commissioner Department of Agriculture 165 Capitol Avenue Hartford, CT 06106
Office of Policy & Management	Benjamin Barnes, Secretary Office of Policy and Management 450 Capitol Avenue Hartford, CT 06106
State Department of Economic & Community Development	Catherine Smith, Commissioner Department of Economic and Community Development 505 Hudson Street Hartford, CT 06106
State Department of Transportation	James P. Redeker, Commissioner Department of Transportation 2800 Berlin Turnpike Newington, CT 06111
Any Federal Agencies with Jurisdiction Over the Site	None

ABUTTERS LIST	
City of Norwich 100 Broadway Norwich, CT 06360 Prop.: 81/1/3 (subject parcel), 82 Rogers Rd 73/1/31 (subject parcel), Rogers Rd. 73/1/32 73/1/30	Darrell M. Mattos et al. 153 Rogers Road Norwich, CT 06360 Prop.: 81/1/10 81/1/1
Stephanie L. & Darrell Mattos 153 Rogers Road Norwich, CT 06360 Prop.: 81/1/2	Guy St. George 38 North B Street Taftville, CT 06380 Prop.: 81/1/7
Robin L. Bourne 71 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 81/1/5	Robert S. Brown 49 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 81/1/4

ABUTTERS LIST	
Cindi M. Duthrie 63 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 82/1/4	Erica L. Sinko Timothy M. Plummer 43 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 82/1/3
Christopher W. & Kerri L. Brown 37 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 82/1/2	Angelo P. Jr & Tina M. Yeitz 29 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 82/1/1
Michael P. & Stacey L. Gualtieri 16 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 74/1/12	David A. Pringle 6 N. Wawecus Hill Road Norwich, CT 06360 Prop.: 74/1/11
Ronald Fogg & Christine Connor 4 Rogers Road Norwich, CT 06360 Prop.: 74/1/10 74/1/9 74/1/4	A to Z Carpentry LLC 20 Rogers Road Norwich, CT 06360 Prop.: 74/1/8
Andrew T. Zeeman 20 Rogers Road Norwich, CT 06360 Prop.: 74/1/7	Raymond M. & Wendy S. Henry 18 Rogers Road Norwich, CT 06360 Prop.: 74/1/6
Fred G. Rogers 12 Rogers Road Norwich, CT 06360 Prop.: 74/1/5	Ed Oloff 19 Browning Road Norwich, CT 06360 Prop.: 66/1/54
Peter D. & Diana E. Phelan 15 Browning Road Norwich, CT 06360 Prop.: 66/1/55	Charles D. & Susan M. Gorman 47 Browning Road Norwich, CT 06360 Prop.: 66/1/56
Norwich Fish & Game Association 44 Browning Road Norwich, CT 06360 Prop.: 73/1/19 73/1/20	Dana M. & Mark M. Blake c/o Hazel Johnson 72 Coatney Hill Road Woodstock, CT 06281 Prop.: 73/1/25

ABUTTERS LIST	
Phillip L. Couture III 1653 Pond Road Vernon, VT 05354 Prop.: 73/1/29	Melissa & Michael Vitagliano 11 Barnsider Lane Norwich, CT 06360 Prop.: 73/1/33
Thomas J. & Jean L. Miller 10 Watson Drive L Norwich, CT 06360 Prop.: 73/1/52	Robert R. Nejbauer III 8 Watson Drive Norwich, CT 06360 Prop.: 73/1/51
Donna C. & John A. McClafferty 7 Watson Drive R Norwich, CT 06360 Prop.: 73/1/53	Seymour's Sand & Stone Inc. 34 Bozrah Street Bozrah, CT 06334 Prop.: 73/1/57

By: _____
Philip M. Small, Esq.

61991957 v1-031819/0001

1,490.17 KW SOLAR PV SYSTEM FOR CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE - NORWICH (ROGER'S RD.) LANDFILL

PROJECT TEAM

DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE:

PAUL KIRSCHNER
SOLARCITY, INC.
3055 CLEARVIEW WAY
SAN MATEO, CA 94402
TEL: (650) 963-5807
PKIRSCHNER@SOLARCITY.COM

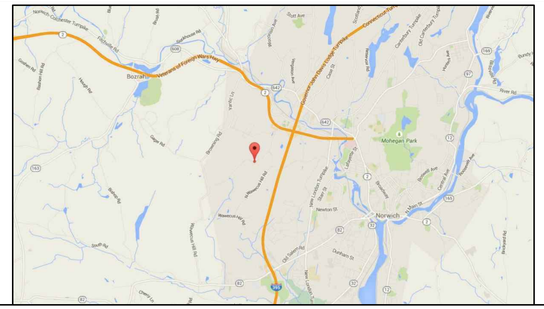
ELECTRICAL ENGINEER:

ALLISON D. KIMBALL, PE
KMB DESIGN GROUP LLC.
1800 RTE 34, STE 209
WALL, NJ 07719
TEL: (732) 894-5061
AKIMBALL@KMBCOMPANIES.COM

STRUCTURAL:

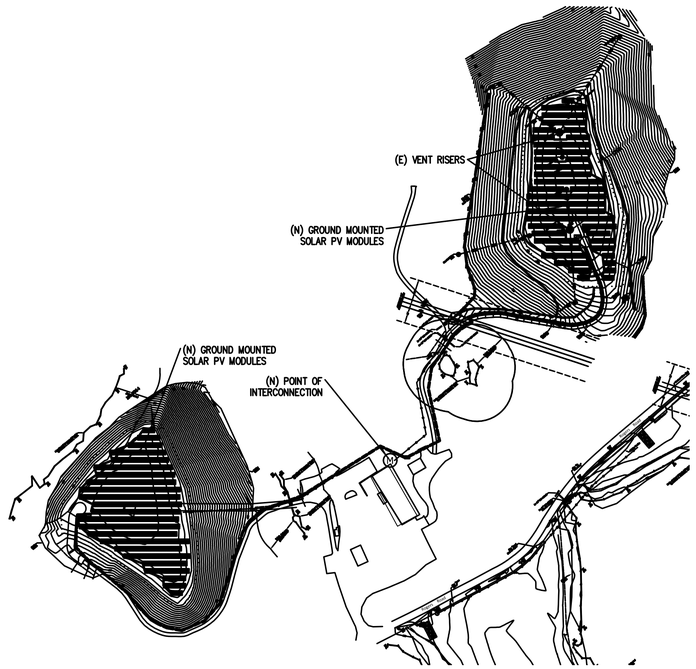
GAMECHANGE RACKING LLC
730 FIFTH AVE, 16TH FLOOR
NEW YORK, NY 10019
TEL: (212) 359-0205

VICINITY MAP



AERIAL MAP





PROPERTY PLAN

1"=200'-0"

0 200' 400'

N W E S 180°

GENERAL NOTES

ALL WORK SHALL COMPLY WITH ALL STATE AND LOCAL CODES AND ANY OTHER REGULATING AUTHORITIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK.

DRAWINGS HAVE BEEN DETAILED IN COMPLIANCE WITH UL LISTING REQUIREMENTS, OSFM SOLAR PHOTOVOLTAIC INSTALLATION REQUIREMENTS, AND BUILDING CODES FOR THE MATERIALS SPECIFIED.

PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND NOTIFY THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE FROM SOLARCITY OF ANY DISCREPANCIES. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED AT THE SUBCONTRACTORS SOLE EXPENSE.

SUBCONTRACTOR INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO SOLARCITY FOR APPROVAL BEFORE MAKING ANY CHANGES. DEVIATION FROM PLANS BEFORE WRITTEN APPROVAL FROM SOLARCITY PLACES LIABILITY ON THE SUBCONTRACTOR.

ALL EQUIPMENT SHALL BE MOUNTED AS SHOWN. WHERE DETAILS ARE NOT PROVIDED, CONTRACTOR SHALL USE STANDARD CONSTRUCTION PRACTICES.

ALL SURFACES SHALL BE PATCHED AND PAINTED AROUND NEW DEVICES AND EQUIPMENT TO MATCH EXISTING FINISHES.

ANY METAL SHAVINGS FROM SITE WORK SHALL BE CLEANED FROM ALL SURFACES WHERE OXIDIZED OR CONDUCTIVE METAL SHAVINGS MY CAUSE RUST, ELECTRICAL SHORT CIRCUITS, OR OTHER DAMAGE.

BEAMS OR PURLINS SHALL NOT BE DRILLED UNLESS AUTHORIZED BY SOLARCITY OR SHOWN IN THE DRAWINGS.

APPROVALS FROM BUILDING INSPECTORS SHALL NOT CONSTITUTE AUTHORITY TO DEVIATE FROM THE DRAWINGS.

ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
ADA	AMERICANS WITH DISABILITIES ACT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BLDG	BUILDING
CLR	CLEAR
CONC	CONCRETE
DC	DIRECT CURRENT
DIA	DIAMETER
DIST	DISTANCE
EQ	EQUAL
EGC	EQUIPMENT GROUNDING CONDUCTOR
(E)	EXISTING
EA.	EACH
EMT	ELECTRICAL METALLIC TUBING
GALV	GALVANIZED
GEC	GROUNDING ELECTRODE CONDUCTOR
GND	GROUND
HDG	HOT DIPPED GALVANIZED
I	CURRENT
Imp	CURRENT AT MAX POWER
INVS	INVERTERS
Isc	SHORT CIRCUIT CURRENT
kVA	KILOVOLT AMPERE
kW	KILOWATT
kWh	KILOWATT-HOUR
LBW	LOAD BEARING WALL
MAX	MAXIMUM
MIN	MINIMUM
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OCP	OVERCURRENT PROTECTION
PL	PROPERTY LINES
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
SCH	SCHEDULE
SQ. IN.	SQUARE INCHES
SS	STAINLESS STEEL
SSD	SEE STRUCTURAL DRAWINGS
STC	STANDARD TESTING CONDITIONS
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
VIF	VERIFY IN FIELD
V	VOLT
Vmp	VOLTAGE AT MAX POWER
Voc	VOLTAGE AT OPEN CIRCUIT
W	WATT
3R	NEMA 3R, RAINTIGHT

SYSTEM SUMMARY

MODULE: (4,807) CANADIAN SOLAR # CS6X-310P

INVERTER:
(2) SOLECTRIA SGI 750XTM

RACK TYPE: GAMECHANGE GROUND MOUNT

ARRAY TILT: 15°

AZIMUTH: 180°

DESIGN CRITERIA

WIND SPEED: 121 MPH

EXPOSURE: B

SNOW LOAD: 30 PSF

CODE SUMMARY

BUILDING CODE
ALL WORK SHALL COMPLY WITH THE 2012 INTERNATIONAL BUILDING CODE.

ELECTRICAL CODE
ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 NATIONAL ELECTRIC CODE.

INDEX

PV1 COVER SHEET
PV2 SITE PLAN
PV3 SITE PLAN
PV4 ACCESS PLAN
PV5 STRUCTURAL DETAILS & INVERTER PADS
PV6 PV EQUIPMENT PLAN & ELEVATION
PV7 ELECTRICAL SYMBOLS & NOTES
PV8 LINE DIAGRAM
PV9 LINE DIAGRAM
PV10 MONITORING DETAILS
PV11 WARNING LABELS

SolarCity
3055 Clearview Way, San Mateo, CA 94402
T:(650) 638-1028 | F:(650) 638-1029
(888)-SOL-CITY (765-2489) | www.solarcity.com

CONFIDENTIAL – THE INFORMATION HEREIN CONTAINED SHALL NOT BE USED FOR THE BENEFIT OF ANYONE EXCEPT SOLARCITY INC., NOR SHALL IT BE DISCLOSED IN WHOLE OR IN PART TO OTHERS OUTSIDE THE RECIPIENT'S ORGANIZATION, EXCEPT IN CONNECTION WITH THE SALE AND USE OF THE RESPECTIVE SOLARCITY EQUIPMENT, WITHOUT THE WRITTEN PERMISSION OF SOLARCITY INC.

CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGERS RD.) LANDFILL – 1,490.17 KW PV SYSTEM
Norwich (Rogers Rd.) LANDFILL
82 Rogers Road
Norwich, CT
860-889-4088

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-9933
FOR ALL QUESTIONS, PLEASE CONTACT ALLISON D. KIMBALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT STEPHEN A. BRAY LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES: (4807) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM: GAMECHANGE

INVERTER: (2) Solectria # SGI-750XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKET: COMM

PROJECT MANAGER: D VENELL

DATE: 9/2

PAYMENT TYPE: PPA

SHEET NAME: COVER SHEET

JOB NUMBER: JB-0632141-00

SHEET: PV 1

REV: 0

C: \Common \Installs \Customers \JB-0632141-00 Connecticut Municipal Electric Energy Cooperative – Norwich (Rogers Rd. LANDFILL) \Drawings \AutoCAD \jb_0632141_00___acad_b_01.dwg



SITE PLAN

1"=80'-0"

C:\Common\Installs\Customers\JB-0632141-00 Connecticut Municipal Electric Energy Cooperative - Norwich (Rogers Rd. LANDFILL)\Drawings\AutoCAD\jb_0632141_00___acad_b_01.dwg

SolarCity

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CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGERS RD.) LANDFILL – 1,490.17 KW PV SYSTEM

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FOR ALL QUESTIONS, PLEASE CONTACT ALLISON D. KIMBALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

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(4807) CANADIAN SOLAR # CS6X-310P
*

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GAMECHANGE

INVERTER:
(2) Solectria # SGI-750XTM-380

DESIGN: P KIRSCHNER

CHECKED BY:
EZ

MARKET:
COMM

PROJECT MANAGER:
D VENELL

DATE:
9/2

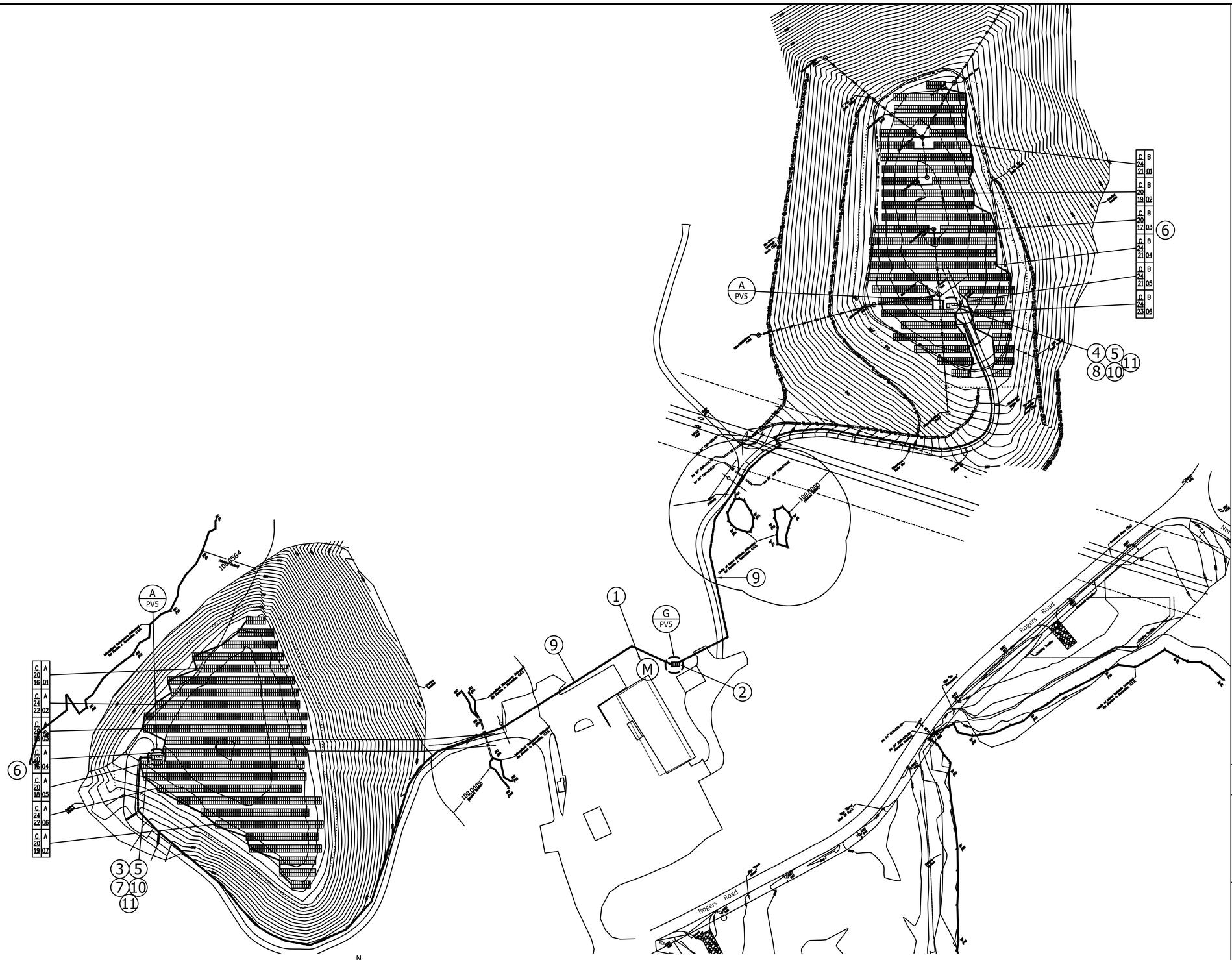
PAYMENT TYPE:
PPA

SHEET NAME:
SITE PLAN

JOB NUMBER:
JB-0632141-00

SHEET:
PV 2

REV:
0



SITE PLAN

1"=80'-0"

0 80' 160'

SHEET NOTES

A. SEE PV15 FOR WARNING LABEL DETAILS.
B.

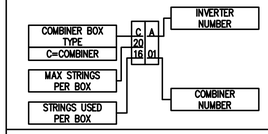
LEGEND

- (N) GROUND-MOUNTED SOLAR PV MODULES (ELECTRICALLY CONNECTED)
- (N) GATE
- (N) TRENCH
- (N) DC COMBINER BOX

KEYED NOTES

1. (E) UTILITY POWER POLE (N) POINT OF AC INTERCONNECTION. WARNING LABEL DETAIL
2. (N) MAIN SWITCHGEAR WITH PV SYSTEM UTILITY AC DISCONNECT
3. (N) PV INVERTER "A". WARNING LABEL DETAIL 2/PV15.
4. (N) PV INVERTER "B". WARNING LABEL DETAIL 2/PV15
5. (N) DC DISCONNECT SWITCH(ES) LOCATED AT INVERTER. WARNING LABEL DETAIL 3/PV15.
6. (N) PV SOURCE CIRCUIT DC COMBINER BOXES WITH INTEGRATED LOAD-BREAK DISCONNECT SWITCH. WARNING LABEL DETAIL 4/PV15.
7. (N) 750KVA STEP UP TRANSFORMER "I"
8. (N) 750KVA STEP UP TRANSFORMER "II"
9. (N) CONDUIT IN TRENCH. SEE DETAILS C,D/PV7.
10. (N) MONITORING EQUIPMENT, SOLARGUARD GATEWAY.
11. (N) MONITORING EQUIPMENT, SOLARGUARD PV PRODUCTION kWh METER.

COMBINER BOX NUMBERING SYSTEM



SolarCity
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CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGERS RD.) LANDFILL – 1,490.17 KW PV SYSTEM

Norwich (Rogers Rd.) LANDFILL
82 Rogers Road
Norwich, CT

860-889-4088

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 309
WALL, NJ 07719
(732) 280-0833
FOR ALL QUESTIONS, PLEASE CONTACT
ALISON D. KNALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES: (4807) CANADIAN SOLAR # CS6X-310P *

MOUNTING SYSTEM: GAMECHANGE

INVERTER: (2) Solectria # SGI-750XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKET: COMM

PROJECT MANAGER: D VENELLI

DATE: 9/2

PAYMENT TYPE: PPA

SHEET NAME: SITE PLAN

JOB NUMBER: JB-0632141-00

SHEET: PV 3

REV: 0

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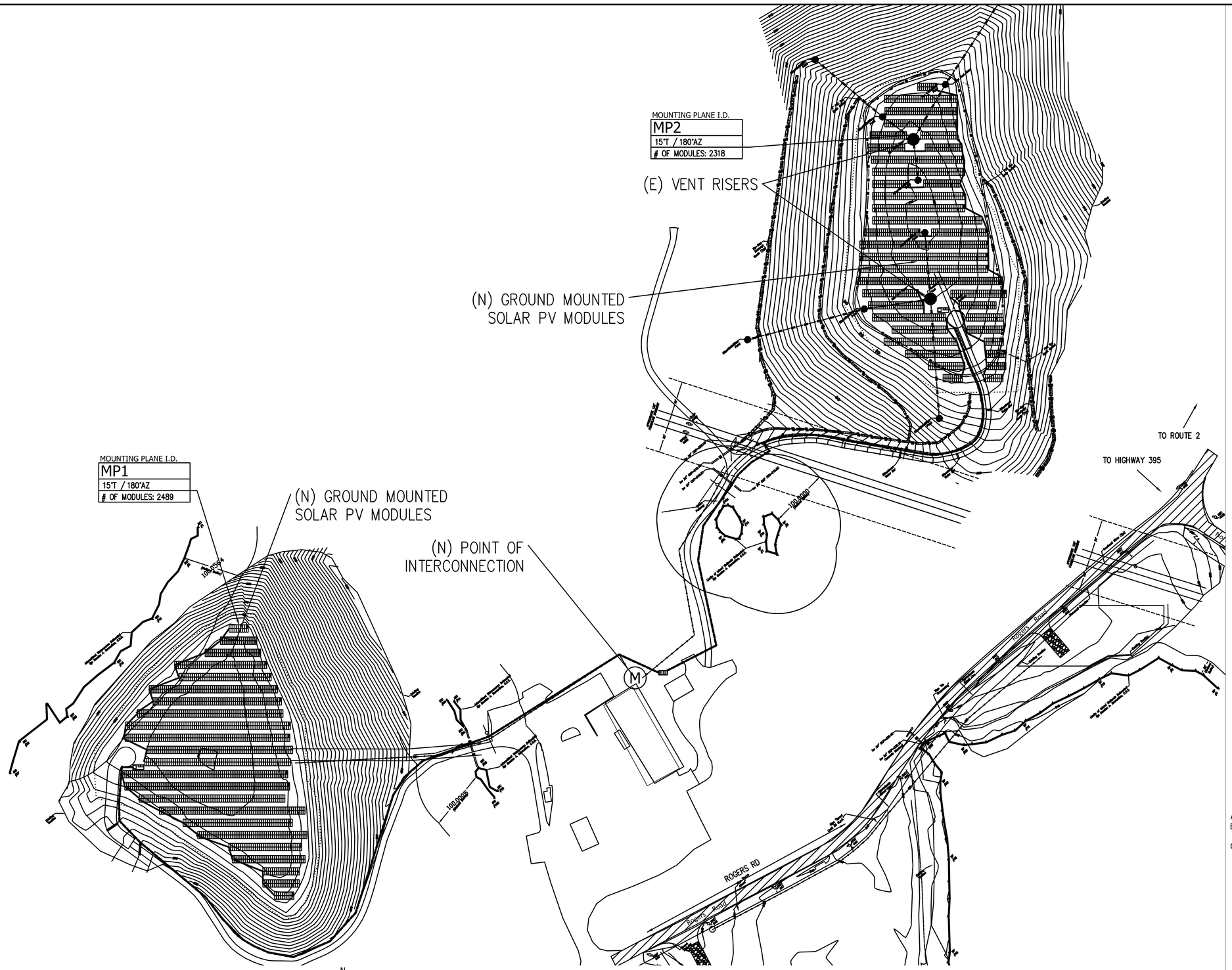

ACCESS PLAN

1"=80'-0"

LEGEND

- (N) GROUND-MOUNTED SOLAR PV MODULES (ELECTRICALLY CONNECTED)
- FIRE ACCESS PATH
- (N) GATE
- (N) TRENCH

FIRE SIGNAGE NOTES

SIGNAGE SHALL BE IN COMPLIANCE WITH CEC 690 AND THE CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION OFFICE OF THE STATE FIRE MARSHALL SOAR PHOTOVOLTAIC INSTALLATION GUIDELINE

MARK EXISTING MAIN SERVICE DISCONNECT

MARKING CONTENT: "CAUTION ELECTRIC SYSTEM CONNECTED"

-RED BACKROUND
-WHITE LETTERING
-MINIMUM 3/8" LETTER HEIGHT
-ALL CAPITAL LETTERS
-ARIAL OR SIMILAR FONT, NON BOLD
-REFLECTIVE, WEATHER RESISTANT
MATERIAL SUITABLE FOR THE ENVIRONMENT (DURAB LE ADHESIVE MATERIALS MAY MEET THE REQUREMENT)

MARK ALL DC ENCLOSURES AND JUNCTION BOXES AND ALL ABOVE GROUND RACEWAYS AND CABLEWAY ASSEMBLIES EVERY 10 FEET

MARKING CONTENT: "CAUTION SOLAR CIRCUIT"

-RED BACKROUND
-WHITE LETTERING
-MINIMUM 3/8" LETTER HEIGHT
-ALL CAPITAL LETTERS
-ARIAL OR SIMILAR FONT, NON BOLD
-REFLECTIVE, WEATHER RESISTANT
MATERIAL SUITABLE FOR THE ENVIRONMENT (DURABLE ADHESIVE MATERIALS MAY MEET THE REQUIREMENT)

GROUND MOUNT ACCESS NOTES

A. MIN X' SETBACK FROM FENCING.
B. MIN X' ACCESS GATES ON XXXX AND XXXX SIDE OF THE ARRAY FENCING.
C. MIN X' SETBACK FROM ALL PROPERTY LINES.

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Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

REVISIONS

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(4807) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM:
GAMECHANGE

INVERTER:
(2) Solectria # SGI-750XTM-380

DESIGN: P KIRSCHNER
CHECKED BY: EZ
MARKET: COMM
PROJECT MANAGER: D VENELL
DATE: 9/2
PAYMENT TYPE: PPA
SHEET NAME: ACCESS PLAN
JOB NUMBER: JB-0632141-00
SHEET: PV 4
REV: 0

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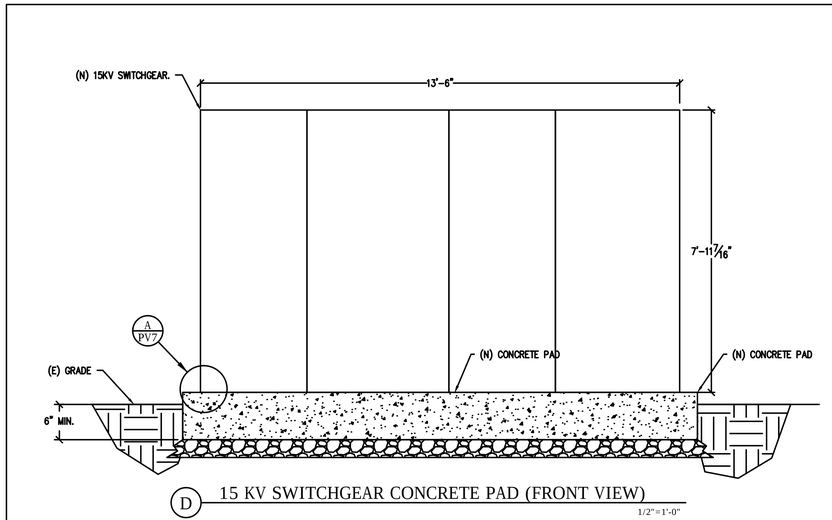
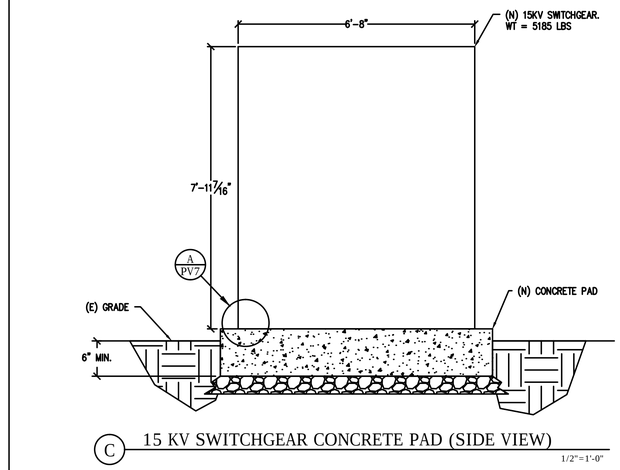


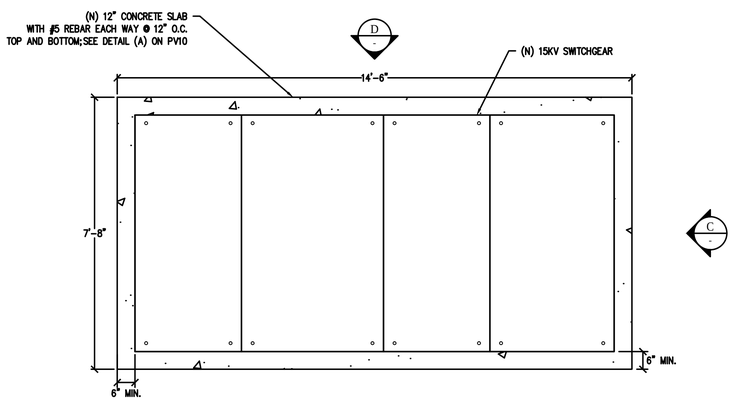
D 15 KV SWITCHGEAR CONCRETE PAD (FRONT VIEW)

1/2"=1'-0"



C 15 KV SWITCHGEAR CONCRETE PAD (SIDE VIEW)

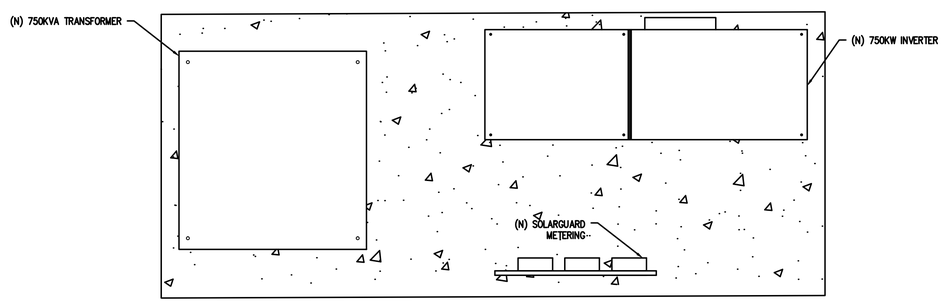
1/2"=1'-0"



B 15 KV SWITCHGEAR CONCRETE PAD (PLAN VIEW)

1/2"=1'-0"

INVERTER AND TRANSFORMER
PAD SPECIFICATIONS DESIGNED
BY WESTON & SAMPSON



A EQUIPMENT CONCRETE PAD (PLAN VIEW)

1/2"=1'-0"

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860-889-4088

STATE OF CONNECTICUT
ANDREW D. WHITE
No. 25355
LICENSED PROFESSIONAL ENGINEER

STAMPED & SIGNED
FOR STRUCTURAL ONLY

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

MODULES: (4876) CANADIAN SOLAR # CS6X-310P *
MOUNTING SYSTEM: *
INVERTER: (2) Solectria # SGI-750XTM-380
DESIGN: *
CHECKED BY: -
MARKET: * PROJECT MANAGER: *
DATE: * PAYMENT TYPE: PPA
SHEET NAME: STRUCTURAL DETAILS & INVERTER PADS
JOB NUMBER: JB-0632141-00
SHEET: PV 5 REV: 0

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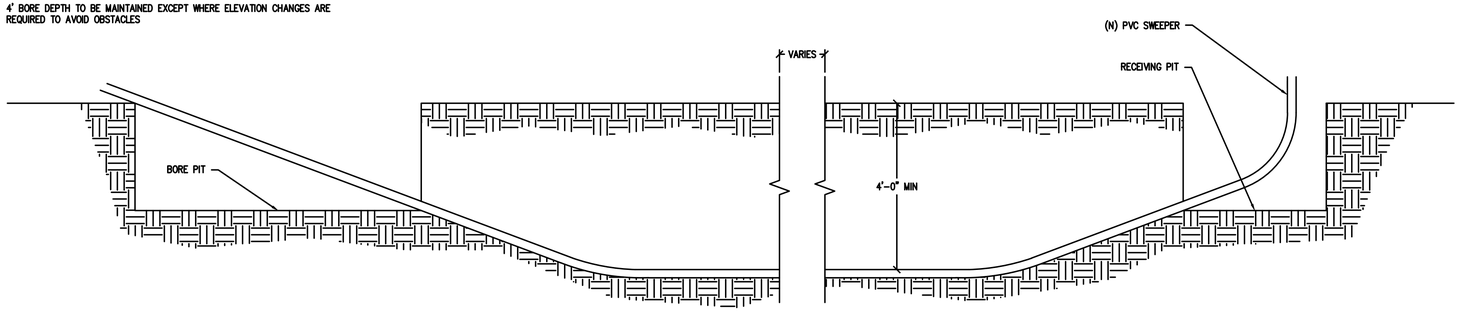
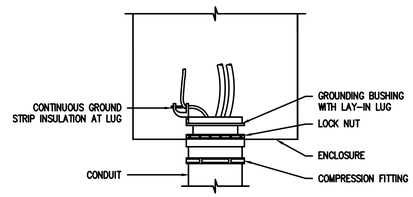
NOTE:

4' BORE DEPTH TO BE MAINTAINED EXCEPT WHERE ELEVATION CHANGES ARE REQUIRED TO AVOID OBSTACLES



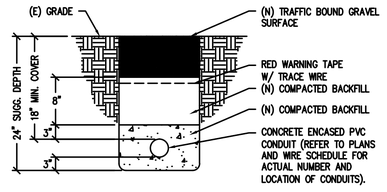
E HORIZONTAL BORE DETAIL

NTS



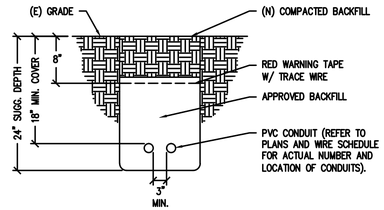
D CONDUIT GROUNDING DETAIL

NTS



C TRENCH THROUGH GRAVEL DRIVEWAY DETAIL

NTS



B TRENCH THROUGH SOIL NON-TRAFFIC DETAIL

NTS

CONCRETE NOTES

1. CONCRETE STRENGTH -PROVIDE CONCRETE WITH THE FOLLOWING STRENGTHS AT THE LOCATIONS NOTED. MIX DESIGN, SLUMP, AIR ENTRAINMENT, AGGREGATE SIZE, ETC. SHALL BE IN CONFORMANCE WITH THE ACI CODE, LATEST EDITION.

LOCATION: ANY

STRENGTH AT 28 DAYS: 3000 PSI

A. ALL CONCRETE AGGREGATE IS HARD ROCK UON
B. DESIGN MIX SHALL CONTAIN 5-1/2 SACKS OF CEMENT, MIN.
C. TYPE I/II CEMENT TO MEET ASTM C150.
D. MAX AGGREGATE SIZE SHALL BE 3/4"
E. MAX WATER/CEMENT RATIO SHALL BE 0.54 (MAX 0.50 IN COLORADO)
F. MAX SLUMP SHALL BE 4"
G. PROVIDE 6% AIR ENTRAINMENT, ADD MIXTURE IN SNOW STATES ONLY (MIN 6% +/- 1.5%)

2. REINFORCING STEEL -ASTM A615 WITH THE FOLLOWING STRENGTHS:

SIZE	STRENGTH:
#4 AND SMALLER	GRADE 60 (fy = 60000 PSI)
#5 AND LARGER	GRADE 60 (fy = 60000 PSI)

3. FABRICATE AND PLACE REINFORCEMENT IN ACCORDANCE WITH ACI PUBLICATION SP-66, ACI DETAILING MANUAL - LATEST EDITION.

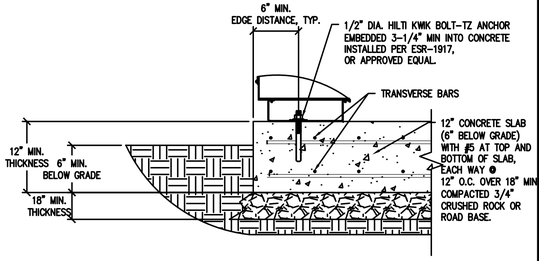
4. PLACE CONCRETE IN COMPLIANCE WITH ACI 304. ALL CONCRETE SHALL BE MECHANICALLY VIBRATED.

5. CONCRETE COVER FOR REINFORCEMENT FOR NON-PRESTRESSED, CAST IN PLACE CONCRETE SHALL BE AS FOLLOWS:

CONDITION	COVER
CAST AGAINST EARTH	3"
EXPOSED TO WEATHER	
#5 AND SMALLER	1-1/2"
#6 AND LARGER	2"
SLAB-ON-GRADE	2"

6. EMBEDS -ALL ITEMS TO BE CAST INTO CONCRETE SUCH AS REINFORCING DOWELS, BOLTS, ANCHORS, PIPES, SLEEVES, ETC., SHALL BE SECURELY AND ACCURATELY POSITIONED INTO THE FORMS PRIOR TO PLACING THE CONCRETE.

NOTE: TOP UPPER BARS AND BOTTOM LOWER BARS SHALL RUN IN THE LONG DIRECTION OF THE SLAB



A ANCHOR DETAIL

NTS

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STATE OF CONNECTICUT ANDREW D. WHITE No. 25355 LICENSED PROFESSIONAL ENGINEER

STAMPED & SIGNED FOR STRUCTURAL ONLY

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

MAE

MODULES:
(4876) CANADIAN SOLAR # CS6X-310P
*

MOUNTING SYSTEM:
*

INVERTER:
(2) Solectria # SGI-750XTM-380
DESIGN: *

CHECKED BY:
-

MARKET:
*

PROJECT MANAGER:
*

DATE:
*

PAYMENT TYPE:
PPA

SHEET NAME:
PV EQUIPMENT PLAN & ELEVATION

JOB NUMBER:
JB-0632141-00

SHEET:
PV 6

REV:
0

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EXTERNAL TRANSFORMER REQUIREMENTS FOR SOLECTRIA XTM INVERTER

1. TRANSFORMER TYPE
THE TRANSFORMER SHALL BE THREE PHASE, SELF-COOLED, AND DESIGNED FOR STEP-UP OPERATION. TRANSFORMER SHALL BE UL LISTED. PAD MOUNT, DISTRIBUTION TYPE TRANSFORMERS SHALL COMPLY WITH THE LATEST ISSUE OF IEEE/ANSI C57.12.34. TRANSFORMER SHALL OPERATE AT 60HZ NOMINAL AND SHALL BE TOLERANT OF CONTINUOUS FREQUENCIES BETWEEN 54.0HZ AND 60.5HZ. TRANSFORMER SHALL BE CAPABLE OF OPERATING AT 1.1P.U. VOLTAGE AT FULL LOAD WITHOUT SATURATION FOR PERIODS OF TIME TYPICAL OF THE EXPECTED GENERATION PROFILE. DIFFERENT FREQUENCY AND VOLTAGE REQUIREMENTS MAY BE NECESSARY FOR PROJECTS WITH VOLTAGE OR FREQUENCY RIDE THROUGH REQUIREMENTS OTHER THAN THOSE DEFINED IN IEEE 1547-2003. REQUIREMENTS OUTSIDE OF THIS STANDARD RANGE MUST BE REVIEWED AND APPROVED BY SOLECTRIA.

2. TRANSFORMER RATING

A SINGLE INVERTER ISOLATED BY ONE TRANSFORMER SHALL HAVE ONE PRIMARY WINDING AND ONE SECONDARY WINDING. THE KVA RATING OF THE TRANSFORMER MUST AT LEAST BE EQUAL TO THE KVA RATING OF THE INVERTER. TWO INVERTERS ISOLATED BY ONE TRANSFORMER SHALL HAVE THREE WINDINGS TOTAL; ONE SECONDARY WINDING AND TWO PRIMARY WINDINGS. EACH PRIMARY WINDING MUST HAVE A KVA RATING AT LEAST BE EQUAL TO THE KVA RATING FOR THE INVERTER THIS WINDING ISOLATES. THE SECONDARY WINDING MUST HAVE A KVA RATING AT LEAST BE EQUAL TO THE SUM OF THE KVA RATING FOR THE TWO INVERTERS CONNECTED TO THE TRANSFORMER. THE TWO PRIMARY WINDINGS SHALL HAVE THE SAME VOLTAGE, WINDING CONFIGURATION AND BIL. THE THREE WINDINGS SHALL BE CONSTRUCTED IN A LOW-HIGH-LOW CONFIGURATION.

3. TRANSFORMER IMPEDANCE
FOR TRANSFORMERS WITH THREE WINDINGS, THE PERCENT IMPEDANCE BETWEEN BOTH LOW VOLTAGE PRIMARY WINDINGS MUST BE GREATER THAN 7%. THE PERCENT IMPEDANCE BETWEEN LOW VOLTAGE WINDING #1 AND THE HIGH VOLTAGE WINDING AS WELL AS PERCENT IMPEDANCE BETWEEN LOW VOLTAGE WINDING #2 AND THE HIGH VOLTAGE WINDING MUST SATISFY THE MINIMUM IMPEDANCE REQUIREMENTS IN TABLE 1 ON THE FOLLOWING PAGE. FOR STANDARD TWO WINDING TRANSFORMERS, THE TRANSFORMER IMPEDANCE VOLTAGE Z(%) MUST SATISFY THE CONDITIONS IN TABLE 1.

4. PRIMARY CONFIGURATION
THE PRIMARY WINDING(S) SHALL BE COMPLETELY FLOATING OR GROUNDED THROUGH A HIGH IMPEDANCE (>1MOHMS).
380V NOMINAL DELTA
OR
380V NOMINAL WYE WITH THE NEUTRAL FULLY INSULATED FROM GROUND AND CONSTRUCTED SUCH THAT THE NEUTRAL TERMINAL IS NOT ACCESSIBLE

5. TAPS
THE TRANSFORMER SHALL BE FURNISHED WITH SECONDARY CAPACITY HIGH-VOLTAGE TAPS WITH A MINIMUM OF TWO - 2½% TAPS ABOVE AND BELOW THE RATED NAMEPLATE VOLTAGE.

6. SECONDARY CONFIGURATION
THE SECONDARY WINDING CONFIGURATION SHALL BE EITHER:
DELTA
OR
FLOATING WYE
OR
GROUNDED WYE
NOTE FOR GROUNDED WYE CONFIGURATION: A TRANSFORMER CONFIGURATION OF SOLIDLY GROUNDED WYE ON THE SECONDARY AND DELTA ON THE PRIMARY INDUCES NEUTRAL CURRENT TO THE TRANSFORMER AND THROUGH THREE-PHASE OVER CURRENT PROTECTION DEVICES ON THE SECONDARY SIDE OF THE TRANSFORMER. THE ADDITIONAL CURRENT COULD LEAD TO UNINTENDED ACTIVATION OF THE OVER CURRENT PROTECTION. IT MAY ALSO REDUCE THE INVERTER'S ABILITY TO DETECT A SINGLE OPEN PHASE CONDITION. FOR THIS TRANSFORMER CONFIGURATION, THE CUSTOMER MUST PROVIDE SUPPLEMENTAL SINGLE OPEN PHASE DETECTION.

7. ELECTROSTATIC SHIELD
TRANSFORMERS WITH THREE WINDINGS SHALL INCLUDE ELECTROSTATIC SHIELDING BETWEEN THE LOW AND HIGH VOLTAGE WINDINGS. THE SHIELDING MUST BE GROUNDED TO THE TRANSFORMER TANK OR ENCLOSURE.

8. LOW VOLTAGE BUSHINGS AND TERMINALS
THE MINIMUM QUANTITY OF CONNECTION HOLES MUST ACCOMMODATE THE TOTAL NUMBER OF CONDUCTOR TERMINATIONS PER PHASE. PAD MOUNT DISTRIBUTION TRANSFORMERS SHALL BE PROVIDED WITH SPADE-TYPE BUSHINGS.

9. TANK GROUNDING
CLAMP-TYPE TANK GROUNDING CONNECTIONS SHALL BE PROVIDED FOR PAD MOUNT DISTRIBUTION TRANSFORMERS IN ACCORDANCE WITH ANSI C57.12.34

10. SUBMITTAL DRAWINGS
FINAL TRANSFORMER SUBMITTAL DRAWINGS MUST BE RECEIVED AND REVIEWED BY SOLECTRIA PRIOR TO INVERTER SHIP DATE.

ELECTRICAL NOTES

GENERAL NOTES

1. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 NATIONAL ELECTRIC CODE AS AMENDED BY APPLICABLE STATE AND LOCAL CODES.
2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.
3. ALL EQUIPMENT SHALL BE LISTED BY A NRTL IN COMPLIANCE WITH ART 110.3.
4. DC CONDUCTORS INSIDE BUILDING SHALL BE IN METALLIC RACEWAY PER ART 690.31(E).
5. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.
6. INSTALL PARALLEL CONDUCTORS PER ART 310.10(H)
7. ALL VALUES FOR IMP AND ISC AND VMP ARE MANUFACTURER'S LISTED DATA UNCORRECTED BY NEC.
8. REFER TO CURRENT MANUFACTURER'S PLANNING AND INSTALLATION MANUAL FOR TORQUE SPECS FOR ALL BOLTS AND TERMINAL CONNECTIONS.
9. DC STRING CIRCUITS SHALL BE RUN IN OUTDOOR ROOFTOP AMBIENT CONDITIONS.
10. DC BRANCH CIRCUITS RUN IN OUTDOOR ROOFTOP AMBIENT CONDITIONS SHALL BE INSTALLED > 3.5 INCHES ABOVE ROOF SURFACE UON.
11. PV INVERTER CONTAINS INTEGRATED AC AND DC DISCONNECTS.
12. BURIED CONDUCTORS SHALL BE BURIED TO THE MINIMUM DEPTH SPECIFIED IN ART. 300.5 FOR CIRCUITS 600V AND UNDER AND ART. 300.50 FOR CIRCUITS ABOVE 600V.
13. ALL CONDUCTORS ARE COPPER UON.
14. USE NON-METALLIC UV RATED TIE WRAPS FOR BUNDLED PV WIRE.
15. ALL LINE SIDE AND LOAD SIDE TERMINATIONS OF ALUMINUM AND COPPER CONDUCTORS SHAL BE MADE WITH HIGH PRESS CRIMP LUGS ON BUSSING UNLESS OTHERWISE NOTED.
16. ALL TERMINATIONS OF ALUMINUM CONDUCTORS SHALL BE PROPERLY INSTALLED WITH BEST PRACTICE PROCEDURES THAT INCLUDE BUT NOT LIMITED TO: USE OF TERMINATION EQUIPMENT RATED FOR ALUMINUM AT THE CONDUCTOR TEMPERATURE, CURRENT, AND VOLTAGE; ALLOWANCE FOR MOVEMENT DUE TO THERMAL EXPANSION/CONTRACTION; EXPOSED ALUMINUM SHALL BE PROPERLY COATED WITH ANTI-OXIDIZATION COMPOUND; TERMINALS ARE TORQUE AND MARKED TO REQUIRED SETTINGS WITH CALIBRATED DEVICES.

GROUNDING NOTES

1. SINGLE-CONDUCTOR CABLE USED AS A GROUNDED CONDUCTOR IN PHOTOVOLTAIC POWER SYSTEMS SHALL BE IDENTIFIED AT THE TIME OF INSTALLATION BY DISTINCTIVE WHITE MARKING AT ALL TERMINATIONS PER ART 200.6.
2. THE DC GEC SHALL BE CONTINUOUS FROM THE INVERTER GROUND BUSBAR TO THE MAIN ELECTRICAL SERVICE GROUNDING ELECTRODE SYSTEM. THE DC GEC SHALL BE ATTACHED TO THE GROUND ELECTRODE USING AN IRREVERSIBLE MEANS AS CALLED OUT IN ART 250.64 AND 690.47.
3. PV INVERTER CONTAINS AN INTEGRATED GFDI CIRCUIT. DO NOT BOND THE GROUNDED DC CONDUCTOR TO GROUND EXCEPT THROUGH THE INVERTER GFDI.
4. ALL EXPOSED METAL PARTS (MODULE FRAMES, RAIL, PIPE, BOXES, ETC) SHALL BE GROUNDED USING TIN-PLATED COPPER LAY-IN LUGS OR GROUNDING CLIPS LISTED FOR THE PURPOSE. RAIL CLAMPS SHALL BE MADE ELECTRICALLY CONTINUOUS WITH ATTACHED RAIL.
5. RBI SOLAR RACKING SYSTEMS SHALL BE BONDED PER MANUFACTURER'S UL 2703 INSTRUCTIONS.
6. MIN #10 BARE COPPER EGC AT SOURCE CIRCUITS SHALL BE ROUTED SECURELY TO MOUNTING HARDWARE IN A MANNER THAT PROTECTS FROM PHYSICAL HARM. #6 BARE COPPER EGC FOR AREAS SUBJECT TO PHYSICAL DAMAGE.
7. MODULE FRAMES SHALL BE GROUNDED AT THE LISTED LOCATION PROVIDED BY THE MANUFACTURER OR USING LISTED THIRD-PARTY HARDWARE ONLY IF SPECIFICALLY REFERRED TO IN MANUFACTURE'S INSTRUCTIONS PER UL 1703.
8. BOTH ENDS OF ALL METALLIC CONDUIT CONTAINING GROUNDING ELECTRODE CONDUCTORS SHALL BE BONDED PER ART 250.64(E).
9. GROUNDING ELECTRODE CONDUCTOR TO BE BONDED TO (E) GROUNDING ELECTRODE PER ART 250.68.
10. GROUNDING ELECTRODE CONDUCTOR SIZED PER ART 690.47(C).
11. INCREASES IN EQUIPMENT GROUNDING CONDUCTOR SIZE TO ADDRESS VOLTAGE CONSIDERATIONS SHALL NOT BE REQUIRED PER ART 690.45(A).
12. INSTALLATION SHALL COMPLY WITH ART 250.52, 250.53.
13. CIRCUITS OVER 250V TO GROUND SHALL COMPLY WITH ART 250.97, 250.92(B)

MARKING AND SIGNAGE

14. SEE SHEET PV17 FOR MARKING AND SIGNAGE PLAN.

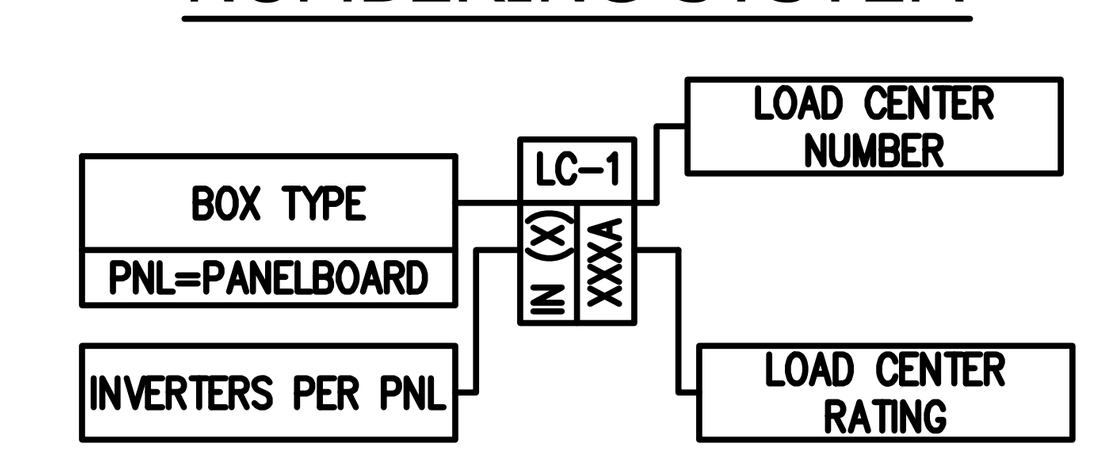
INTERCONNECTION NOTES

1. LOAD SIDE INTERCONNECTIONS SHALL COMPLY WITH ART. 705.12(D) AND ART 230 FOR THE INSTALLATION OF AN ADDITIONAL SERVICE ENTRANCE
2. LOAD SIDE INTERCONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS AND SHALL NOT INVALIDATE THE NRTL LISTING OF THE EQUIPMENT.
3. EMT OR SCH 40 PVC TYPE CONDUIT SHALL BE USED TO ENCLOSE CONDUCTORS BETWEEN A LOAD SIDE INTERCONNECTION AND THE FIRST OCP IN THE INVERTER OUTPUT CIRCUIT.

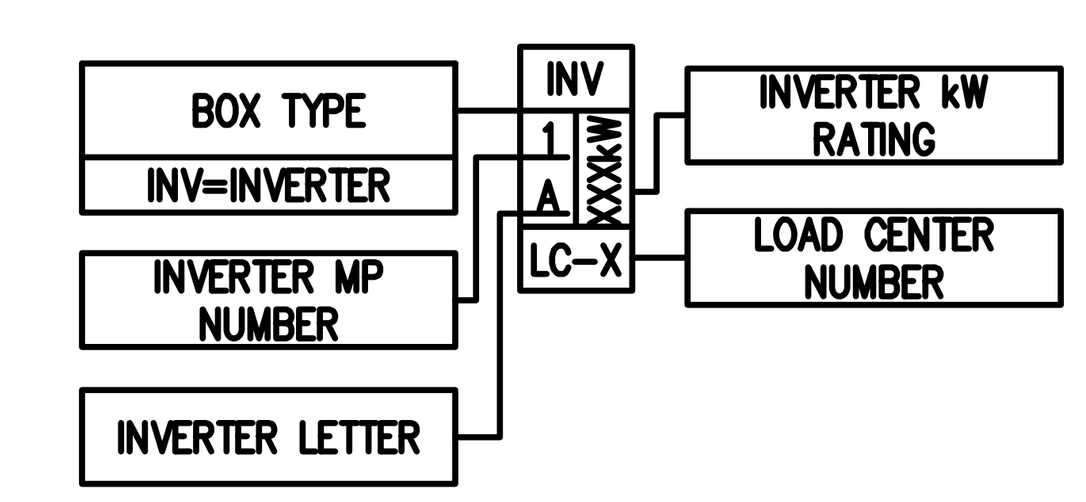
LEGEND

2-POLE CIRCUIT BREAKER
3-POLE CIRCUIT BREAKER
2-POLE SWITCH
3-POLE SWITCH
FUSE
GROUNDING ELECTRODE
kWH METER
CURRENT TRANSDUCER
TRANSFORMER (DELTA-WYE)
PHOTOVOLTAIC MODULE
NEUTRAL BAR
GROUND BAR
(N) DC COMBINER BOX
TERMINAL BLOCK
65,000AFC AVAILABLE FAULT CURRENT
IN-AXX CIRCUIT TAG
X"C. XXX XXXFT CONDUIT TAG

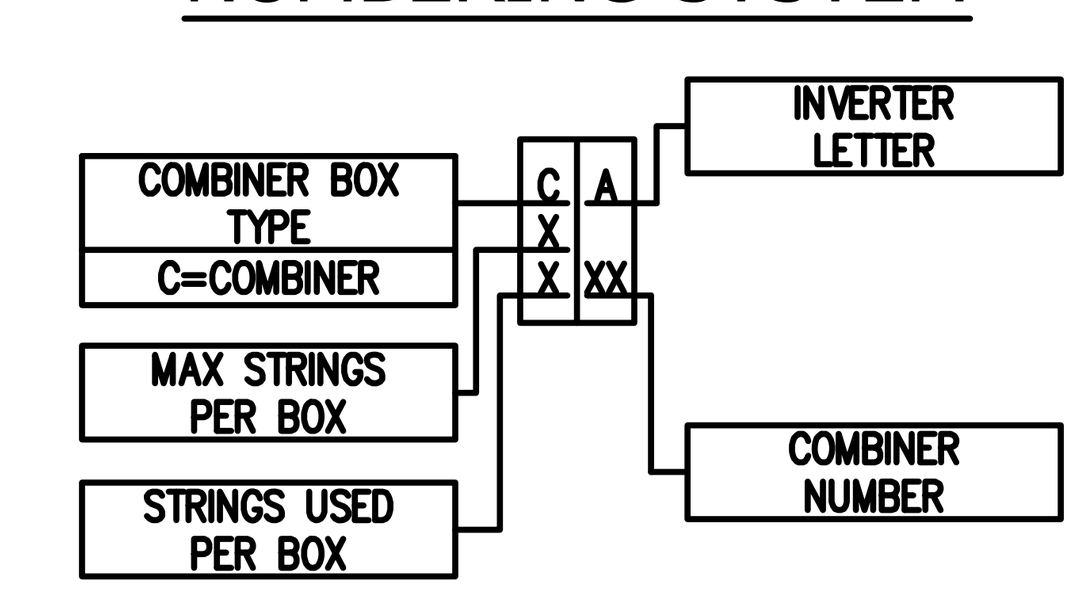
INVERTER PANEL BOARD NUMBERING SYSTEM



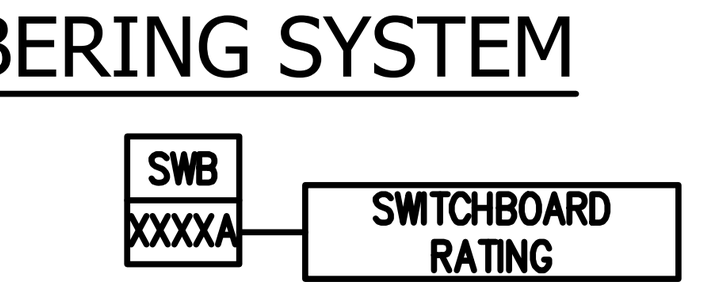
INVERTER NUMBERING SYSTEM



COMBINER BOX NUMBERING SYSTEM



SWITCHBOARD NUMBERING SYSTEM



MODULE SPECIFICATIONS AND MAXIMUM SYSTEM VOLTAGE CALCULATION

Photovoltaic Module Electrical Specifications:			Model:	Canadian Solar CS6X-310P		
Voc=	44.9	V at STC				
Vmp=	36.4	V at STC				
Isc=	9.08	A at STC		**Temperature Data**		
Imp=	8.52	A at STC	ASHRAE Mean Low Temp		-15	deg C
Tvoc=	-0.15266	V/deg C	ASHRAE 2% Dry Bulb Temp		32	deg C
Tisc=	5.902	mA/deg C				
Tvmp=	-0.15652	V/deg C				
Sample Calculation #1: Maximum System DC Voltage per art 690.7						
Vmax=	# of series connected modules x (Voc at STC - (25 deg C - Low Temp) x Tvoc V/deg C)					
	=24 x (44.9V - (25 - -15) deg C x -0.15266 V/deg C)					
	=1224V					

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DESCRIPTION: CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGERS RD.) LANDFILL – 1,490.17 KW PV SYSTEM

CUSTOMER: Norwich (Rogers Rd.) LANDFILL
82 Rogers Road
Norwich, CT
860-889-4088

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623
FOR ALL QUESTIONS, PLEASE CONTACT
ALLISON D. KIMBALL – PROJECT MANAGER
Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT STEPHEN A. BRAY No. 26657 LICENSED PROFESSIONAL ENGINEER
CT LICENSE: 26657 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:
MODULES: (4807) CANADIAN SOLAR # CS6X-310P *
MOUNTING SYSTEM: GAMECHANGE
INVERTER: (2) Solectria # SGI-750XTM-380
DESIGN: P KIRSCHNER
CHECKED BY: EZ
MARKET: COMM
PROJECT MANAGER: D VENELL
DATE: 9/2
PAYMENT TYPE: PPA
SHEET NAME: ELECTRICAL SYMBOLS & NOTES
JOB NUMBER: JB-0632141-00
SHEET: PV 7
REV: 0

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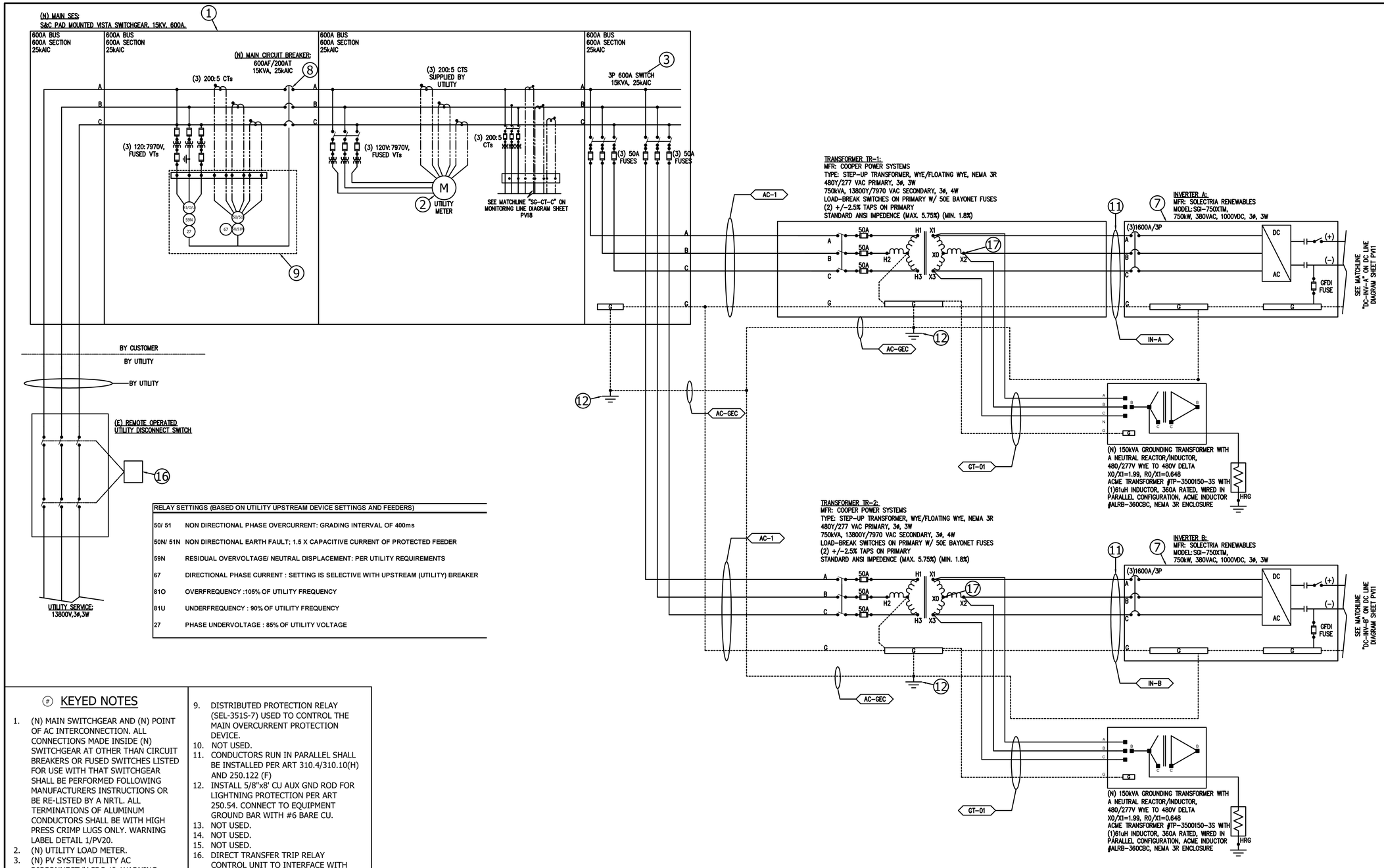

RELAY SETTINGS (BASED ON UTILITY UPSTREAM DEVICE SETTINGS AND FEEDERS)	
50/ 51	NON DIRECTIONAL PHASE OVERCURRENT: GRADING INTERVAL OF 400ms
50N/ 51N	NON DIRECTIONAL EARTH FAULT; 1.5 X CAPACITIVE CURRENT OF PROTECTED FEEDER
59N	RESIDUAL OVERVOLTAGE/ NEUTRAL DISPLACEMENT: PER UTILITY REQUIREMENTS
67	DIRECTIONAL PHASE CURRENT : SETTING IS SELECTIVE WITH UPSTREAM (UTILITY) BREAKER
81O	OVERFREQUENCY :105% OF UTILITY FREQUENCY
81U	UNDERFREQUENCY : 90% OF UTILITY FREQUENCY
27	PHASE UNDERVOLTAGE : 85% OF UTILITY VOLTAGE

KEYED NOTES

1. (N) MAIN SWITCHGEAR AND (N) POINT OF AC INTERCONNECTION. ALL CONNECTIONS MADE INSIDE (N) SWITCHGEAR AT OTHER THAN CIRCUIT BREAKERS OR FUSED SWITCHES LISTED FOR USE WITH THAT SWITCHGEAR SHALL BE PERFORMED FOLLOWING MANUFACTURERS INSTRUCTIONS OR BE RE-LISTED BY A NRTL. ALL TERMINATIONS OF ALUMINUM CONDUCTORS SHALL BE WITH HIGH PRESS CRIMP LUGS ONLY. WARNING LABEL DETAIL 1/PV20.
2. (N) UTILITY LOAD METER.
3. (N) PV SYSTEM UTILITY AC DISCONNECT "ACDS-1". WARNING LABEL DETAIL 2/PV17.
4. NOT USED.
5. NOT USED.
6. NOT USED.
7. (N) GRID-INTERACTIVE PV INVERTER LISTED TO UL 1741 WITH GROUND FAULT DETECTION & INTERRUPTION. WARNING LABEL DETAIL 8/PV20.
8. MEDIUM VOLTAGE BREAKER OVERCURRENT AND OVER/UNDER VOLTAGE/FREQUENCY RELAYS.
9. DISTRIBUTED PROTECTION RELAY (SEL-351S-7) USED TO CONTROL THE MAIN OVERCURRENT PROTECTION DEVICE.
10. NOT USED.
11. CONDUCTORS RUN IN PARALLEL SHALL BE INSTALLED PER ART 310.4/310.10(H) AND 250.122 (F)
12. INSTALL 5/8"x8' CU AUX GND ROD FOR LIGHTNING PROTECTION PER ART 250.54. CONNECT TO EQUIPMENT GROUND BAR WITH #6 BARE CU.
13. NOT USED.
14. NOT USED.
15. NOT USED.
16. DIRECT TRANSFER TRIP RELAY CONTROL UNIT TO INTERFACE WITH UTILITY.
17. PRIMARY NEUTRAL IS FULLY INSULATED FROM GROUND AND NEUTRAL TERMINAL IS NOT ACCESSIBLE, PER SOLECTRIA INVERTER SPECIFICATIONS.

Circuit #	Icont per conductor	Vmp	Temp Derate	Conduit Fill Derate	Conductor Metal	# of Conduits	# Phase Conductors Per Conduit	Phase Conductor Size	Neutral Conductor Size	EGC Size	Min. Circuit Length	Max. Circuit Length	%V Drop	Wire Insul.	Min EMT Size (in)	Min PVC Size (in)	Min RMC Size (in)
IN-A	285.0	380	1	0.8	Al	4	3	750 KCMIL	-	350 KCMIL	30	30	0.12%	THWN2	4	4	4
IN-B	285.0	380	1	0.8	Al	4	3	750 KCMIL	-	350 KCMIL	30	30	0.12%	THWN2	4	4	4
GT-01	285.0	380	1	0.8	Al	4	3	750 KCMIL	-	350 KCMIL	30	30	-	THWN2	4	4	4
AC-01	52.3	13800	1	1	Al	1	3	AWG 03	-	AWG 08	50	50	0.01%	MV-105		4	
AC-GEC	-	-	-	-	CU	1	1	AWG 04	-	-	-	50	-	THWN2	3/4	3/4	3/4

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KMB DESIGN GROUP
kmbdg.com
1800 SOUTH 24, SUITE 209
ROLLA, MO 65401
(314) 380-0933
FOR ALL QUESTIONS, PLEASE CONTACT ALLISON D. KIMBALL – PROJECT MANAGER
Stephen A. Bray
PROFESSIONAL ENGINEER
CT LICENSE: 29657
9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES: (4807) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM: GAMECHANGE

INVERTER: (2) Solectria # SGI-750XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKET: COMM

PROJECT MANAGER: D VENELL

DATE: 9/2

PAYMENT TYPE: PPA

SHEET NAME: LINE DIAGRAM

JOB NUMBER: JB-0632141-00

SHEET: PV 8

REV: 0

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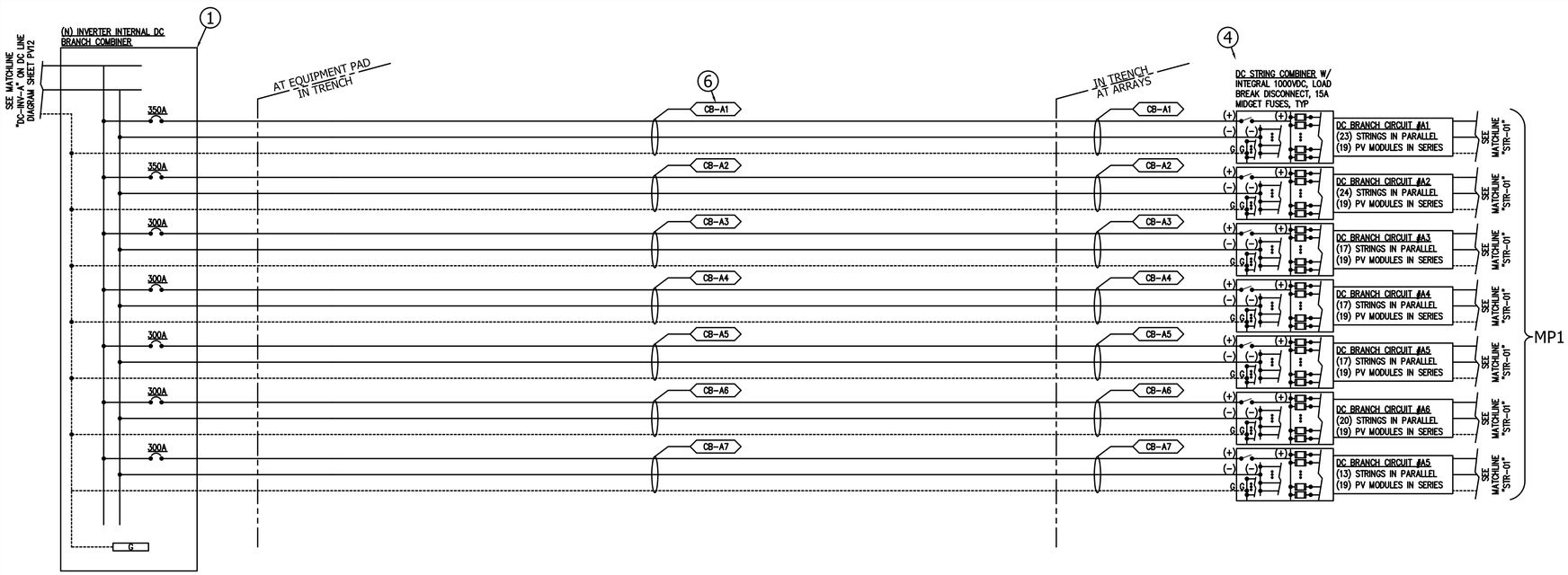
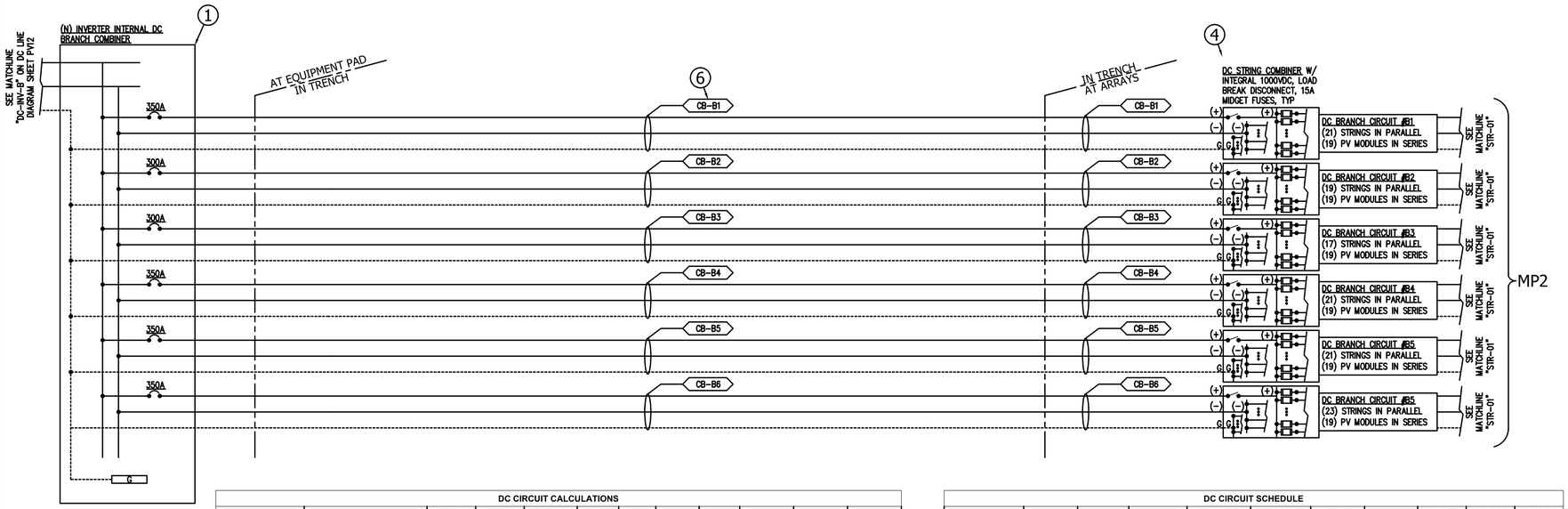




KEYED NOTES

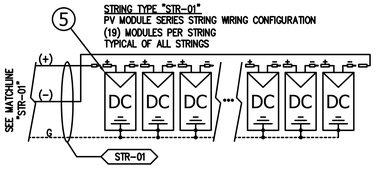
1. (N) INVERTER INTERNAL BREAKER DC BRANCH COMBINER.
2. NOT USED.
3. NOT USED
4. (N) PV SOURCE CIRCUIT DC COMBINER BOXES WITH INTEGRATED LOAD-BREAK DISCONNECT SWITCH AND KLKD SERIES 1000VDC FAST-ACTING PHOTOVOLTAIC MIDGET FUSES. WARNING LABEL DETAIL 3/PV17.
5. (N) PV MODULE LISTED TO UL 1703.
6. ALL DC CIRCUITS ARE ADEQUATELY SIZED FOR TEMPERATURE AND CONDUIT FILL DERATE SO THAT ANY (2) OR (3) CIRCUITS CAN BE ROUTED TOGETHER IN (1) CONDUIT PROVIDED THE CONDUIT IS UP-SIZED TO ACCOMMODATE. THE EGC SHALL BE SIZED FOR THE LARGEST SINGLE OVERCURRENT DEVICE PROTECTING CONDUCTORS IN THE RACEWAY PER ART 250.122(C).

DC CIRCUIT CALCULATIONS

Circuit #	Module	# mods per string	# strings	Imp	Isc	Voc	Vmp at STC	Temp Derate	Conduit Fill Derate	Max. 1 way length (ft)	%Vdrop
STR-01	Canadian Solar CS6X-310P	19	1	8.52	9.08	853.1	691.6	0.96	0.5	400	1.84%
CB-A1	Canadian Solar CS6X-310P	19	23	195.96	208.8	853.1	691.6	1	0.8	250	0.35%
CB-A2	Canadian Solar CS6X-310P	19	24	204.48	217.9	853.1	691.6	1	0.8	150	0.22%
CB-A3	Canadian Solar CS6X-310P	19	17	144.84	154.4	853.1	691.6	1	0.8	100	0.16%
CB-A4	Canadian Solar CS6X-310P	19	17	144.84	154.4	853.1	691.6	1	0.8	50	0.08%
CB-A5	Canadian Solar CS6X-310P	19	17	144.84	154.4	853.1	691.6	1	0.8	50	0.08%
CB-A6	Canadian Solar CS6X-310P	19	20	170.4	181.6	853.1	691.6	1	0.8	100	0.18%
CB-A7	Canadian Solar CS6X-310P	19	13	110.76	118	853.1	691.6	1	0.8	250	0.30%
CB-B1	Canadian Solar CS6X-310P	19	21	178.92	190.7	853.1	691.6	1	0.8	400	0.52%
CB-B2	Canadian Solar CS6X-310P	19	19	161.88	172.5	853.1	691.6	1	0.8	350	0.61%
CB-B3	Canadian Solar CS6X-310P	19	17	144.84	154.4	853.1	691.6	1	0.8	250	0.39%
CB-B4	Canadian Solar CS6X-310P	19	21	178.92	190.7	853.1	691.6	1	0.8	150	0.19%
CB-B5	Canadian Solar CS6X-310P	19	21	178.92	190.7	853.1	691.6	1	0.8	50	0.06%
CB-B6	Canadian Solar CS6X-310P	19	23	195.96	208.8	853.1	691.6	1	0.8	50	0.07%

DC CIRCUIT SCHEDULE

Circuit #	Conductor Metal	# of Conduits	# CC Conductors	Conductor Size	EGC Size	Max. 1 way length (ft)	Wire Insul.	Min EMT Size (in)	Min PVC Size (in)	Min RMC Size (in)
STR-01	Cu	1	2	AWG 12	AWG 10	400	PVWire	-	-	-
CB-A1	Al	1	2	750 KCMIL	AWG 01	250	THWN2	3	3	3
CB-A2	Al	1	2	750 KCMIL	AWG 01	150	THWN2	3	3	3
CB-A3	Al	1	2	500 KCMIL	AWG 02	100	THWN2	3	3	3
CB-A4	Al	1	2	500 KCMIL	AWG 02	50	THWN2	3	3	3
CB-A5	Al	1	2	500 KCMIL	AWG 02	50	THWN2	3	3	3
CB-A6	Al	1	2	500 KCMIL	AWG 02	100	THWN2	3	3	3
CB-A7	Al	1	2	500 KCMIL	AWG 04	250	THWN2	3	3	3
CB-B1	Al	1	2	750 KCMIL	AWG 02	400	THWN2	3	3	3
CB-B2	Al	1	2	500 KCMIL	AWG 02	350	THWN2	3	3	3
CB-B3	Al	1	2	500 KCMIL	AWG 02	250	THWN2	3	3	3
CB-B4	Al	1	2	750 KCMIL	AWG 02	150	THWN2	3	3	3
CB-B5	Al	1	2	750 KCMIL	AWG 02	50	THWN2	3	3	3
CB-B6	Al	1	2	750 KCMIL	AWG 01	50	THWN2	3	3	3



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FOR ALL QUESTIONS, PLEASE CONTACT ALISON D. KIMBALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

XFMR:
MODULES: (4807) CANADIAN SOLAR # CS6X-310P *
MOUNTING SYSTEM: GAMECHANGE
INVERTER: (2) Solectria # SGI-750XTM-380
DESIGN: P KIRSCHNER
CHECKED BY: EZ
MARKET: COMM
PROJECT MANAGER: D VENELI
DATE: 9/2
PAYMENT TYPE: PPA
SHEET NAME: LINE DIAGRAM
JOB NUMBER: JB-0632141-00
SHEET: PV 9
REV: 0

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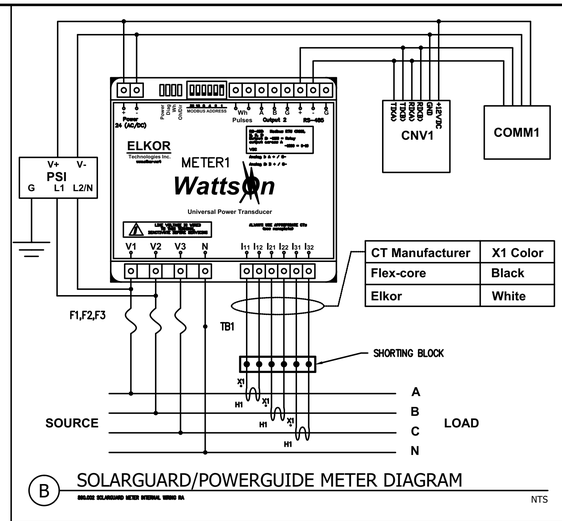
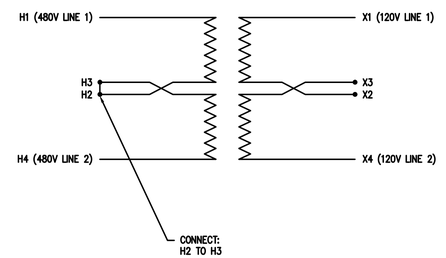


CT Manufacturer	X1 Color
Flex-core	Black
Elkor	White

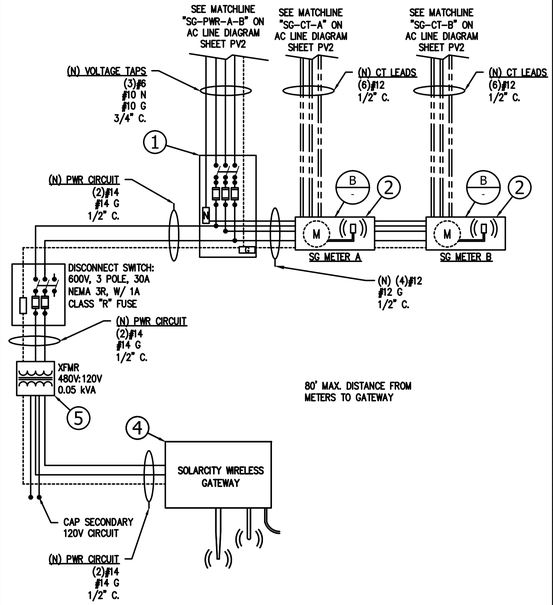
B SOLARGUARD/POWERGUIDE METER DIAGRAM

NTS



C GATEWAY PWR XFMR WIRING DIAGRAM

NTS



A PV SYSTEM MONITORING DIAGRAM

NTS

KEYED NOTES

1. (N) SOLARCITY MONITORING EQUIPMENT DISCONNECT; 600 VAC, 30A, 15A CLASS R FUSES
2. (N) SOLARCITY SOLARGUARD PV PRODUCTION kWH METER - REVENUE GRADE, CSI PBI COMPLIANT, UL LISTED.
3. NOT USED.
4. (N) SOLARCITY CELLULAR GATEWAY; LOCATED WITHIN 80' OF SG AND PG METERS.
5. (N) GATEWAY POWER TRANSFORMER, 480V PRI, 240V SEC, 0.05kVA, SINGLE PHASE, EATON #S20N11S81N OR EQUAL. SEE DETAIL C/- FOR WIRING DIAGRAM.

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CT LICENSE: 26657 9/9/15

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REV	BY	DATE	COMMENTS

JOB DETAILS

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MOUNTING SYSTEM: GAMECHANGE

INVERTER: (2) Solectria # SGI-750XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKET: COMM

PROJECT MANAGER: D VENELL

DATE: 9/2

PAYMENT TYPE: PPA

SHEET NAME: MONITORING DETAILS

JOB NUMBER: JB-0632141-00

SHEET: PV 10

REV: 0

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NOT USED

20 NOT USED
901.901 WARNING LABEL DETAILS RK
Scale NTS

NOT USED

19 NOT USED
901.901 WARNING LABEL DETAILS RK
Scale NTS

NOT USED

18 NOT USED
901.901 WARNING LABEL DETAILS RK
Scale NTS

NOT USED

17 NOT USED
901.901 WARNING LABEL DETAILS RK
Scale NTS

NOT USED

16 NOT USED
901.901 WARNING LABEL DETAILS RK
Scale NTS

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

INVERTER A

NOTE:
1. INVERTER IDENTIFICATION LABEL
2. BLACK BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 3/16" MIN.

9 INVERTER ID
901.901 WARNING LABEL DETAILS RK
Scale NTS

3"

WARNING
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED
NORMALLY GROUNDED
CONDUCTORS MAY BE
UNGROUNDED AND ENERGIZED

#LB-030004-10X

NOTE:
1. MARKING PER ART 690.5(C)
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

8 INVERTER GROUND-FAULT WARNING
901.901 WARNING LABEL DETAILS RK
Scale NTS

NOTE:
1. MARKING PER ART 690.64(B)/705.12
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

3"

WARNING
INVERTER OUTPUT
CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

#LB-030039-10X

7 INVERTER AC CIRCUIT BREAKER
901.901 WARNING LABEL DETAILS RK
Scale NTS

8"

2"

SERVICE DISCONNECT

NOTE:
1. SERVICE DISCONNECT PLACARDS PER ART 230.2(E)
2. BLACK BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 3/16"

12 SERVICE DISCONNECT PLACARDS
901.901 WARNING LABEL DETAILS RK
Scale NTS

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

3"

DC PHOTOVOLTAIC
DISCONNECT

#LB-050002-10X

MAXIMUM POWER
POINT CURRENT (Imp) A
MAXIMUM POWER
POINT VOLTAGE (Vmp) V
MAXIMUM SYSTEM
VOLTAGE (Voc) V
SHORT-CIRCUIT
CURRENT (Isc) A

#LB-030042-10X

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

#LB-030005-10X

NOTE:
1. MARKING PER ART 690.17, 690.53
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

3 DC DISCONNECT
901.901 WARNING LABEL DETAILS RK
Scale NTS

3"

AC PHOTOVOLTAIC DISCONNECT

#LB-050006-10X

MAXIMUM AC
OPERATING CURRENT A
MAXIMUM AC
OPERATING VOLTAGE V

#LB-040007-10X

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

#LB-030005-10X

PV SYSTEM DISCONNECT
FOR UTILITY OPERATION

#LB-050013-10X

NOTE:
1. MARKING PER ART 690.14(C)(2), 690.17, 690.54
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

2 PV SYSTEM UTILITY AC DISCONNECT
901.901 WARNING LABEL DETAILS RK
Scale NTS

3"

PHOTOVOLTAIC POWER SOURCE

#LB-020003-10X

MAXIMUM AC
OPERATING CURRENT A
MAXIMUM AC
OPERATING VOLTAGE V

#LB-040007-10X

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

#LB-030005-10X

NOTE:
1. MARKING PER ART 230.2(E), 690.17, 690.54
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

1 POINT OF INTERCONNECTION
901.901 WARNING LABEL DETAILS RK
Scale NTS

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CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGERS RD.) LANDFILL – 1,490.17 KW PV SYSTEM

Norwich (Rogers Rd.) LANDFILL
82 Rogers Road
Norwich, CT
860-889-4088

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

MODULES: (4807) CANADIAN SOLAR # CS6X-310P
MOUNTING SYSTEM: GAMECHANGE
INVERTER: (2) Solectria # SGI-750XTM-380
DESIGN: P KIRSCHNER
CHECKED BY: EZ
MARKER: COMM
PROJECT MANAGER: D VENELL
DATE: 9/2
PAYMENT TYPE: PPA
SHEET NAME: WARNING LABELS
JOB NUMBER: JB-0632141-00
SHEET: PV 11
REV: 0

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1,254.57 KW SOLAR PV SYSTEM FOR CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE - NORWICH (ROGER'S RD.)

PROJECT TEAM

DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE:
PAUL KIRSCHNER
SOLARCITY, INC.
3055 CLEARVIEW WAY
SAN MATEO, CA 94402
TEL: (650) 963-5807
PKIRSCHNER@SOLARCITY.COM

ELECTRICAL ENGINEER:
ALLISON D. KIMBALL, PE
KMB DESIGN GROUP LLC.
1800 RTE 34, STE 209
WALL, NJ 07719
TEL: (732) 894-5061
AKIMBALL@KMBCOMPANIES.COM

STRUCTURAL:
RBI SOLAR
5513 VINE STREET
CINCINNATI, OH 45217
TEL: (513) 242-2051

SolarCity
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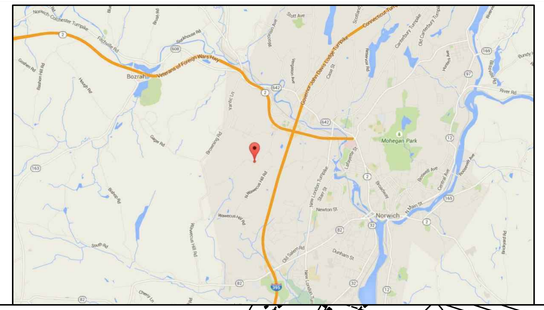
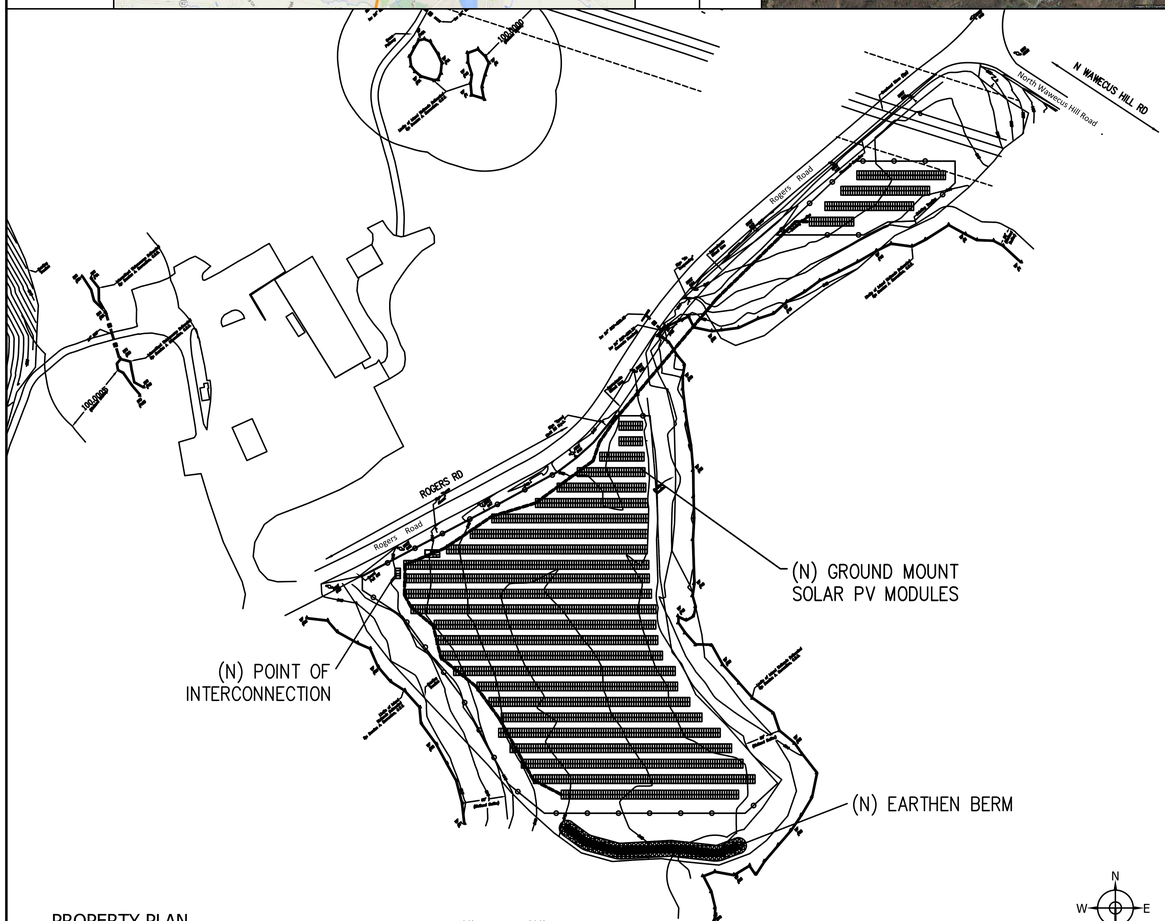
VICINITY MAP



AERIAL MAP





PROPERTY PLAN
1"=100'-0"
0 100' 200'

GENERAL NOTES

ALL WORK SHALL COMPLY WITH ALL STATE AND LOCAL CODES AND ANY OTHER REGULATING AUTHORITIES WHICH HAVE AUTHORITY OVER ANY PORTION OF THE WORK.

DRAWINGS HAVE BEEN DETAILED IN COMPLIANCE WITH UL LISTING REQUIREMENTS, OSFM SOLAR PHOTOVOLTAIC INSTALLATION REQUIREMENTS, AND BUILDING CODES FOR THE MATERIALS SPECIFIED.

PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND NOTIFY THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE FROM SOLARCITY OF ANY DISCREPANCIES. ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED AT THE SUBCONTRACTORS SOLE EXPENSE.

SUBCONTRACTOR INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO SOLARCITY FOR APPROVAL BEFORE MAKING ANY CHANGES. DEVIATION FROM PLANS BEFORE WRITTEN APPROVAL FROM SOLARCITY PLACES LIABILITY ON THE SUBCONTRACTOR.

ALL EQUIPMENT SHALL BE MOUNTED AS SHOWN. WHERE DETAILS ARE NOT PROVIDED, CONTRACTOR SHALL USE STANDARD CONSTRUCTION PRACTICES.

ALL SURFACES SHALL BE PATCHED AND PAINTED AROUND NEW DEVICES AND EQUIPMENT TO MATCH EXISTING FINISHES.

ANY METAL SHAVINGS FROM SITE WORK SHALL BE CLEANED FROM ALL SURFACES WHERE OXIDIZED OR CONDUCTIVE METAL SHAVINGS MY CAUSE RUST, ELECTRICAL SHORT CIRCUITS, OR OTHER DAMAGE.

BEAMS OR PURLINS SHALL NOT BE DRILLED UNLESS AUTHORIZED BY SOLARCITY OR SHOWN IN THE DRAWINGS.

APPROVALS FROM BUILDING INSPECTORS SHALL NOT CONSTITUTE AUTHORITY TO DEVIATE FROM THE DRAWINGS.

ABBREVIATIONS

A	AMPERE
AC	ALTERNATING CURRENT
ADA	AMERICANS WITH DISABILITIES ACT
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
BLDG	BUILDING
CLR	CLEAR
CONC	CONCRETE
DC	DIRECT CURRENT
DIA	DIAMETER
DIST	DISTANCE
EQ	EQUAL
EGC	EQUIPMENT GROUNDING CONDUCTOR
(E)	EXISTING
EA.	EACH
EMT	ELECTRICAL METALLIC TUBING
GALV	GALVANIZED
GEC	GROUNDING ELECTRODE CONDUCTOR
GND	GROUND
HDG	HOT DIPPED GALVANIZED
I	CURRENT
Imp	CURRENT AT MAX POWER
INVS	INVERTERS
Isc	SHORT CIRCUIT CURRENT
kVA	KILOVOLT AMPERE
kW	KILOWATT
kWh	KILOWATT-HOUR
LBW	LOAD BEARING WALL
MAX	MAXIMUM
MIN	MINIMUM
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OC	ON CENTER
OCP	OVERCURRENT PROTECTION
PL	PROPERTY LINES
PV	PHOTOVOLTAIC
PVC	POLYVINYL CHLORIDE
SCH	SCHEDULE
SQ. IN.	SQUARE INCHES
SS	STAINLESS STEEL
SSD	SEE STRUCTURAL DRAWINGS
STC	STANDARD TESTING CONDITIONS
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
VIF	VERIFY IN FIELD
V	VOLT
Vmp	VOLTAGE AT MAX POWER
Voc	VOLTAGE AT OPEN CIRCUIT
W	WATT
3R	NEMA 3R, RAINTIGHT

SYSTEM SUMMARY

MODULE: (4,047) CANADIAN SOLAR # CS6X-310P

INVERTER:
(2) SOLECTRIA SGI 500XTM

RACK TYPE: RBI SOLAR GROUND MOUNT

ARRAY TILT: 20°

AZIMUTH: 180°

DESIGN CRITERIA

WIND SPEED: 121 MPH

EXPOSURE: C

SNOW LOAD: 30 PSF

CODE SUMMARY

BUILDING CODE
ALL WORK SHALL COMPLY WITH THE 2012 INTERNATIONAL BUILDING CODE.

ELECTRICAL CODE
ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 NATIONAL ELECTRIC CODE.

INDEX

PV1	COVER SHEET
PV2	SITE PLAN
PV3	ARRAY
PV4	ACCESS PLAN
PV5	STRUCTURAL DETAILS & INVERTER PADS
PV6	EQUIPMENT DETAILS
PV7	ELECTRICAL SYMBOLS & NOTES
PV8	LINE DIAGRAM
PV9	LINE DIAGRAM
PV10	MONITORING DETAILS
PV11	WARNING LABELS

CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGER'S RD.) – 1254.54 KW PV SYSTEM

CMEEC – Norwich (Roger's Rd.)
82 Rodgers Road
Norwich, CT
860-889-4088

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-0933
FOR ALL QUESTIONS, PLEASE CONTACT ALLISON D. KIMBALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT · STEPHEN A. BRAY · 26527 · LICENSED PROFESSIONAL ENGINEER
CT LICENSE 26527 6/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

JOB:
MODULES: (4047) CANADIAN SOLAR # CS6X-310P #
MOUNTING SYSTEM: RBI SOLAR
INVERTER: (2) Solectria # SGI-500XTM-380
DESIGN: P KIRSCHNER
CHECKED BY: EZ
MARKET: COMM
PROJECT MANAGER: D VENELL
DATE: 9/1/2015
PAYMENT TYPE: PPA
SHEET NAME: COVER SHEET
JOB NUMBER: JB-0632042-00
SHEET: PV 1
REV: 0

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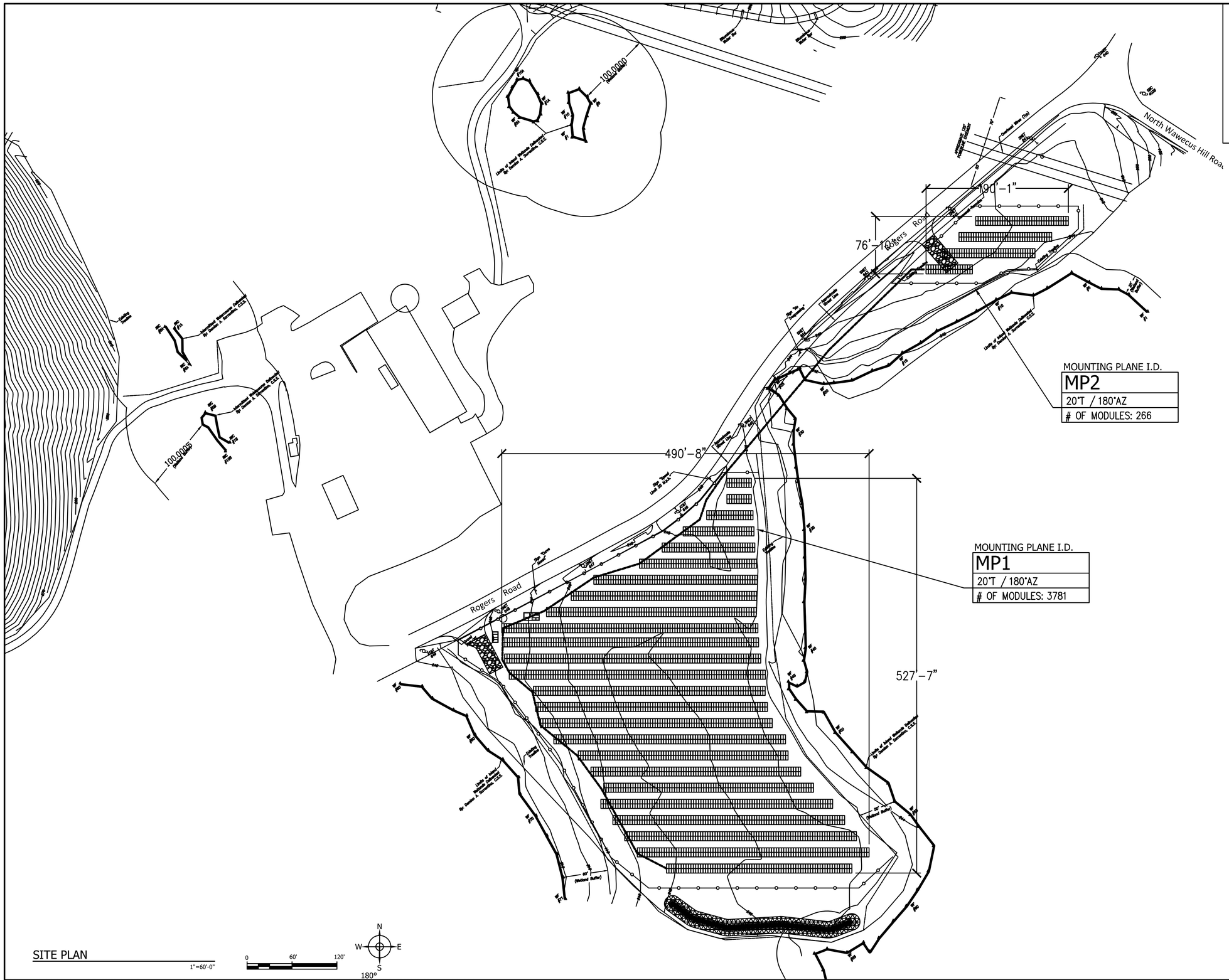

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NORWICH (ROGER'S RD.) – 1254.54 KW PV SYSTEM

CMEEC – Norwich (Roger's Rd.)
82 Rodgers Road
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860-889-4088

KMB DESIGN GROUP
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1600 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-0633
FOR ALL QUESTIONS, PLEASE CONTACT ALLISON D. KIMBALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

JOB:

MODULES:
(4047) CANADIAN SOLAR # CS6X-310P
*

MOUNTING SYSTEM:
RBI SOLAR

INVERTER:
(2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER

CHECKED BY:
EZ

MARKER:
COMM

PROJECT MANAGER:
D VENELL

DATE:
9/1/2015

PAYMENT TYPE:
PPA

SHEET NAME:
SITE PLAN

JOB NUMBER:
JB-0632042-00

SHEET:
PV 2

REV:
0

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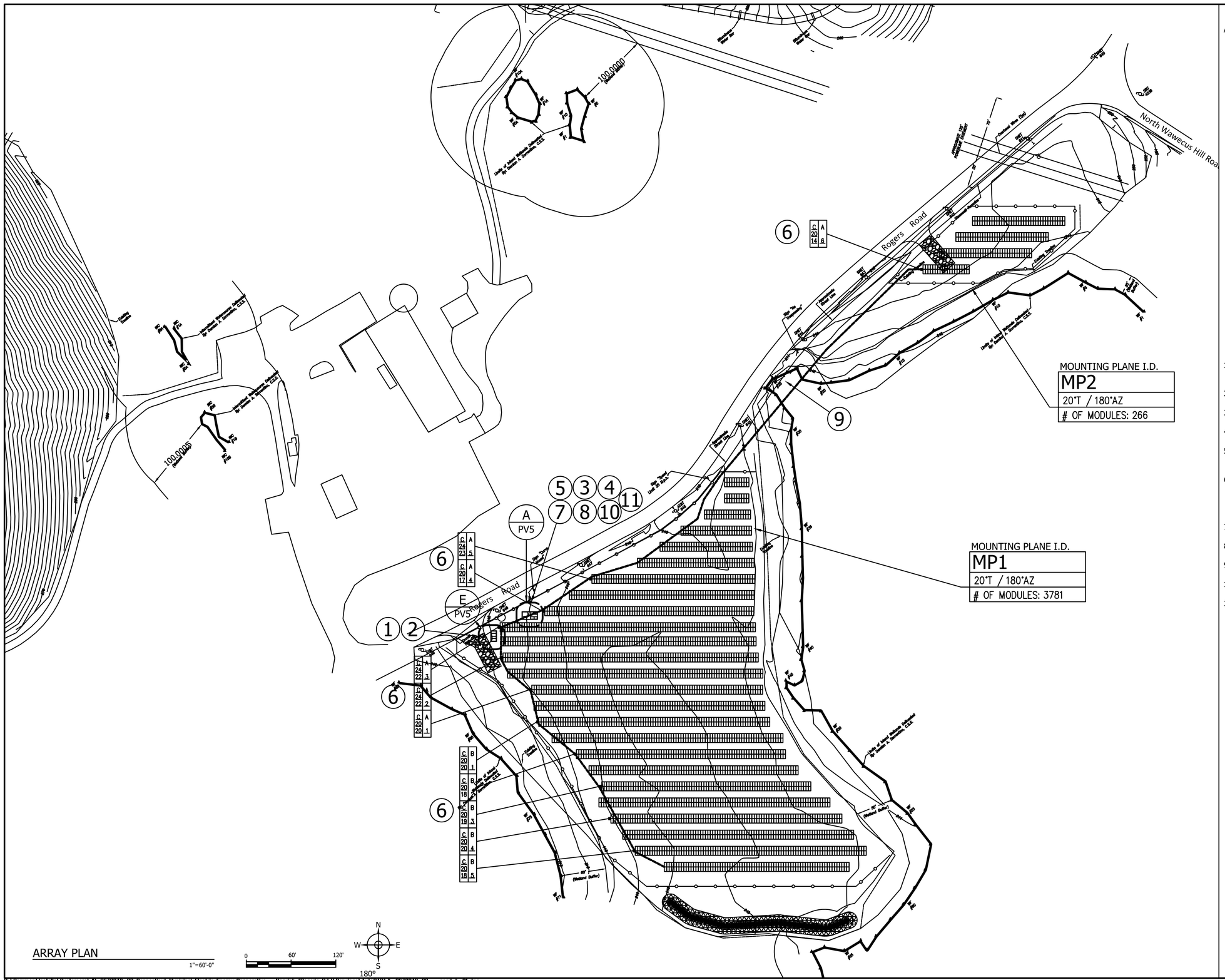
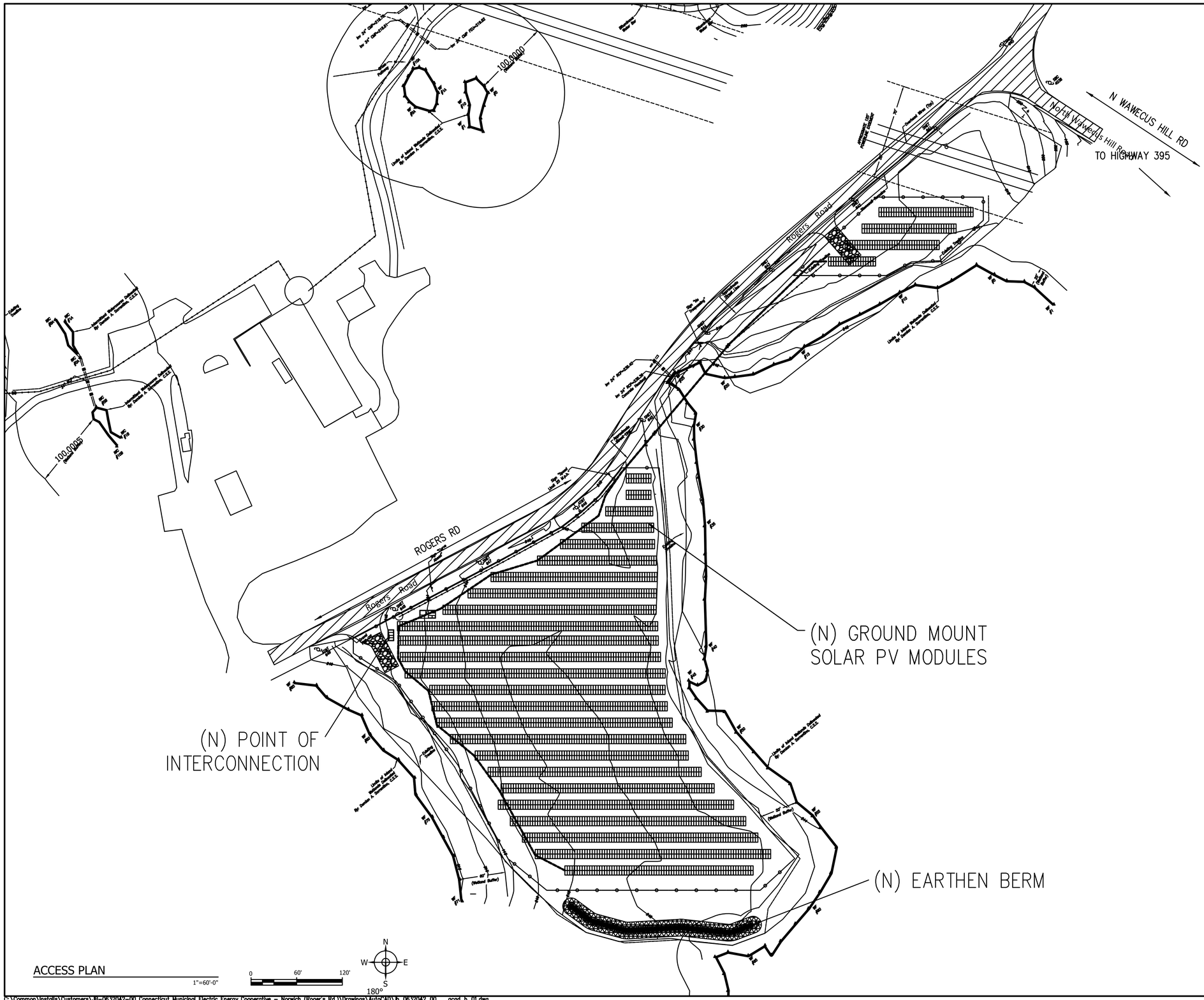

North Wawecus Hill Road
Rogers Road
Rogers Road
MOUNTING PLANE I.D.
MP2
20°T / 180°AZ
OF MODULES: 266
MOUNTING PLANE I.D.
MP1
20°T / 180°AZ
OF MODULES: 3781
A
PV5
E
PV5
6
9
5 3 4 11
7 8 10
1 2
100.0000
(Measured)
100.0000
(Measured)
Property Line
Property Line
Property Line



LEGEND

- (N) GROUND-MOUNTED SOLAR PV MODULES (ELECTRICALLY CONNECTED)
- FIRE ACCESS PATH
- (N) FENCE
- (N) TRENCH

FIRE SIGNAGE NOTES

SIGNAGE SHALL BE IN COMPLIANCE WITH CEC 690 AND THE CALIFORNIA DEPARTMENT OF FORESTRY AND FIRE PROTECTION OFFICE OF THE STATE FIRE MARSHALL SOAR PHOTOVOLTAIC INSTALLATION GUIDELINE

MARK EXISTING MAIN SERVICE DISCONNECT

MARKING CONTENT: "CAUTION ELECTRIC SYSTEM CONNECTED"

-RED BACKROUND
-WHITE LETTERING
-MINIMUM 3/8" LETTER HEIGHT
-ALL CAPITAL LETTERS
-ARIAL OR SIMILAR FONT, NON BOLD
-REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (DURAB LE ADHESIVE MATERIALS MAY MEET THE REQUREMENT)

MARK ALL DC ENCLOSURES AND JUNCTION BOXES AND ALL ABOVE GROUND RACEWAYS AND CABLEWAY ASSEMBLIES EVERY 10 FEET

MARKING CONTENT: "CAUTION SOLAR CIRCUIT"

-RED BACKROUND
-WHITE LETTERING
-MINIMUM 3/8" LETTER HEIGHT
-ALL CAPITAL LETTERS
-ARIAL OR SIMILAR FONT, NON BOLD
-REFLECTIVE, WEATHER RESISTANT MATERIAL SUITABLE FOR THE ENVIRONMENT (DURABLE ADHESIVE MATERIALS MAY MEET THE REQUIREMENT)

GROUND MOUNT ACCESS NOTES

A. MIN 12' SETBACK FROM FENCING.
B. ACCESS GATES ON NORTH AND WEST SIDE OF THE ARRAY FENCING.
C. MIN 50' SETBACK FROM ALL PROPERTY LINES.

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CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGER'S RD.) – 1254.54 KW PV SYSTEM

CMEEC – Norwich (Roger's Rd.)
82 Rodgers Road
Norwich, CT
860-889-4088

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 309
WALL, NJ 07719
(732) 280-0933
FOR ALL QUESTIONS, PLEASE CONTACT ALISON D. KNIBALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES: (4047) CANADIAN SOLAR # CS6X-310P *

MOUNTING SYSTEM: RBI SOLAR

INVERTER: (2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER
CHECKED BY: EZ

MARKET: COMM
PROJECT MANAGER: D VENELL

DATE: 9/1/2015
PAYMENT TYPE: PPA

SHEET NAME: ACCESS PLAN

JOB NUMBER: JB-0632042-00

SHEET: PV 4
REV: 0

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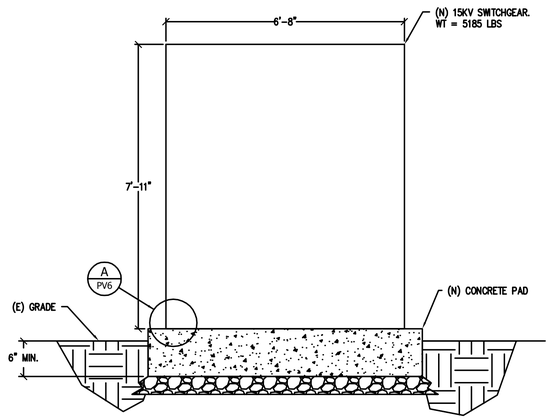
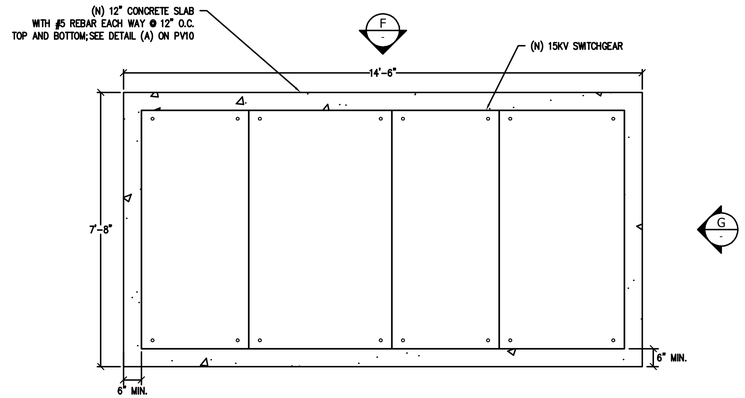
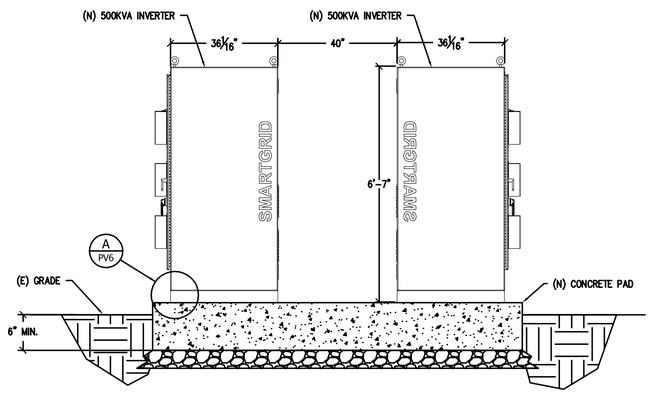


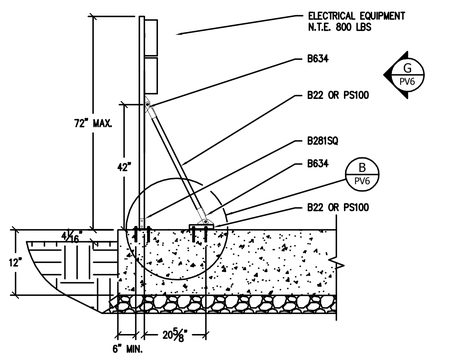
G 15 KV SWITCHGEAR CONCRETE PAD (SIDE VIEW)
1/2"=1'-0"



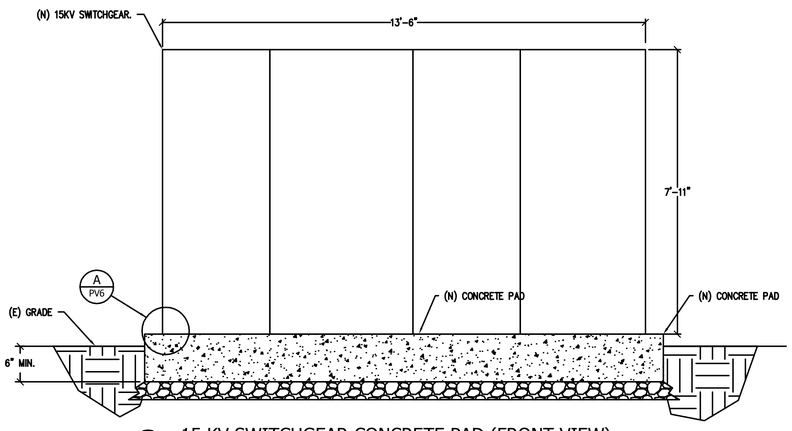
E 15 KV SWITCHGEAR CONCRETE PAD (PLAN VIEW)
1/2"=1'-0"



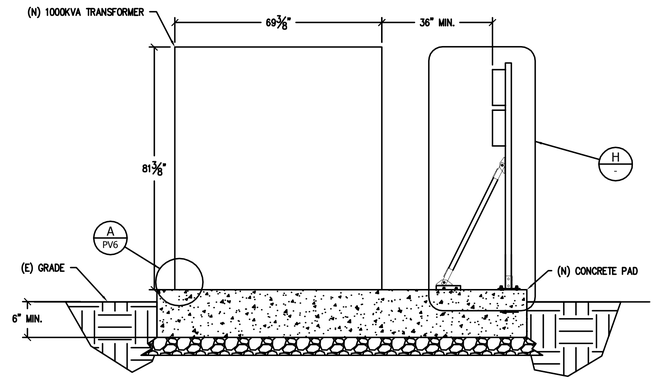
D EQUIPMENT CONCRETE PAD (SIDE VIEW)
1/2"=1'-0"



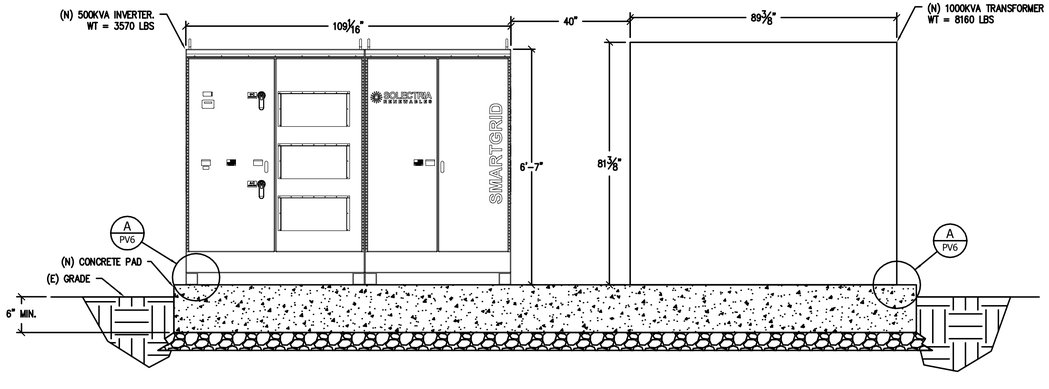
H EQUIPMENT RACK, STRUT (SIDE ELEVATION)
1/2"=1'-0"



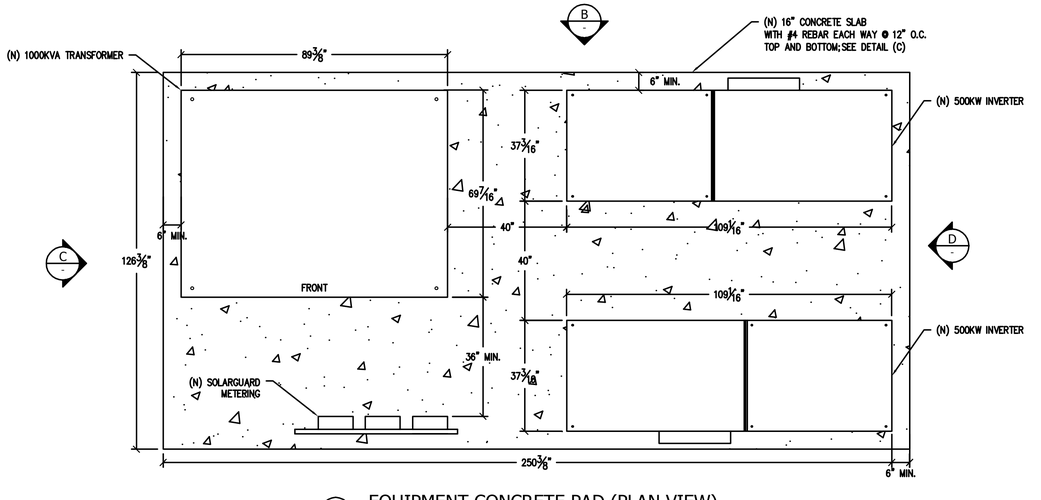
F 15 KV SWITCHGEAR CONCRETE PAD (FRONT VIEW)
1/2"=1'-0"



C EQUIPMENT CONCRETE PAD (SIDE VIEW)
1/2"=1'-0"



B EQUIPMENT CONCRETE PAD (FRONT)
1/2"=1'-0"



A EQUIPMENT CONCRETE PAD (PLAN VIEW)
1/2"=1'-0"

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NORWICH (ROGER'S RD.) – 1254.54 KW PV SYSTEM

CMEEC – Norwich (Roger's Rd.)
82 Rodgers Road
Norwich, CT
860-889-4088

STATE OF CONNECTICUT
ANDREW D. WHITE
No. 25355
LICENSED
PROFESSIONAL ENGINEER

STAMPED & SIGNED
FOR STRUCTURAL ONLY

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES:
(4047) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM:
RBI SOLAR

INVERTER:
(2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER
CHECKED BY: EZ

WARRIER: COMM
PROJECT MANAGER: D VENELL

DATE: 9/1/2015
PAYMENT TYPE: PPA

SHEET NAME:
STRUCTURAL DETAILS & INVERTER PADS

JOB NUMBER:
JB-0632042-00

SHEET: PV 5
REV: 0

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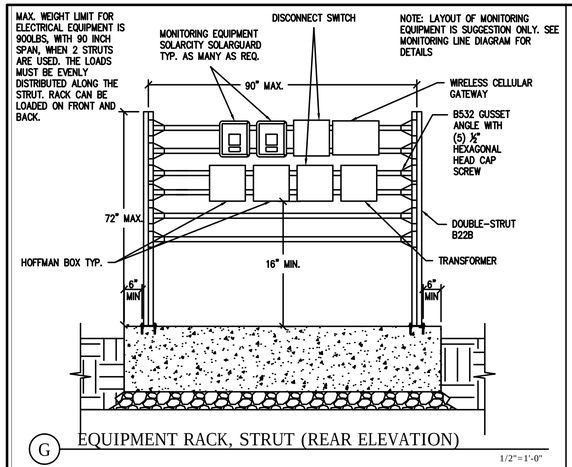
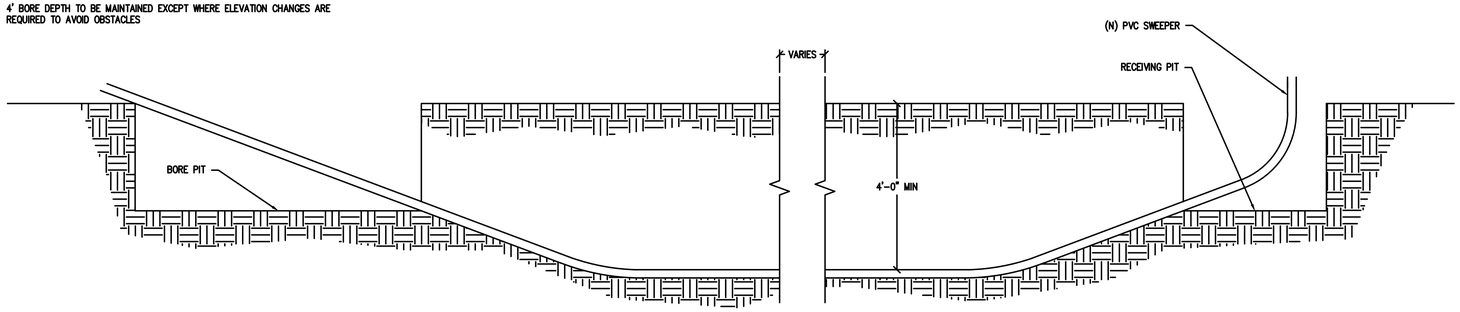


G EQUIPMENT RACK, STRUT (REAR ELEVATION)

1/2"=1'-0"

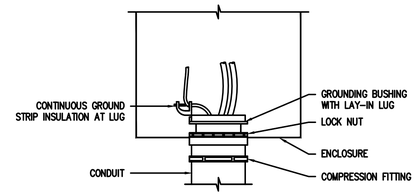
NOTE:

4' BORE DEPTH TO BE MAINTAINED EXCEPT WHERE ELEVATION CHANGES ARE REQUIRED TO AVOID OBSTACLES



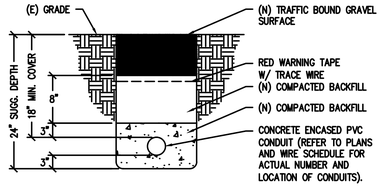
F HORIZONTAL BORE DETAIL

NTS



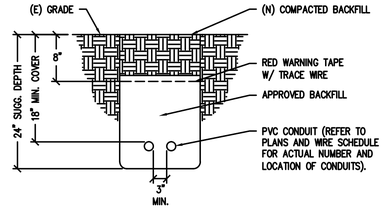
E CONDUIT GROUNDING DETAIL

NTS



D TRENCH THROUGH GRAVEL DRIVEWAY DETAIL

NTS



C TRENCH THROUGH SOIL NON-TRAFFIC DETAIL

NTS

CONCRETE NOTES

1. CONCRETE STRENGTH -PROVIDE CONCRETE WITH THE FOLLOWING STRENGTHS AT THE LOCATIONS NOTED. MIX DESIGN, SLUMP, AIR ENTRAINMENT, AGGREGATE SIZE, ETC. SHALL BE IN CONFORMANCE WITH THE ACI CODE, LATEST EDITION.

LOCATION: ANY

STRENGTH AT 28 DAYS: 3000 PSI

A. ALL CONCRETE AGGREGATE IS HARD ROCK UON
B. DESIGN MIX SHALL CONTAIN 5-1/2 SACKS OF CEMENT, MIN.
C. TYPE I/II CEMENT TO MEET ASTM C150.
D. MAX AGGREGATE SIZE SHALL BE 3/4"
E. MAX WATER/CEMENT RATIO SHALL BE 0.54 (MAX 0.50 IN COLORADO)
F. MAX SLUMP SHALL BE 4"
G. PROVIDE 6% AIR ENTRAINMENT, ADD MIXTURE IN SNOW STATES ONLY (MIN 6% +/- 1.5%)

2. REINFORCING STEEL -ASTM A615 WITH THE FOLLOWING STRENGTHS:

SIZE	STRENGTH:
#4 AND SMALLER	GRADE 60 (fy = 60000 PSI)
#5 AND LARGER	GRADE 60 (fy = 60000 PSI)

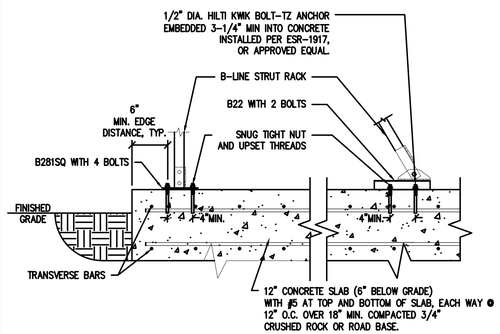
3. FABRICATE AND PLACE REINFORCEMENT IN ACCORDANCE WITH ACI PUBLICATION SP-66, ACI DETAILING MANUAL - LATEST EDITION.

4. PLACE CONCRETE IN COMPLIANCE WITH ACI 304. ALL CONCRETE SHALL BE MECHANICALLY VIBRATED.

5. CONCRETE COVER FOR REINFORCEMENT FOR NON-PRESTRESSED, CAST IN PLACE CONCRETE SHALL BE AS FOLLOWS:

CONDITION	COVER
CAST AGAINST EARTH	3"
EXPOSED TO WEATHER	
#5 AND SMALLER	1-1/2"
#6 AND LARGER	2"
SLAB-ON-GRADE	2"

6. EMBEDS -ALL ITEMS TO BE CAST INTO CONCRETE SUCH AS REINFORCING DOWELS, BOLTS, ANCHORS, PIPES, SLEEVES, ETC., SHALL BE SECURELY AND ACCURATELY POSITIONED INTO THE FORMS PRIOR TO PLACING THE CONCRETE.



B ANCHOR DETAIL, STRUT

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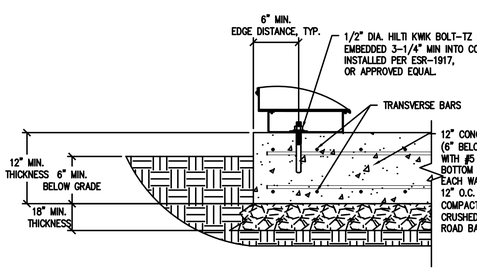
NOTE: TOP UPPER BARS AND BOTTOM LOWER BARS SHALL RUN IN THE LONG DIRECTION OF THE SLAB



A ANCHOR DETAIL

NTS

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CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGER'S RD.) – 1254.54 KW PV SYSTEM

CMEEC – Norwich (Roger's Rd.)
82 Rodgers Road
Norwich, CT
860-889-4088

STATE OF CONNECTICUT ANDREW D. WHITE No. 25355 LICENSED PROFESSIONAL ENGINEER

STAMPED & SIGNED FOR STRUCTURAL ONLY

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES:
(4047) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM:
RBI SOLAR

INVERTER:
(2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKET: COMM

PROJECT MANAGER: D VENELL

DATE: 9/1/2015

PAYMENT TYPE: PPA

SHEET NAME: EQUIPMENT DETAILS

JOB NUMBER: JB-0632042-00

SHEET: PV 6

REV: 0

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EXTERNAL TRANSFORMER REQUIREMENTS FOR SOLECTRIA XTM INVERTER

1. TRANSFORMER TYPE

THE TRANSFORMER SHALL BE THREE PHASE, SELF-COOLED, AND DESIGNED FOR STEP-UP OPERATION. TRANSFORMER SHALL BE UL LISTED. PAD MOUNT, DISTRIBUTION TYPE TRANSFORMERS SHALL COMPLY WITH THE LATEST ISSUE OF IEEE/ANSI C57.12.34. TRANSFORMER SHALL OPERATE AT 60HZ NOMINAL AND SHALL BE TOLERANT OF CONTINUOUS FREQUENCIES BETWEEN 54.0HZ AND 60.5HZ. TRANSFORMER SHALL BE CAPABLE OF OPERATING AT 1.1P.U. VOLTAGE AT FULL LOAD WITHOUT SATURATION FOR PERIODS OF TIME TYPICAL OF THE EXPECTED GENERATION PROFILE. DIFFERENT FREQUENCY AND VOLTAGE REQUIREMENTS MAY BE NECESSARY FOR PROJECTS WITH VOLTAGE OR FREQUENCY RIDE THROUGH REQUIREMENTS OTHER THAN THOSE DEFINED IN IEEE 1547-2003. REQUIREMENTS OUTSIDE OF THIS STANDARD RANGE MUST BE REVIEWED AND APPROVED BY SOLECTRIA.

2. TRANSFORMER RATING

A SINGLE INVERTER ISOLATED BY ONE TRANSFORMER SHALL HAVE ONE PRIMARY WINDING AND ONE SECONDARY WINDING. THE KVA RATING OF THE TRANSFORMER MUST AT LEAST BE EQUAL TO THE KVA RATING OF THE INVERTER. TWO INVERTERS ISOLATED BY ONE TRANSFORMER SHALL HAVE THREE WINDINGS TOTAL; ONE SECONDARY WINDING AND TWO PRIMARY WINDINGS. EACH PRIMARY WINDING MUST HAVE A KVA RATING AT LEAST BE EQUAL TO THE KVA RATING FOR THE INVERTER THIS WINDING ISOLATES. THE SECONDARY WINDING MUST HAVE A KVA RATING AT LEAST BE EQUAL TO THE SUM OF THE KVA RATING FOR THE TWO INVERTERS CONNECTED TO THE TRANSFORMER. THE TWO PRIMARY WINDINGS SHALL HAVE THE SAME VOLTAGE, WINDING CONFIGURATION AND BIL. THE THREE WINDINGS SHALL BE CONSTRUCTED IN A LOW-HIGH-LOW CONFIGURATION.

3. TRANSFORMER IMPEDANCE

FOR TRANSFORMERS WITH THREE WINDINGS, THE PERCENT IMPEDANCE BETWEEN BOTH LOW VOLTAGE PRIMARY WINDINGS MUST BE GREATER THAN 7%. THE PERCENT IMPEDANCE BETWEEN LOW VOLTAGE WINDING #1 AND THE HIGH VOLTAGE WINDING AS WELL AS PERCENT IMPEDANCE BETWEEN LOW VOLTAGE WINDING #2 AND THE HIGH VOLTAGE WINDING MUST SATISFY THE MINIMUM IMPEDANCE REQUIREMENTS IN TABLE 1 ON THE FOLLOWING PAGE. FOR STANDARD TWO WINDING TRANSFORMERS, THE TRANSFORMER IMPEDANCE VOLTAGE Z(%) MUST SATISFY THE CONDITIONS IN TABLE 1.

Number of 380V Windings (Inverters)	Impedance (Absolute Minimum)
1	1.80%
2	High-Low#1 4%
	High-Low #2 4%
	Low#1-Low#2 7%
Table 1 – Percent Impedance %Z	

4. PRIMARY CONFIGURATION

THE PRIMARY WINDING(S) SHALL BE COMPLETELY FLOATING OR GROUNDED THROUGH A HIGH IMPEDANCE (>1MOHMS).
380V NOMINAL DELTA
OR
380V NOMINAL WYE WITH THE NEUTRAL FULLY INSULATED FROM GROUND AND CONSTRUCTED SUCH THAT THE NEUTRAL TERMINAL IS NOT ACCESSIBLE

5. TAPS

THE TRANSFORMER SHALL BE FURNISHED WITH SECONDARY CAPACITY HIGH-VOLTAGE TAPS WITH A MINIMUM OF TWO - 2½% TAPS ABOVE AND BELOW THE RATED NAMEPLATE VOLTAGE.

6. SECONDARY CONFIGURATION

THE SECONDARY WINDING CONFIGURATION SHALL BE EITHER:
DELTA
OR
FLOATING WYE
OR
GROUNDED WYE
NOTE FOR GROUNDED WYE CONFIGURATION: A TRANSFORMER CONFIGURATION OF SOLIDLY GROUNDED WYE ON THE SECONDARY AND DELTA ON THE PRIMARY INDUCES NEUTRAL CURRENT TO THE TRANSFORMER AND THROUGH THREE-PHASE OVER CURRENT PROTECTION DEVICES ON THE SECONDARY SIDE OF THE TRANSFORMER. THE ADDITIONAL CURRENT COULD LEAD TO UNINTENDED ACTIVATION OF THE OVER CURRENT PROTECTION. IT MAY ALSO REDUCE THE INVERTER'S ABILITY TO DETECT A SINGLE OPEN PHASE CONDITION. FOR THIS TRANSFORMER CONFIGURATION, THE CUSTOMER MUST PROVIDE SUPPLEMENTAL SINGLE OPEN PHASE DETECTION.

7. ELECTROSTATIC SHIELD

TRANSFORMERS WITH THREE WINDINGS SHALL INCLUDE ELECTROSTATIC SHIELDING BETWEEN THE LOW AND HIGH VOLTAGE WINDINGS. THE SHIELDING MUST BE GROUNDED TO THE TRANSFORMER TANK OR ENCLOSURE.

8. LOW VOLTAGE BUSHINGS AND TERMINALS

THE MINIMUM QUANTITY OF CONNECTION HOLES MUST ACCOMMODATE THE TOTAL NUMBER OF CONDUCTOR TERMINATIONS PER PHASE. PAD MOUNT DISTRIBUTION TRANSFORMERS SHALL BE PROVIDED WITH SPADE-TYPE BUSHINGS.

9. TANK GROUNDING

CLAMP-TYPE TANK GROUNDING CONNECTIONS SHALL BE PROVIDED FOR PAD MOUNT DISTRIBUTION TRANSFORMERS IN ACCORDANCE WITH ANSI C57.12.34

10. SUBMITTAL DRAWINGS

FINAL TRANSFORMER SUBMITTAL DRAWINGS MUST BE RECEIVED AND REVIEWED BY SOLECTRIA PRIOR TO INVERTER SHIP DATE.

ELECTRICAL NOTES

GENERAL NOTES

1. ALL ELECTRICAL WORK SHALL COMPLY WITH THE 2011 NATIONAL ELECTRIC CODE AS AMENDED BY APPLICABLE STATE AND LOCAL CODES.
2. EACH UNGROUNDED CONDUCTOR OF THE MULTIWIRE BRANCH CIRCUIT WILL BE IDENTIFIED BY PHASE AND SYSTEM PER ART 210.5.
3. ALL EQUIPMENT SHALL BE LISTED BY A NRTL IN COMPLIANCE WITH ART 110.3.
4. DC CONDUCTORS INSIDE BUILDING SHALL BE IN METALLIC RACEWAY PER ART 690.31(E).
5. ALL WIRES SHALL BE PROVIDED WITH STRAIN RELIEF AT ALL ENTRY INTO BOXES AS REQUIRED BY NRTL LISTING.
6. INSTALL PARALLEL CONDUCTORS PER ART 310.10(H)
7. ALL VALUES FOR IMP AND ISC AND VMP ARE MANUFACTURER'S LISTED DATA UNCORRECTED BY NEC.
8. REFER TO CURRENT MANUFACTURER'S PLANNING AND INSTALLATION MANUAL FOR TORQUE SPECS FOR ALL BOLTS AND TERMINAL CONNECTIONS.
9. DC STRING CIRCUITS SHALL BE RUN IN OUTDOOR ROOFTOP AMBIENT CONDITIONS.
10. DC BRANCH CIRCUITS RUN IN OUTDOOR ROOFTOP AMBIENT CONDITIONS SHALL BE INSTALLED > 3.5 INCHES ABOVE ROOF SURFACE UON.
11. PV INVERTER CONTAINS INTEGRATED AC AND DC DISCONNECTS.
12. BURIED CONDUCTORS SHALL BE BURIED TO THE MINIMUM DEPTH SPECIFIED IN ART. 300.5 FOR CIRCUITS 600V AND UNDER AND ART. 300.50 FOR CIRCUITS ABOVE 600V.
13. ALL CONDUCTORS ARE COPPER UON.
14. USE NON-METALLIC UV RATED TIE WRAPS FOR BUNDLED PV WIRE.
15. ALL LINE SIDE AND LOAD SIDE TERMINATIONS OF ALUMINUM AND COPPER CONDUCTORS SHAL BE MADE WITH HIGH PRESS CRIMP LUGS ON BUSSING UNLESS OTHERWISE NOTED.
16. ALL TERMINATIONS OF ALUMINUM CONDUCTORS SHALL BE PROPERLY INSTALLED WITH BEST PRACTICE PROCEDURES THAT INCLUDE BUT NOT LIMITED TO: USE OF TERMINATION EQUIPMENT RATED FOR ALUMINUM AT THE CONDUCTOR TEMPERATURE, CURRENT, AND VOLTAGE; ALLOWANCE FOR MOVEMENT DUE TO THERMAL EXPANSION/CONTRACTION; EXPOSED ALUMINUM SHALL BE PROPERLY COATED WITH ANTI-OXIDIZATION COMPOUND; TERMINALS ARE TORQUE AND MARKED TO REQUIRED SETTINGS WITH CALIBRATED DEVICES.

GROUNDING NOTES

1. SINGLE-CONDUCTOR CABLE USED AS A GROUNDED CONDUCTOR IN PHOTOVOLTAIC POWER SYSTEMS SHALL BE IDENTIFIED AT THE TIME OF INSTALLATION BY DISTINCTIVE WHITE MARKING AT ALL TERMINATIONS PER ART 200.6.
2. THE DC GEC SHALL BE CONTINUOUS FROM THE INVERTER GROUND BUSBAR TO THE MAIN ELECTRICAL SERVICE GROUNDING ELECTRODE SYSTEM. THE DC GEC SHALL BE ATTACHED TO THE GROUND ELECTRODE USING AN IRREVERSIBLE MEANS AS CALLED OUT IN ART 250.64 AND 690.47.
3. PV INVERTER CONTAINS AN INTEGRATED GFDI CIRCUIT. DO NOT BOND THE GROUNDED DC CONDUCTOR TO GROUND EXCEPT THROUGH THE INVERTER GFDI.
4. ALL EXPOSED METAL PARTS (MODULE FRAMES, RAIL, PIPE, BOXES, ETC) SHALL BE GROUNDED USING TIN-PLATED COPPER LAY-IN LUGS OR GROUNDING CLIPS LISTED FOR THE PURPOSE. RAIL CLAMPS SHALL BE MADE ELECTRICALLY CONTINUOUS WITH ATTACHED RAIL.
5. RBI SOLAR RACKING SYSTEMS SHALL BE BONDED PER MANUFACTURER'S UL 2703 INSTRUCTIONS.
6. MIN #10 BARE COPPER EGC AT SOURCE CIRCUITS SHALL BE ROUTED SECURELY TO MOUNTING HARDWARE IN A MANNER THAT PROTECTS FROM PHYSICAL HARM. #6 BARE COPPER EGC FOR AREAS SUBJECT TO PHYSICAL DAMAGE.
7. MODULE FRAMES SHALL BE GROUNDED AT THE LISTED LOCATION PROVIDED BY THE MANUFACTURER OR USING LISTED THIRD-PARTY HARDWARE ONLY IF SPECIFICALLY REFERRED TO IN MANUFACTURE'S INSTRUCTIONS PER UL 1703.
8. BOTH ENDS OF ALL METALLIC CONDUIT CONTAINING GROUNDING ELECTRODE CONDUCTORS SHALL BE BONDED PER ART 250.64(E).
9. GROUNDING ELECTRODE CONDUCTOR TO BE BONDED TO (E) GROUNDING ELECTRODE PER ART 250.68.
10. GROUNDING ELECTRODE CONDUCTOR SIZED PER ART 690.47(C).
11. INCREASES IN EQUIPMENT GROUNDING CONDUCTOR SIZE TO ADDRESS VOLTAGE CONSIDERATIONS SHALL NOT BE REQUIRED PER ART 690.45(A).
12. INSTALLATION SHALL COMPLY WITH ART 250.52, 250.53.
13. CIRCUITS OVER 250V TO GROUND SHALL COMPLY WITH ART 250.97, 250.92(B)

MARKING AND SIGNAGE

14. SEE SHEET PV17 FOR MARKING AND SIGNAGE PLAN.

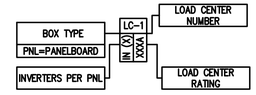
INTERCONNECTION NOTES

1. LOAD SIDE INTERCONNECTIONS SHALL COMPLY WITH ART. 705.12(D) AND ART 230 FOR THE INSTALLATION OF AN ADDITIONAL SERVICE ENTRANCE
2. LOAD SIDE INTERCONNECTIONS SHALL BE MADE IN ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS AND SHALL NOT INVALIDATE THE NRTL LISTING OF THE EQUIPMENT.
3. EMT OR SCH 40 PVC TYPE CONDUIT SHALL BE USED TO ENCLOSE CONDUCTORS BETWEEN A LOAD SIDE INTERCONNECTION AND THE FIRST OCP IN THE INVERTER OUTPUT CIRCUIT.

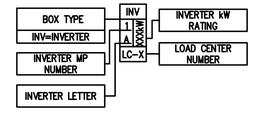
LEGEND

2-POLE CIRCUIT BREAKER
3-POLE CIRCUIT BREAKER
2-POLE SWITCH
3-POLE SWITCH
FUSE
GROUNDING ELECTRODE
M — kWH METER
CURRENT TRANSDUCER
TRANSFORMER (DELTA-WYE)
DC — PHOTOVOLTAIC MODULE
N — NEUTRAL BAR
G — GROUND BAR
C X X A XX — (N) DC COMBINER BOX
TERMINAL BLOCK
65,000AFC — AVAILABLE FAULT CURRENT
IN-AXX — CIRCUIT TAG
X"C. XXX XXXFT — CONDUIT TAG

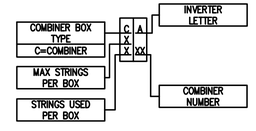
INVERTER PANEL BOARD NUMBERING SYSTEM



INVERTER NUMBERING SYSTEM



COMBINER BOX NUMBERING SYSTEM



SWITCHBOARD NUMBERING SYSTEM



MODULE SPECIFICATIONS AND MAXIMUM SYSTEM VOLTAGE CALCULATION

Photovoltaic Module Electrical Specifications:			Model:	Canadian Solar CS6X-310P		
Voc=	44.9	V at STC				
Vmp=	36.4	V at STC				
Isc=	9.08	A at STC		**Temperature Data**		
Imp=	8.52	A at STC	ASHRAE Mean Low Temp		-15	deg C
Tvoc=	-0.15266	V/deg C	ASHRAE 2% Dry Bulb Temp		32	deg C
Tisc=	5.902	mA/deg C				
Tvmp=	-0.15652	V/deg C				
Sample Calculation #1: Maximum System DC Voltage per art 690.7						
Vmax=	# of series connected modules x (Voc at STC - (25 deg C - Low Temp) x Tvoc V/deg C)					
	=24 x (44.9V - (25 - -15) deg C x -0.15266 V/deg C)					
	=1224V					

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(732) 280-0855
FOR ALL QUESTIONS, PLEASE CONTACT ALLISON D. KIMBALL – PROJECT MANAGER

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT – STEPHEN A. BRAY – LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 29557 9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES: (4047) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM: RBI SOLAR

INVERTER: (2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKET: COMM

PROJECT MANAGER: D VENELL

DATE: 9/1/2015

PAYMENT TYPE: PPA

SHEET NAME: ELECTRICAL SYMBOLS & NOTES

JOB NUMBER: JB-0632042-00

SHEET: PV 7

REV: 0

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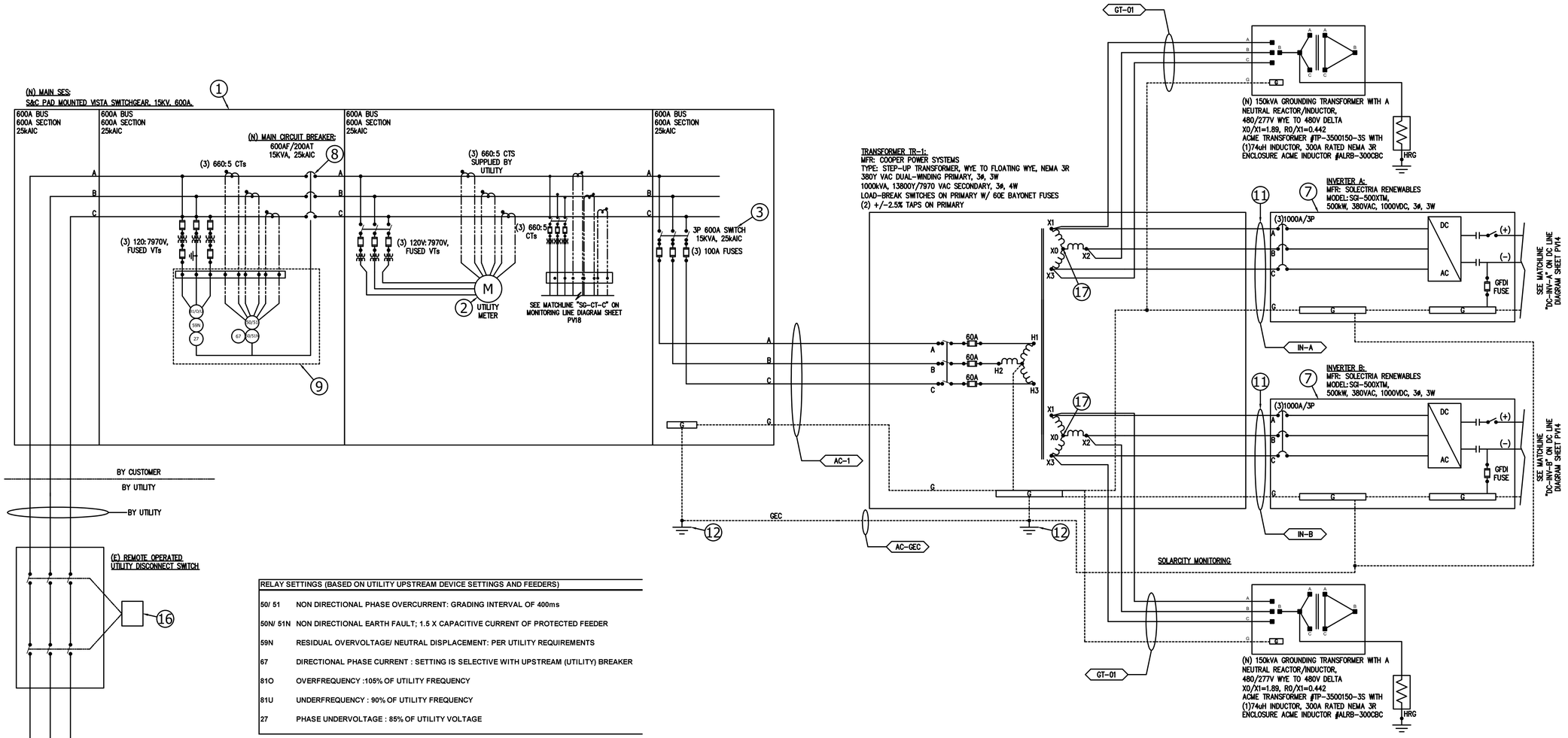

RELAY SETTINGS (BASED ON UTILITY UPSTREAM DEVICE SETTINGS AND FEEDERS)

50/ 51	NON DIRECTIONAL PHASE OVERCURRENT: GRADING INTERVAL OF 400ms
50N/ 51N	NON DIRECTIONAL EARTH FAULT; 1.5 X CAPACITIVE CURRENT OF PROTECTED FEEDER
59N	RESIDUAL OVERVOLTAGE/ NEUTRAL DISPLACEMENT: PER UTILITY REQUIREMENTS
67	DIRECTIONAL PHASE CURRENT : SETTING IS SELECTIVE WITH UPSTREAM (UTILITY) BREAKER
81O	OVERFREQUENCY :105% OF UTILITY FREQUENCY
81U	UNDERFREQUENCY : 90% OF UTILITY FREQUENCY
27	PHASE UNDERVOLTAGE : 85% OF UTILITY VOLTAGE

Circuit #	Icont per conductor	Vmp	Temp Derate	Conduit Fill Derate	Conductor Metal	# of Conduits	# Phase Conductors Per Conduit	Phase Conductor Size	Neutral Conductor Size	EGC Size	Min. Circuit Length	Max. Circuit Length	%V Drop	Wire Insul.	Min EMT Size (in)	Min PVC Size (in)	Min RMC Size (in)
IN-A	253.3	380	1	0.8	Al	3	3	600 KCMIL	-	AWG 4/0	30	30	0.13%	THWN2	3	4	4
IN-B	253.3	380	1	0.8	Al	3	3	600 KCMIL	-	AWG 4/0	30	30	0.13%	THWN2	3	4	4
GT-01	253.3	380	1	0.8	Al	3	3	600 KCMIL	-	AWG 4/0	30	30	-	THWN2	3	4	4
AC-01	41.9	13800	1	1	Al	1	3	AWG 04	-	AWG 08	50	50	0.01%	THWN2	1	1	1
AC-GEC	-	-	-	-	CU	1	1	AWG 04	-	-	-	50	-	THWN2	3/4	3/4	3/4

KEYED NOTES

1. (N) MAIN SWITCHGEAR AND (N) POINT OF AC INTERCONNECTION. ALL CONNECTIONS MADE INSIDE (N) SWITCHGEAR AT OTHER THAN CIRCUIT BREAKERS OR FUSED SWITCHES LISTED FOR USE WITH THAT SWITCHGEAR SHALL BE PERFORMED FOLLOWING MANUFACTURERS INSTRUCTIONS OR BE RE-LISTED BY A NRTL. ALL TERMINATIONS OF ALUMINUM CONDUCTORS SHALL BE WITH HIGH PRESS CRIMP LUGS ONLY. WARNING LABEL DETAIL 1/PV20.
2. (N) UTILITY LOAD METER.
3. (N) PV SYSTEM UTILITY AC DISCONNECT "ACDS-1". WARNING LABEL DETAIL 2/PV17.
4. NOT USED.
5. NOT USED.
6. NOT USED.
7. (N) GRID-INTERACTIVE PV INVERTER LISTED TO UL 1741 WITH GROUND FAULT DETECTION & INTERRUPTION. WARNING LABEL DETAIL 8/PV20.
8. MEDIUM VOLTAGE BREAKER WITH OVERCURRENT AND OVER/UNDER VOLTAGE/FREQUENCY RELAYS.
9. DISTRIBUTED PROTECTION RELAY (SEL-351S-7) USED TO CONTROL THE MAIN OVERCURRENT PROTECTION DEVICE.
10. NOT USED.
11. CONDUCTORS RUN IN PARALLEL SHALL BE INSTALLED PER ART 310.4/310.10(H) AND 250.122 (F)
12. INSTALL 5/8"x8' CU AUX GND ROD FOR LIGHTNING PROTECTION PER ART 250.54. CONNECT TO EQUIPMENT GROUND BAR WITH #6 BARE CU.
13. NOT USED.
14. NOT USED.
15. NOT USED.
16. DIRECT TRANSFER TRIP RELAY CONTROL UNIT TO INTERFACE WITH UTILITY.
17. PRIMARY NEUTRAL IS FULLY INSULATED FROM GROUND AND NEUTRAL TERMINAL IS NOT ACCESSIBLE, PER SOLECTRIA INVERTER SPECIFICATIONS

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DESIGN: P KIRSCHNER

CHECKED BY:
EZ

WARRIE:
COMM

PROJECT MANAGER:
D VENELL

DATE:
9/1/2015

PAYMENT TYPE:
PPA

SHEET NAME:
LINE DIAGRAM

JOB NUMBER:
JB-0632042-00

SHEET: PV 8

REV: 0

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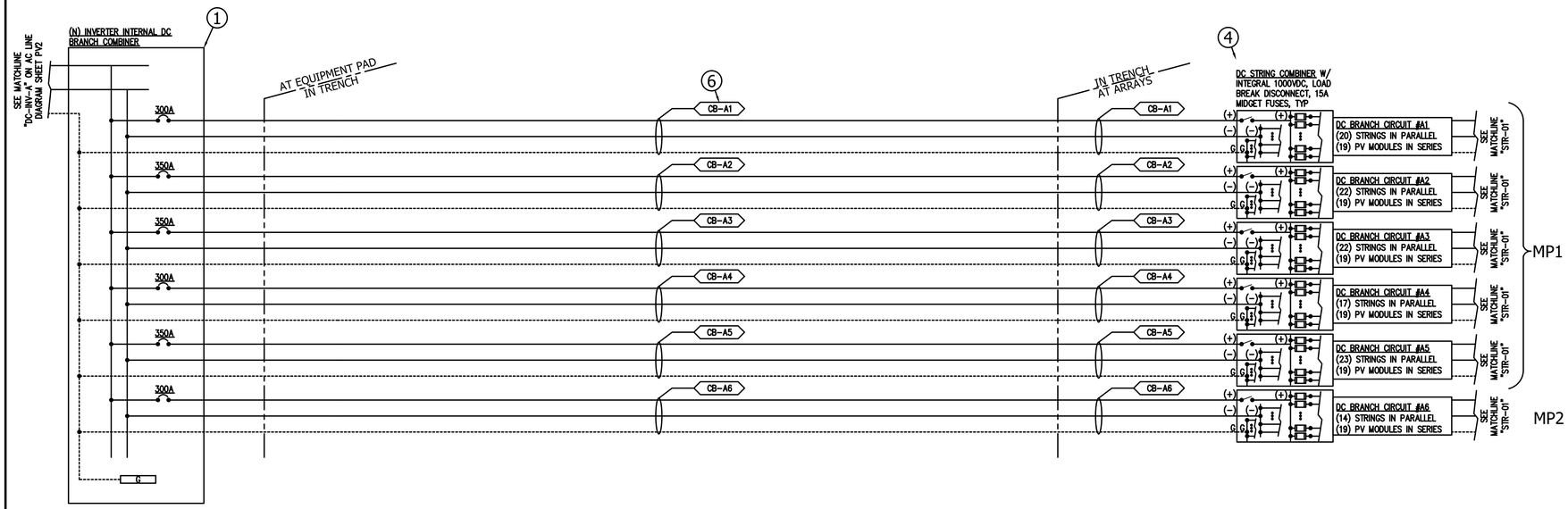
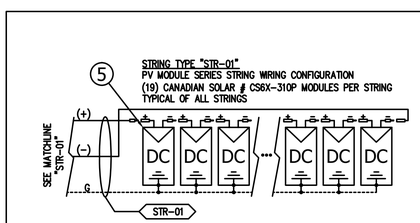


KEYED NOTES

1. (N) INVERTER INTERNAL BREAKER DC BRANCH COMBINER.
2. NOT USED.
3. NOT USED
4. (N) PV SOURCE CIRCUIT DC COMBINER BOXES WITH INTEGRATED LOAD-BREAK DISCONNECT SWITCH AND KLKD SERIES 1000VDC FAST-ACTING PHOTOVOLTAIC MIDGET FUSES. WARNING LABEL DETAIL 3/PV17.
5. (N) PV MODULE LISTED TO UL 1703.
6. ALL DC CIRCUITS ARE ADEQUATELY SIZED FOR TEMPERATURE AND CONDUIT FILL DERATE SO THAT ANY (2) OR (3) CIRCUITS CAN BE ROUTED TOGETHER IN (1) CONDUIT PROVIDED THE CONDUIT IS UP-SIZED TO ACCOMMODATE. THE EGC SHALL BE SIZED FOR THE LARGEST SINGLE OVERCURRENT DEVICE PROTECTING CONDUCTORS IN THE RACEWAY PER ART 250.122(C).

Circuit #	Module	# mods per string	# strings	Imp	Isc	Voc	Vmp at STC	Temp Derate	Conduit Fill Derate	Max. 1 way length (ft)	%Vdrop
STR-01	Canadian Solar CS6X-310P	19	1	8.52	9.08	853.1	691.6	0.87	0.5	400	2.00%
CB-A1	Canadian Solar CS6X-310P	19	20	170.4	181.6	853.1	691.6	1	0.8	100	0.20%
CB-A2	Canadian Solar CS6X-310P	19	22	187.44	199.8	853.1	691.6	1	0.8	50	0.07%
CB-A3	Canadian Solar CS6X-310P	19	22	187.44	199.8	853.1	691.6	1	0.8	50	0.07%
CB-A4	Canadian Solar CS6X-310P	19	17	144.84	154.4	853.1	691.6	1	0.8	100	0.17%
CB-A5	Canadian Solar CS6X-310P	19	23	195.96	208.8	853.1	691.6	1	0.8	150	0.23%
CB-A6	Canadian Solar CS6X-310P	19	14	119.28	127.1	853.1	691.6	1	0.8	800	1.12%
CB-B1	Canadian Solar CS6X-310P	19	20	170.4	181.6	853.1	691.6	1	0.8	150	0.30%
CB-B2	Canadian Solar CS6X-310P	19	18	153.36	163.4	853.1	691.6	1	0.8	200	0.36%
CB-B3	Canadian Solar CS6X-310P	19	19	161.88	172.5	853.1	691.6	1	0.8	250	0.48%
CB-B4	Canadian Solar CS6X-310P	19	20	170.4	181.6	853.1	691.6	1	0.8	300	0.60%
CB-B5	Canadian Solar CS6X-310P	19	18	153.36	163.4	853.1	691.6	1	0.8	350	0.63%

Circuit #	Conductor Metal	# of Conduits	# CC Conductors	Conductor Size	EGC Size	Max. 1 way length (ft)	Wire Insul.	Min EMT Size (in)	Min PVC Size (in)	Min RMC Size (in)
STR-01	Cu	1	2	AWG 12	AWG 10	400	PVWire	-	-	-
CB-A1	Al	1	2	500 KCMIL	AWG 02	100	THWN2	3	3	3
CB-A2	Al	1	2	750 KCMIL	AWG 01	50	THWN2	3	3	3
CB-A3	Al	1	2	750 KCMIL	AWG 01	50	THWN2	3	3	3
CB-A4	Al	1	2	500 KCMIL	AWG 02	100	THWN2	3	3	3
CB-A5	Al	1	2	750 KCMIL	AWG 01	150	THWN2	3	3	3
CB-A6	Al	1	2	500 KCMIL	AWG 04	800	THWN2	3	3	3
CB-B1	Al	1	2	500 KCMIL	AWG 02	150	THWN2	3	3	3
CB-B2	Al	1	2	500 KCMIL	AWG 02	200	THWN2	3	3	3
CB-B3	Al	1	2	500 KCMIL	AWG 02	250	THWN2	3	3	3
CB-B4	Al	1	2	500 KCMIL	AWG 02	300	THWN2	3	3	3
CB-B5	Al	1	2	500 KCMIL	AWG 02	350	THWN2	3	3	3



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CONNECTICUT MUNICIPAL ELECTRIC ENERGY COOPERATIVE
NORWICH (ROGER'S RD.) – 1254.54 KW PV SYSTEM

CMEEC – Norwich (Roger's Rd.)
82 Rodgers Road
Norwich, CT
860-889-4088

KMB DESIGN GROUP
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Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT
CT LICENSE: 26657
9/9/15

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

AHJ:

MODULES: (4047) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM: RBI SOLAR

INVERTER: (2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKER: COMM

PROJECT MANAGER: D VENELL

DATE: 9/1/2015

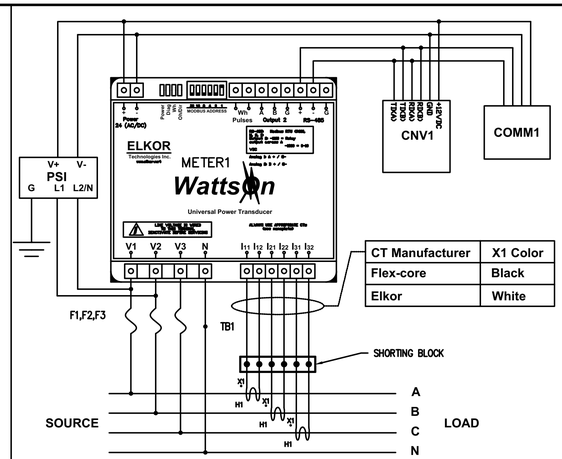
PAYMENT TYPE: PPA

SHEET NAME: LINE DIAGRAM

JOB NUMBER: JB-0632042-00

SHEET: PV 9

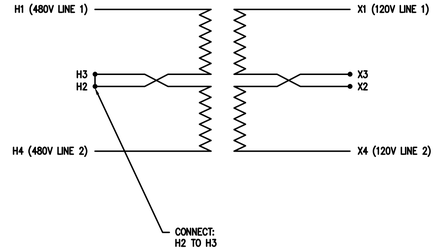
REV: 0



CT Manufacturer	X1 Color
Flex-core	Black
Elkor	White

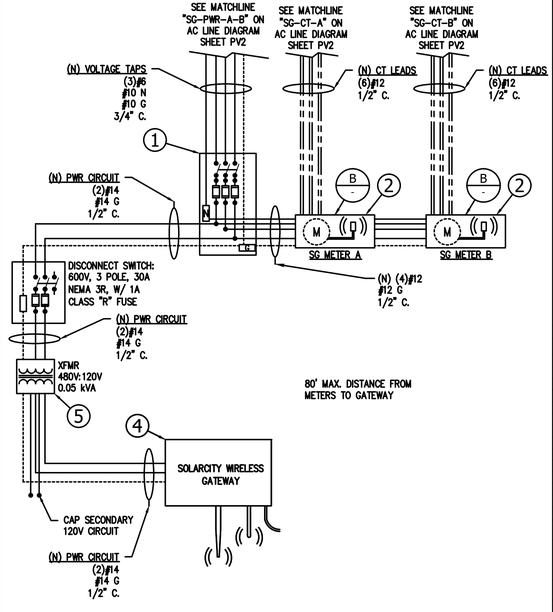
B SOLARGUARD/POWERGUIDE METER DIAGRAM

NTS



C GATEWAY PWR XFMR WIRING DIAGRAM

NTS



A PV SYSTEM MONITORING DIAGRAM

NTS

KEYED NOTES

1. (N) SOLARCITY MONITORING EQUIPMENT DISCONNECT; 600 VAC, 30A, 15A CLASS R FUSES
2. (N) SOLARCITY SOLARGUARD PV PRODUCTION kWH METER - REVENUE GRADE, CSI PBI COMPLIANT, UL LISTED.
3. NOT USED.
4. (N) SOLARCITY CELLULAR GATEWAY; LOCATED WITHIN 80' OF SG AND PG METERS.
5. (N) GATEWAY POWER TRANSFORMER, 480V PRI, 240V SEC, 0.05kVA, SINGLE PHASE, EATON #S20N11S81N OR EQUAL. SEE DETAIL C/- FOR WIRING DIAGRAM.

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Stephen A. Bray
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STATE OF CONNECTICUT · STEPHEN A. BRAY · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 9/9/15

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AHJ:

MODULES:
(4047) CANADIAN SOLAR # CS6X-310P

MOUNTING SYSTEM:
REI SOLAR

INVERTER:
(2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER

CHECKED BY: EZ

MARKET: COMM

PROJECT MANAGER: D VENELL

DATE: 9/1/2015

PAYMENT TYPE: PPA

SHEET NAME: MONITORING DETAILS

JOB NUMBER: JB-0632042-00

SHEET: PV 10

REV: 0

NOT USED

20 NOT USED
901.901 WARNING LABEL DETAILS RK Scale NTS

NOT USED

NOT USED

19 NOT USED
901.901 WARNING LABEL DETAILS RK Scale NTS

NOT USED

NOT USED

18 NOT USED
901.901 WARNING LABEL DETAILS RK Scale NTS

NOT USED

NOT USED

17 NOT USED
901.901 WARNING LABEL DETAILS RK Scale NTS

NOT USED

NOT USED

16 NOT USED
901.901 WARNING LABEL DETAILS RK Scale NTS

NOT USED

NOT USED

8"
2"
SERVICE DISCONNECT

NOTE:
1. SERVICE DISCONNECT PLACARDS PER ART 230.2(E)
2. BLACK BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 3/16"

12 SERVICE DISCONNECT PLACARDS
901.901 WARNING LABEL DETAILS RK Scale NTS

INVERTER A

NOTE:
1. INVERTER IDENTIFICATION LABEL
2. BLACK BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 3/16" MIN.

9 INVERTER ID
901.901 WARNING LABEL DETAILS RK Scale NTS

3"
WARNING
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED
NORMALLY GROUNDED
CONDUCTORS MAY BE
UNGROUNDED AND ENERGIZED

#LB-030004-10X

NOTE:
1. MARKING PER ART 690.5(C)
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

8 INVERTER GROUND-FAULT WARNING
901.901 WARNING LABEL DETAILS RK Scale NTS

NOTE:
1. MARKING PER ART 690.64(B)/705.12
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

3"
WARNING
INVERTER OUTPUT
CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

#LB-030039-10X

7 INVERTER AC CIRCUIT BREAKER
901.901 WARNING LABEL DETAILS RK Scale NTS

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

NOT USED

3"
DC PHOTOVOLTAIC
DISCONNECT

#LB-050002-10X

MAXIMUM POWER
POINT CURRENT (Imp) A
MAXIMUM POWER
POINT VOLTAGE (Vmp) V
MAXIMUM SYSTEM
VOLTAGE (Voc) V
SHORT-CIRCUIT
CURRENT (Isc) A

#LB-030042-10X

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

#LB-030005-10X

NOTE:
1. MARKING PER ART 690.17, 690.53
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

3 DC DISCONNECT
901.901 WARNING LABEL DETAILS RK Scale NTS

3"
AC PHOTOVOLTAIC DISCONNECT

#LB-050006-10X

MAXIMUM AC
OPERATING CURRENT A
MAXIMUM AC
OPERATING VOLTAGE V

#LB-040007-10X

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

#LB-030005-10X

PV SYSTEM DISCONNECT
FOR UTILITY OPERATION

#LB-050013-10X

NOTE:
1. MARKING PER ART 690.14(C)(2), 690.17, 690.54
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

2 PV SYSTEM UTILITY AC DISCONNECT
901.901 WARNING LABEL DETAILS RK Scale NTS

3"
PHOTOVOLTAIC POWER SOURCE

#LB-020003-10X

MAXIMUM AC
OPERATING CURRENT A
MAXIMUM AC
OPERATING VOLTAGE V

#LB-040007-10X

WARNING
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

#LB-030005-10X

NOTE:
1. MARKING PER ART 230.2(E), 690.17, 690.54
2. RED BACKGROUND
3. WHITE LETTERING
4. TEXT HEIGHT: 1/8" MIN.

1 POINT OF INTERCONNECTION
901.901 WARNING LABEL DETAILS RK Scale NTS

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NORWICH (ROGER'S RD.) – 1254.54 KW PV SYSTEM

CMEEC – Norwich (Roger's Rd.)
82 Rodgers Road
Norwich, CT
860-889-4088

REVISIONS

REV	BY	DATE	COMMENTS

JOB DETAILS

ALL:

MODULES:
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MOUNTING SYSTEM:
RBI SOLAR

INVERTER:
(2) Solectria # SGI-500XTM-380

DESIGN: P KIRSCHNER
CHECKED BY: EZ

MARKET: COMM
PROJECT MANAGER: D VENELL

DATE: 9/1/2015
PAYMENT TYPE: PPA

SHEET NAME: WARNING LABELS

JOB NUMBER: JB-0632042-00

SHEET: PV 11
REV: 0

C:\Common Installs\Customers\JB-0632042-00 Connecticut Municipal Electric Energy Cooperative - Norwich (Roger's Rd.)\Drawings\AutoCAD\jb_0632042_00___acad_b_01.dwg

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STORMWATER MANAGEMENT REPORT

PREPARED FOR:

SOLARCITY CORPORATION
DEVELOPMENT AND MANAGEMENT PLAN
ROGERS ROAD SOLAR PROJECT
82 ROGERS ROAD
NORWICH, CONNECTICUT

AUGUST 2015

PREPARED BY:

BOUNDARIES LLC

PROJECT I.D. NO. 14-2302

Table of Contents

Introduction 3
Existing Conditions 4
Proposed Conditions 7
Summary 12

Table of Figures

FIGURE 1 LOCATION MAP
FIGURE 2 PRE-DEVELOPMENT CONDITIONS WATERSHED MAP
FIGURE 3 POST-DEVELOPMENT CONDITIONS WATERSHED MAP

Table of Appendices

APPENDIX A NRCS WEB SOIL SURVEY SOILS REPORT
APPENDIX B HYDROCAD MODELING RESULTS
APPENDIX C SITE DEVELOPMENT PLANS

Introduction

On behalf of SolarCity Corporation, Boundaries LLC has prepared the following stormwater management report for the proposed solar photovoltaic development to be located at 82 Rogers Road and the Norwich Landfill in Norwich, CT. The proposed development consists of an approximately 2.8 MW DC solar photovoltaic development on two distinct lots (four locations/mounting planes). This stormwater management report has been prepared to determine the potential for the proposed development to impact stormwater runoff patterns and flow rates. The proposed development makes use of low impact development techniques in order to limit the impacts to stormwater flow patterns and utilize the existing stormwater management systems.

The new construction includes solar panels mounted on posts or concrete ballasts, electrical equipment installed on concrete pads, and improvements to the existing gravel access drives for maintenance access to the landfill sites. The proposed developments will be protected by a chain link fences and access gates as shown on the attached plans. The mounting posts for the solar arrays located at 82 Rogers Road will be pole driven approximately 8-feet into the ground, while the landfill solar panels will be anchored on plastic tubs filled with concrete set on top of the landfill cover. The proposed project areas are shown on the Location Map included as Figure 1.

The primary purpose of this stormwater management report is to demonstrate how the proposed solar arrays may affect the existing runoff flow patterns. The proposed solar panel system is raised above grade by approximately 2-feet at its leading edge (lowest end). There will be minimal regrading required on all sites and with the exception of the installation of the pole driven supports, the proposed project areas remain essentially unchanged. These low impact techniques will have minimal impact on runoff flow patterns and will ensure that the landfill caps continue to operate as designed.

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey the soils on the landfill sites are classified as “Dumps”, and have no Hydrologic Soil Group classification. Hydrologic Soil Group C was assigned for the purposes of this analysis as a typical value for landfills in this region due to the impervious liner below the vegetative support layer. The non-landfill sites located south of Rogers Road consist primarily of Agawam fine sandy loam, 3 to 8% slopes, with some areas designated as Charlon-Chatfield complex, 3 to 15% slopes, very rocky; Hollis-Chatfield-Rock outcrop complex, 3 to 15% slopes; Walpole sandy loam, 0 to 3% slopes; and Catden and Freetown soils. Agawam and Charlton-Chatfield soils are classified as Hydrologic Soil Group B. Hollis-Chatfield-Rock outcrop, Walpole, and Catden and Freetown soils are classified as Hydrologic Soil Group A/D or D, and have been modeled as Hydrologic Soils Group D. The Soils Report is provided in Appendix A.

Existing and post-development conditions hydrographs were estimated using the hydrologic modeling program HydroCAD. The methodology selected was NRCS TR-20. Times of concentration were estimated using multiple segment flow paths as described in the NRCS TR-55 manual. The Type III 24-hour storm was analyzed under antecedent moisture condition two. HydroCAD modeling results are presented in Appendix B.

There are several regulated inland wetlands resource areas in the vicinity of the project, as determined by Demian Sorrentino of Boundaries LLC, a certified soil scientist, and were confirmed by All-Points Technology. The wetland areas south of Rogers Road are located in the woods at the limits of the existing cleared areas. There are also wetlands and watercourses located at the base of both of the landfills. For additional information regarding the locations of the regulated wetland resources within the project areas, please see Sheets 2, 4, and 6 of the Proposed Site Development Plans included in Appendix C.

Existing Conditions

The proposed project area consists of approximately 5.1 acres of the 75.0-acre parcel that contains the Norwich landfills and approximately 4.2 acres of the 23.3 acre 82 Rogers Road parcel. The proposed array area includes 2.5 acres on the bulky waste landfill (MP-2), 2.6 acres on the Norwich landfill (MP-3), 3.8 acres on the western portion of 82 Rogers Road (MP-1), and 0.4 acres on the eastern portion of 82 Rogers Road (MP-4). The landfill property is zoned ROS and 82 Rogers Road is zoned R-80. The Norwich Landfill property contains the City of Norwich's former bulky waste and municipal waste landfills. The property currently contains the City of Norwich's Transfer Station. 82 Rogers Road is a City-owned property and consists of wooded areas with wetlands and open fields that were previously used for agricultural purposes. The landfill property is adjacent to properties owned by the Norwich Fish and Game Club, municipally owned properties, undeveloped properties, and a large residential lot. 82 Rogers Road is adjacent to several single family residential lots and two undeveloped properties. Existing conditions of the property are shown below.



Aerial Photograph of Project Area

During storm events, runoff flows overland from the 82 Rogers Road site (MP-1/MP-4) to the wetlands systems that surround the existing clearings. Runoff from the bulky waste landfill (MP-2) flows overland to the wooded areas and the adjacent wetlands and watercourses that surround the landfill. The majority of the runoff from the Norwich landfill (MP-3) is collected in riprap lined swales and discharged to a detention basin. The remainder of the runoff from MP-3 flows overland to the wooded areas and watercourse located at the northern base of the landfill. Existing conditions sub-watersheds are shown on Figure 2. Existing conditions sub-watersheds were delineated using topographic survey data supplemented with aerial topographic survey from the City of Norwich's GIS mapping for areas outside of the detailed survey limits. Land uses were estimated based on Site inspections, aerial photography and survey data.

Runoff Curve Numbers (CN) used for the existing conditions analysis are as follows: 61 (>75% grass cover) for the grassed areas in Hydrologic Soil Group B, 74 (>75% grass cover) for the grassed landfill cap and the grassed areas in Hydrologic Soil Group C, 80 (>75% grass cover) for the grassed areas in Hydrologic Soil Group D, 55 (woods) for wooded areas in Hydrologic Soil Group B, 77 (woods) for wooded areas in Hydrologic Soil Group D, and 89 (gravel roads) for existing unpaved access drives.

The existing conditions sub-watersheds are described further below:

Drainage Area #1S (DA #1S)

This 1.0± acre drainage area encompasses the southern portion of the top of the bulky waste landfill (MP-2). The drainage area is comprised of dense grass that makes up the vegetative cover of the landfill. The weighted CN of the drainage area is 74. This area drains generally southerly via overland flow along the existing gravel access drive and eventually flows to a depression area south of the landfill before entering the wooded area and intermittent water course east of the bulky waste landfill.

Drainage Area #2S (DA #2S)

This 0.7± acre drainage area encompasses the western portion of the top of the bulky waste landfill (MP-2). The drainage area is comprised of dense grass that makes up the vegetative cover of the landfill. The weighted CN of the drainage area is 74. This area drains generally westerly via overland flow over the landfill cover before entering the wooded wetland area west of the bulky waste landfill.

Drainage Area #3S (DA #3S)

This 1.1± acre drainage area encompasses the eastern portion of the top of the bulky waste landfill (MP-2). The drainage area is comprised of dense grass that makes up the vegetative cover of the landfill. The weighted CN of the drainage area is 74. This area drains generally easterly via overland flow over the landfill cover before entering the wooded area and intermittent water course east of the bulky waste landfill.

Drainage Area #4S (DA #4S)

This 0.6± acre drainage area encompasses the northern portion of the top of the Norwich landfill (MP-3). The drainage area is comprised of dense grass that makes up the vegetative cover of the landfill. The weighted CN of the drainage area is 74. This area drains generally northerly via overland flow over the landfill cover before entering the brushy area of the old landfill cover and the wooded area north of the landfill.

Drainage Area #5S (DA #5S)

This 2.0± acre drainage area encompasses the western portion of the top of the Norwich landfill (MP-3). The drainage area is comprised of dense grass that makes up the vegetative cover of the landfill. The weighted CN of the drainage area is 74. This area drains generally westerly via overland flow over the landfill cover before entering a riprap drainage swale that collects runoff from the landfill and eventually discharges to a detention basin at the base of the landfill.

Drainage Area #6S (DA #6S)

This 1.2± acre drainage area encompasses the eastern portion of the top of the Norwich landfill (MP-3). The drainage area is comprised of dense grass that makes up the vegetative cover of the landfill and a portion of the existing gravel access drive. The weighted CN of the drainage area is 75. This area drains generally easterly via overland flow over the landfill cover and gravel access drive before entering a riprap drainage swale that collects runoff from the landfill and eventually discharges to a detention basin at the base of the landfill.

Drainage Area #7S (DA #7S)

This 2.1± acre drainage area encompasses the western portion of the larger 82 Rogers Road clearing (MP-1). The drainage area is comprised of dense grass pasture. The weighted CN of the drainage area is 62. This area drains generally westerly via overland flow to the wooded wetland area adjacent to the clearing.

Drainage Area #8S (DA #8S)

This 2.9± acre drainage area encompasses the eastern portion of the larger 82 Rogers Road clearing (MP-1). The drainage area is comprised of dense grass pasture. The weighted CN of the drainage area is 62. This area drains generally easterly via overland flow to the wooded wetland area adjacent to the clearing.

Drainage Area #9S (DA #9S)

This 1.7± acre drainage area encompasses the smaller 82 Rogers Road clearing (MP-4). The drainage area is comprised of dense grass pasture and a small wooded area. The weighted CN of the drainage area is 63. This area drains generally southerly and westerly via overland flow to the wooded wetland area adjacent to the clearing.

Existing conditions peak runoff rates were analyzed at the limits of the proposed development areas. The existing conditions peak runoff rates will be compared to the post-development peak runoff rates to determine the effect of the proposed development on existing stormwater runoff patterns. Existing conditions peak flow rates are summarized below in Tables 1 through 3. Detailed modeling results are included in Appendix B.

Table 1
Peak Runoff Rates – Bulky Waste Landfill (MP-2) Existing Conditions

Storm Event	DA #1S (CFS)	DA #2S (CFS)	DA #3S (CFS)
2-Year	1.0	0.7	1.1
5-Year	1.6	1.1	1.7
10-Year	2.0	1.5	2.3
25-Year	2.5	1.9	2.9
50-Year	3.0	2.2	3.3
100-Year	3.6	2.6	4.0

Table 2
Peak Runoff Rates – Norwich Landfill (MP-3) Existing Conditions

Storm Event	DA #4S (CFS)	DA #5S (CFS)	DA #6S (CFS)
2-Year	0.6	1.9	1.5
5-Year	1.0	3.1	2.3
10-Year	1.3	4.0	3.0
25-Year	1.6	5.0	3.8
50-Year	1.9	5.9	4.4
100-Year	2.3	7.1	5.2

Table 3
Peak Runoff Rates – 82 Rogers Road (MP-1/4) Existing Conditions

Storm Event	DA #7S (CFS)	DA #8S (CFS)	DA #9S (CFS)
2-Year	0.7	0.9	0.6
5-Year	1.4	2.0	1.3
10-Year	2.0	3.0	1.9
25-Year	2.8	4.0	2.6
50-Year	3.4	5.0	3.2
100-Year	4.3	6.3	4.0

Proposed Conditions

The proposed improvements to the site include the installation of solar panels mounted on steel posts driven into the ground, or in the case of the landfills, at grade plastic tubs filled with concrete. Additional proposed conditions include minor improvements to the existing gravel landfill access drives as needed to support construction equipment, various concrete pads for electrical equipment, and installation of chain link security fence to limits access to each solar array.

Installation of the solar arrays will consist of mowing the dense grass in the proposed development areas, installing proposed metal racking posts or plastic tubs as applicable, installing and anchoring the solar array panels to the racking system, installing the proposed chain link fence, and installing the necessary electrical equipment for harvesting power.

The stormwater analysis was conducted to determine if the proposed development would result in significant changes to existing flow patterns, water quality, or peak runoff rates. The design

incorporates measures for limiting disturbed areas and minimizing increases in impervious area. Proposed impervious areas are limited to the steel posts for the proposed racking system, the proposed electrical equipment pads, the cast-in-place concrete racking ballasts for the solar arrays on the landfill sites, paved aprons for access to the 82 Rogers Road arrays, and gravel drive improvements to the to the landfill access roadways.

The W8X10 steel post each cover 2.96 square inches (0.02 square feet) and they are spaced approximately 16 feet along each row of solar arrays. The plastic tubs for the cast-in-place racking system cover approximately 22 square feet each, are spaced at 13 feet along each row of solar arrays for the edge of the layout and at approximately 20 feet along each row of solar arrays in the interior of the layout. The proposed concrete equipment pads are approximately 18 feet by 8 feet and cover approximately 144 square feet. The changes in impervious areas and CN values for each drainage area as a result of the proposed development are presented below in Table 4 – Impervious Area Summary.

Table 4
Impervious Area Summary

Drainage Area	Access Drive Improvements (SF)	Proposed Racking System (SF)	Proposed Concrete Pads (SF)	Total Proposed Impervious Area (SF)	Total Watershed Area (SF)	CN (Pre)	CN (Post)
DA #1S	3,485	1,742	144	5,371	41,469	74	76
DA #2S	610	1,394	0	2,004	30,710	74	75
DA #3S	0	2,526	0	2,526	47,567	74	75
MP-2 Total	**4,095**	**5,662**	**144**	**9,901**	**119,746**	**74**	**75**
DA #4S	0	1,220	0	1,220	26,921	74	75
DA #5S	0	2,778	0	2,778	85,378	74	75
DA #6S	440	2,004	144	2,588	53,318	75	76
MP-3 Total	**440**	**6,002**	**144**	**6,586**	**165,617**	**74**	**75**
DA #7S	340	4	230	574	93,438	62	62
DA #8S	0	5	0	5	125,941	62	62
DA #9S	218	<1	0	219	74,793	63	63
MP-1/4 Total	**558**	**10**	**230**	**798**	**294,172**	**62**	**62**

Proposed conditions sub-watersheds are shown on Figure 3. Proposed conditions sub-watersheds were delineated using topographic survey data supplemented with aerial topographic survey from the City of Norwich's GIS mapping for areas outside of the detailed survey limits. Land uses were estimated based on Site inspections and by using the proposed site development plan.

Runoff Curve Numbers (CN) used for the proposed conditions analysis are as follows: 61 (>75% grass cover) for the grassed areas in Hydrologic Soil Group B, 74 (>75% grass cover) for the grassed landfill cap and the grassed areas in Hydrologic Soil Group C, 80 (>75% grass cover) for the grassed areas in Hydrologic Soil Group D, 55 (woods) for wooded areas in Hydrologic Soil Group B, 77 (woods) for wooded areas in Hydrologic Soil Group D, and 89 (gravel roads) for proposed gravel access improvements, and 98 (impervious) for solar array ballasts and posts, concrete equipment pads and fence post ballasts, and paved aprons.

The proposed improvements to the existing conditions sub-watersheds are described further below:

Drainage Area #1S (DA #1S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the construction of 3,485 square feet of gravel access drive and the installation of 1,742 square feet of concrete ballasts for the proposed racking system, and the installation of 144 square feet of concrete equipment pads. The weighted CN of the drainage area is 76. This area drains generally southerly via overland flow along the existing gravel access drive and eventually flows to a depression area south of the landfill before entering the wooded area and intermittent water course east of the bulky waste landfill. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #2S (DA #2S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the construction of 610 square feet of gravel access drive and the installation of 1,394 square feet of concrete ballasts for the proposed racking system. The weighted CN of the drainage area is 75. This area drains generally westerly via overland flow over the landfill cover before entering the wooded wetland area west of the bulky waste landfill. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #3S (DA #3S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the installation of 2,526 square feet of concrete ballasts for the proposed racking system. The weighted CN of the drainage area is 75. This area drains generally easterly via overland flow over the landfill cover before entering the wooded area and intermittent water course east of the bulky waste landfill. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #4S (DA #4S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the installation of 1,220 square feet of concrete ballasts for the proposed racking system. The weighted CN of the drainage area is 75. This area drains generally northerly via overland flow over the landfill cover before entering the brushy area of the old landfill cover and the wooded area north of the landfill. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #5S (DA #5S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the installation of 2,778 square feet of concrete ballasts for the proposed racking system. The weighted CN of the drainage area is 75. This area drains generally westerly via overland flow over the landfill cover before entering a riprap drainage swale that collects runoff from the landfill and eventually discharges to a detention basin at the base of the landfill. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #6S (DA #6S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the construction of 440 square feet of gravel access drive and the installation of 2,004 square feet of concrete ballasts for the proposed racking system, and the installation 144 square feet of concrete equipment pads. The weighted CN of the drainage area is 76. This area drains generally easterly via overland flow over the landfill cover and gravel access drive before entering a riprap drainage swale that collects runoff from the landfill and eventually discharges to a detention basin at the base of the landfill. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #7S (DA #7S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the construction of 340 square feet of paved apron, the installation of 4 square feet of posts for the proposed racking system, and the installation of an estimated 230 square feet of concrete pads for the proposed electrical equipment. The weighted CN of the drainage area is 62. This area drains generally westerly via overland flow to the wooded wetland area adjacent to the clearing. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #8S (DA #8S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the installation of 5 square feet of posts for the proposed racking system. The weighted CN of the drainage area is 62. This area drains generally easterly via overland flow to the wooded wetland area adjacent to the clearing. The existing runoff flow paths will not be affected by the proposed development.

Drainage Area #9S (DA #9S)

The area will be mowed prior to construction. The proposed improvements to this drainage area include the construction of 218 square feet of paved apron, and the installation of 1 square foot of posts for the proposed racking system. The weighted CN of the drainage area is 63. This area drains generally southerly and westerly via overland flow to the wooded wetland area adjacent to the clearing. The existing runoff flow paths will not be affected by the proposed development.

Proposed conditions peak flow rates were analyzed at the down-gradient limit of the proposed development areas for 82 Rogers Road (MP-1/MP-4) and the bulky waste landfill (MP-2) as there are no stormwater management systems in place on these sites and runoff flows overland. Peak runoff rates for the Norwich landfill (MP-3) were analyzed at the existing riprap swales. The change in peak runoff rates as a result of the proposed improvements are summarized below in Tables 5, 6, and 7. Detailed modeling results are included in Appendix B.

Table 5
Peak Runoff Rates – Bulky Waste Landfill (MP-2) Post-Development vs. Pre-Development

Storm Event	DA #1S			DA #2S			DA #3S		
	Post (CFS)	Pre (CFS)	Change (CFS)	Post (CFS)	Pre (CFS)	Change (CFS)	Post (CFS)	Pre (CFS)	Change (CFS)
2-Year	1.1	1.0	+0.1	0.8	0.7	+0.1	1.2	1.1	+0.1
5-Year	1.7	1.6	+0.1	1.2	1.1	+0.1	1.8	1.7	+0.1
10-Year	2.2	2.0	+0.2	1.6	1.5	+0.1	2.4	2.3	+0.1
25-Year	2.7	2.5	+0.2	1.9	1.9	+0.0	2.9	2.9	+0.0
50-Year	3.2	3.0	+0.2	2.3	2.2	+0.1	3.4	3.3	+0.1
100-Year	3.8	3.6	+0.2	2.7	2.6	+0.1	4.1	4.0	+0.1

Table 6
Peak Runoff Rates – Norwich Landfill (MP-3) Post-Development vs. Pre-Development

Storm Event	DA #4S			DA #5S			DA #6S		
	Post (CFS)	Pre (CFS)	Change (CFS)	Post (CFS)	Pre (CFS)	Change (CFS)	Post (CFS)	Pre (CFS)	Change (CFS)
2-Year	0.7	0.6	+0.1	2.0	1.9	+0.1	1.6	1.5	+0.1
5-Year	1.0	1.0	+0.0	3.2	3.1	+0.1	2.4	2.3	+0.1
10-Year	1.4	1.3	+0.1	4.2	4.0	+0.2	3.1	3.0	+0.1
25-Year	1.7	1.6	+0.1	5.2	5.0	+0.2	3.9	3.8	+0.1
50-Year	2.0	1.9	+0.1	6.1	5.9	+0.2	4.5	4.4	+0.1
100-Year	2.4	2.3	+0.1	7.3	7.1	+0.2	5.4	5.2	+0.2

Table 7
Peak Runoff Rates – 82 Rogers Road (MP-1/4) Post-Development vs. Pre-Development

Storm Event	DA #7S			DA #8S			DA #9S		
	Post (CFS)	Pre (CFS)	Change (CFS)	Post (CFS)	Pre (CFS)	Change (CFS)	Post (CFS)	Pre (CFS)	Change (CFS)
2-Year	0.7	0.7	+0.0	0.9	0.9	+0.0	0.6	0.6	+0.0
5-Year	1.4	1.4	+0.0	2.0	2.0	+0.0	1.3	1.3	+0.0
10-Year	2.0	2.0	+0.0	3.0	3.0	+0.0	1.9	1.9	+0.0
25-Year	2.8	2.8	+0.0	4.0	4.0	+0.0	2.6	2.6	+0.0
50-Year	3.4	3.4	+0.0	5.0	5.0	+0.0	3.2	3.2	+0.0
100-Year	4.3	4.3	+0.0	6.3	6.3	+0.0	4.0	4.0	+0.0

As presented above, the proposed low impact development has limited effects on peak runoff rates. Due to the minimal impervious area increase associated with the post mounted solar arrays to be used at 82 Rogers Road (MP-1/MP-4) there is no modeled increase in peak runoff rates after development. The larger impervious areas of the concrete ballasts for the ballasted solar arrays results in minor increases in the peak runoff rates, but no change in the runoff flow paths.

As a result of the proposed development, runoff from the bulky waste landfill (MP-2) solar array increases slightly due to the proposed concrete ballasts, as presented above in Table 5. Runoff from the bulky waste landfill currently flows overland from the top of the cap (the location of the proposed development) to the wooded areas and wetlands/watercourses that surround the base of the landfill. Due to the heavily vegetated nature of the landfill cap, the distance of overland flow to the wetland

resources, and the lack of an existing stormwater management system point discharge, and current conditions being maintained and essentially unchanged, it is believed that the minimal increases in peak flow rates should not negatively impact down gradient areas.

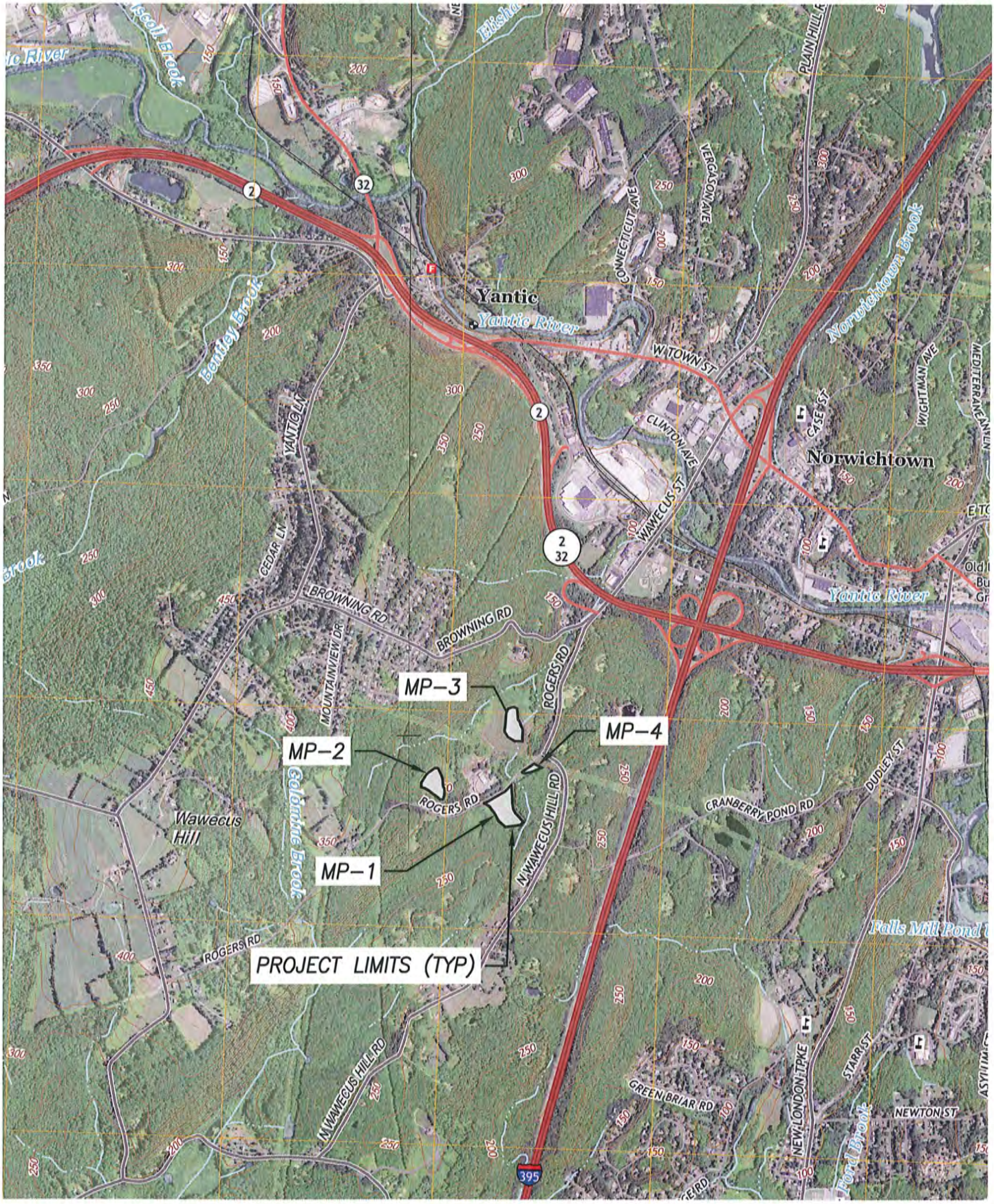
Runoff from the Norwich landfill (MP-3) solar array also increases slightly due to the proposed concrete ballasts, as presented above in Table 6. Runoff from two out of the three sub-watersheds on the Norwich landfill is collected by riprap swales and is discharged to an existing detention basin. The capacities of the swales were analyzed to determine if they had sufficient capacity to transport the post-development runoff to the existing detention basin. The existing riprap swales, based on the existing conditions and survey data, have capacity for greater than 8.6 CFS, depending on the running slope of the swale. The detailed modeling results of the swale capacities are included in Appendix B. The post-development peak runoff rate ranges from 5.4 CFS to 7.3 CFS during the 100-year storm event, therefore the existing stormwater management system should have sufficient excess capacity to manage the slight increase in peak runoff rates. Runoff from the top of the cap (the location of the proposed development) currently flows to the wooded areas and wetlands/watercourses that surround the base of the landfill on the northern and eastern sides. Due to the heavily vegetated nature of the landfill cap in this area, the distance of overland flow to the wetland resources, and the lack of an existing stormwater management system point discharge, and current conditions being maintained and essentially unchanged, it is believed that the minimal increases in peak flow rates should not negatively impact down gradient areas.

Summary

As discussed above the proposed development has been designed to limit the impacts to existing stormwater runoff flow rates and patterns. The existing runoff flow paths have been maintained and while there are minor increases in peak runoff rates from the existing landfill sites they should not have a negative impact on down gradient areas.

The proposed improvements are shown on plans titled “Rogers Road Solar Project, Prepared for SolarCity Corporation, 82 Rogers Road, Norwich, Connecticut, July 2015, Job I.D. No. 14-2302, Cover Sheet through Sheet 11 of 11” prepared by Boundaries LLC.

Figures



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CIVIL ENGINEERING LAND SURVEYING LAND USE PLANNING SOIL SCIENCE

Boundaries LLC
179 Pachaug River Drive, Griswold, CT 06351
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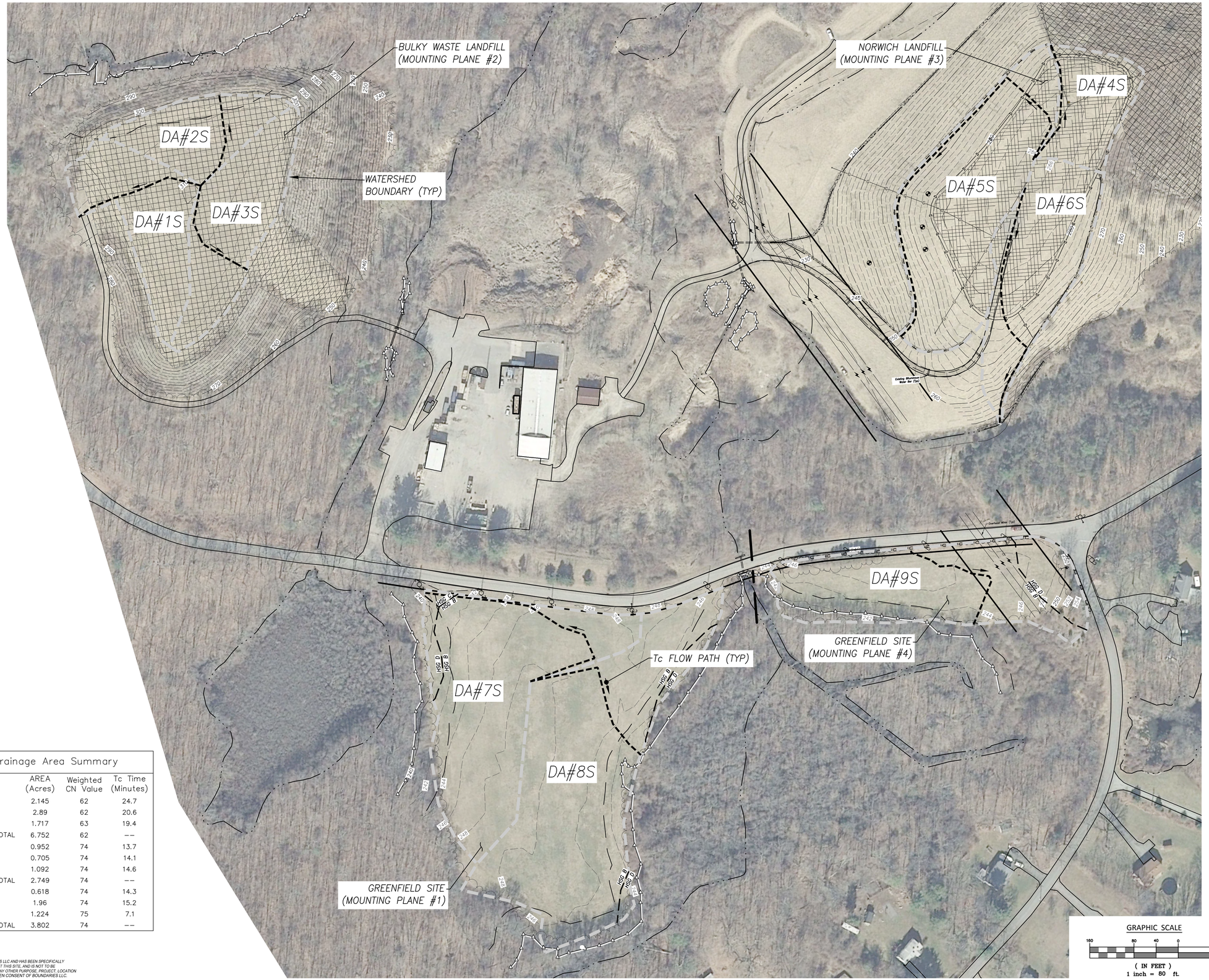
Location Map
(Norwich/Fitchville Quads)
Brightfields Development, LLC
82 Rogers Road, Norwich, CT

SCALE:	1"=2,000'
DATE:	August 2015
JOB NO.	14–2302
FIGURE	1



Drainage Area Summary			
NAME	AREA (Acres)	Weighted CN Value	Tc Time (Minutes)
DA #7S	2.145	62	24.7
DA #8S	2.89	62	20.6
DA #9S	1.717	63	19.4
MP-1/4 TOTAL	6.752	62	--
DA #1S	0.952	74	13.7
DA #2S	0.705	74	14.1
DA #3S	1.092	74	14.6
MP-2 TOTAL	2.749	74	--
DA #4S	0.618	74	14.3
DA #5S	1.96	74	15.2
DA #6S	1.224	75	7.1
MP-3 TOTAL	3.802	74	--

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Figure 2
"Pre-Development Conditions Watershed Map"
Prepared for
SolarCity Corporation
Rogers Road, Norwich, Connecticut

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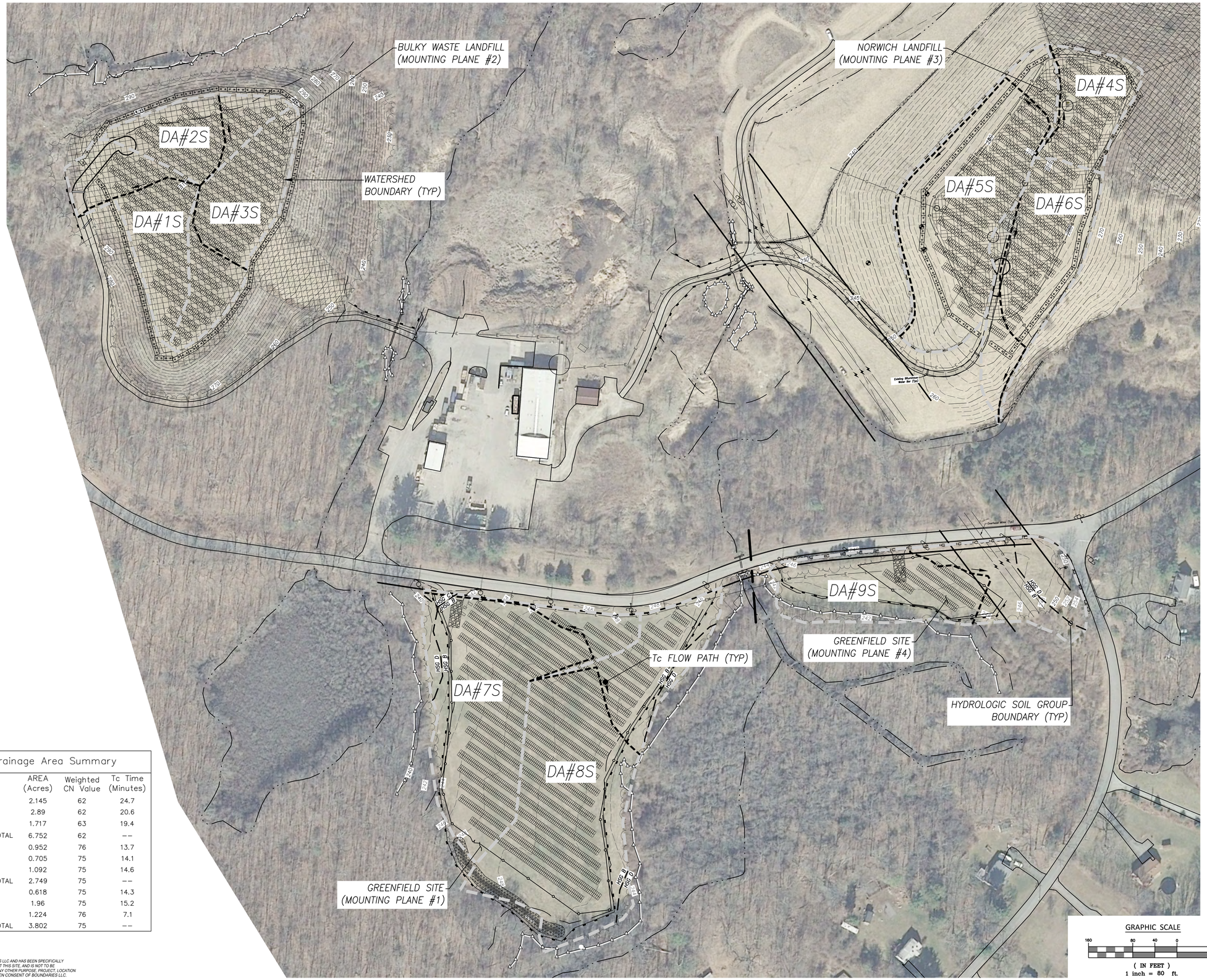
SCALE: 1" = 80'
DATE: August 2015
JOB I.D. NO. 14-2302

Revisions

SHEET NO.
1
2



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DA #5S	1.96	75	15.2
DA #6S	1.224	76	7.1
MP-3 TOTAL	3.802	75	--

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Figure 3
"Post-Development Conditions Watershed Map"
Prepared for
SolarCity Corporation
Rogers Road, Norwich, Connecticut

SCALE: 1" = 80'
DATE: August 2015
JOB I.D. NO. 14-2302
Revisions

SHEET NO.
2
2

Appendix A
NRCS Web Soil Survey Soils Report

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for State of Connecticut

Rogers Road Solar Sites



June 5, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....7
Soil Map.....8
Legend.....9
Map Unit Legend.....10
Map Unit Descriptions.....10
State of Connecticut.....13
3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony.....13
13—Walpole sandy loam, 0 to 3 percent slopes.....15
17—Timakwa and Natchaug soils.....17
18—Catden and Freetown soils.....19
29B—Agawam fine sandy loam, 3 to 8 percent slopes.....21
34B—Merrimac sandy loam, 3 to 8 percent slopes.....23
38E—Hinckley gravelly sandy loam, 15 to 45 percent slopes.....25
45B—Woodbridge fine sandy loam, 3 to 8 percent slopes.....26
73C—Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky.....28
73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky.....30
75C—Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes.....32
75E—Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes.....34
302—Dumps.....37
306—Udorthents-Urban land complex.....38
Soil Information for All Uses.....40
Soil Properties and Qualities.....40
Soil Physical Properties.....40
Saturated Hydraulic Conductivity (Ksat).....40
Soil Qualities and Features.....44
Hydrologic Soil Group.....44
References.....48

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

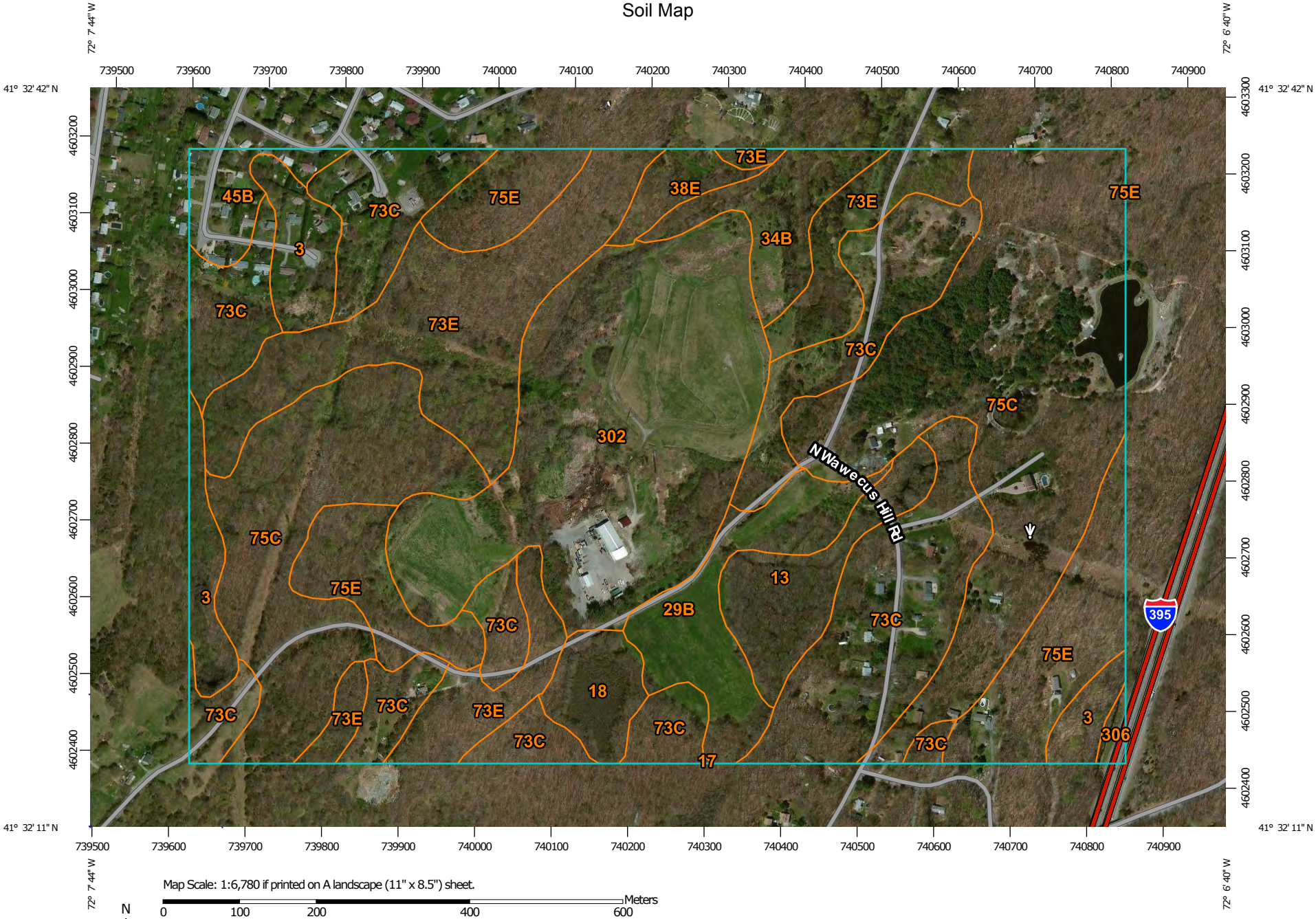
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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: State of Connecticut
Survey Area Data: Version 13, Oct 28, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—May 12, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

State of Connecticut (CT600)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	9.4	3.9%
13	Walpole sandy loam, 0 to 3 percent slopes	7.3	3.0%
17	Timakwa and Natchaug soils	0.0	0.0%
18	Catden and Freetown soils	4.1	1.7%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	9.7	4.0%
34B	Merrimac sandy loam, 3 to 8 percent slopes	6.1	2.5%
38E	Hinckley gravelly sandy loam, 15 to 45 percent slopes	2.5	1.0%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	3.7	1.5%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	47.4	19.5%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	33.0	13.6%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	60.5	24.9%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	19.7	8.1%
302	Dumps	39.0	16.1%
306	Udorthents-Urban land complex	0.6	0.3%
Totals for Area of Interest		**243.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic

class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

State of Connecticut

3—Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2t2qt
Elevation: 0 to 1,480 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Ridgebury, extremely stony, and similar soils: 40 percent
Leicester, extremely stony, and similar soils: 35 percent
Whitman, extremely stony, and similar soils: 20 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ridgebury, Extremely Stony

Setting

Landform: Drainageways, depressions, hills, ground moraines
Landform position (two-dimensional): Backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, base slope, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

A - 0 to 5 inches: fine sandy loam
Bw - 5 to 9 inches: sandy loam
Bg - 9 to 18 inches: gravelly sandy loam
Cd - 18 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 14 to 32 inches to densic material
Natural drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D

Description of Leicester, Extremely Stony

Setting

Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope, footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Coarse-loamy melt-out till derived from gneiss, granite, and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 7 inches: fine sandy loam
Bg1 - 7 to 10 inches: fine sandy loam
Bg2 - 10 to 18 inches: fine sandy loam
BC - 18 to 24 inches: fine sandy loam
C1 - 24 to 43 inches: gravelly fine sandy loam
C2 - 43 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B/D

Description of Whitman, Extremely Stony

Setting

Landform: Depressions, drainageways
Landform position (two-dimensional): Toeslope, footslope, backslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 9 inches: fine sandy loam
Bg - 9 to 16 inches: fine sandy loam
Cdg1 - 16 to 22 inches: fine sandy loam
Cdg2 - 22 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 12 to 20 inches to densic material
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Available water storage in profile: Very low (about 1.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D

Minor Components

Woodbridge, extremely stony

Percent of map unit: 3 percent
Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear

Swansea

Percent of map unit: 2 percent
Landform: Swamps, bogs
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave

13—Walpole sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2svkl
Elevation: 0 to 1,020 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Walpole and similar soils: 80 percent

Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Walpole

Setting

Landform: Deltas, depressions, outwash terraces, outwash plains, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, talf, dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Sandy glaciofluvial deposits derived from igneous, metamorphic and sedimentary rock

Typical profile

Oe - 0 to 1 inches: mucky peat
A - 1 to 7 inches: sandy loam
Bg - 7 to 21 inches: sandy loam
BC - 21 to 25 inches: gravelly sandy loam
C - 25 to 65 inches: very gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.14 to 14.17 in/hr)
Depth to water table: About 0 to 4 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Minor Components

Sudbury

Percent of map unit: 10 percent
Landform: Terraces, deltas, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Linear

Scarboro

Percent of map unit: 10 percent
Landform: Outwash plains, outwash terraces, deltas
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread, dip
Down-slope shape: Concave
Across-slope shape: Concave

17—Timakwa and Natchaug soils

Map Unit Setting

National map unit symbol: 9lk2
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Timakwa and similar soils: 45 percent
Natchaug and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Timakwa

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Woody organic material over sandy and gravelly glaciofluvial deposits

Typical profile

Oa1 - 0 to 10 inches: muck
Oa2 - 10 to 21 inches: muck
Oa3 - 21 to 24 inches: muck
Oa4 - 24 to 37 inches: muck
2Cg1 - 37 to 47 inches: very gravelly loamy coarse sand
2Cg2 - 47 to 60 inches: gravelly loamy very fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (0.57 to 99.62 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 16.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D

Description of Natchaug

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Woody organic material over loamy alluvium and/or loamy glaciofluvial deposits and/or loamy till

Typical profile

Oi1 - 0 to 2 inches: peat
Oi2 - 2 to 4 inches: peat
Oa1 - 4 to 6 inches: muck
Oa2 - 6 to 11 inches: muck
Oa3 - 11 to 18 inches: muck
Oa4 - 18 to 24 inches: muck
2Cg1 - 24 to 33 inches: fine sandy loam
2Cg2 - 33 to 36 inches: fine sandy loam
2Cg3 - 36 to 80 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 1.98 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 13.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: B/D

Minor Components

Maybid

Percent of map unit: 3 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

Catden

Percent of map unit: 3 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

Saco

Percent of map unit: 3 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave

Whitman

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave

Menlo

Percent of map unit: 2 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave

Scarboro

Percent of map unit: 2 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

18—Catden and Freetown soils

Map Unit Setting

National map unit symbol: 9lk3
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Freetown and similar soils: 40 percent
Catden and similar soils: 40 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Catden

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Woody organic material

Typical profile

Oa1 - 0 to 2 inches: muck
Oa2 - 2 to 18 inches: muck
Oa3 - 18 to 47 inches: muck
Oa4 - 47 to 49 inches: muck
Oa5 - 49 to 61 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D

Description of Freetown

Setting

Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Woody organic material

Typical profile

Oi1 - 0 to 4 inches: peat
Oi2 - 4 to 10 inches: peat
Oa1 - 10 to 22 inches: muck
Oa2 - 22 to 35 inches: muck
Oa3 - 35 to 41 inches: muck
Oa4 - 41 to 55 inches: muck
Oa5 - 55 to 71 inches: muck
Oa6 - 71 to 91 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D

Minor Components

Timakwa

Percent of map unit: 5 percent
Landform: Depressions

Down-slope shape: Concave
Across-slope shape: Concave

Natchaug
Percent of map unit: 5 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

Whitman
Percent of map unit: 3 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave

Scarboro
Percent of map unit: 2 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

Saco
Percent of map unit: 2 percent
Landform: Flood plains
Down-slope shape: Concave
Across-slope shape: Concave

Maybid
Percent of map unit: 2 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

Menlo
Percent of map unit: 1 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave

29B—Agawam fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9lm6
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Agawam and similar soils: 80 percent

Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Agawam

Setting

Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy eolian deposits over sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 8 inches: fine sandy loam
Bw1 - 8 to 14 inches: fine sandy loam
Bw2 - 14 to 24 inches: fine sandy loam
2C - 24 to 60 inches: stratified very gravelly coarse sand to fine sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B

Minor Components

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, kames, outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Convex

Merrimac

Percent of map unit: 5 percent
Landform: Kames, outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear

Walpole

Percent of map unit: 3 percent
Landform: Depressions on terraces, drainageways on terraces
Down-slope shape: Concave
Across-slope shape: Concave

Ninigret

Percent of map unit: 3 percent
Landform: Outwash plains, terraces

Down-slope shape: Linear
Across-slope shape: Concave

Unnamed, red parent material
Percent of map unit: 2 percent

Scarboro
Percent of map unit: 2 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

34B—Merrimac sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 9lmy
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 54 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Merrimac and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Merrimac

Setting
Landform: Kames, outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile
Ap - 0 to 9 inches: sandy loam
Bw1 - 9 to 16 inches: sandy loam
Bw2 - 16 to 24 inches: gravelly sandy loam
2C - 24 to 60 inches: stratified very gravelly coarse sand to gravelly sand

Properties and qualities
Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Low (about 4.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A

Minor Components

Windsor

Percent of map unit: 5 percent
Landform: Kames, outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Convex

Agawam

Percent of map unit: 3 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear

Hinckley

Percent of map unit: 3 percent
Landform: Eskers, kames, outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Convex

Walpole

Percent of map unit: 2 percent
Landform: Depressions on terraces, drainageways on terraces
Down-slope shape: Concave
Across-slope shape: Concave

Scarboro

Percent of map unit: 2 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

Ninigret

Percent of map unit: 2 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Concave

Sudbury

Percent of map unit: 2 percent
Landform: Outwash plains, terraces
Down-slope shape: Concave
Across-slope shape: Linear

Unnamed, red parent material

Percent of map unit: 1 percent

38E—Hinckley gravelly sandy loam, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 9lnb
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Eskers, kames, outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Sandy and gravelly glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 8 inches: gravelly sandy loam
Bw1 - 8 to 20 inches: very gravelly loamy sand
Bw2 - 20 to 27 inches: very gravelly sand
C1 - 27 to 42 inches: stratified cobbly coarse sand to extremely gravelly sand
C2 - 42 to 60 inches: stratified cobbly coarse sand to extremely gravelly sand

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A

Minor Components

Windsor
Percent of map unit: 5 percent
Landform: Kames, outwash plains, terraces
Down-slope shape: Convex
Across-slope shape: Convex

Merrimac
Percent of map unit: 5 percent
Landform: Kames, outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear

Agawam
Percent of map unit: 3 percent
Landform: Outwash plains, terraces
Down-slope shape: Linear
Across-slope shape: Linear

Sudbury
Percent of map unit: 2 percent
Landform: Outwash plains, terraces
Down-slope shape: Concave
Across-slope shape: Linear

Rock outcrop
Percent of map unit: 1 percent

Unnamed, red parent material
Percent of map unit: 1 percent

Walpole
Percent of map unit: 1 percent
Landform: Depressions on terraces, drainageways on terraces
Down-slope shape: Concave
Across-slope shape: Concave

Scarboro
Percent of map unit: 1 percent
Landform: Depressions, drainageways, terraces
Down-slope shape: Concave
Across-slope shape: Concave

Unnamed, gravelly silt loam solum
Percent of map unit: 1 percent

45B—Woodbridge fine sandy loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: 2t2ql
Elevation: 0 to 1,470 feet

Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodbridge, fine sandy loam, and similar soils: 82 percent
Minor components: 18 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodbridge, Fine Sandy Loam

Setting

Landform: Hills, drumlins, ground moraines
Landform position (two-dimensional): Backslope, footslope, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Coarse-loamy lodgment till derived from gneiss, granite, and/or schist

Typical profile

Ap - 0 to 7 inches: fine sandy loam
Bw1 - 7 to 18 inches: fine sandy loam
Bw2 - 18 to 30 inches: fine sandy loam
Cd - 30 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D

Minor Components

Paxton

Percent of map unit: 10 percent
Landform: Hills, ground moraines, drumlins
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Nose slope, crest, side slope
Down-slope shape: Convex, linear
Across-slope shape: Convex

Ridgebury

Percent of map unit: 8 percent

Landform: Drainageways, hills, ground moraines, depressions
Landform position (two-dimensional): Backslope, footslope, toeslope
Landform position (three-dimensional): Head slope, base slope, dip
Down-slope shape: Concave
Across-slope shape: Concave

73C—Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky

Map Unit Setting

National map unit symbol: 9lqk
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 45 percent
Chatfield and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Description of Chatfield

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Minor Components

Rock outcrop

Percent of map unit: 6 percent

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Hollis

Percent of map unit: 5 percent

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

Unnamed, sandy subsoil
Percent of map unit: 2 percent

Unnamed, red parent material
Percent of map unit: 2 percent

73E—Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky

Map Unit Setting
National map unit symbol: 9lql
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Charlton and similar soils: 45 percent
Chatfield and similar soils: 30 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile
Ap - 0 to 4 inches: fine sandy loam
Bw1 - 4 to 7 inches: fine sandy loam
Bw2 - 7 to 19 inches: fine sandy loam
Bw3 - 19 to 27 inches: gravelly fine sandy loam
C - 27 to 65 inches: gravelly fine sandy loam

Properties and qualities
Slope: 15 to 45 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Description of Chatfield

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Minor Components

Rock outcrop

Percent of map unit: 10 percent

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways

Down-slope shape: Concave
Across-slope shape: Linear

Hollis
Percent of map unit: 3 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

Unnamed, sandy subsoil
Percent of map unit: 1 percent

Unnamed, red parent material
Percent of map unit: 1 percent

75C—Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes

Map Unit Setting
National map unit symbol: 9lqn
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile
Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities
Slope: 3 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock

Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.8 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D

Description of Chatfield

Setting
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile
Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities
Slope: 3 to 15 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: B

Description of Rock Outcrop

Properties and qualities
Slope: 3 to 15 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Hydrologic Soil Group: D

Minor Components

Charlton
Percent of map unit: 7 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Sutton
Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Leicester
Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Brimfield
Percent of map unit: 1 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

Unnamed, sandy subsoil
Percent of map unit: 1 percent

Unnamed, red parent material
Percent of map unit: 1 percent

75E—Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting
National map unit symbol: 9lqp
Elevation: 0 to 1,200 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition
Hollis and similar soils: 35 percent
Chatfield and similar soils: 30 percent
Rock outcrop: 15 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hollis

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 9 inches: channery fine sandy loam
Bw2 - 9 to 15 inches: gravelly fine sandy loam
2R - 15 to 80 inches: bedrock

Properties and qualities

Slope: 15 to 45 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Natural drainage class: Somewhat excessively drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 1.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D

Description of Chatfield

Setting

Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Coarse-loamy melt-out till derived from granite and/or schist and/or gneiss

Typical profile

Oa - 0 to 1 inches: highly decomposed plant material
A - 1 to 6 inches: gravelly fine sandy loam
Bw1 - 6 to 15 inches: gravelly fine sandy loam
Bw2 - 15 to 29 inches: gravelly fine sandy loam
2R - 29 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Description of Rock Outcrop

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D

Minor Components

Charlton

Percent of map unit: 7 percent
Landform: Hills
Down-slope shape: Linear
Across-slope shape: Linear

Sutton

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Linear

Leicester

Percent of map unit: 5 percent
Landform: Depressions, drainageways
Down-slope shape: Linear
Across-slope shape: Concave

Unnamed, sandy subsoil

Percent of map unit: 1 percent

Unnamed, red parent material

Percent of map unit: 1 percent

Brimfield

Percent of map unit: 1 percent
Landform: Hills, ridges
Down-slope shape: Convex
Across-slope shape: Convex

302—Dumps

Map Unit Setting

National map unit symbol: 9lmb
Elevation: 0 to 1,200 feet
Mean annual precipitation: 37 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 140 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Dumps: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dumps

Typical profile

C - 0 to 65 inches: variable

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Minor Components

Udorthents

Percent of map unit: 2 percent

Westbrook

Percent of map unit: 1 percent
Landform: Salt marshes, tidal marshes
Down-slope shape: Concave
Across-slope shape: Concave

Rock outcrop

Percent of map unit: 1 percent

Unnamed, frequently flooded

Percent of map unit: 1 percent
Landform: Drainageways

306—Udorthents-Urban land complex

Map Unit Setting

National map unit symbol: 9lmg
Elevation: 0 to 2,000 feet
Mean annual precipitation: 43 to 56 inches
Mean annual air temperature: 45 to 55 degrees F
Frost-free period: 120 to 185 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents and similar soils: 50 percent
Urban land: 35 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents

Setting

Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Drift

Typical profile

A - 0 to 5 inches: loam
C1 - 5 to 21 inches: gravelly loam
C2 - 21 to 80 inches: very gravelly sandy loam

Properties and qualities

Slope: 0 to 25 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: About 54 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B

Description of Urban Land

Typical profile

H - 0 to 6 inches: material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D

Minor Components

Unnamed, undisturbed soils

Percent of map unit: 8 percent

Udorthents, wet substratum

Percent of map unit: 5 percent
Down-slope shape: Convex
Across-slope shape: Linear

Rock outcrop

Percent of map unit: 2 percent

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Physical Properties

Soil Physical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil physical properties include percent clay, organic matter, saturated hydraulic conductivity, available water capacity, and bulk density.

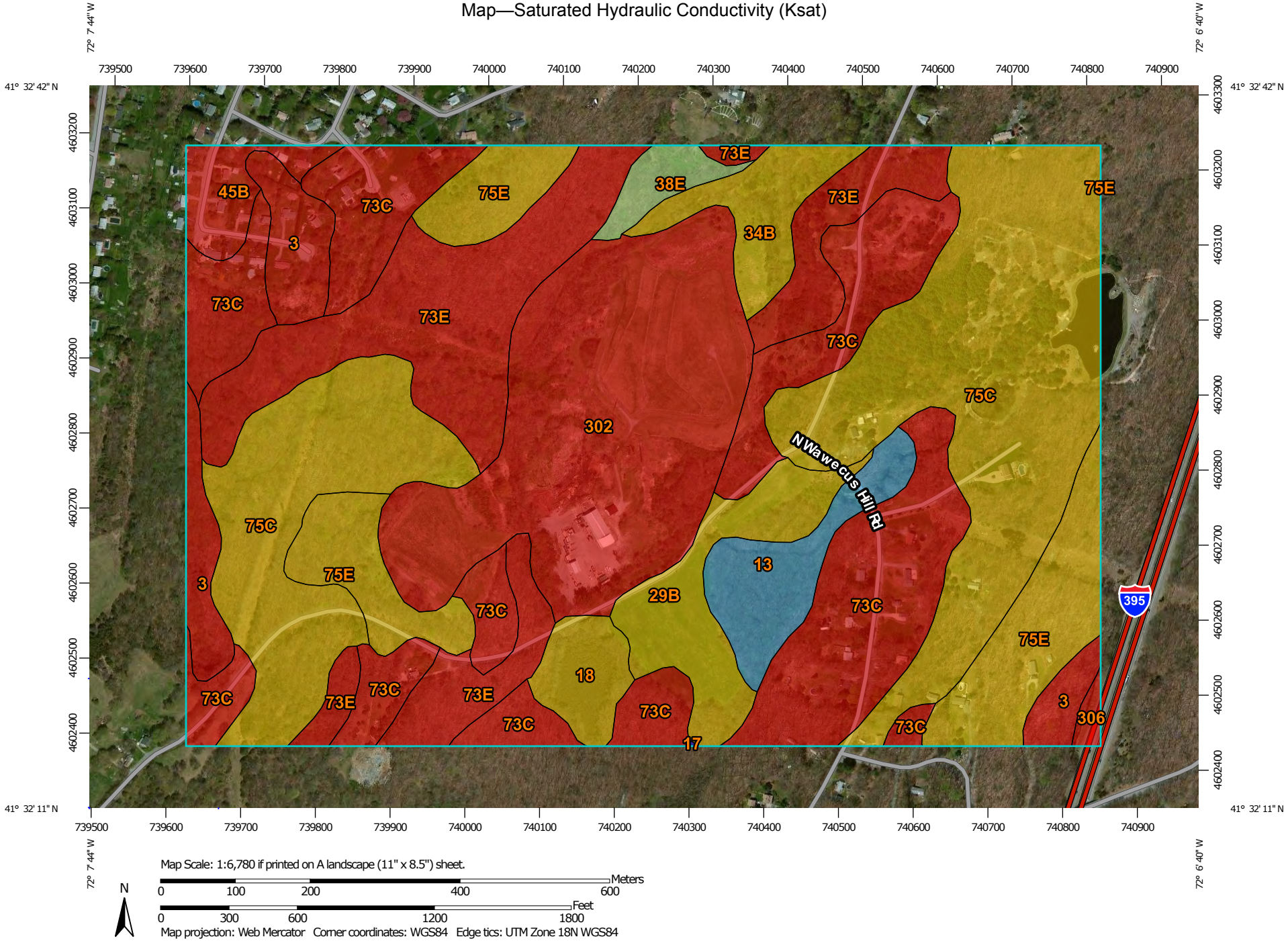
Saturated Hydraulic Conductivity (Ksat)

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Custom Soil Resource Report
Map—Saturated Hydraulic Conductivity (Ksat)



MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- <= 10.0000
- > 10.0000 and <= 28.0000
- > 28.0000 and <= 92.0000
- > 92.0000 and <= 100.0000
- > 100.0000 and <= 354.0000
- Not rated or not available

Soil Rating Lines

- <= 10.0000
- > 10.0000 and <= 28.0000
- > 28.0000 and <= 92.0000
- > 92.0000 and <= 100.0000
- > 100.0000 and <= 354.0000
- Not rated or not available

Soil Rating Points

- <= 10.0000
- > 10.0000 and <= 28.0000
- > 28.0000 and <= 92.0000
- > 92.0000 and <= 100.0000
- > 100.0000 and <= 354.0000
- 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 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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: State of Connecticut
Survey Area Data: Version 13, Oct 28, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—May 12, 2011

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.

Table—Saturated Hydraulic Conductivity (Ksat)

Saturated Hydraulic Conductivity (Ksat)— Summary by Map Unit — State of Connecticut (CT600)				
Map unit symbol	**Map unit name**	**Rating (micrometers per second)**	**Acres in AOI**	**Percent of AOI**
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	5.5000	9.4	3.9%
13	Walpole sandy loam, 0 to 3 percent slopes	100.0000	7.3	3.0%
17	Timakwa and Natchaug soils	354.0000	0.0	0.0%
18	Catden and Freetown soils	23.0000	4.1	1.7%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	28.0000	9.7	4.0%
34B	Merrimac sandy loam, 3 to 8 percent slopes	28.0000	6.1	2.5%
38E	Hinckley gravelly sandy loam, 15 to 45 percent slopes	92.0000	2.5	1.0%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	5.5000	3.7	1.5%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	10.0000	47.4	19.5%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	10.0000	33.0	13.6%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	28.0000	60.5	24.9%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	28.0000	19.7	8.1%
302	Dumps	10.0000	39.0	16.1%
306	Udorthents-Urban land complex	10.0000	0.6	0.3%
Totals for Area of Interest			**243.1**	**100.0%**

Rating Options—Saturated Hydraulic Conductivity (Ksat)

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Surface Layer (Not applicable)

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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.

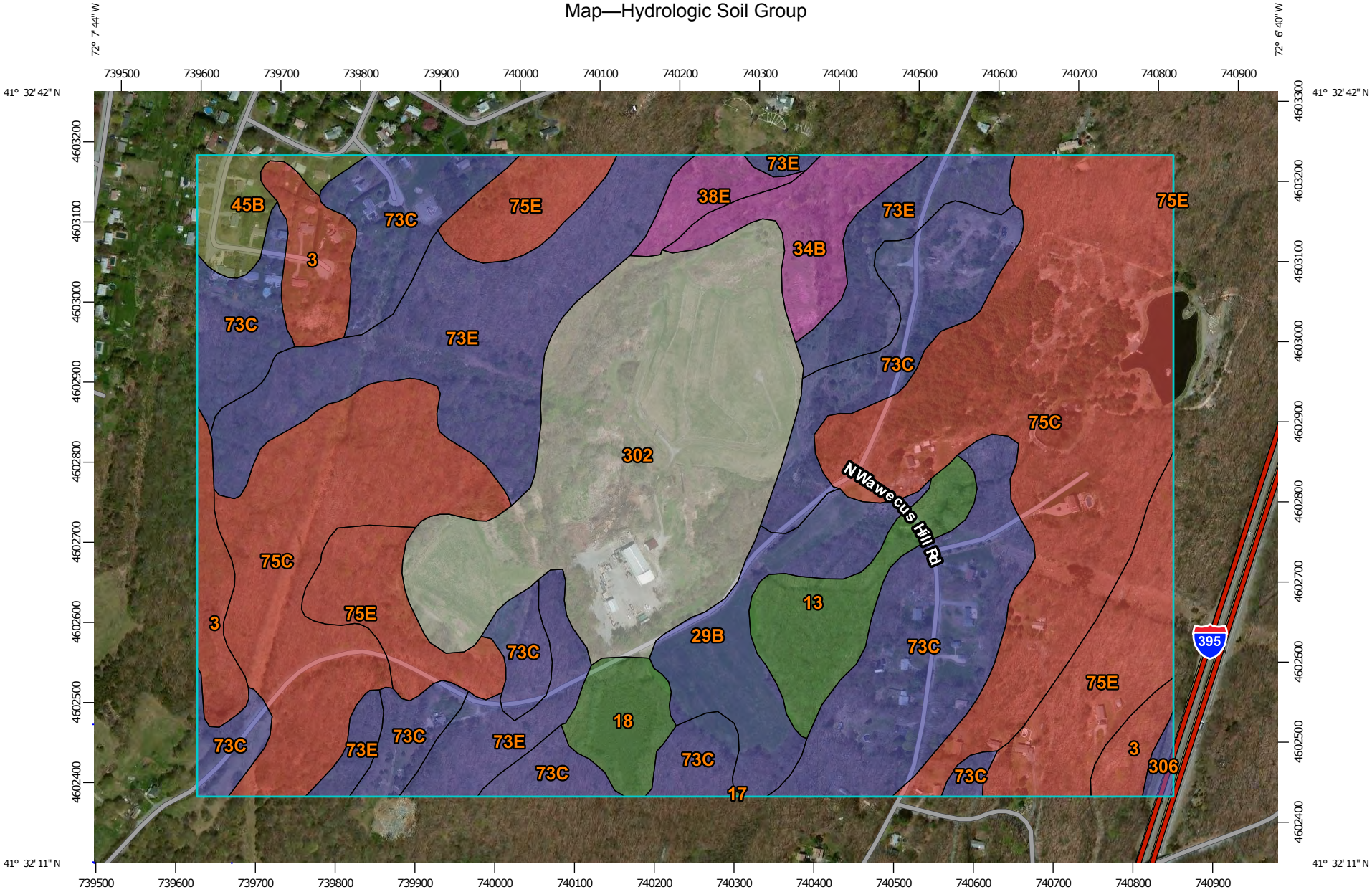
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:6,780 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil 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 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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: State of Connecticut
Survey Area Data: Version 13, Oct 28, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 28, 2011—May 12, 2011

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Table—Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — State of Connecticut (CT600)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	9.4	3.9%
13	Walpole sandy loam, 0 to 3 percent slopes	A/D	7.3	3.0%
17	Timakwa and Natchaug soils	A/D	0.0	0.0%
18	Catden and Freetown soils	A/D	4.1	1.7%
29B	Agawam fine sandy loam, 3 to 8 percent slopes	B	9.7	4.0%
34B	Merrimac sandy loam, 3 to 8 percent slopes	A	6.1	2.5%
38E	Hinckley gravelly sandy loam, 15 to 45 percent slopes	A	2.5	1.0%
45B	Woodbridge fine sandy loam, 3 to 8 percent slopes	C/D	3.7	1.5%
73C	Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky	B	47.4	19.5%
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	B	33.0	13.6%
75C	Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes	D	60.5	24.9%
75E	Hollis-Chatfield-Rock outcrop complex, 15 to 45 percent slopes	D	19.7	8.1%
302	Dumps		39.0	16.1%
306	Udorthents-Urban land complex	B	0.6	0.3%
Totals for Area of Interest			**243.1**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

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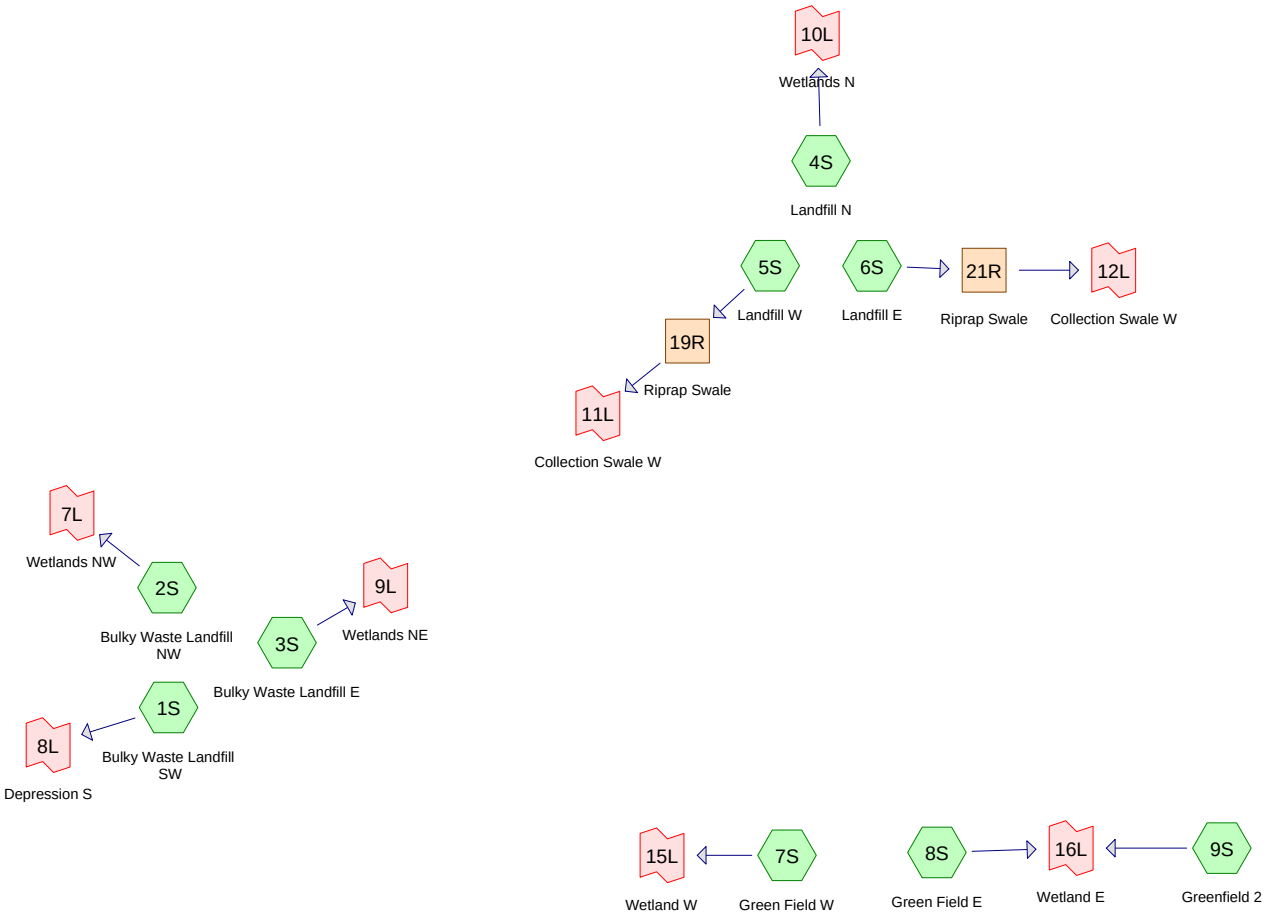
Appendix B
HydroCAD Modeling Results

Existing Conditions Results



Subcat Reach Pond Link

Routing Diagram for Rogers Road Existing Conditions
Prepared by Boundaries LLC - DCM, Printed 8/12/2015
HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
266,021	61	>75% Grass cover, Good, HSG B (7S, 8S, 9S)
282,399	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S)
16,596	80	>75% Grass cover, Good, HSG D (7S, 8S, 9S)
3,920	89	Gravel roads, HSG C (6S)
6,578	55	Woods, Good, HSG B (9S)
3,964	77	Woods, Good, HSG D (9S)
579,479	**68**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
272,598	HSG B	7S, 8S, 9S
286,320	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S
20,560	HSG D	7S, 8S, 9S
0	Other	
579,479		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	266,021	282,399	16,596	0	565,017	>75% Grass cover, Good	
0	0	3,920	0	0	3,920	Gravel roads	
0	6,578	0	3,964	0	10,542	Woods, Good	
0	**272,598**	**286,320**	**20,560**	**0**	**579,479**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 0.00% Impervious Runoff Depth>1.17"
Flow Length=239' Tc=13.7 min CN=74 Runoff=1.0 cfs 4,035 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 0.00% Impervious Runoff Depth>1.17"
Flow Length=179' Tc=14.1 min CN=74 Runoff=0.7 cfs 2,988 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 0.00% Impervious Runoff Depth>1.17"
Flow Length=204' Tc=14.6 min CN=74 Runoff=1.1 cfs 4,628 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 0.00% Impervious Runoff Depth>1.17"
Flow Length=222' Tc=14.3 min CN=74 Runoff=0.6 cfs 2,619 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 0.00% Impervious Runoff Depth>1.17"
Flow Length=752' Tc=15.2 min CN=74 Runoff=1.9 cfs 8,304 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 0.00% Impervious Runoff Depth>1.23"
Flow Length=459' Tc=10.0 min CN=75 Runoff=1.5 cfs 5,460 cf

Subcatchment 7S: Green Field W Runoff Area=2.145 ac 0.00% Impervious Runoff Depth>0.56"
Flow Length=472' Tc=24.7 min CN=62 Runoff=0.7 cfs 4,395 cf

Subcatchment 8S: Green Field E Runoff Area=2.890 ac 0.00% Impervious Runoff Depth>0.57"
Flow Length=305' Tc=20.6 min CN=62 Runoff=0.9 cfs 5,931 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.00% Impervious Runoff Depth>0.61"
Flow Length=247' Tc=19.4 min CN=63 Runoff=0.6 cfs 3,787 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.18' Max Vel=2.61 fps Inflow=1.9 cfs 8,304 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=1.8 cfs 8,265 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.16' Max Vel=2.54 fps Inflow=1.5 cfs 5,460 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=1.4 cfs 5,437 cf

Link 7L: Wetlands NW Inflow=0.7 cfs 2,988 cf
Primary=0.7 cfs 2,988 cf

Link 8L: Depression S Inflow=1.0 cfs 4,035 cf
Primary=1.0 cfs 4,035 cf

Link 9L: Wetlands NE Inflow=1.1 cfs 4,628 cf
Primary=1.1 cfs 4,628 cf

Link 10L: Wetlands N Inflow=0.6 cfs 2,619 cf
Primary=0.6 cfs 2,619 cf

Link 11L: Collection Swale W Inflow=1.8 cfs 8,265 cf
Primary=1.8 cfs 8,265 cf

Link 12L: Collection Swale W Inflow=1.4 cfs 5,437 cf
Primary=1.4 cfs 5,437 cf

Link 15L: Wetland W Inflow=0.7 cfs 4,395 cf
Primary=0.7 cfs 4,395 cf

Link 16L: Wetland E Inflow=1.6 cfs 9,719 cf
Primary=1.6 cfs 9,719 cf

Total Runoff Area = 579,479 sf Runoff Volume = 42,148 cf Average Runoff Depth = 0.87"
100.00% Pervious = 579,479 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

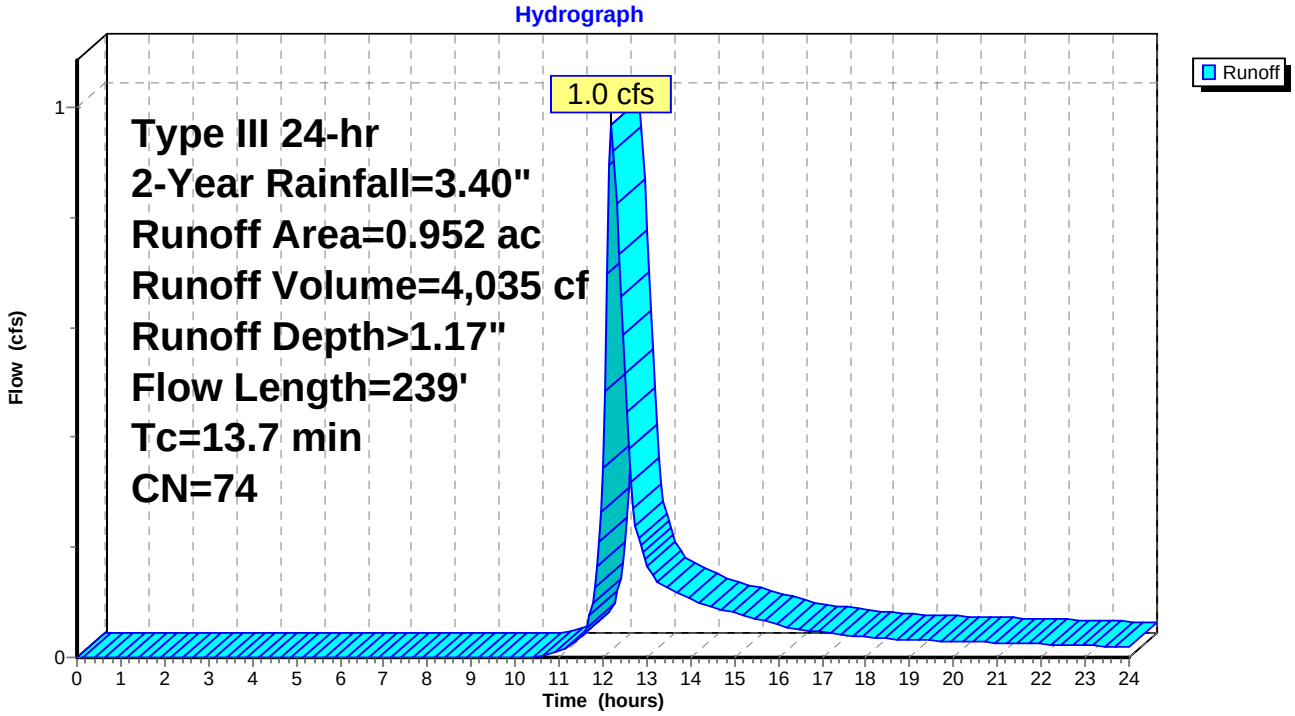
Runoff = 1.0 cfs @ 12.21 hrs, Volume= 4,035 cf, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.952	74	>75% Grass cover, Good, HSG C
0.952		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

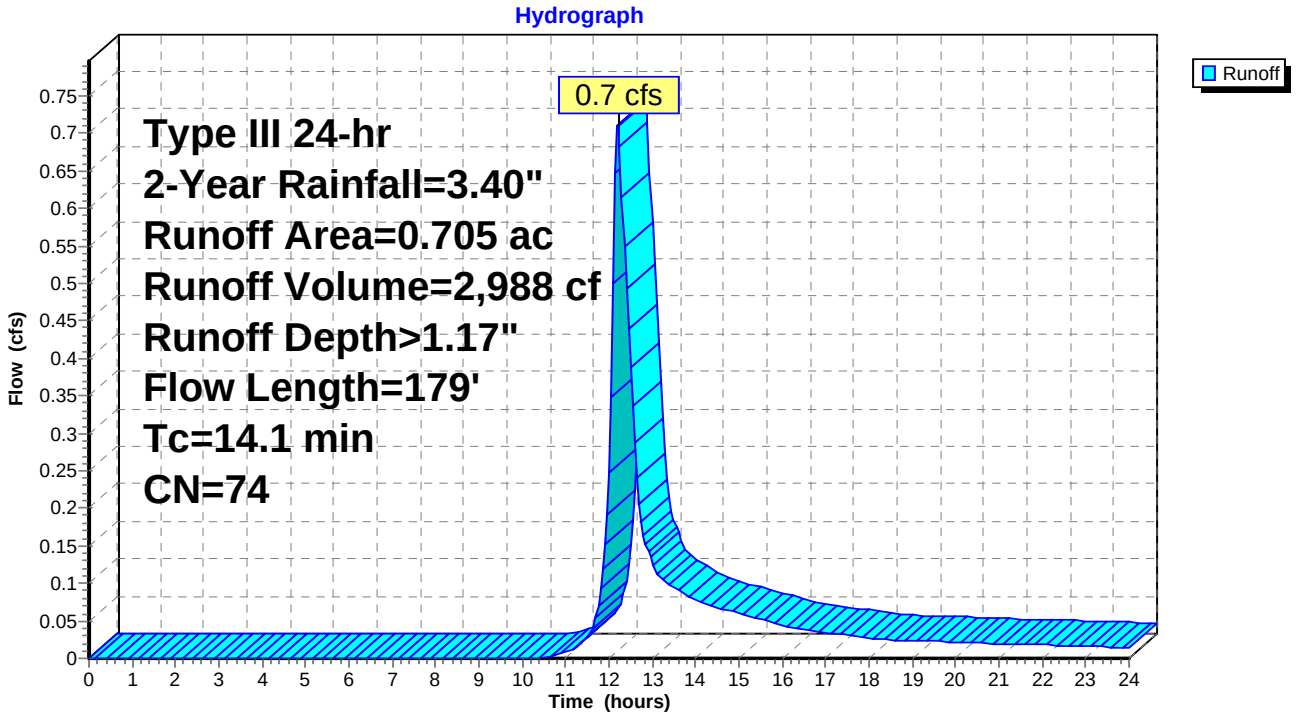
Runoff = 0.7 cfs @ 12.21 hrs, Volume= 2,988 cf, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.705	74	>75% Grass cover, Good, HSG C
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

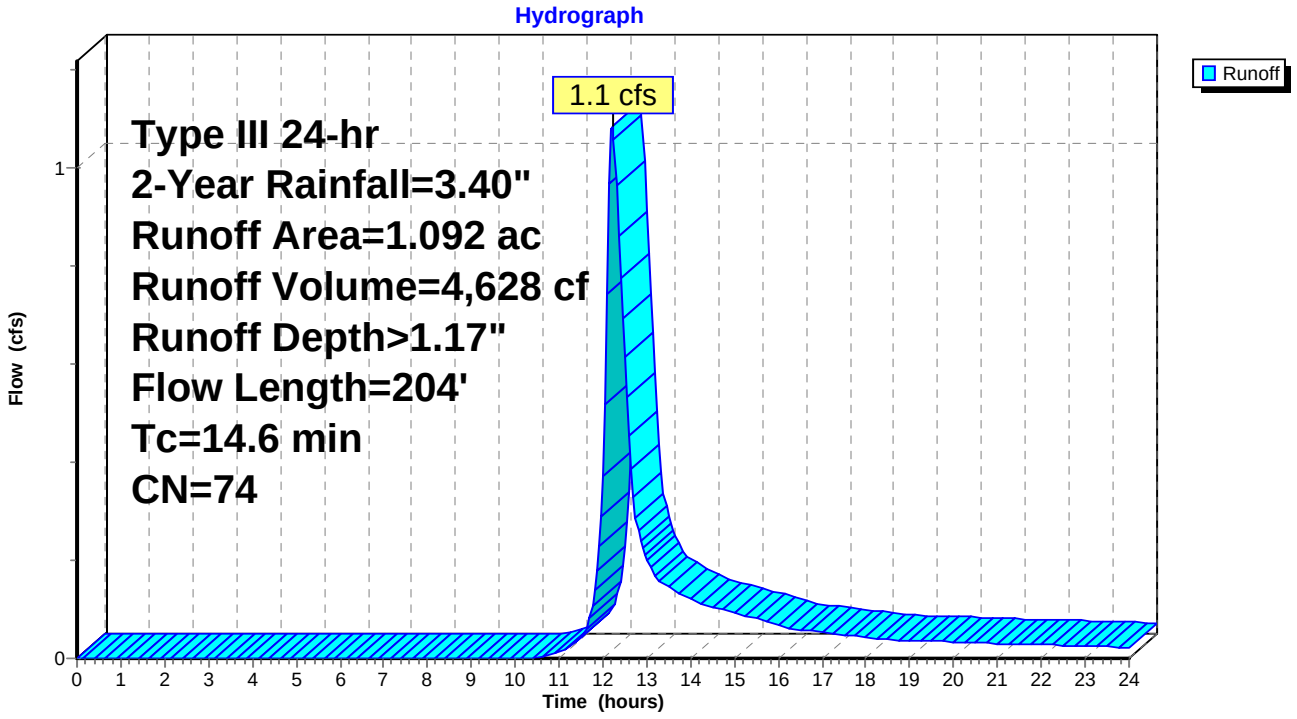
Runoff = 1.1 cfs @ 12.22 hrs, Volume= 4,628 cf, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.092	74	>75% Grass cover, Good, HSG C
1.092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

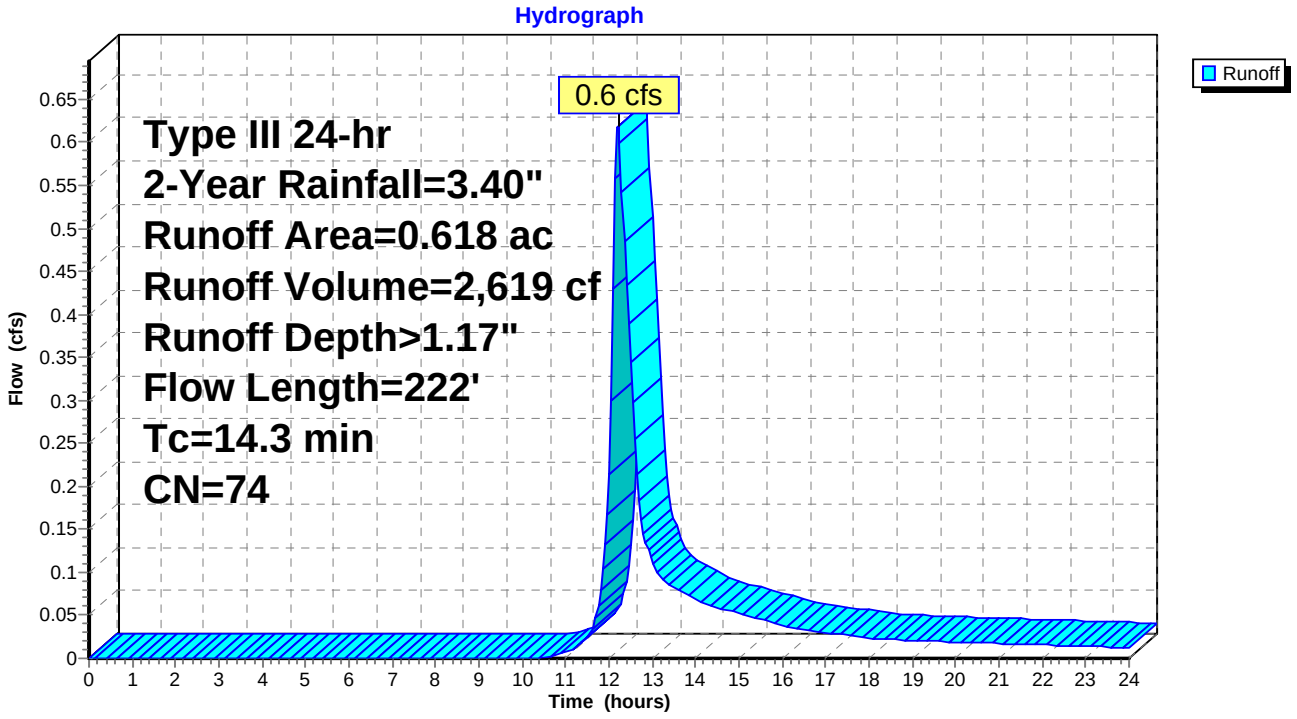
Runoff = 0.6 cfs @ 12.21 hrs, Volume= 2,619 cf, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.618	74	>75% Grass cover, Good, HSG C
0.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

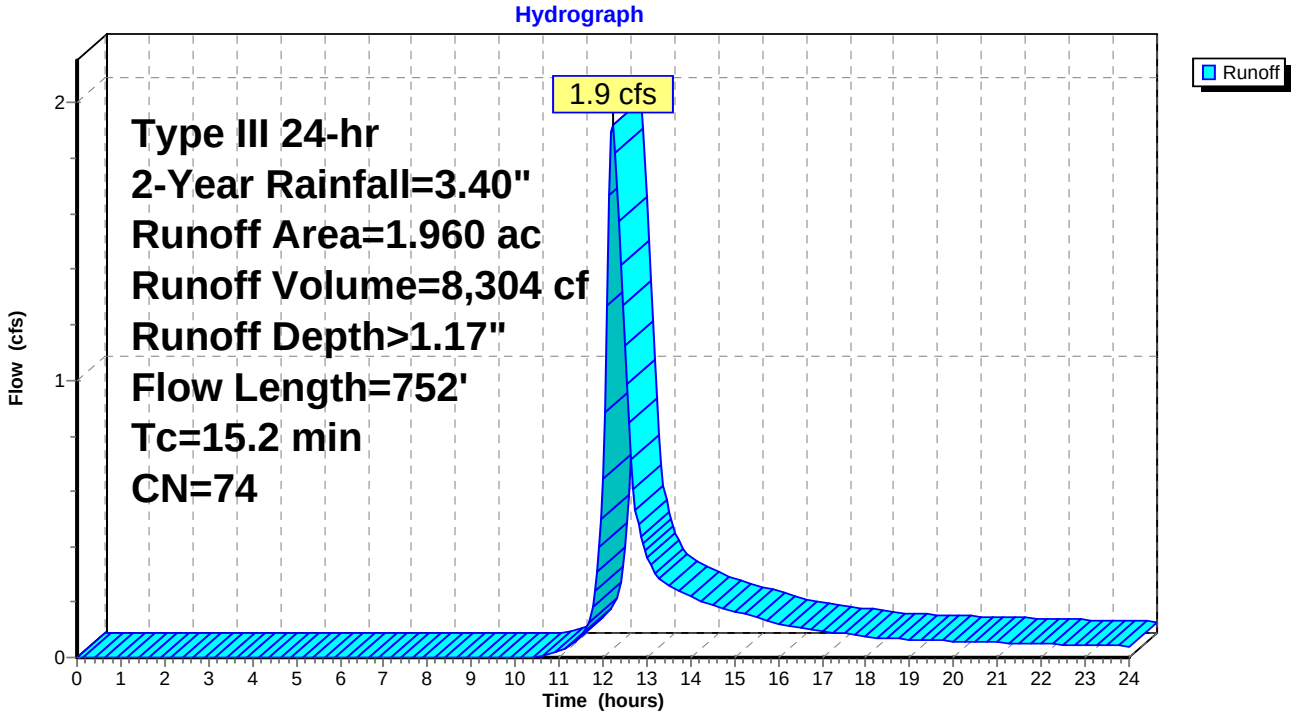
Runoff = 1.9 cfs @ 12.22 hrs, Volume= 8,304 cf, Depth> 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.960	74	>75% Grass cover, Good, HSG C
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

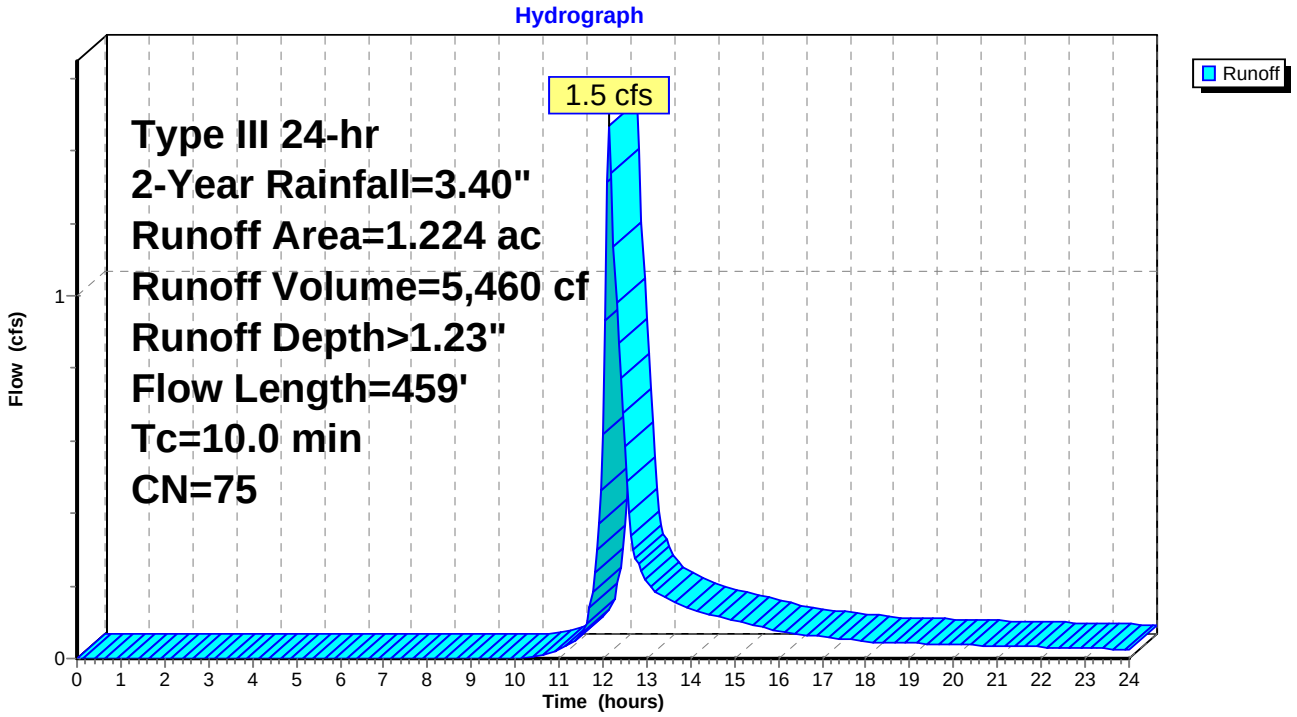
Runoff = 1.5 cfs @ 12.15 hrs, Volume= 5,460 cf, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
1.134	74	>75% Grass cover, Good, HSG C
0.090	89	Gravel roads, HSG C
1.224	75	Weighted Average
1.224		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

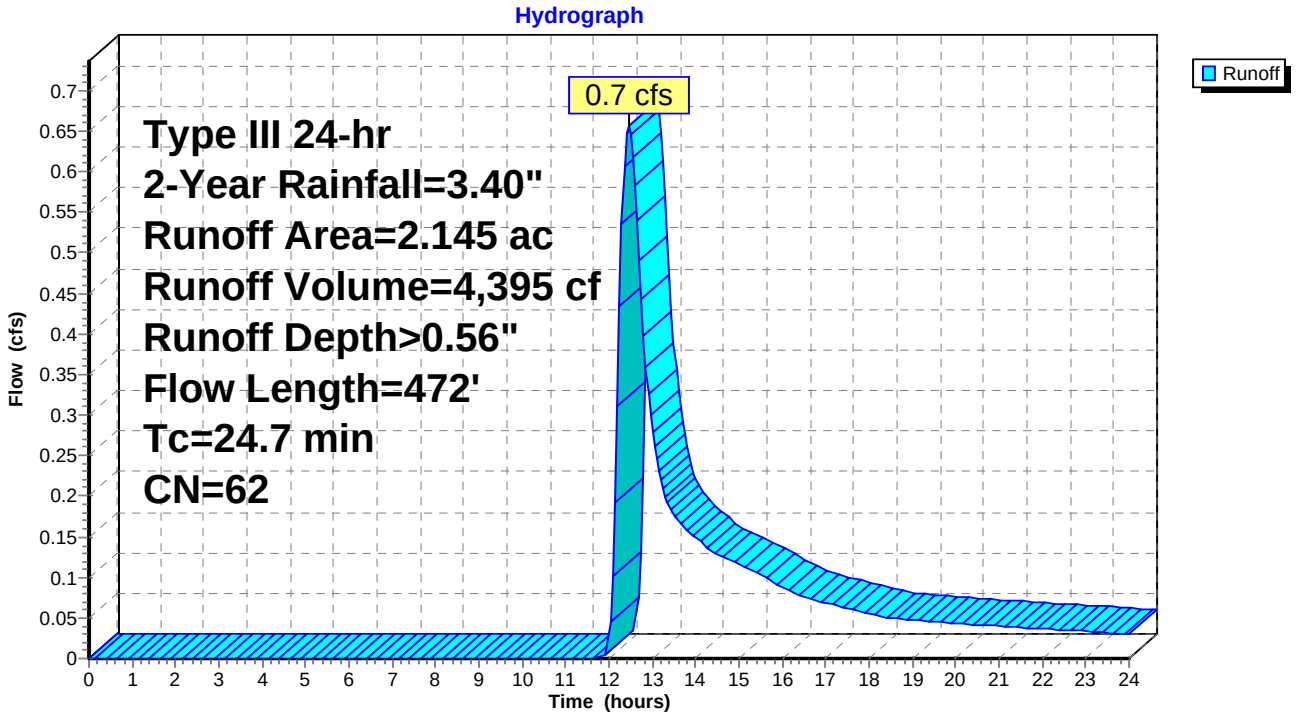
Runoff = 0.7 cfs @ 12.45 hrs, Volume= 4,395 cf, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.022	74	>75% Grass cover, Good, HSG C
0.089	80	>75% Grass cover, Good, HSG D
0.282	61	>75% Grass cover, Good, HSG B
1.752	61	>75% Grass cover, Good, HSG B
2.145	62	Weighted Average
2.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

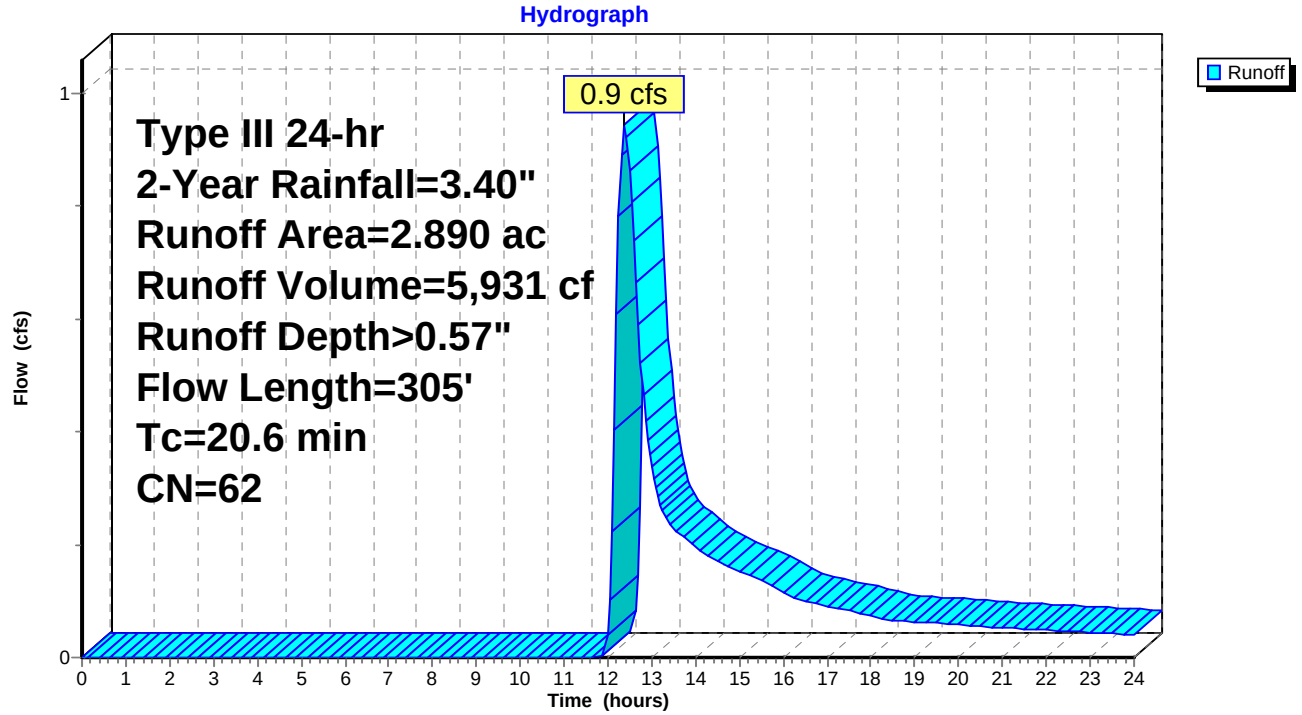
Runoff = 0.9 cfs @ 12.37 hrs, Volume= 5,931 cf, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
2.685	61	>75% Grass cover, Good, HSG B
0.072	80	>75% Grass cover, Good, HSG D
0.033	80	>75% Grass cover, Good, HSG D
0.100	61	>75% Grass cover, Good, HSG B
2.890	62	Weighted Average
2.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

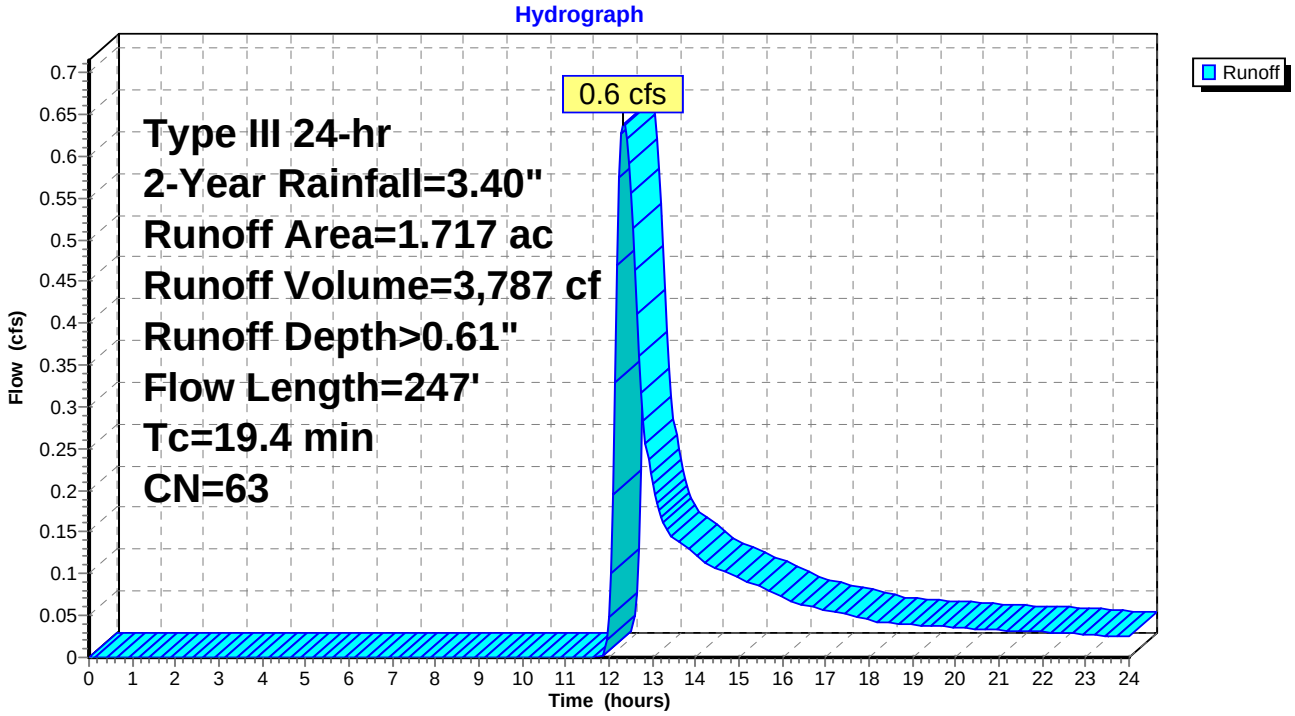
Runoff = 0.6 cfs @ 12.34 hrs, Volume= 3,787 cf, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

Area (ac)	CN	Description
0.091	77	Woods, Good, HSG D
0.151	55	Woods, Good, HSG B
1.288	61	>75% Grass cover, Good, HSG B
0.187	80	>75% Grass cover, Good, HSG D
1.717	63	Weighted Average
1.717		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 1.17" for 2-Year event
Inflow = 1.9 cfs @ 12.22 hrs, Volume= 8,304 cf
Outflow = 1.8 cfs @ 12.28 hrs, Volume= 8,265 cf, Atten= 5%, Lag= 3.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 2.61 fps, Min. Travel Time= 4.2 min
Avg. Velocity = 0.99 fps, Avg. Travel Time= 11.1 min

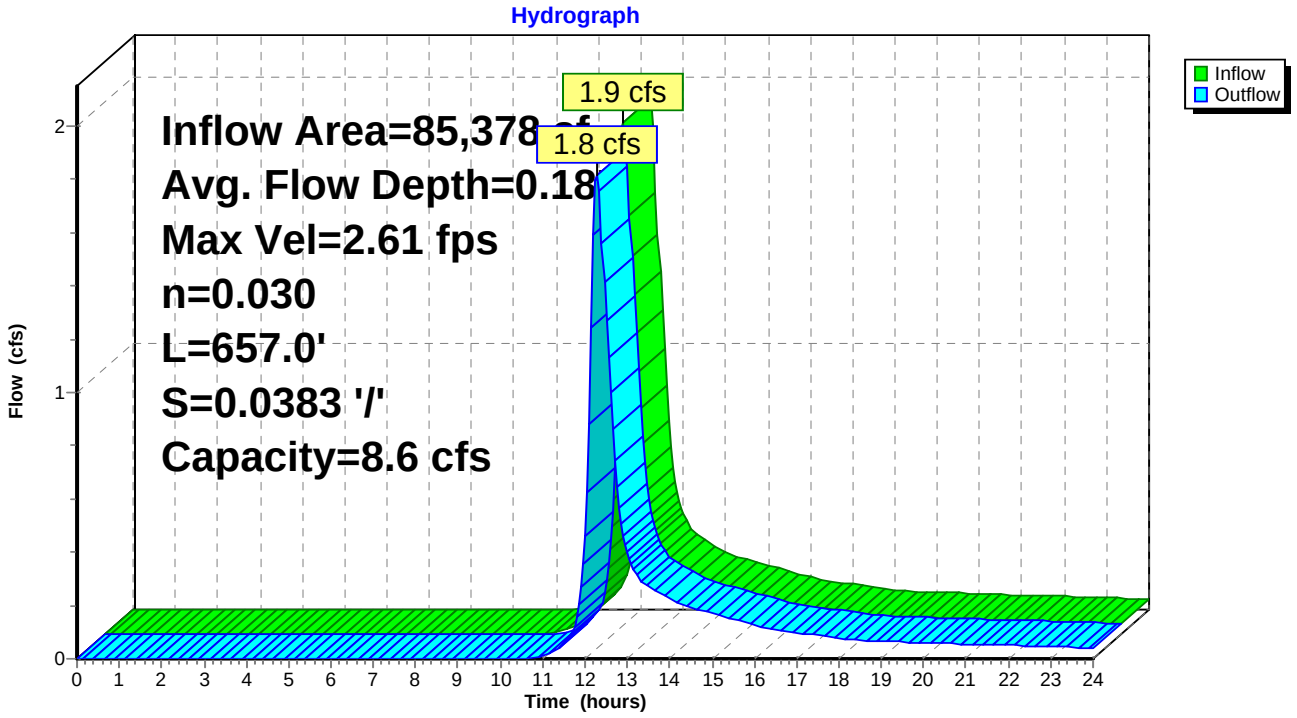
Peak Storage= 457 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡

Reach 19R: Riprap Swale



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 1.23" for 2-Year event
Inflow = 1.5 cfs @ 12.15 hrs, Volume= 5,460 cf
Outflow = 1.4 cfs @ 12.20 hrs, Volume= 5,437 cf, Atten= 6%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 2.54 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 10.2 min

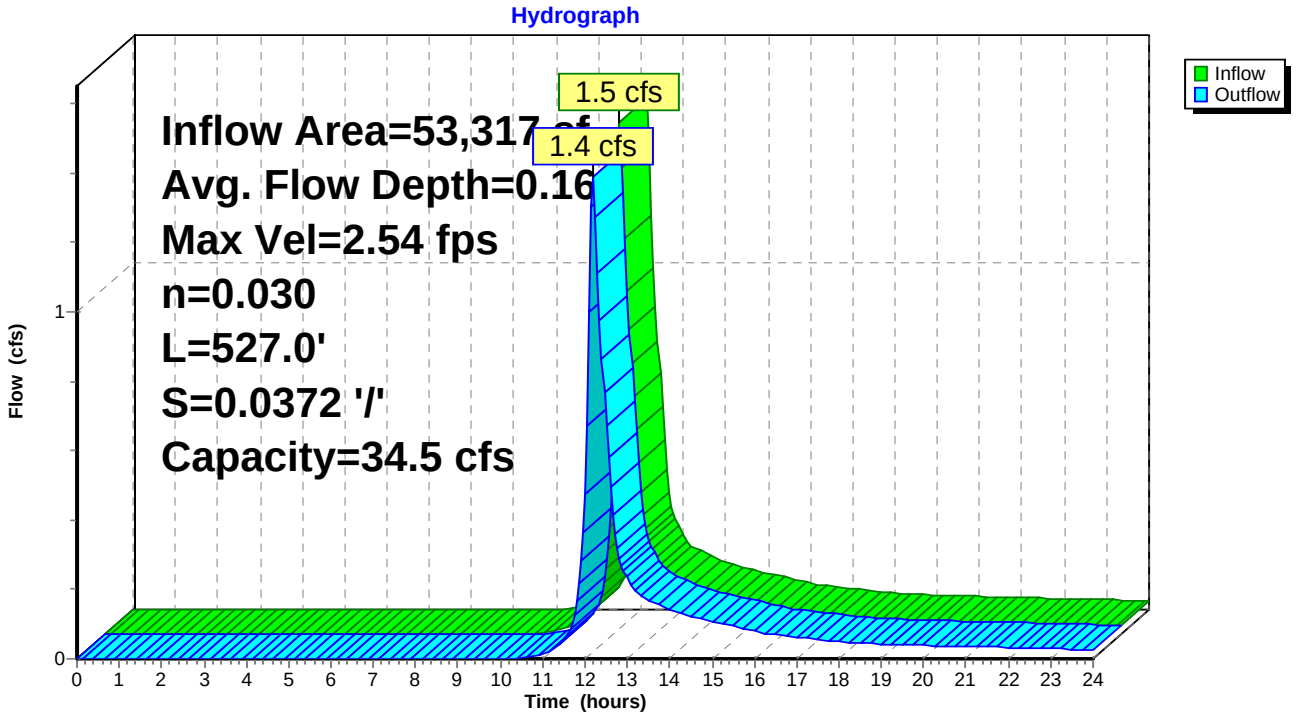
Peak Storage= 288 cf @ 12.20 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

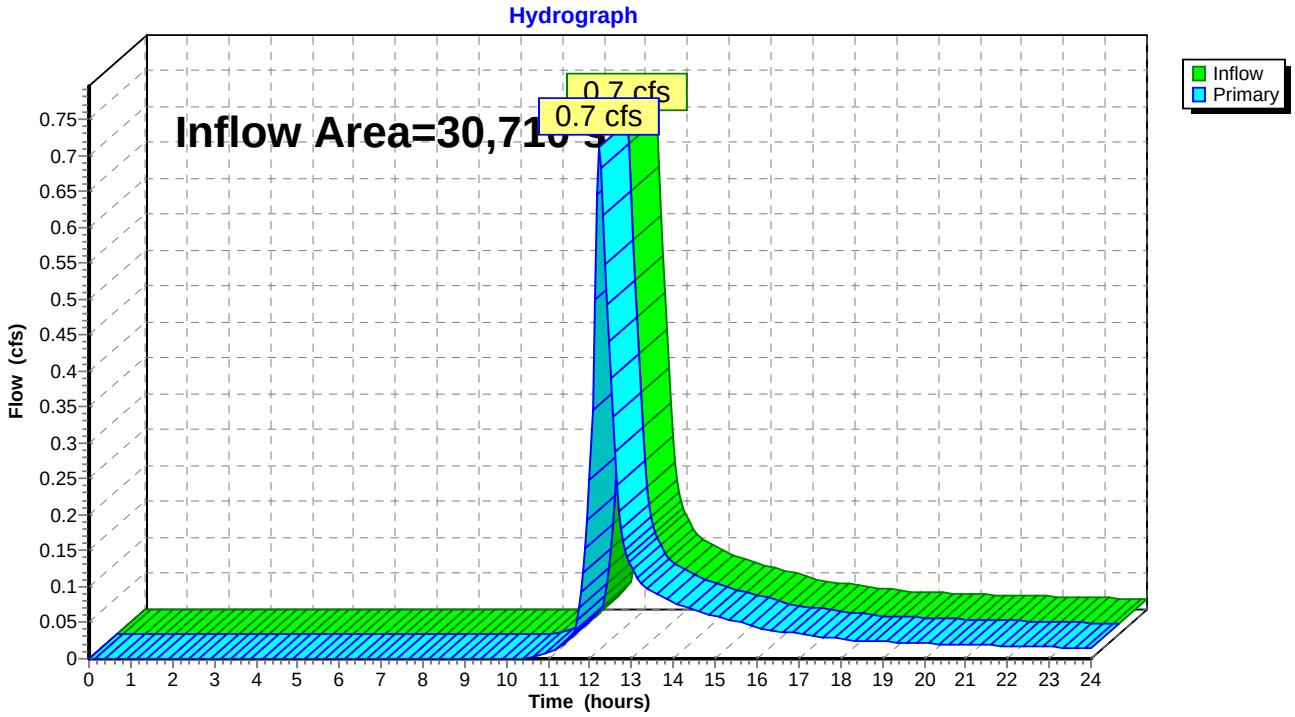


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 0.00% Impervious, Inflow Depth > 1.17" for 2-Year event
Inflow = 0.7 cfs @ 12.21 hrs, Volume= 2,988 cf
Primary = 0.7 cfs @ 12.21 hrs, Volume= 2,988 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

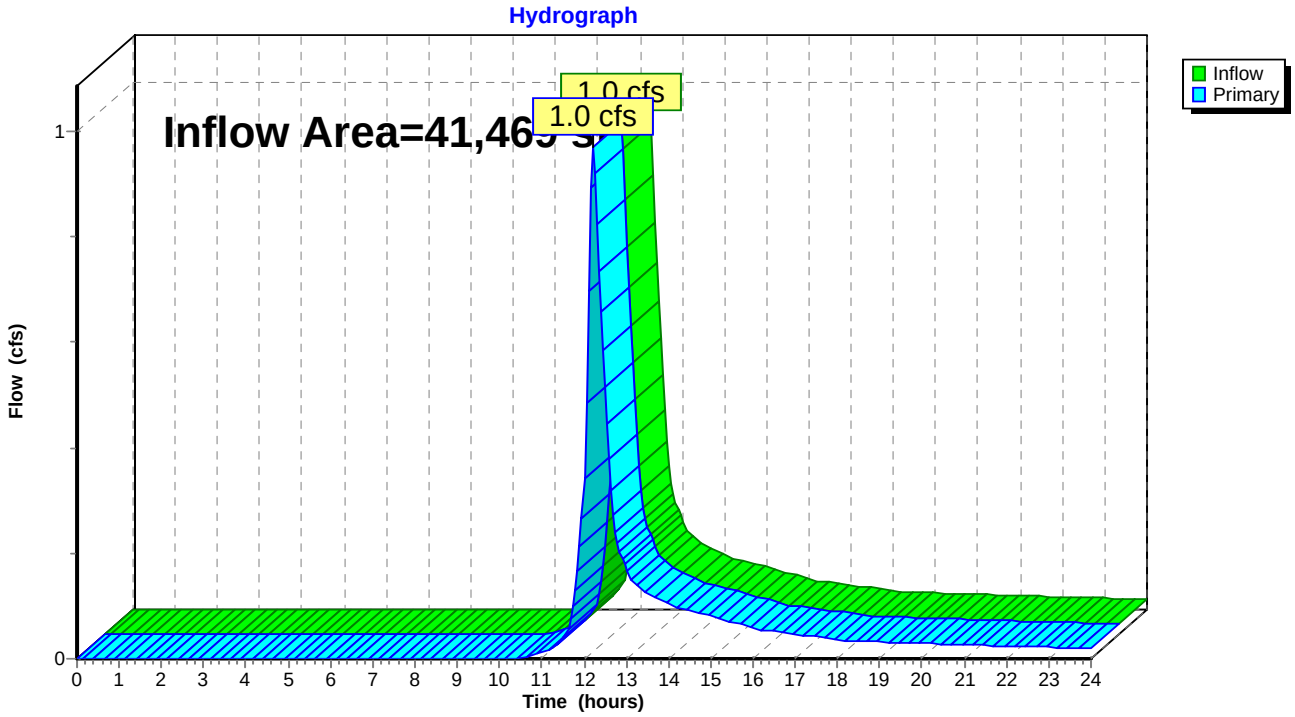


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 0.00% Impervious, Inflow Depth > 1.17" for 2-Year event
Inflow = 1.0 cfs @ 12.21 hrs, Volume= 4,035 cf
Primary = 1.0 cfs @ 12.21 hrs, Volume= 4,035 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

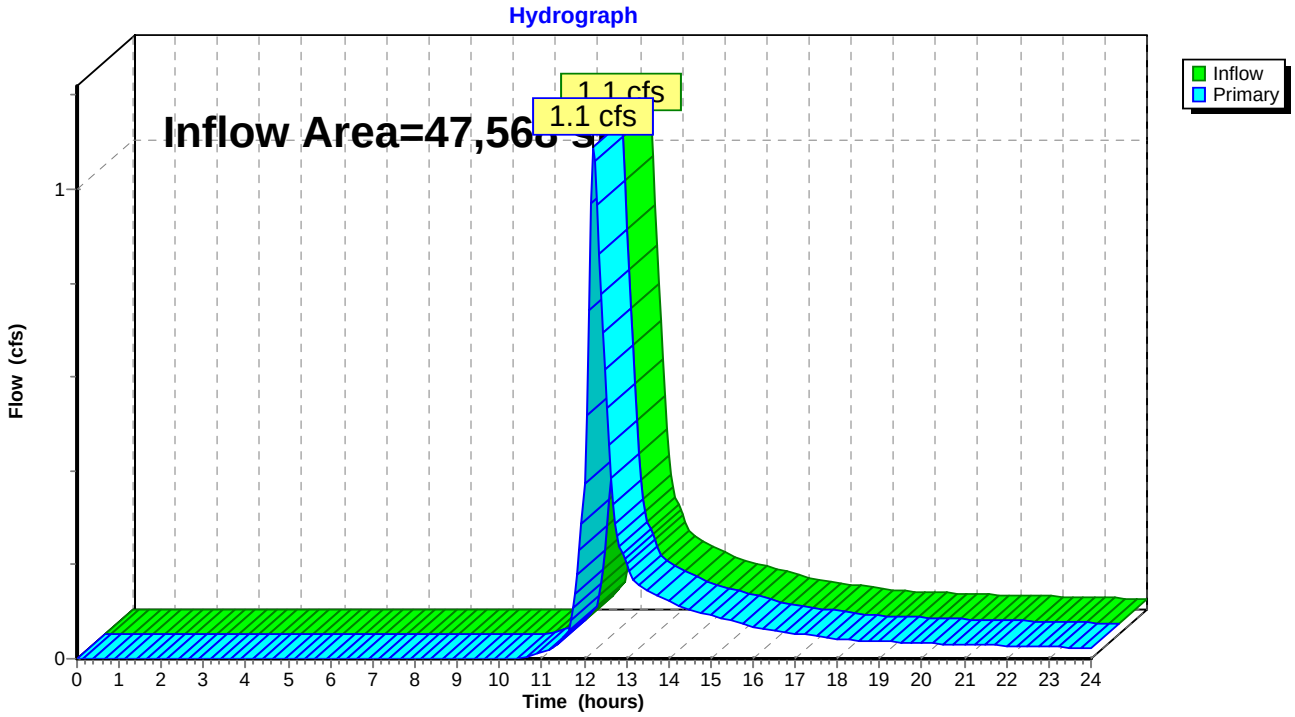


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 0.00% Impervious, Inflow Depth > 1.17" for 2-Year event
Inflow = 1.1 cfs @ 12.22 hrs, Volume= 4,628 cf
Primary = 1.1 cfs @ 12.22 hrs, Volume= 4,628 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

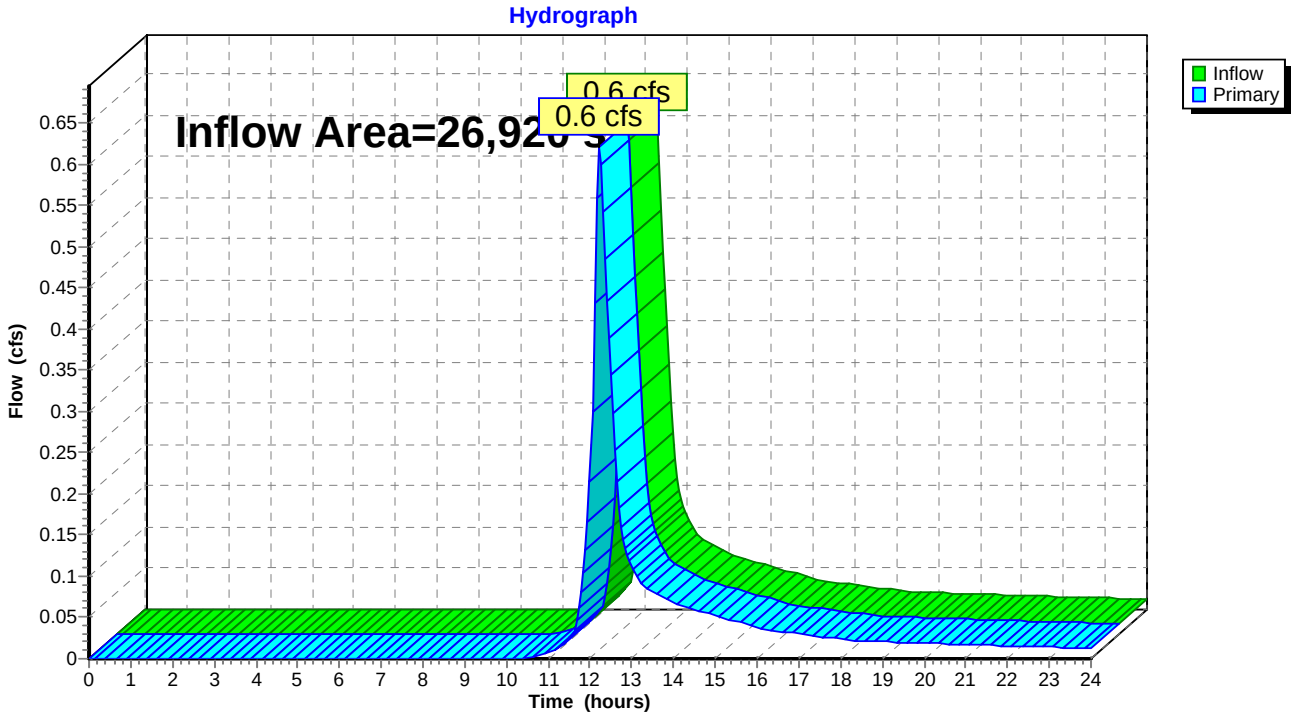


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 0.00% Impervious, Inflow Depth > 1.17" for 2-Year event
Inflow = 0.6 cfs @ 12.21 hrs, Volume= 2,619 cf
Primary = 0.6 cfs @ 12.21 hrs, Volume= 2,619 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

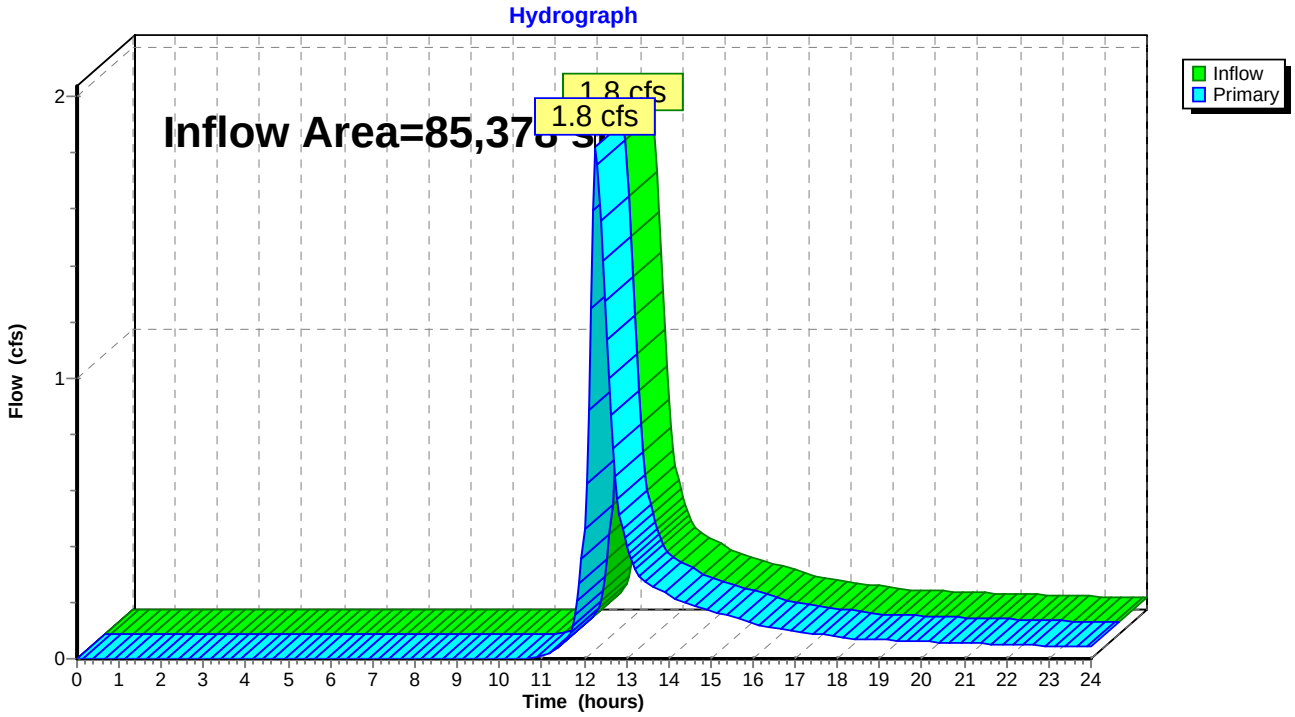


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 1.16" for 2-Year event
Inflow = 1.8 cfs @ 12.28 hrs, Volume= 8,265 cf
Primary = 1.8 cfs @ 12.28 hrs, Volume= 8,265 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

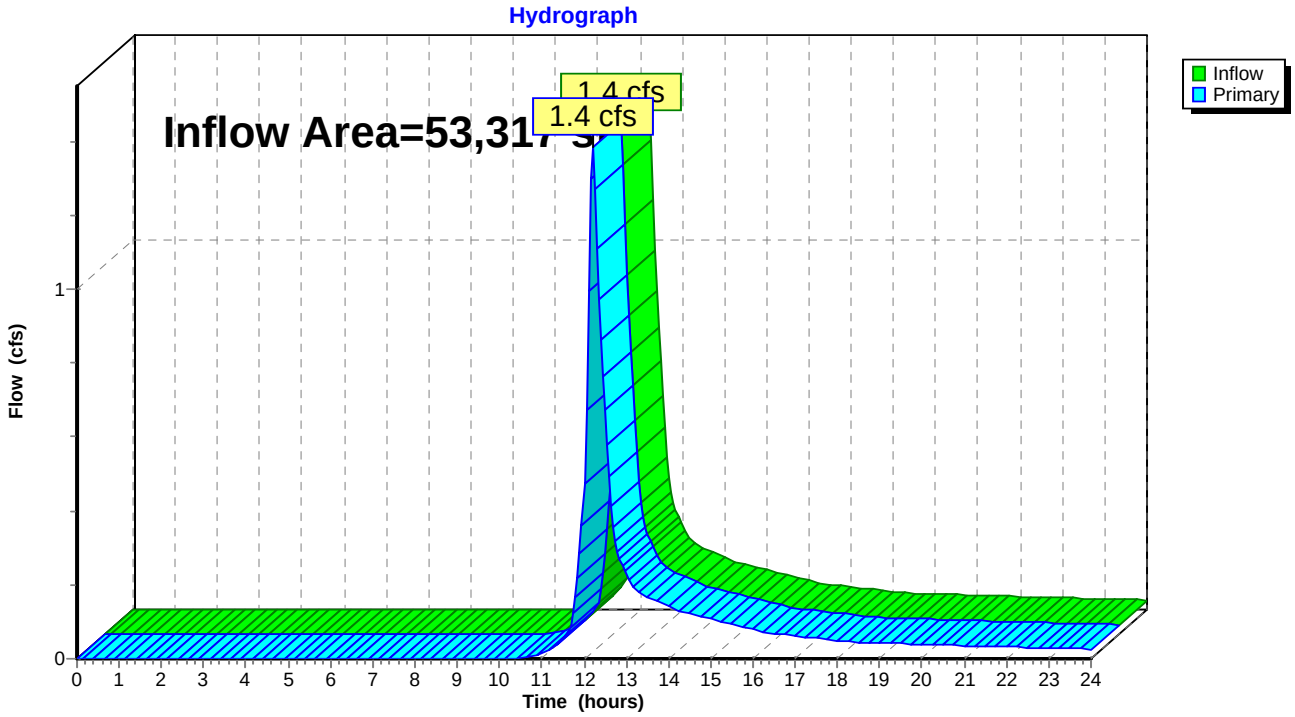


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 1.22" for 2-Year event
Inflow = 1.4 cfs @ 12.20 hrs, Volume= 5,437 cf
Primary = 1.4 cfs @ 12.20 hrs, Volume= 5,437 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

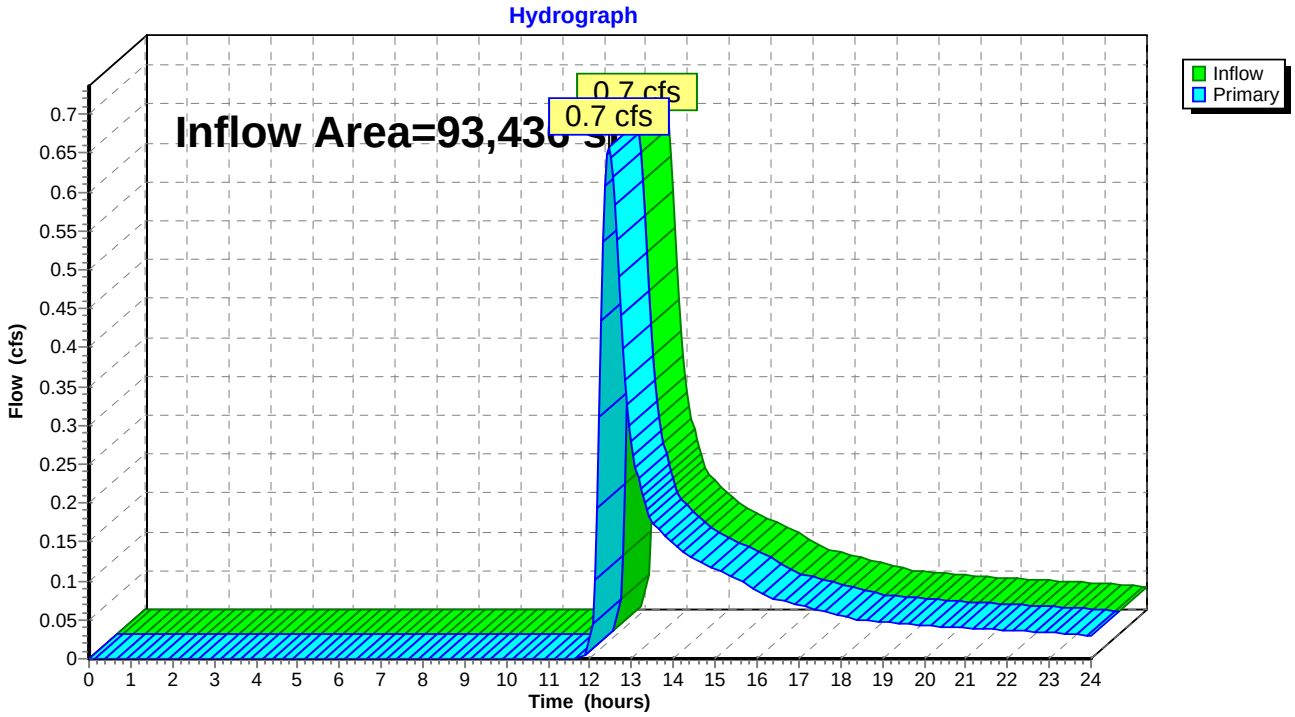


Summary for Link 15L: Wetland W

Inflow Area = 93,436 sf, 0.00% Impervious, Inflow Depth > 0.56" for 2-Year event
Inflow = 0.7 cfs @ 12.45 hrs, Volume= 4,395 cf
Primary = 0.7 cfs @ 12.45 hrs, Volume= 4,395 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

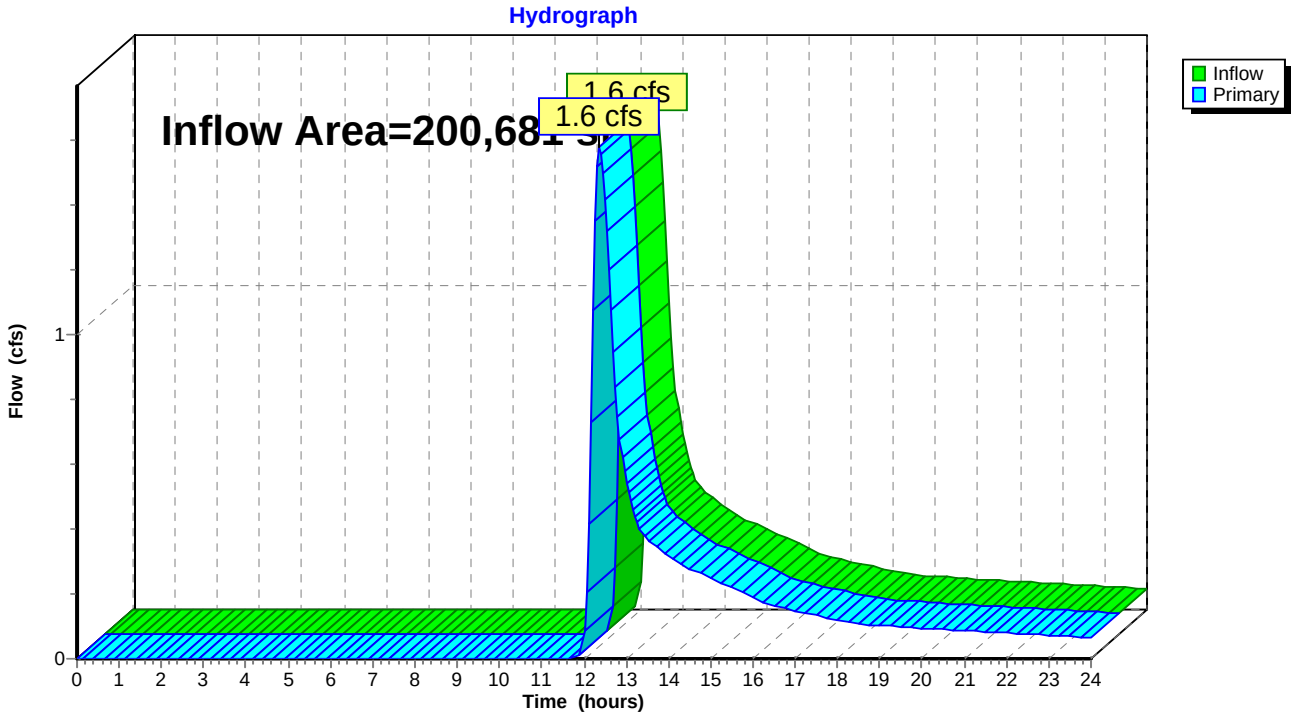


Summary for Link 16L: Wetland E

Inflow Area = 200,681 sf, 0.00% Impervious, Inflow Depth > 0.58" for 2-Year event
Inflow = 1.6 cfs @ 12.36 hrs, Volume= 9,719 cf
Primary = 1.6 cfs @ 12.36 hrs, Volume= 9,719 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 0.00% Impervious Runoff Depth>1.81"
Flow Length=239' Tc=13.7 min CN=74 Runoff=1.6 cfs 6,271 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 0.00% Impervious Runoff Depth>1.81"
Flow Length=179' Tc=14.1 min CN=74 Runoff=1.1 cfs 4,643 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 0.00% Impervious Runoff Depth>1.81"
Flow Length=204' Tc=14.6 min CN=74 Runoff=1.7 cfs 7,191 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 0.00% Impervious Runoff Depth>1.81"
Flow Length=222' Tc=14.3 min CN=74 Runoff=1.0 cfs 4,070 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 0.00% Impervious Runoff Depth>1.81"
Flow Length=752' Tc=15.2 min CN=74 Runoff=3.1 cfs 12,906 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 0.00% Impervious Runoff Depth>1.89"
Flow Length=459' Tc=10.0 min CN=75 Runoff=2.3 cfs 8,403 cf

Subcatchment 7S: Green Field W Runoff Area=2.145 ac 0.00% Impervious Runoff Depth>1.02"
Flow Length=472' Tc=24.7 min CN=62 Runoff=1.4 cfs 7,938 cf

Subcatchment 8S: Green Field E Runoff Area=2.890 ac 0.00% Impervious Runoff Depth>1.02"
Flow Length=305' Tc=20.6 min CN=62 Runoff=2.0 cfs 10,709 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.00% Impervious Runoff Depth>1.08"
Flow Length=247' Tc=19.4 min CN=63 Runoff=1.3 cfs 6,729 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.23' Max Vel=3.03 fps Inflow=3.1 cfs 12,906 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=3.0 cfs 12,857 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.21' Max Vel=2.96 fps Inflow=2.3 cfs 8,403 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=2.2 cfs 8,374 cf

Link 7L: Wetlands NW Inflow=1.1 cfs 4,643 cf
Primary=1.1 cfs 4,643 cf

Link 8L: Depression S Inflow=1.6 cfs 6,271 cf
Primary=1.6 cfs 6,271 cf

Link 9L: Wetlands NE Inflow=1.7 cfs 7,191 cf
Primary=1.7 cfs 7,191 cf

Link 10L: Wetlands N Inflow=1.0 cfs 4,070 cf
Primary=1.0 cfs 4,070 cf

Link 11L: Collection Swale W Inflow=3.0 cfs 12,857 cf
Primary=3.0 cfs 12,857 cf

Link 12L: Collection Swale W Inflow=2.2 cfs 8,374 cf
Primary=2.2 cfs 8,374 cf

Link 15L: Wetland W Inflow=1.4 cfs 7,938 cf
Primary=1.4 cfs 7,938 cf

Link 16L: Wetland E Inflow=3.3 cfs 17,438 cf
Primary=3.3 cfs 17,438 cf

Total Runoff Area = 579,479 sf Runoff Volume = 68,860 cf Average Runoff Depth = 1.43"
100.00% Pervious = 579,479 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

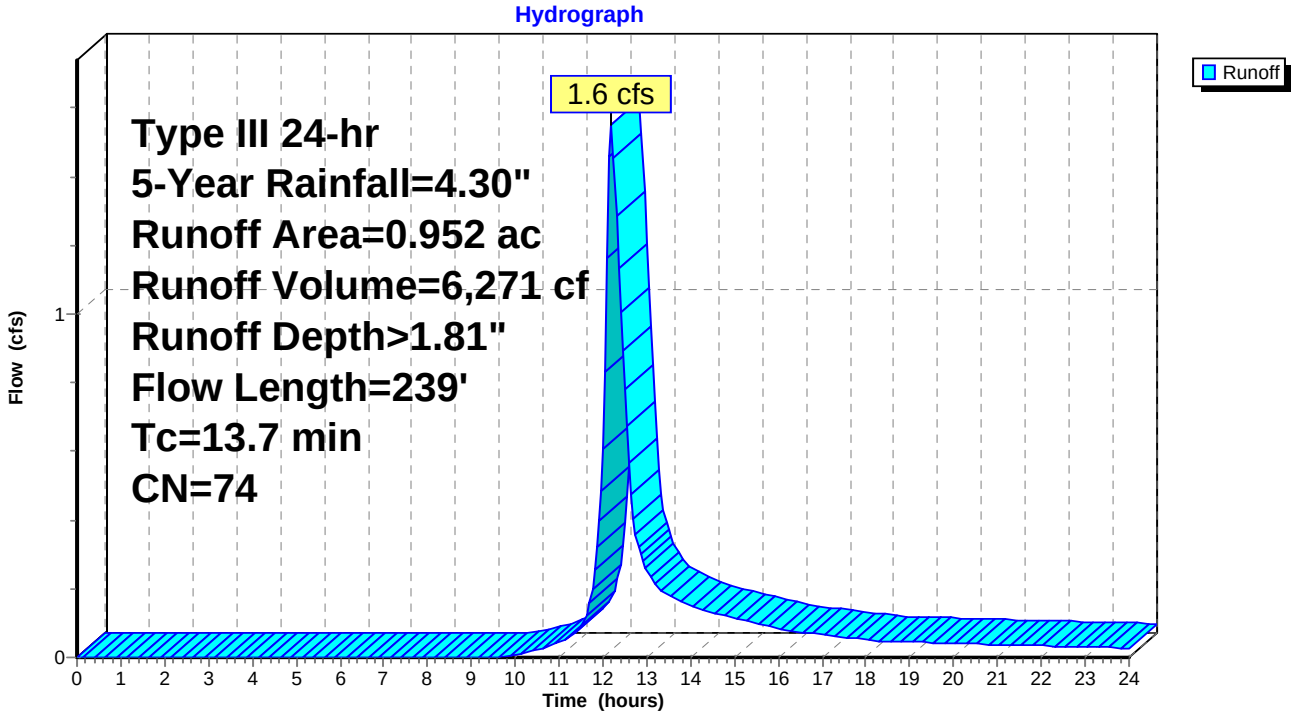
Runoff = 1.6 cfs @ 12.20 hrs, Volume= 6,271 cf, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
0.952	74	>75% Grass cover, Good, HSG C
0.952		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

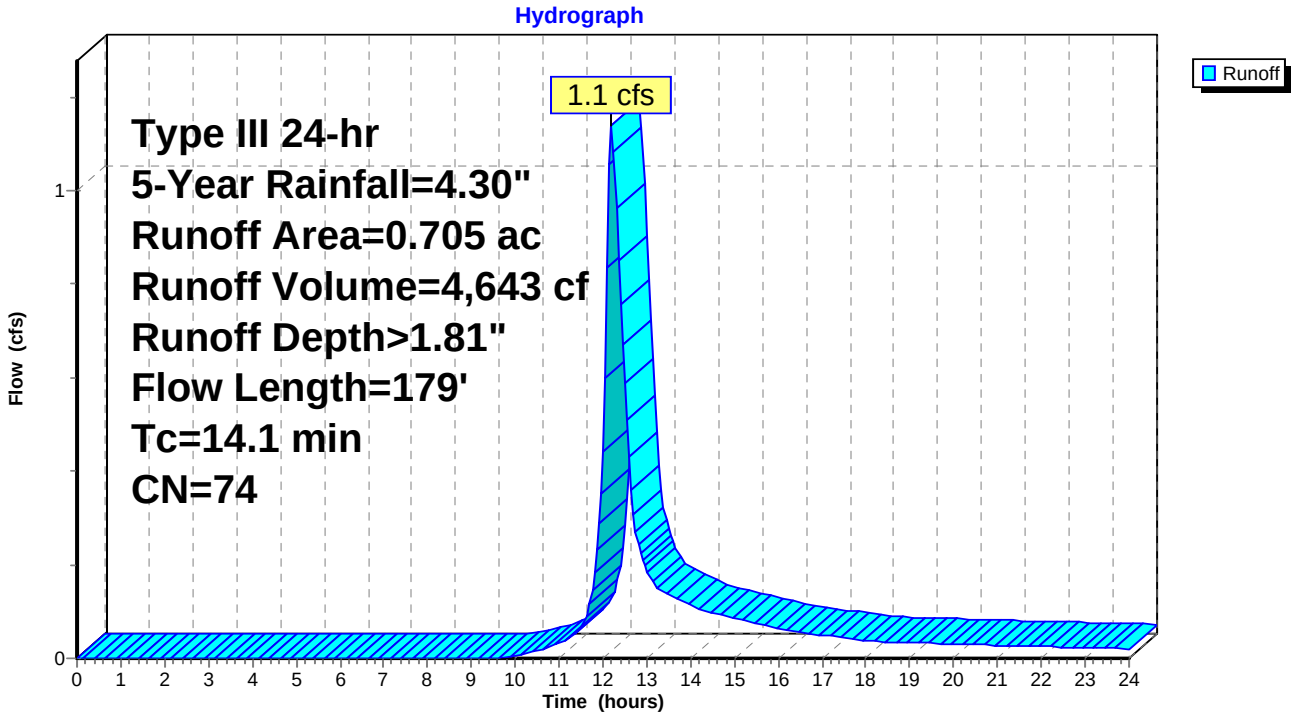
Runoff = 1.1 cfs @ 12.20 hrs, Volume= 4,643 cf, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
0.705	74	>75% Grass cover, Good, HSG C
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

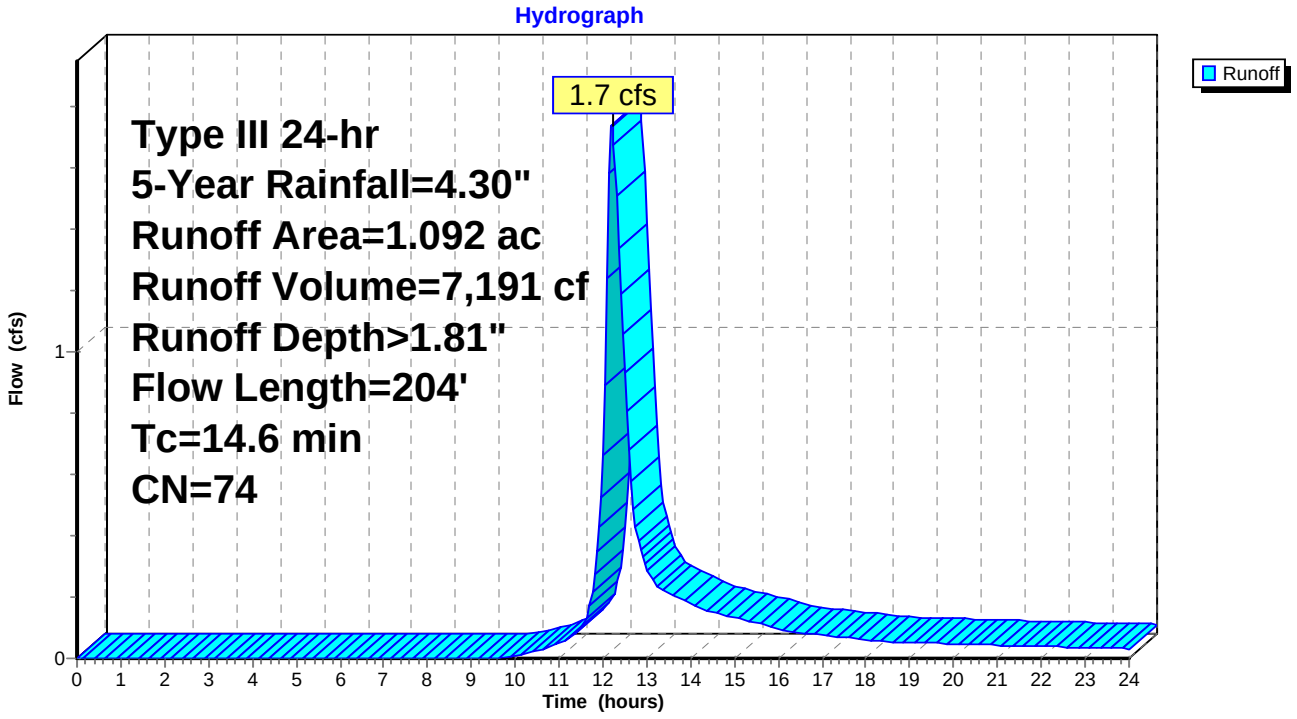
Runoff = 1.7 cfs @ 12.21 hrs, Volume= 7,191 cf, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
1.092	74	>75% Grass cover, Good, HSG C
1.092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

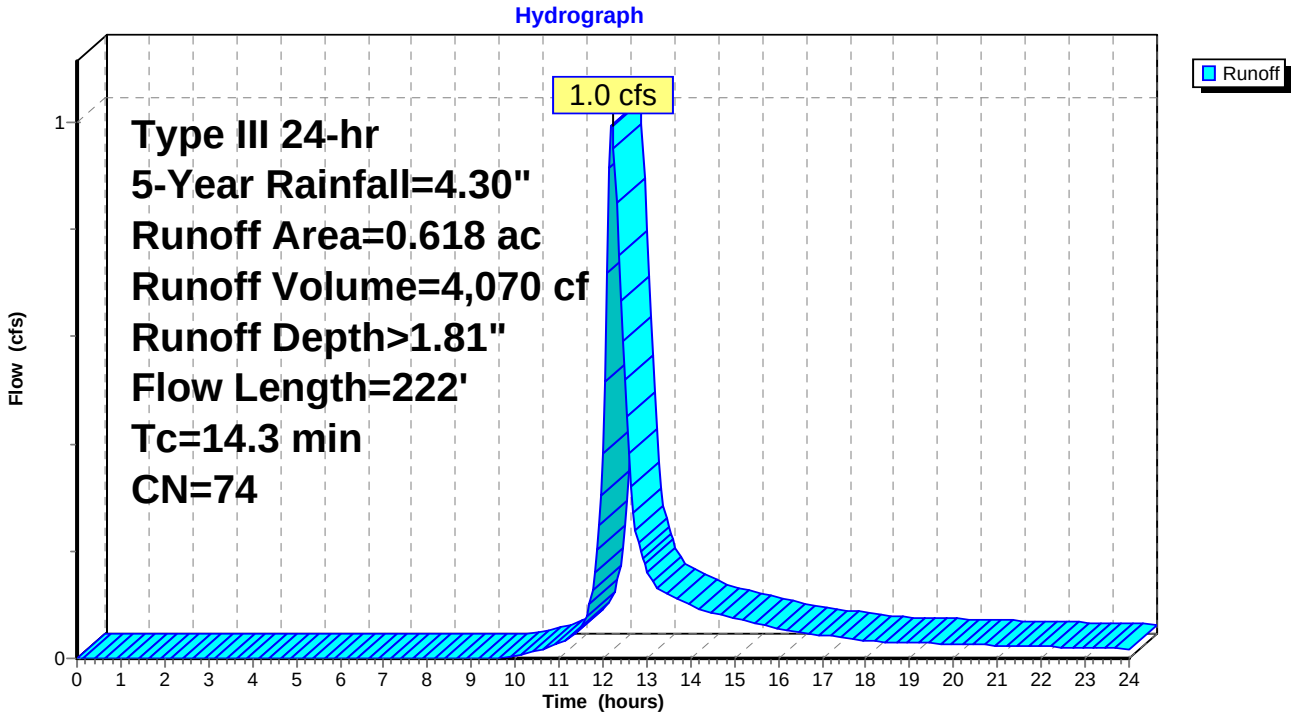
Runoff = 1.0 cfs @ 12.21 hrs, Volume= 4,070 cf, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
0.618	74	>75% Grass cover, Good, HSG C
0.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

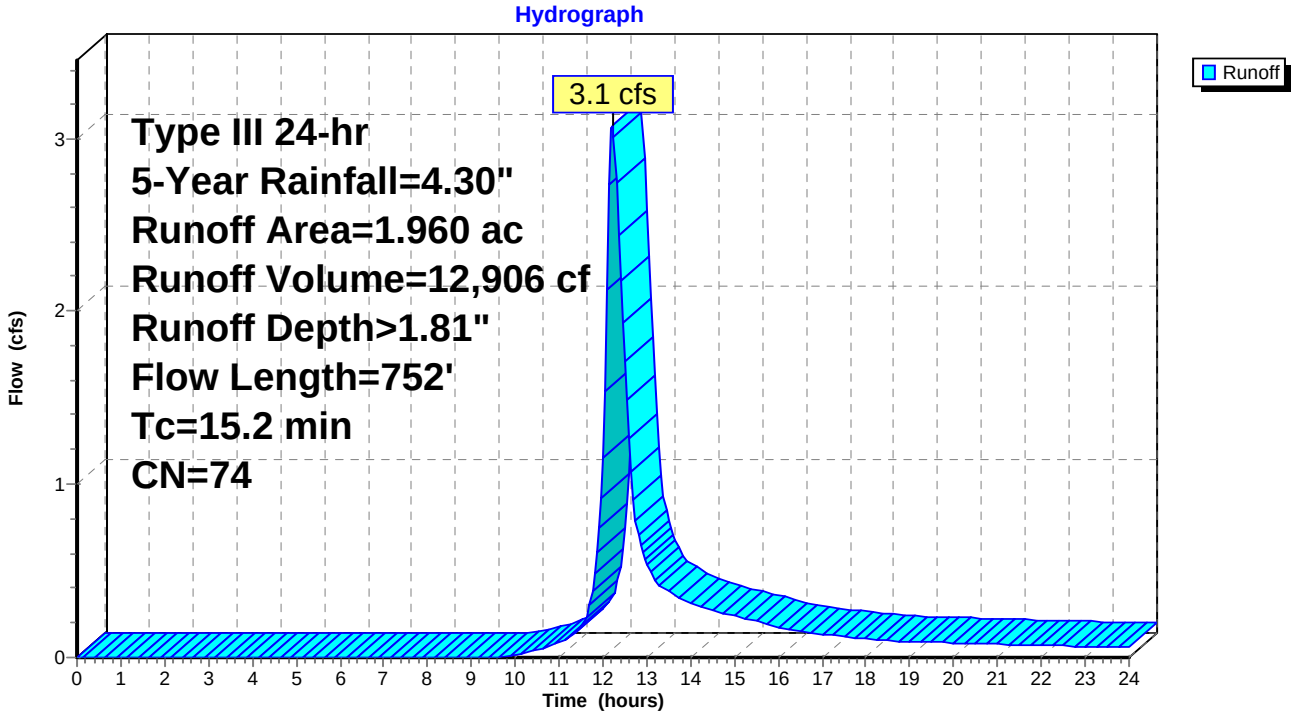
Runoff = 3.1 cfs @ 12.22 hrs, Volume= 12,906 cf, Depth> 1.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
1.960	74	>75% Grass cover, Good, HSG C
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

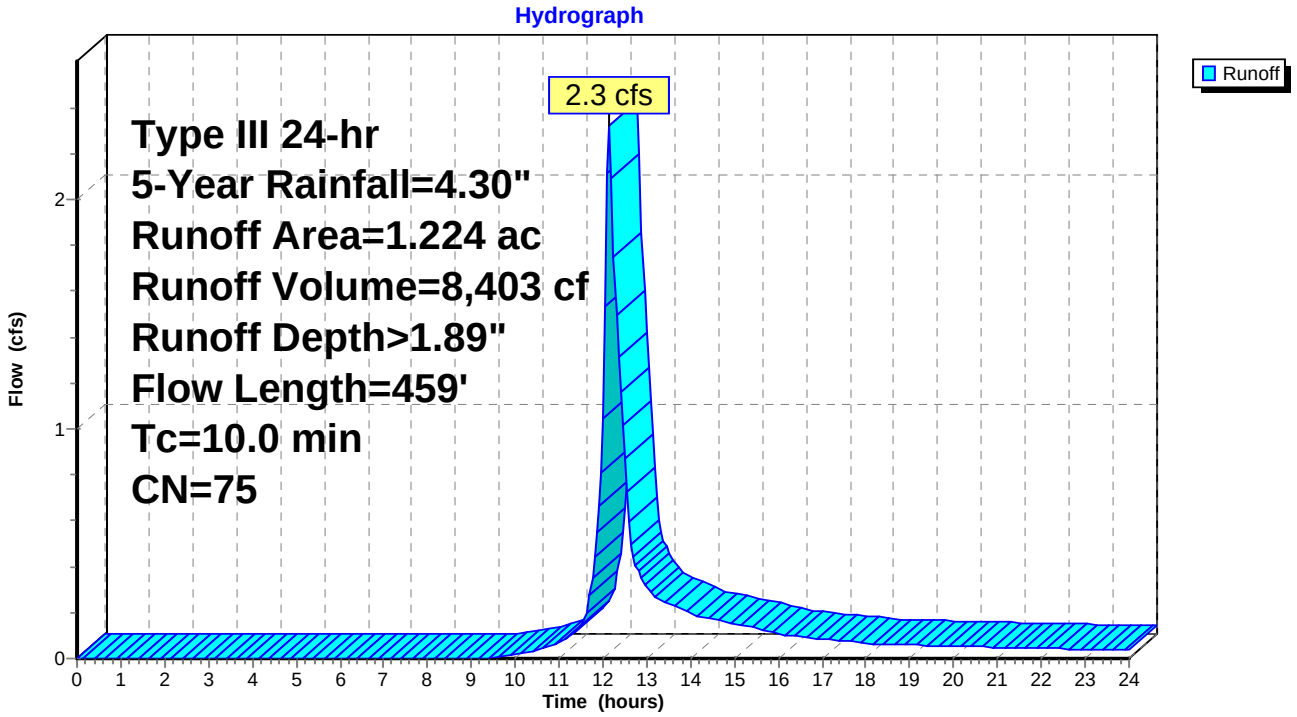
Runoff = 2.3 cfs @ 12.15 hrs, Volume= 8,403 cf, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
1.134	74	>75% Grass cover, Good, HSG C
0.090	89	Gravel roads, HSG C
1.224	75	Weighted Average
1.224		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

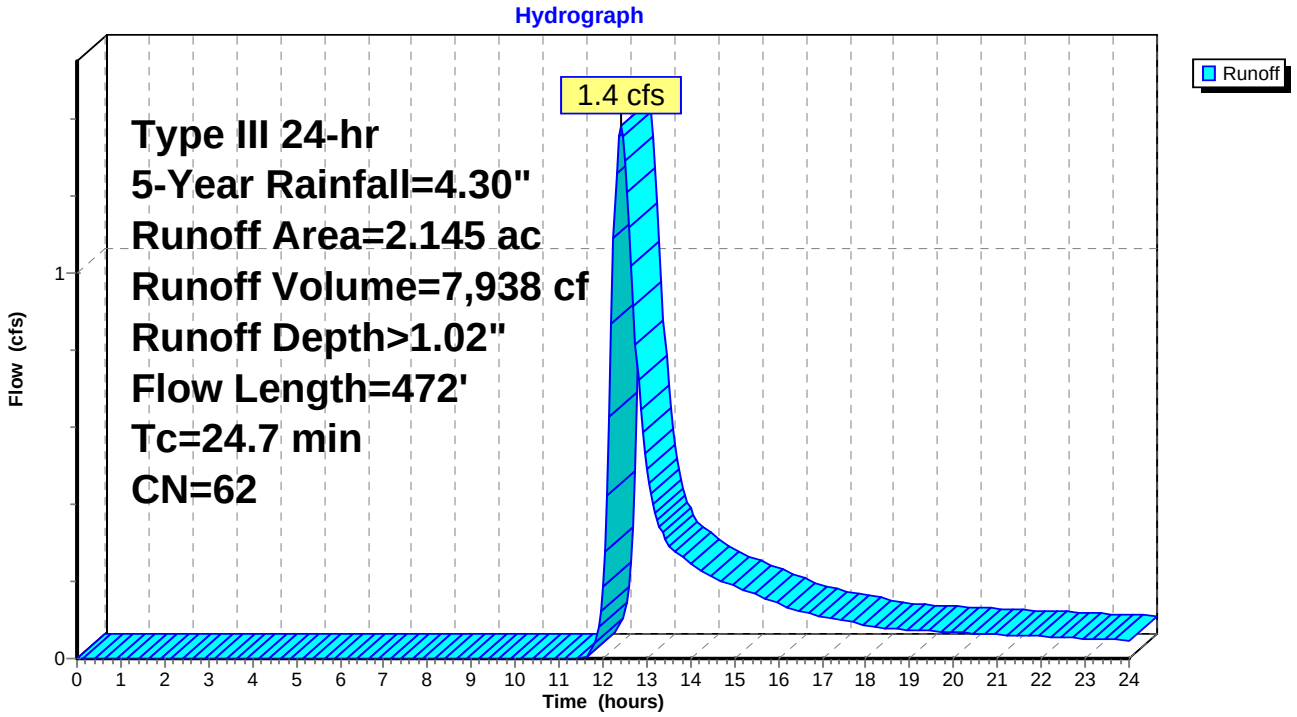
Runoff = 1.4 cfs @ 12.40 hrs, Volume= 7,938 cf, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
0.022	74	>75% Grass cover, Good, HSG C
0.089	80	>75% Grass cover, Good, HSG D
0.282	61	>75% Grass cover, Good, HSG B
1.752	61	>75% Grass cover, Good, HSG B
2.145	62	Weighted Average
2.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

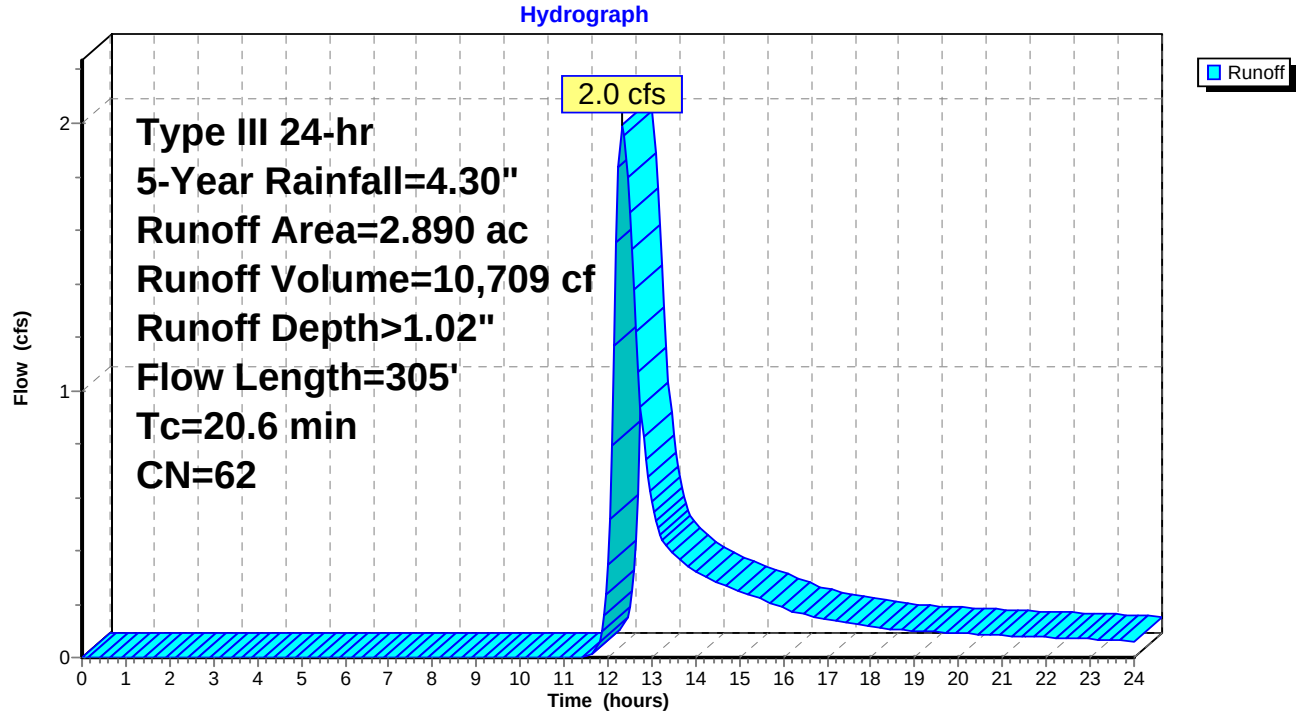
Runoff = 2.0 cfs @ 12.33 hrs, Volume= 10,709 cf, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
2.685	61	>75% Grass cover, Good, HSG B
0.072	80	>75% Grass cover, Good, HSG D
0.033	80	>75% Grass cover, Good, HSG D
0.100	61	>75% Grass cover, Good, HSG B
2.890	62	Weighted Average
2.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

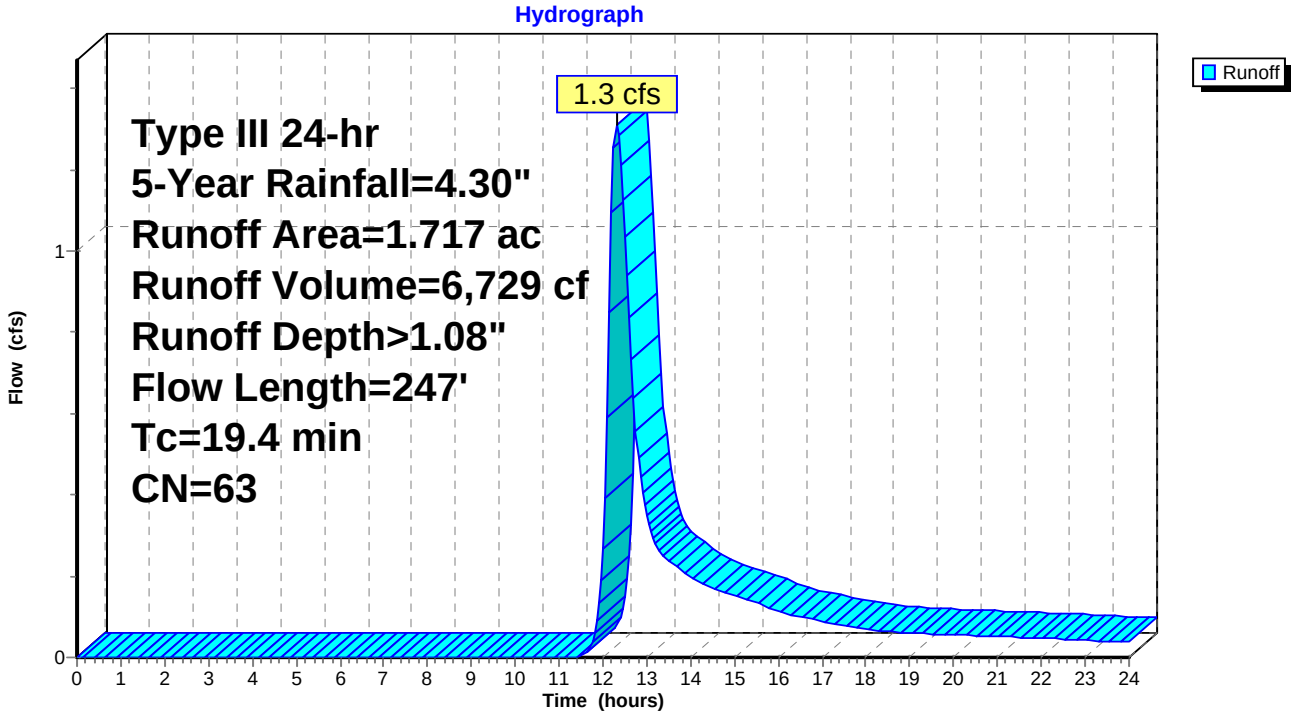
Runoff = 1.3 cfs @ 12.31 hrs, Volume= 6,729 cf, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

Area (ac)	CN	Description
0.091	77	Woods, Good, HSG D
0.151	55	Woods, Good, HSG B
1.288	61	>75% Grass cover, Good, HSG B
0.187	80	>75% Grass cover, Good, HSG D
1.717	63	Weighted Average
1.717		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



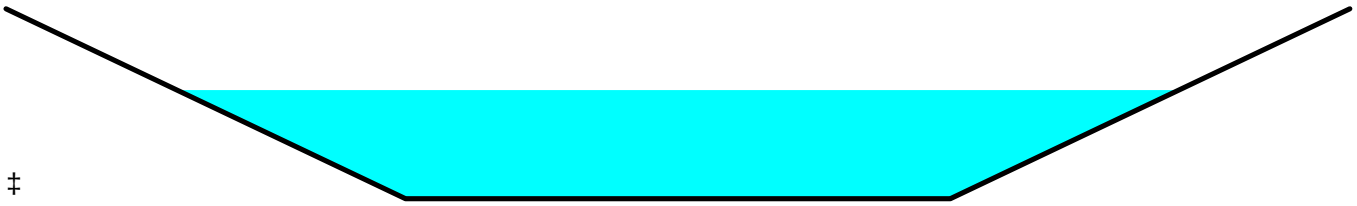
Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 1.81" for 5-Year event
Inflow = 3.1 cfs @ 12.22 hrs, Volume= 12,906 cf
Outflow = 3.0 cfs @ 12.27 hrs, Volume= 12,857 cf, Atten= 4%, Lag= 2.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.03 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 9.8 min

Peak Storage= 641 cf @ 12.27 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



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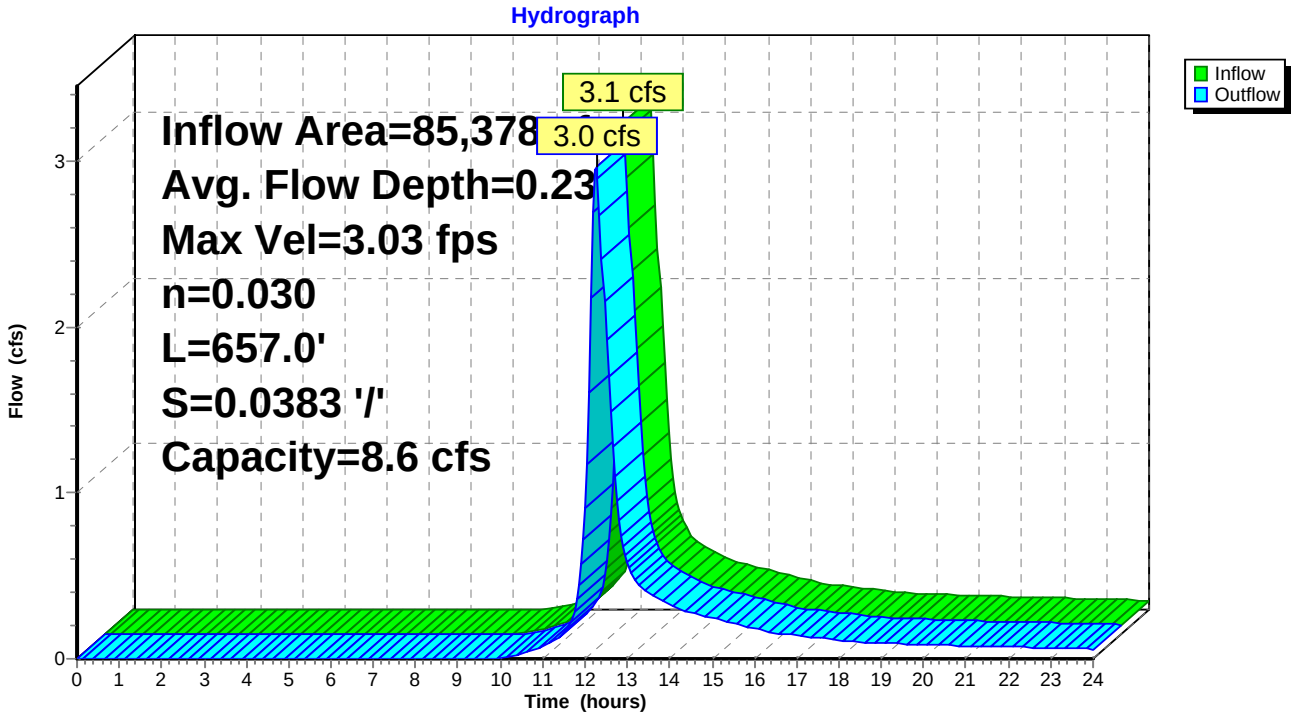
Reach 19R: Riprap Swale



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 1.89" for 5-Year event
Inflow = 2.3 cfs @ 12.15 hrs, Volume= 8,403 cf
Outflow = 2.2 cfs @ 12.19 hrs, Volume= 8,374 cf, Atten= 5%, Lag= 2.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 2.96 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.97 fps, Avg. Travel Time= 9.0 min

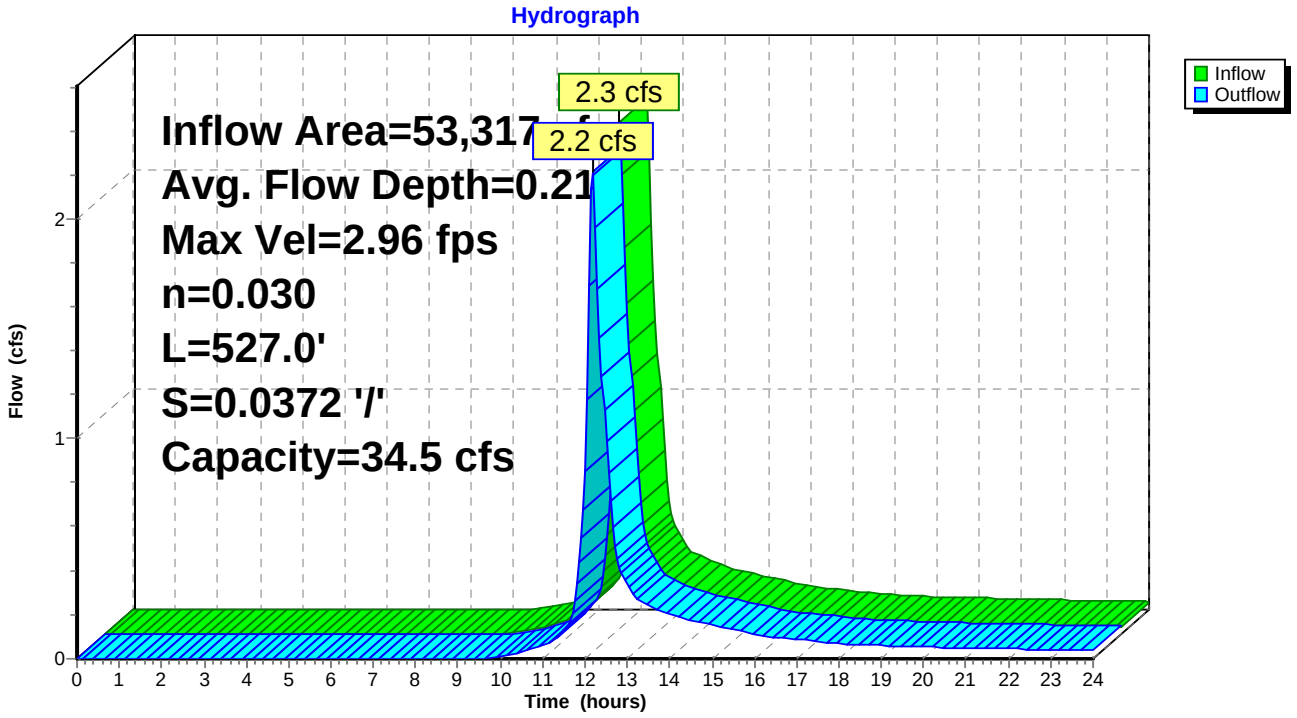
Peak Storage= 392 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

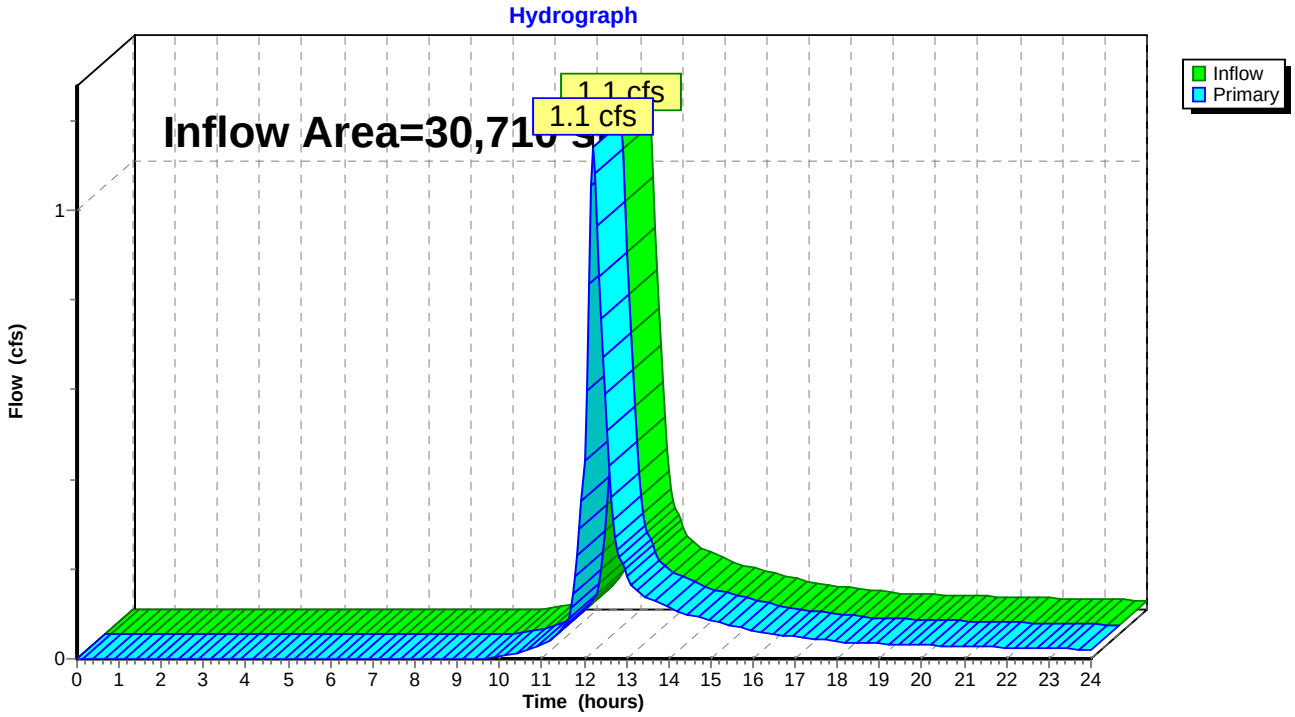


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 0.00% Impervious, Inflow Depth > 1.81" for 5-Year event
Inflow = 1.1 cfs @ 12.20 hrs, Volume= 4,643 cf
Primary = 1.1 cfs @ 12.20 hrs, Volume= 4,643 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

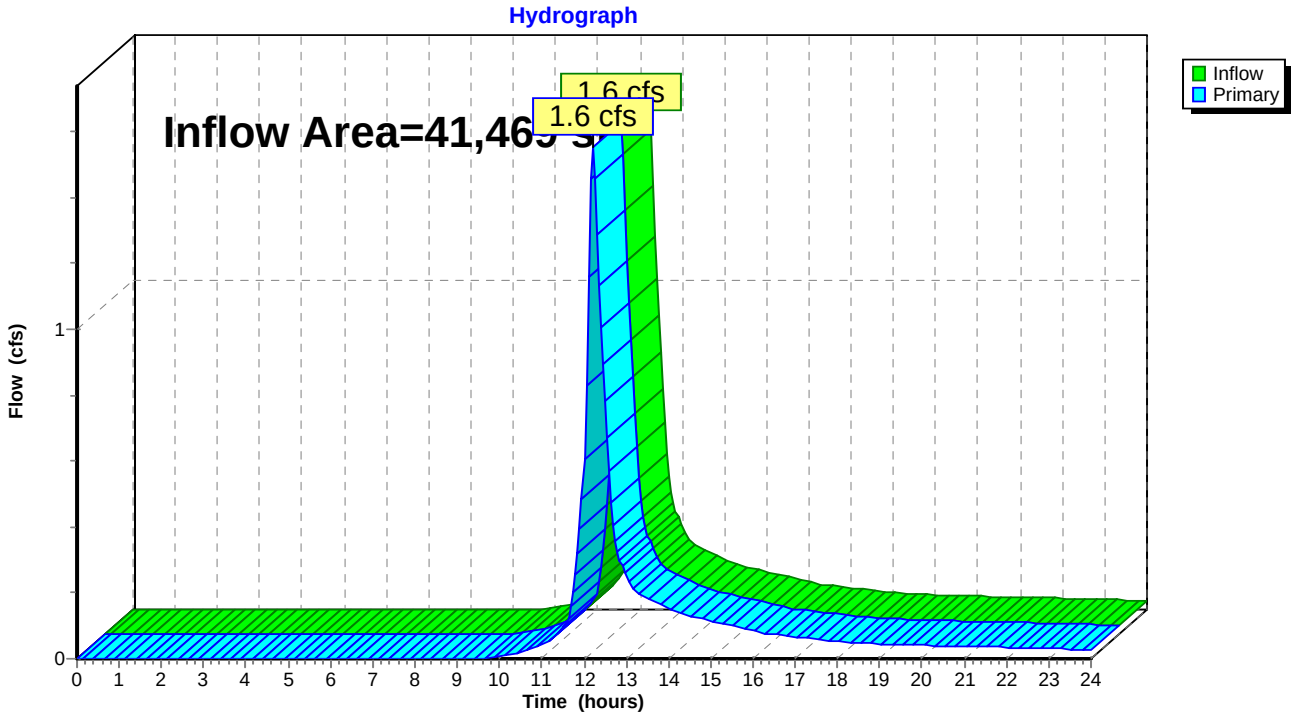


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 0.00% Impervious, Inflow Depth > 1.81" for 5-Year event
Inflow = 1.6 cfs @ 12.20 hrs, Volume= 6,271 cf
Primary = 1.6 cfs @ 12.20 hrs, Volume= 6,271 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

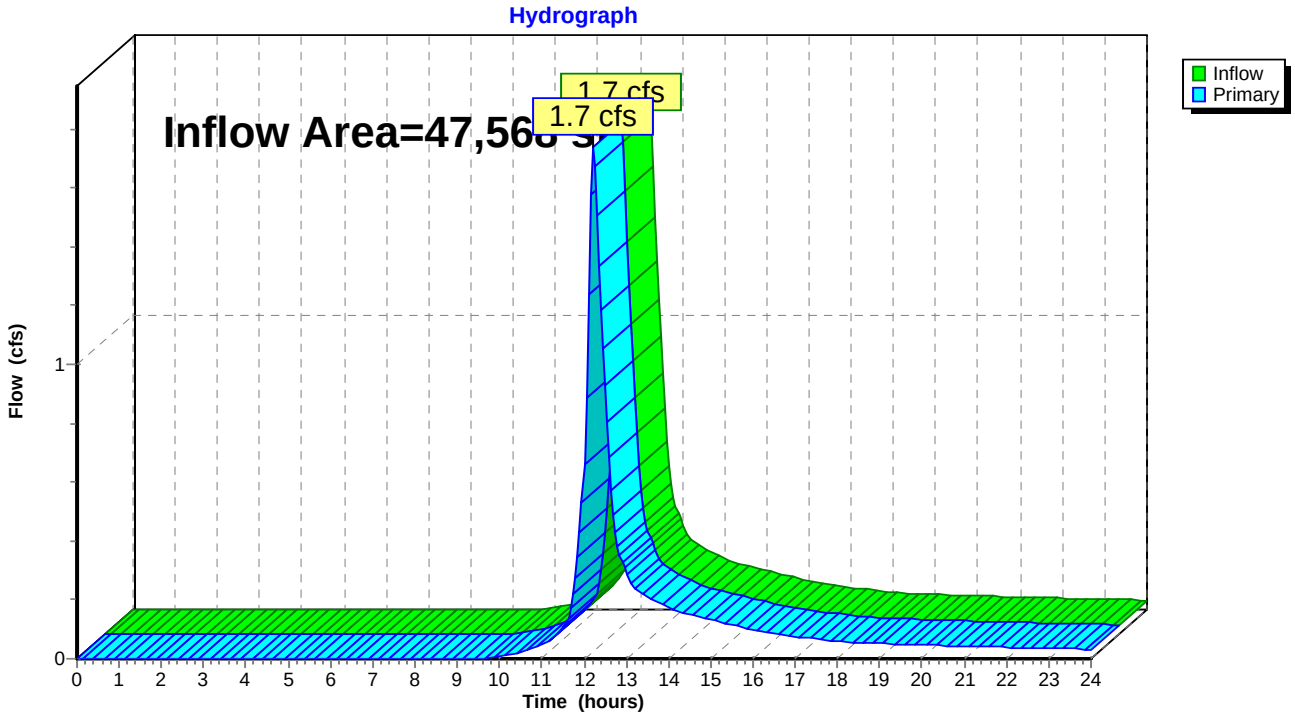


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 0.00% Impervious, Inflow Depth > 1.81" for 5-Year event
Inflow = 1.7 cfs @ 12.21 hrs, Volume= 7,191 cf
Primary = 1.7 cfs @ 12.21 hrs, Volume= 7,191 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

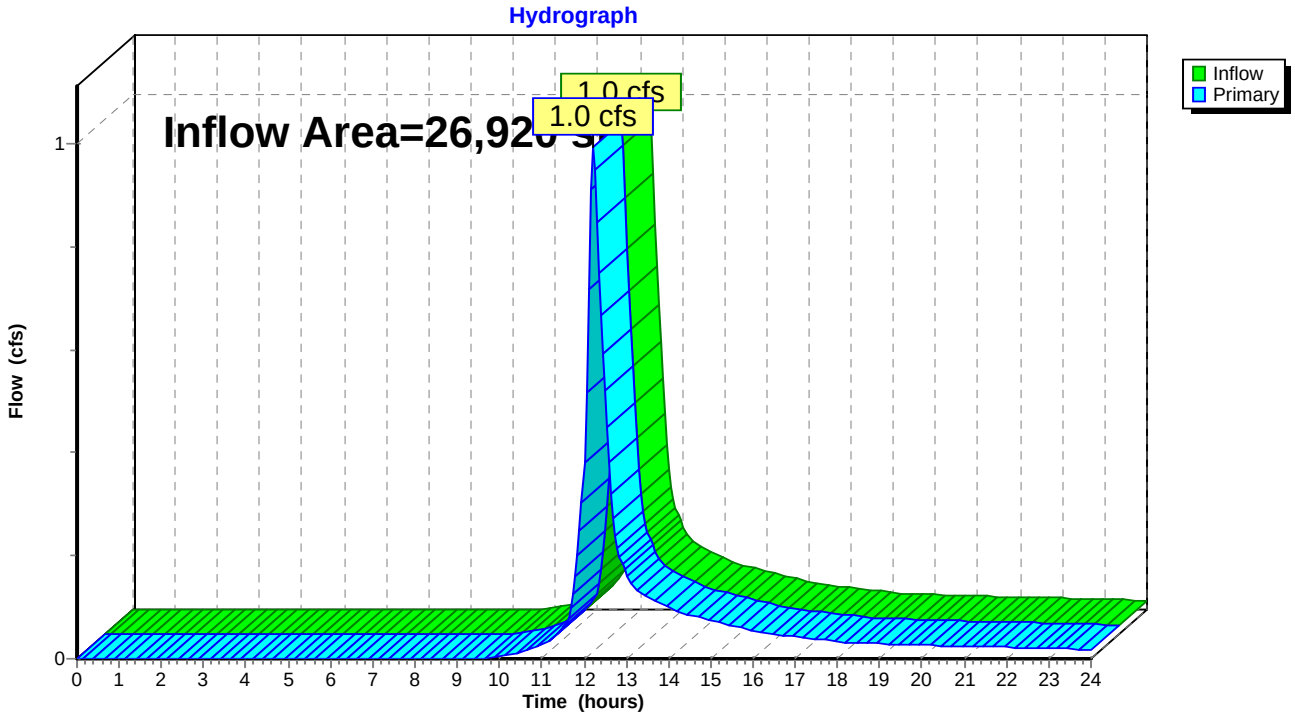


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 0.00% Impervious, Inflow Depth > 1.81" for 5-Year event
Inflow = 1.0 cfs @ 12.21 hrs, Volume= 4,070 cf
Primary = 1.0 cfs @ 12.21 hrs, Volume= 4,070 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

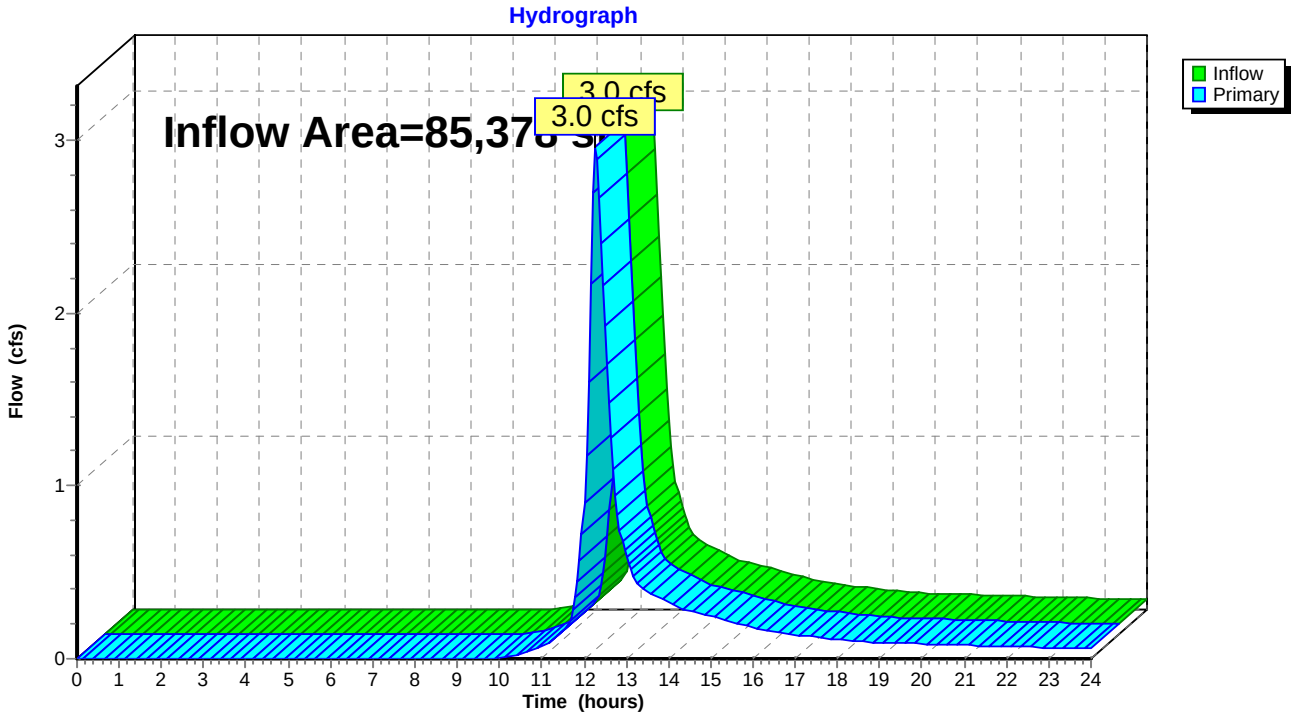


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 1.81" for 5-Year event
Inflow = 3.0 cfs @ 12.27 hrs, Volume= 12,857 cf
Primary = 3.0 cfs @ 12.27 hrs, Volume= 12,857 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

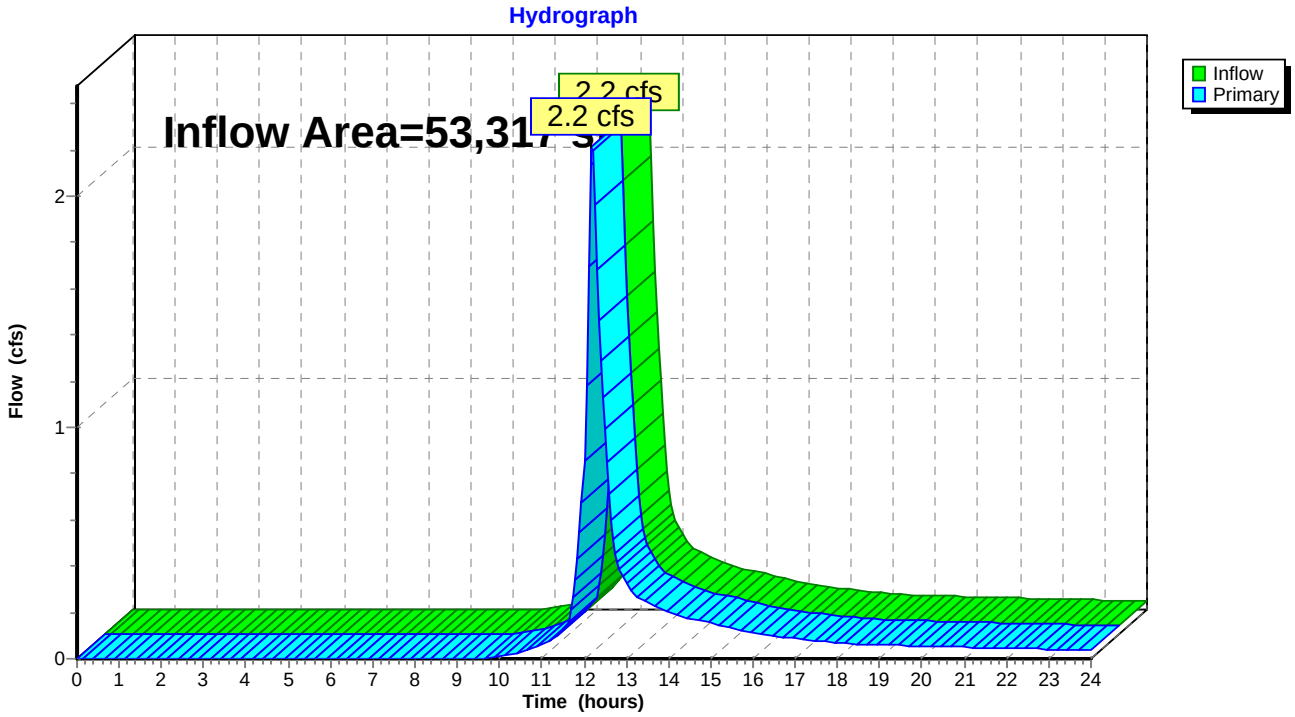


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 1.88" for 5-Year event
Inflow = 2.2 cfs @ 12.19 hrs, Volume= 8,374 cf
Primary = 2.2 cfs @ 12.19 hrs, Volume= 8,374 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

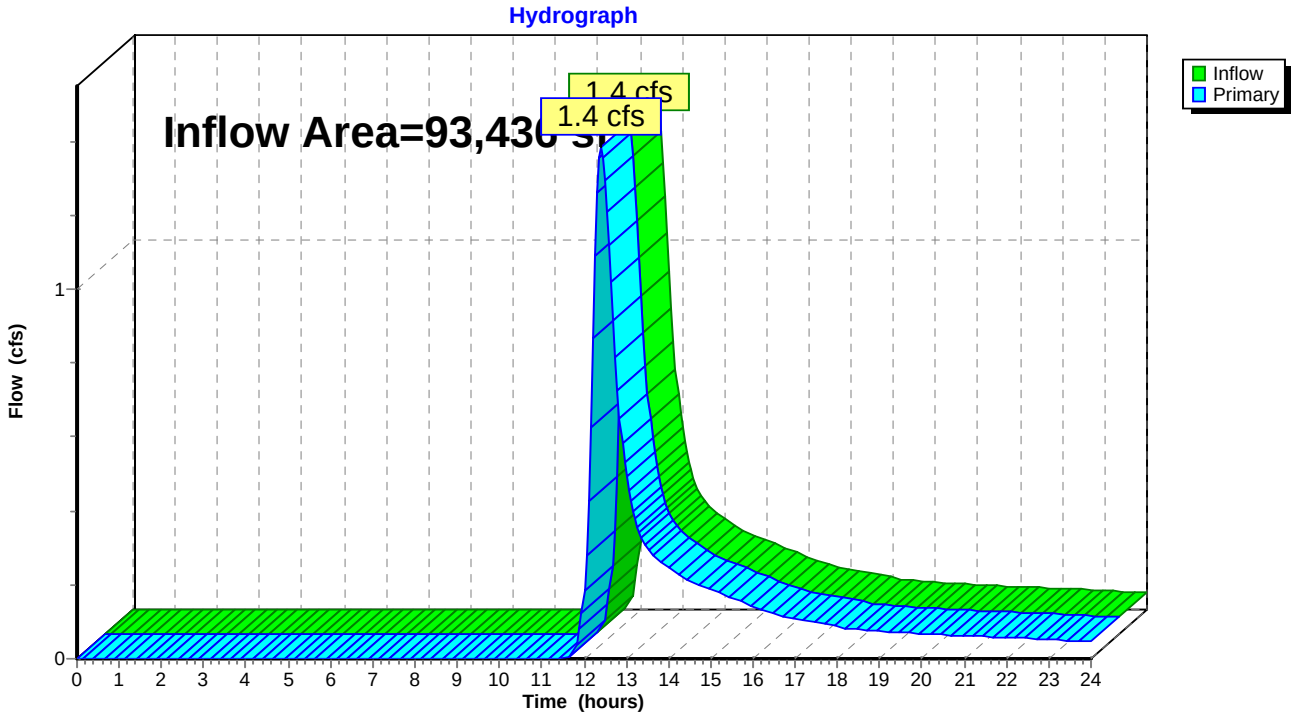


Summary for Link 15L: Wetland W

Inflow Area = 93,436 sf, 0.00% Impervious, Inflow Depth > 1.02" for 5-Year event
Inflow = 1.4 cfs @ 12.40 hrs, Volume= 7,938 cf
Primary = 1.4 cfs @ 12.40 hrs, Volume= 7,938 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

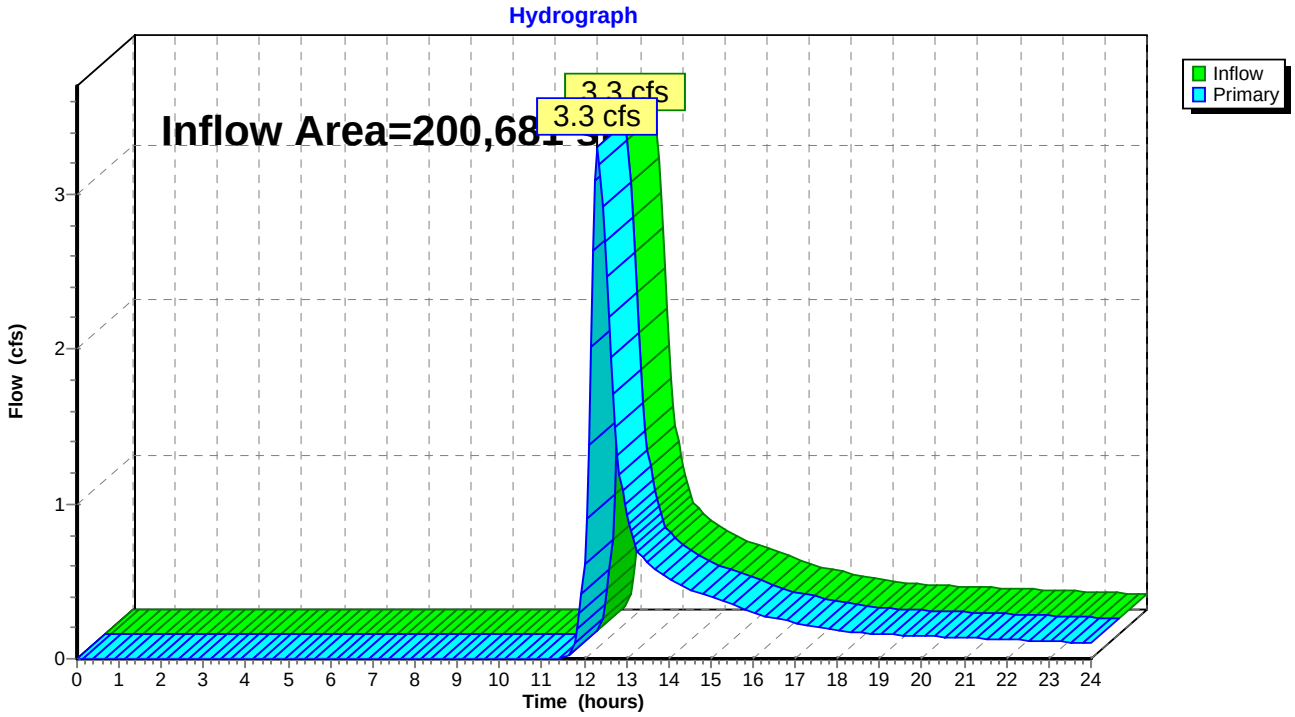


Summary for Link 16L: Wetland E

Inflow Area = 200,681 sf, 0.00% Impervious, Inflow Depth > 1.04" for 5-Year event
Inflow = 3.3 cfs @ 12.32 hrs, Volume= 17,438 cf
Primary = 3.3 cfs @ 12.32 hrs, Volume= 17,438 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 0.00% Impervious Runoff Depth>2.36"
Flow Length=239' Tc=13.7 min CN=74 Runoff=2.0 cfs 8,148 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 0.00% Impervious Runoff Depth>2.36"
Flow Length=179' Tc=14.1 min CN=74 Runoff=1.5 cfs 6,033 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 0.00% Impervious Runoff Depth>2.36"
Flow Length=204' Tc=14.6 min CN=74 Runoff=2.3 cfs 9,344 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 0.00% Impervious Runoff Depth>2.36"
Flow Length=222' Tc=14.3 min CN=74 Runoff=1.3 cfs 5,289 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 0.00% Impervious Runoff Depth>2.36"
Flow Length=752' Tc=15.2 min CN=74 Runoff=4.0 cfs 16,770 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 0.00% Impervious Runoff Depth>2.44"
Flow Length=459' Tc=10.0 min CN=75 Runoff=3.0 cfs 10,862 cf

Subcatchment 7S: Green Field W Runoff Area=2.145 ac 0.00% Impervious Runoff Depth>1.43"
Flow Length=472' Tc=24.7 min CN=62 Runoff=2.0 cfs 11,125 cf

Subcatchment 8S: Green Field E Runoff Area=2.890 ac 0.00% Impervious Runoff Depth>1.43"
Flow Length=305' Tc=20.6 min CN=62 Runoff=3.0 cfs 15,007 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.00% Impervious Runoff Depth>1.50"
Flow Length=247' Tc=19.4 min CN=63 Runoff=1.9 cfs 9,357 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.27' Max Vel=3.30 fps Inflow=4.0 cfs 16,770 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=3.9 cfs 16,715 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.24' Max Vel=3.23 fps Inflow=3.0 cfs 10,862 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=2.9 cfs 10,830 cf

Link 7L: Wetlands NW Inflow=1.5 cfs 6,033 cf
Primary=1.5 cfs 6,033 cf

Link 8L: Depression S Inflow=2.0 cfs 8,148 cf
Primary=2.0 cfs 8,148 cf

Link 9L: Wetlands NE Inflow=2.3 cfs 9,344 cf
Primary=2.3 cfs 9,344 cf

Link 10L: Wetlands N Inflow=1.3 cfs 5,289 cf
Primary=1.3 cfs 5,289 cf

Link 11L: Collection Swale W Inflow=3.9 cfs 16,715 cf
Primary=3.9 cfs 16,715 cf

Link 12L: Collection Swale W Inflow=2.9 cfs 10,830 cf
Primary=2.9 cfs 10,830 cf

Link 15L: Wetland W Inflow=2.0 cfs 11,125 cf
Primary=2.0 cfs 11,125 cf

Link 16L: Wetland E Inflow=4.9 cfs 24,364 cf
Primary=4.9 cfs 24,364 cf

Total Runoff Area = 579,479 sf Runoff Volume = 91,936 cf Average Runoff Depth = 1.90"
100.00% Pervious = 579,479 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

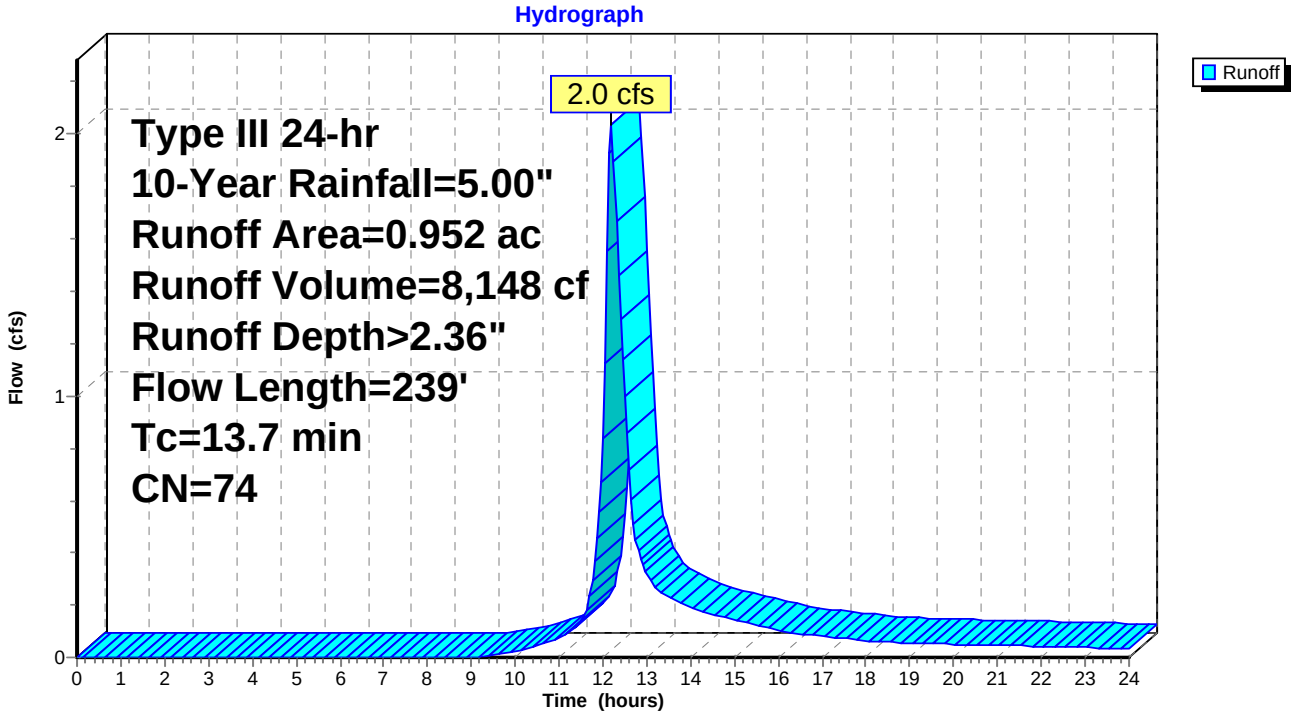
Runoff = 2.0 cfs @ 12.20 hrs, Volume= 8,148 cf, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.952	74	>75% Grass cover, Good, HSG C
0.952		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

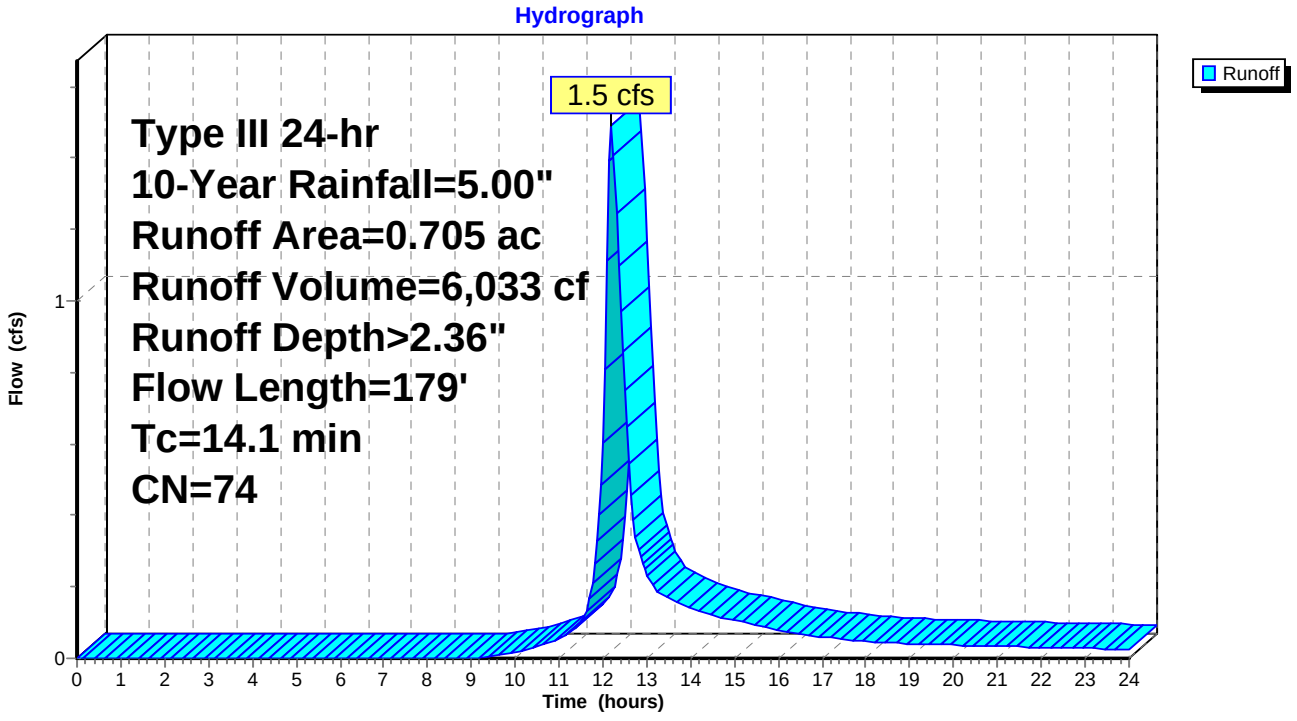
Runoff = 1.5 cfs @ 12.20 hrs, Volume= 6,033 cf, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.705	74	>75% Grass cover, Good, HSG C
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

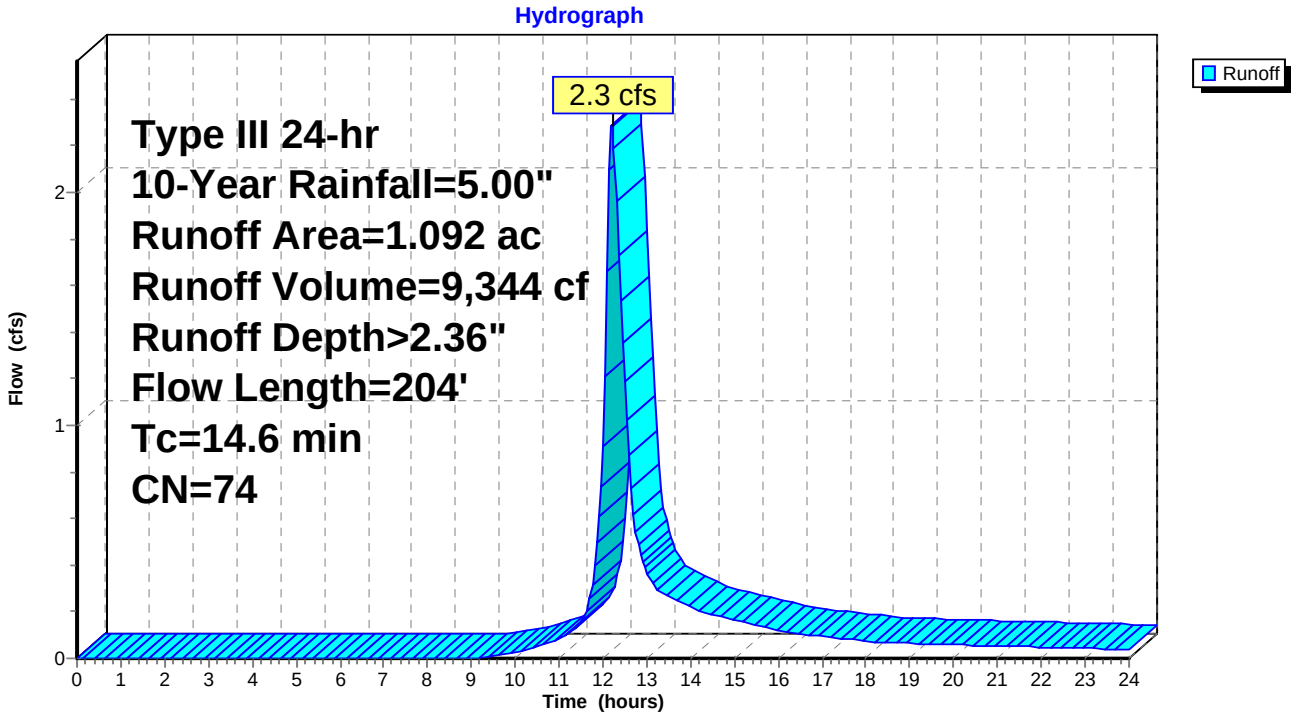
Runoff = 2.3 cfs @ 12.21 hrs, Volume= 9,344 cf, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
1.092	74	>75% Grass cover, Good, HSG C
1.092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

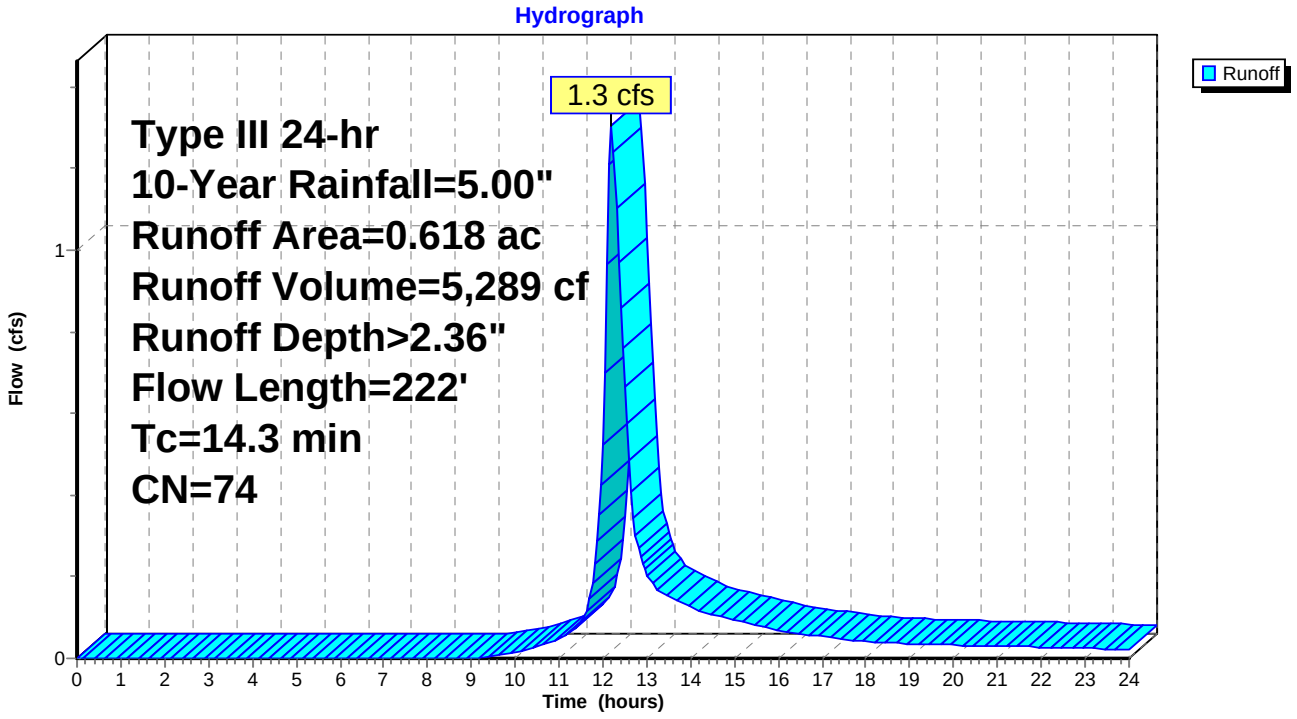
Runoff = 1.3 cfs @ 12.20 hrs, Volume= 5,289 cf, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.618	74	>75% Grass cover, Good, HSG C
0.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

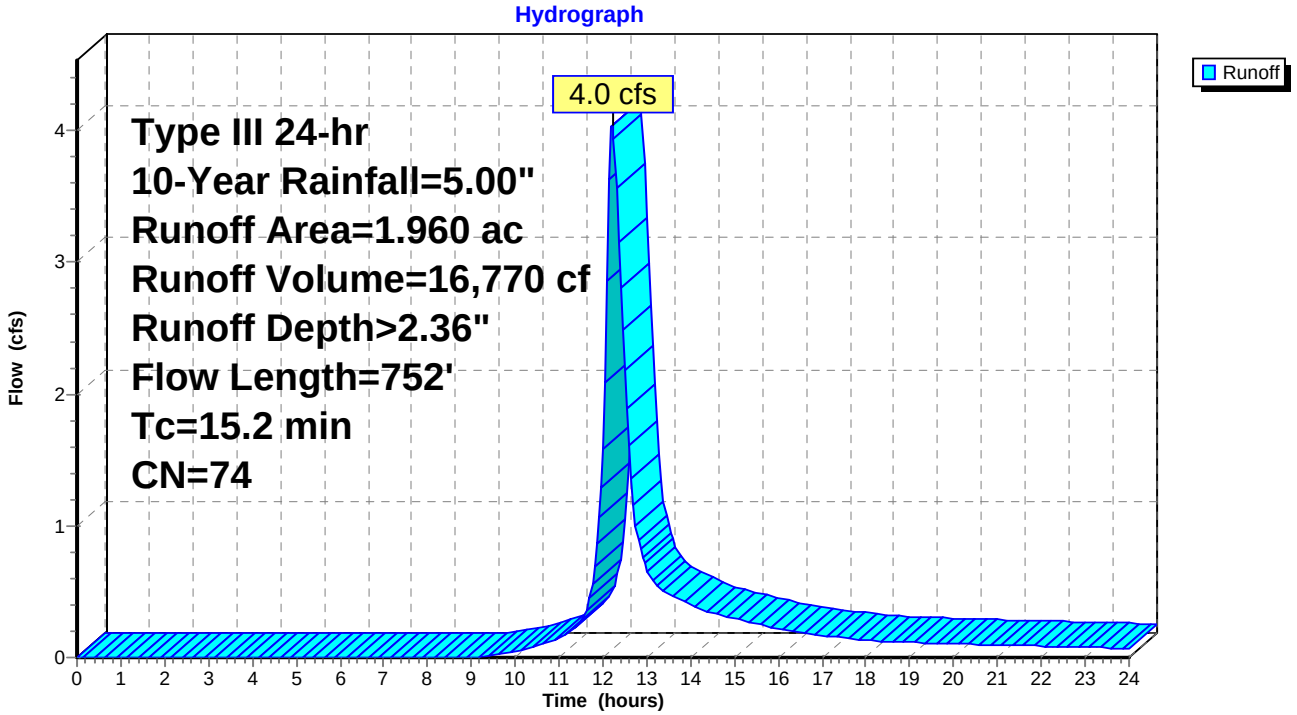
Runoff = 4.0 cfs @ 12.22 hrs, Volume= 16,770 cf, Depth> 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
1.960	74	>75% Grass cover, Good, HSG C
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

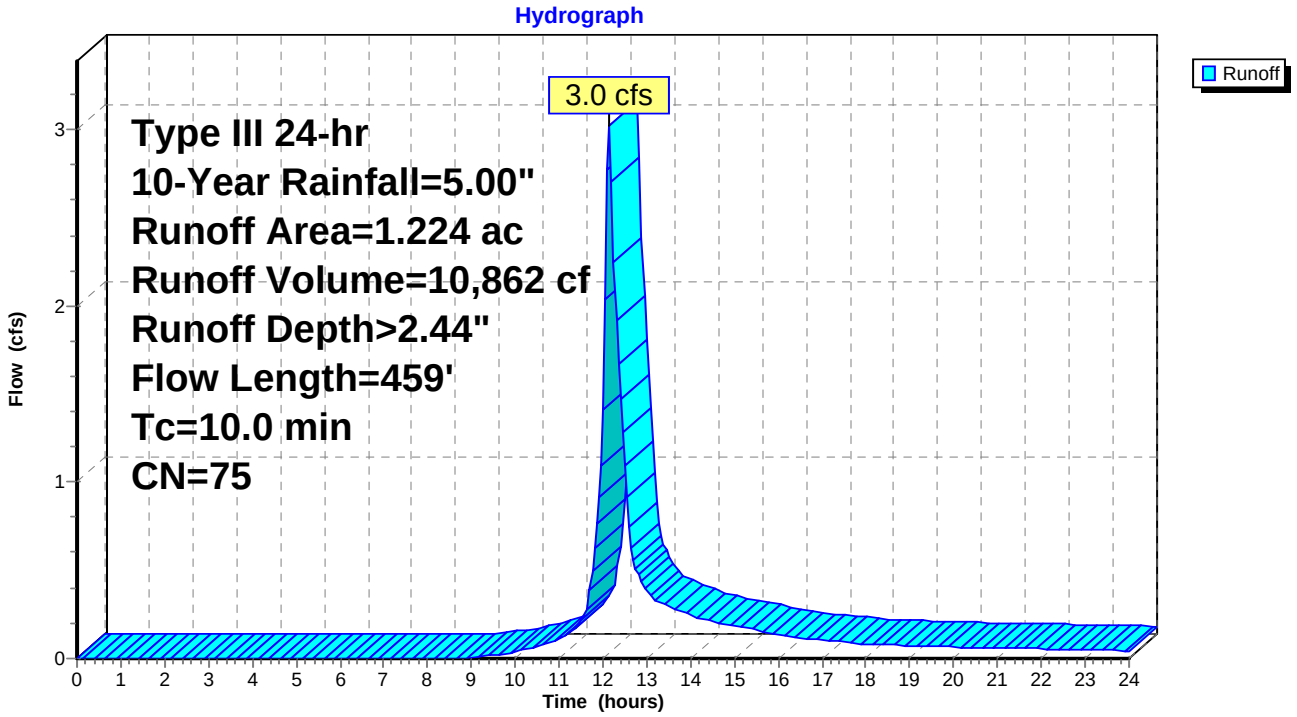
Runoff = 3.0 cfs @ 12.15 hrs, Volume= 10,862 cf, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
1.134	74	>75% Grass cover, Good, HSG C
0.090	89	Gravel roads, HSG C
1.224	75	Weighted Average
1.224		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

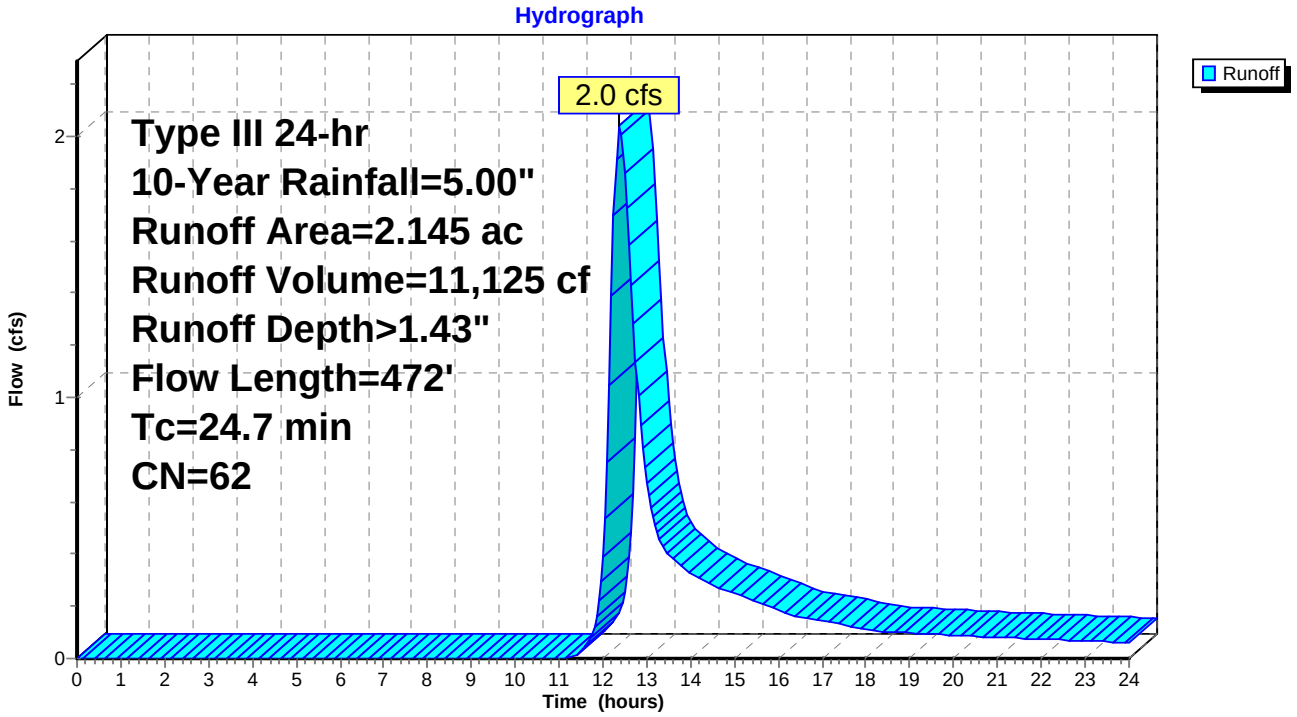
Runoff = 2.0 cfs @ 12.38 hrs, Volume= 11,125 cf, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.022	74	>75% Grass cover, Good, HSG C
0.089	80	>75% Grass cover, Good, HSG D
0.282	61	>75% Grass cover, Good, HSG B
1.752	61	>75% Grass cover, Good, HSG B
2.145	62	Weighted Average
2.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

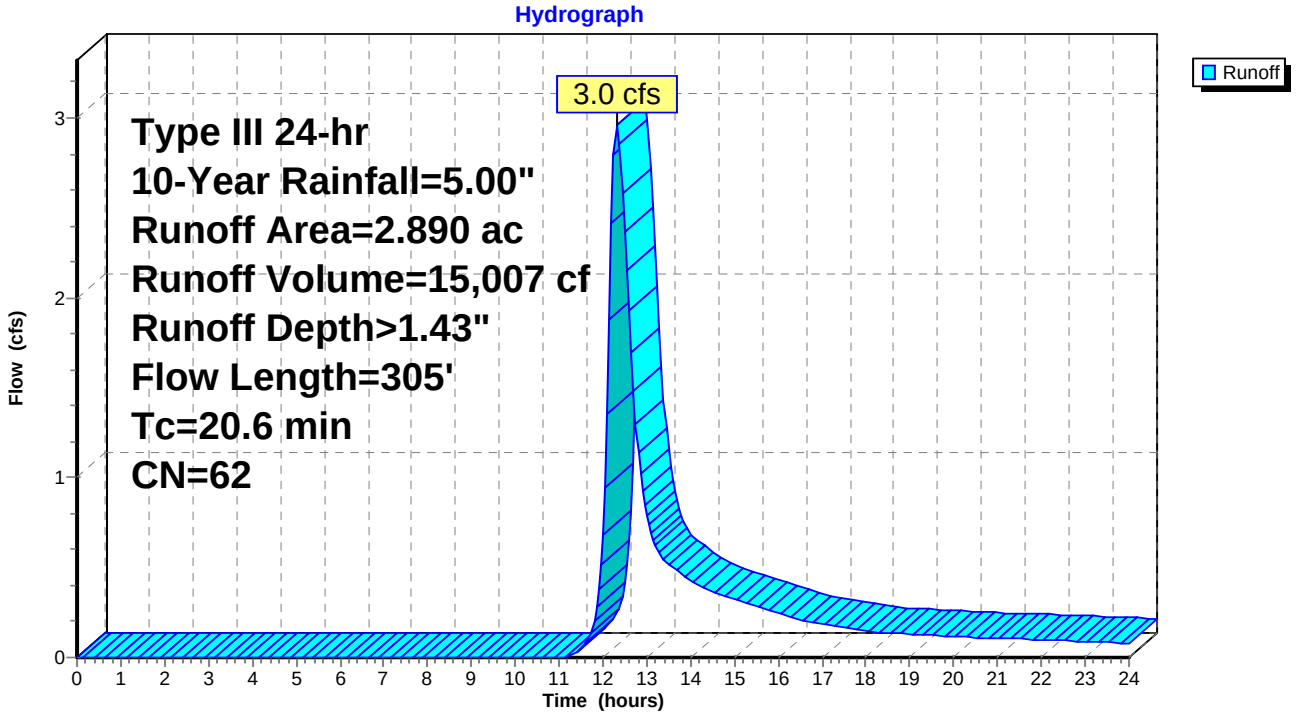
Runoff = 3.0 cfs @ 12.32 hrs, Volume= 15,007 cf, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
2.685	61	>75% Grass cover, Good, HSG B
0.072	80	>75% Grass cover, Good, HSG D
0.033	80	>75% Grass cover, Good, HSG D
0.100	61	>75% Grass cover, Good, HSG B
2.890	62	Weighted Average
2.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

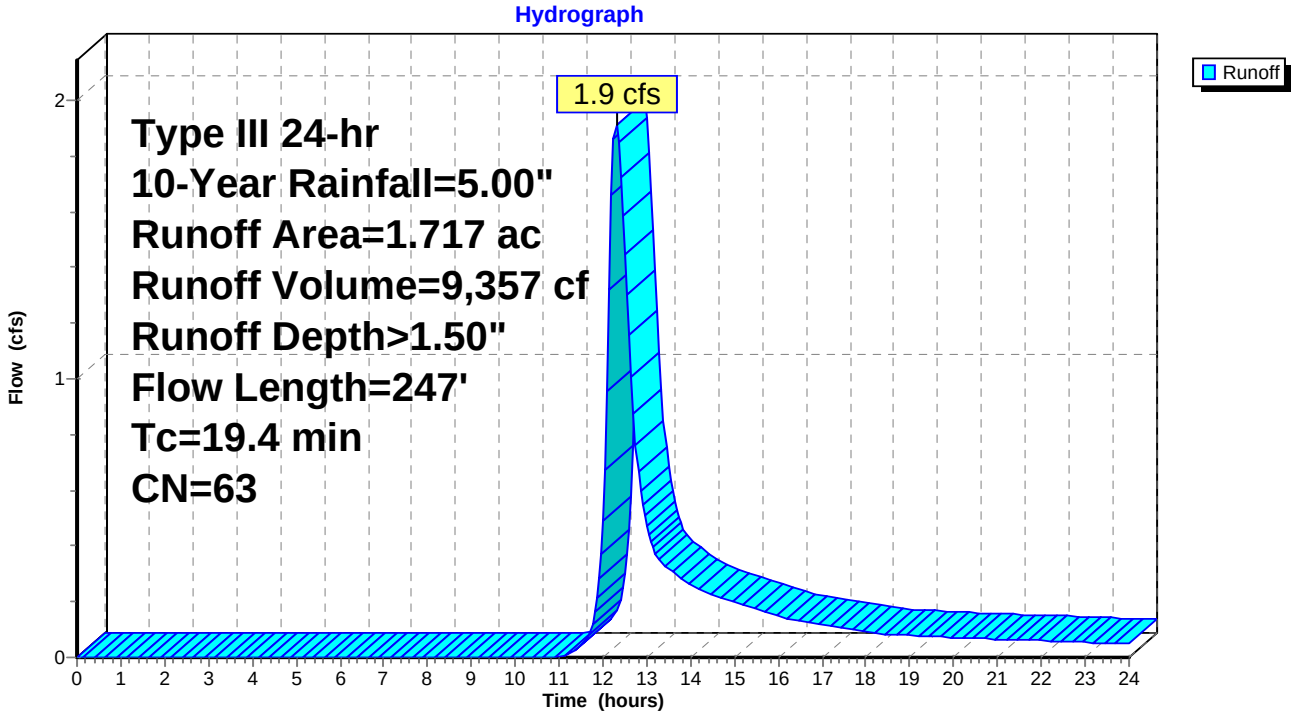
Runoff = 1.9 cfs @ 12.30 hrs, Volume= 9,357 cf, Depth> 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

Area (ac)	CN	Description
0.091	77	Woods, Good, HSG D
0.151	55	Woods, Good, HSG B
1.288	61	>75% Grass cover, Good, HSG B
0.187	80	>75% Grass cover, Good, HSG D
1.717	63	Weighted Average
1.717		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 2.36" for 10-Year event
Inflow = 4.0 cfs @ 12.22 hrs, Volume= 16,770 cf
Outflow = 3.9 cfs @ 12.26 hrs, Volume= 16,715 cf, Atten= 3%, Lag= 2.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.30 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 9.2 min

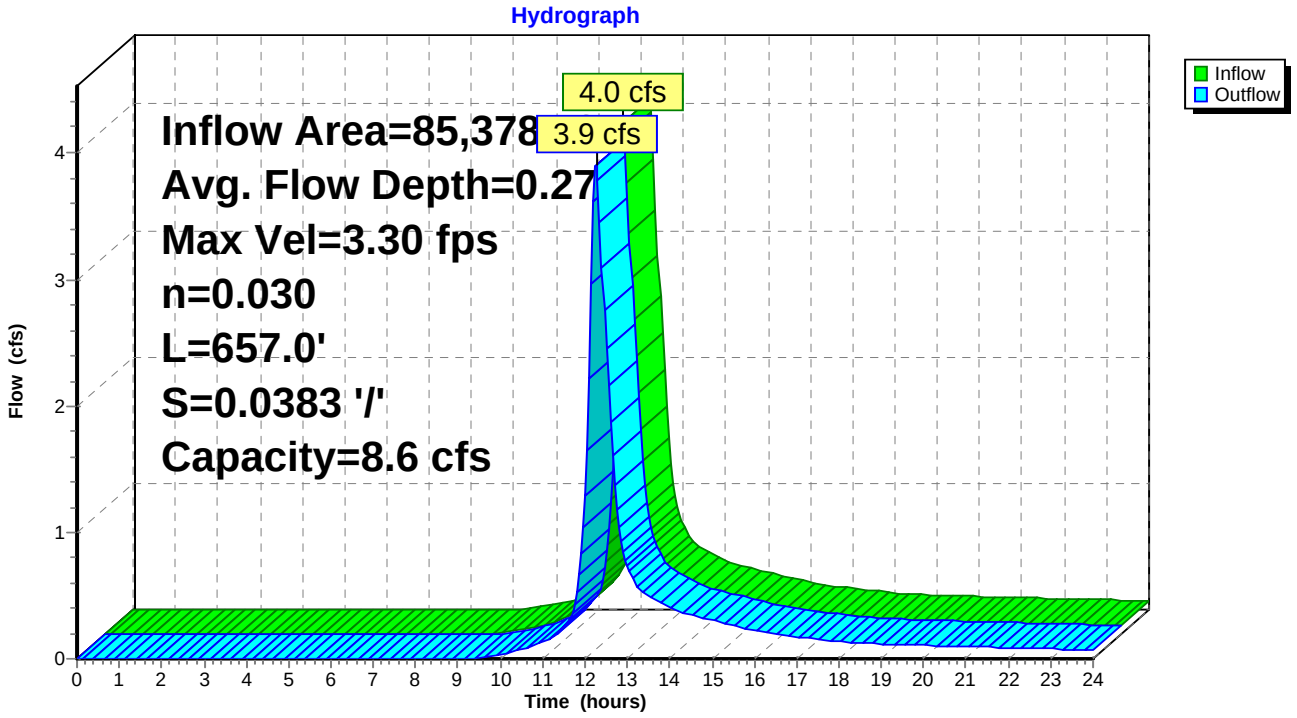
Peak Storage= 778 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡

Reach 19R: Riprap Swale



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 2.44" for 10-Year event
Inflow = 3.0 cfs @ 12.15 hrs, Volume= 10,862 cf
Outflow = 2.9 cfs @ 12.18 hrs, Volume= 10,830 cf, Atten= 4%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.23 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 8.4 min

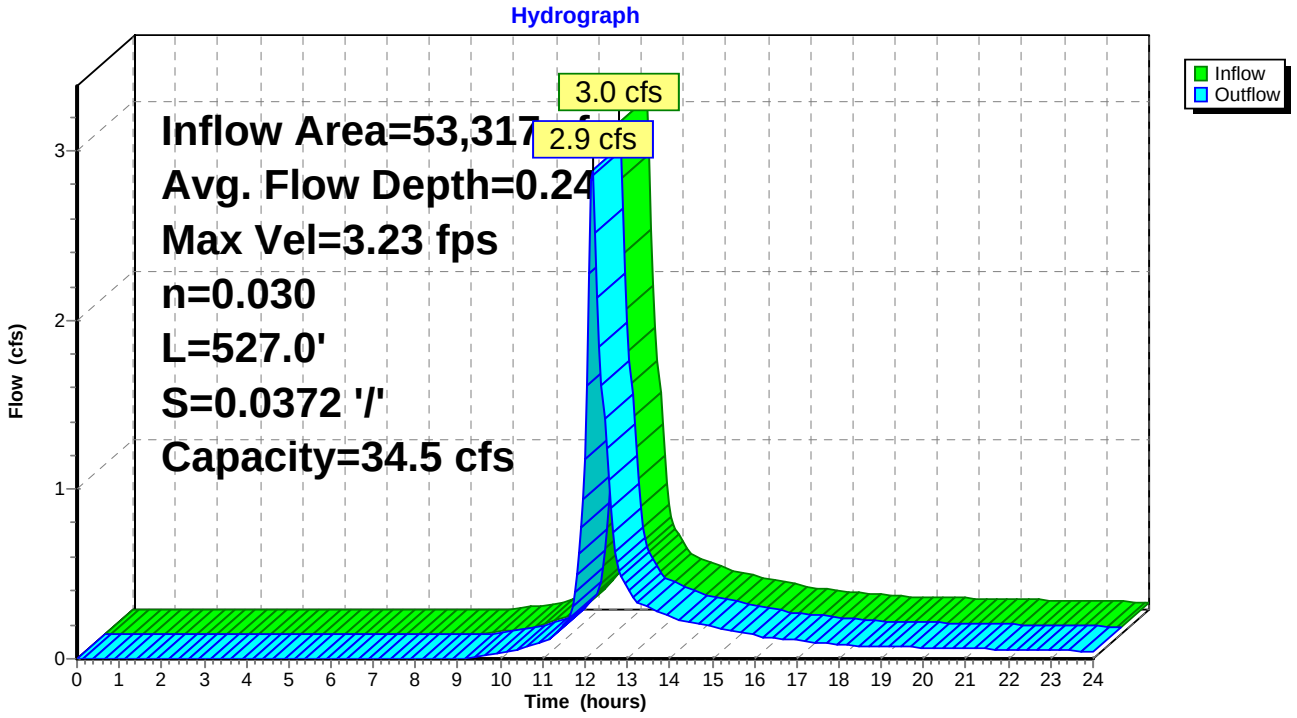
Peak Storage= 470 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

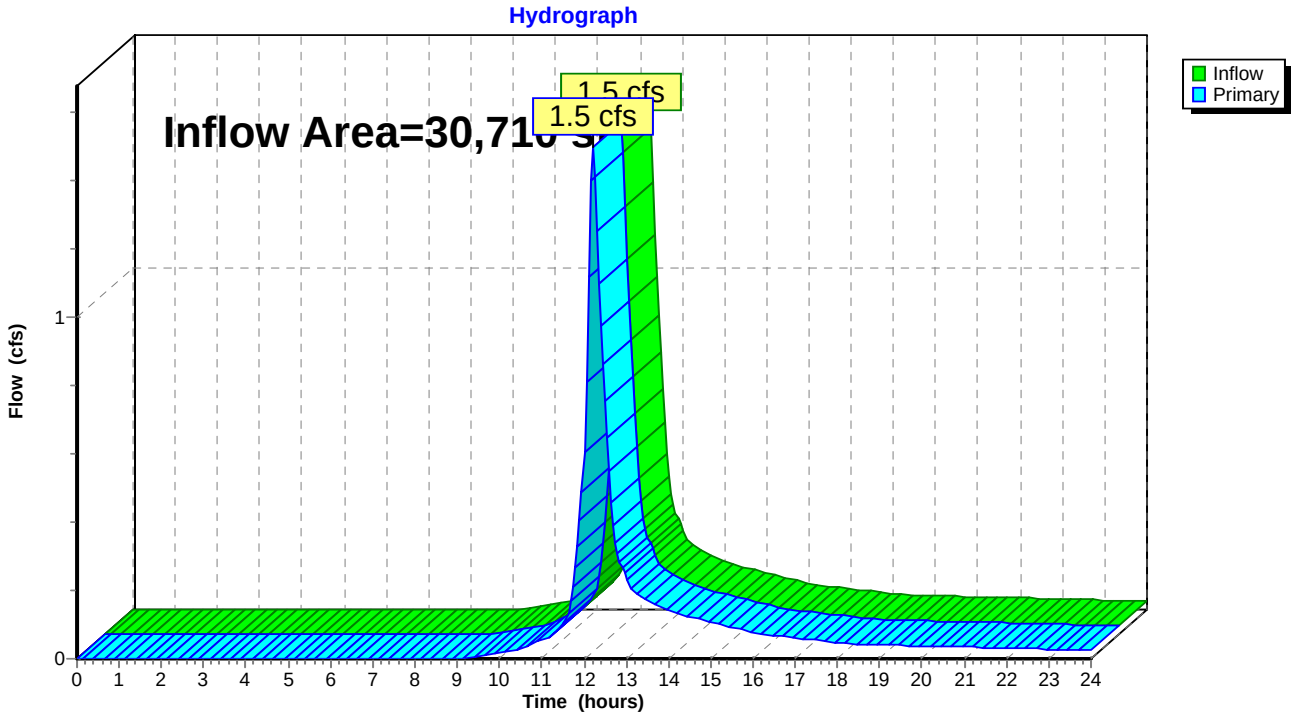


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 0.00% Impervious, Inflow Depth > 2.36" for 10-Year event
Inflow = 1.5 cfs @ 12.20 hrs, Volume= 6,033 cf
Primary = 1.5 cfs @ 12.20 hrs, Volume= 6,033 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

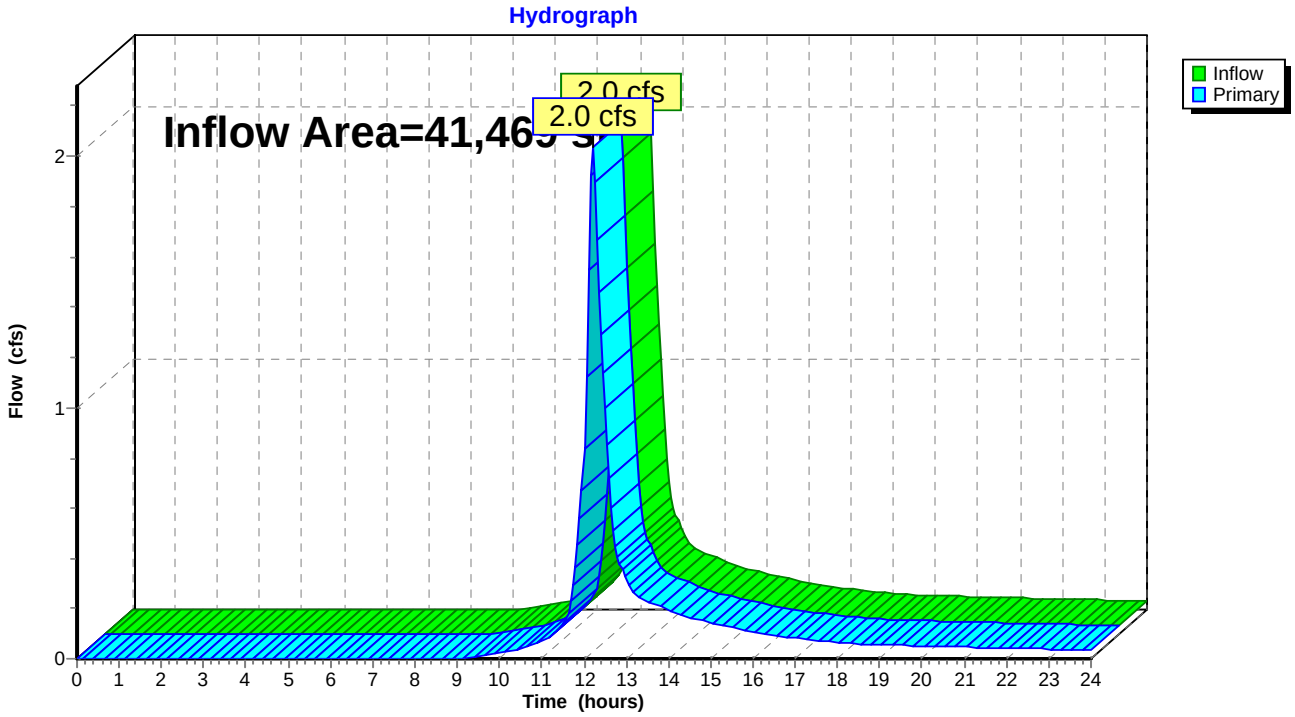


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 0.00% Impervious, Inflow Depth > 2.36" for 10-Year event
Inflow = 2.0 cfs @ 12.20 hrs, Volume= 8,148 cf
Primary = 2.0 cfs @ 12.20 hrs, Volume= 8,148 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

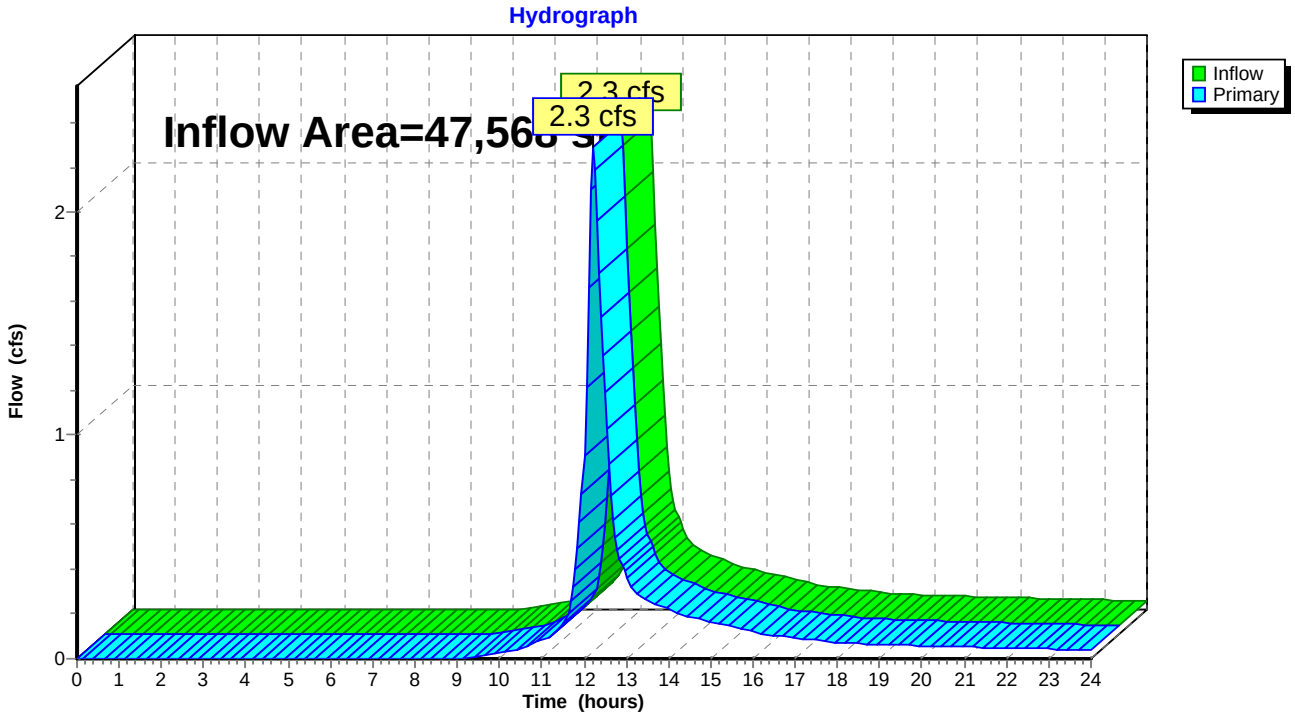


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 0.00% Impervious, Inflow Depth > 2.36" for 10-Year event
Inflow = 2.3 cfs @ 12.21 hrs, Volume= 9,344 cf
Primary = 2.3 cfs @ 12.21 hrs, Volume= 9,344 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

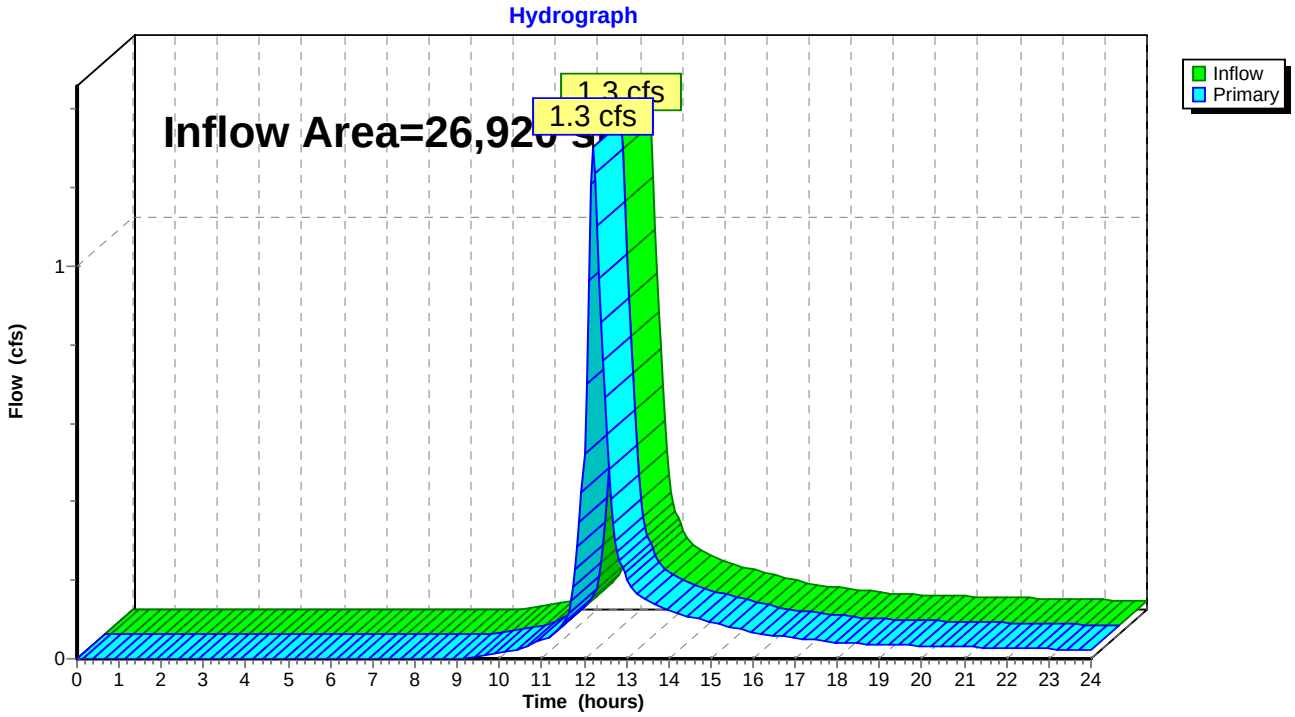


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 0.00% Impervious, Inflow Depth > 2.36" for 10-Year event
Inflow = 1.3 cfs @ 12.20 hrs, Volume= 5,289 cf
Primary = 1.3 cfs @ 12.20 hrs, Volume= 5,289 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

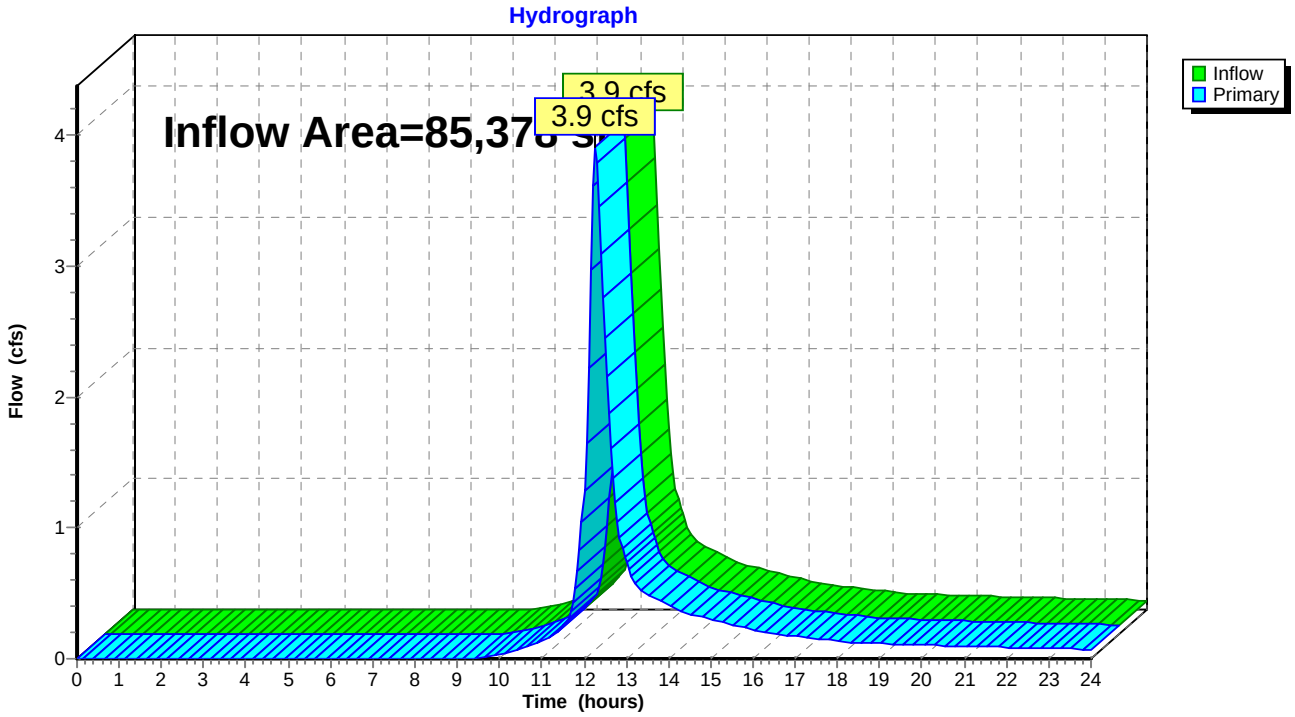


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 2.35" for 10-Year event
Inflow = 3.9 cfs @ 12.26 hrs, Volume= 16,715 cf
Primary = 3.9 cfs @ 12.26 hrs, Volume= 16,715 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

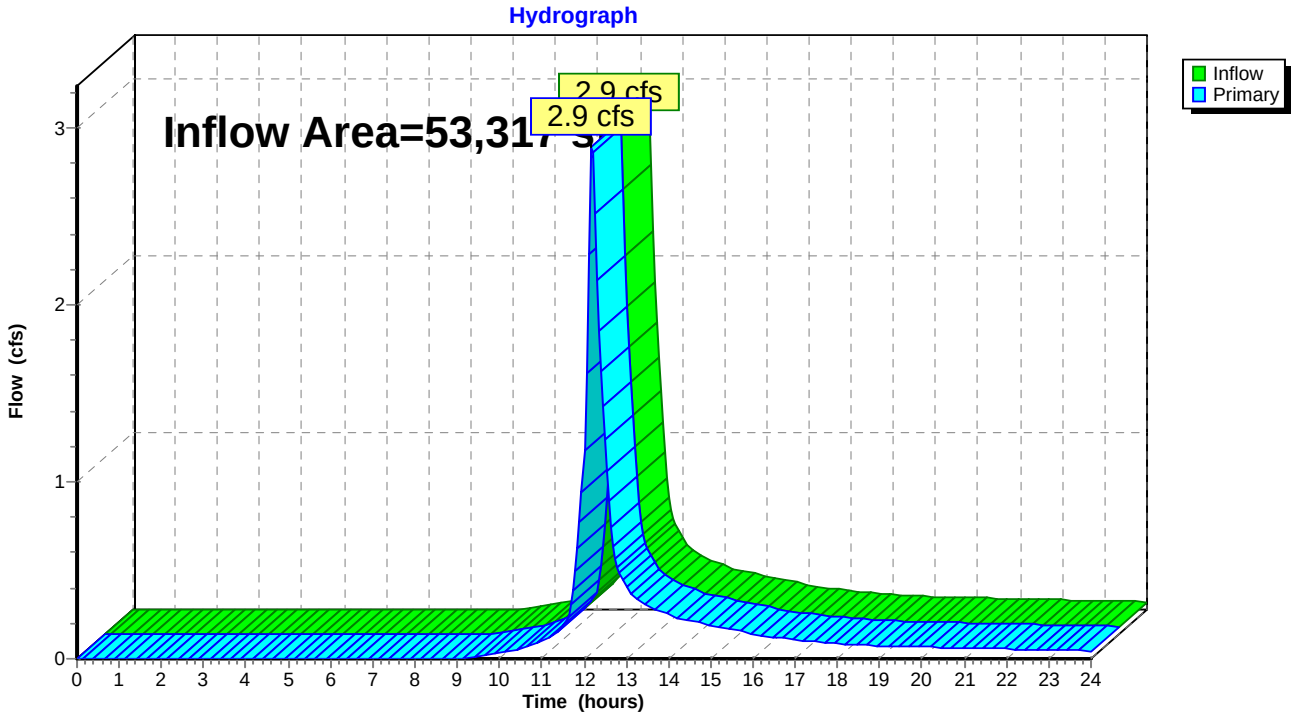


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 2.44" for 10-Year event
Inflow = 2.9 cfs @ 12.18 hrs, Volume= 10,830 cf
Primary = 2.9 cfs @ 12.18 hrs, Volume= 10,830 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

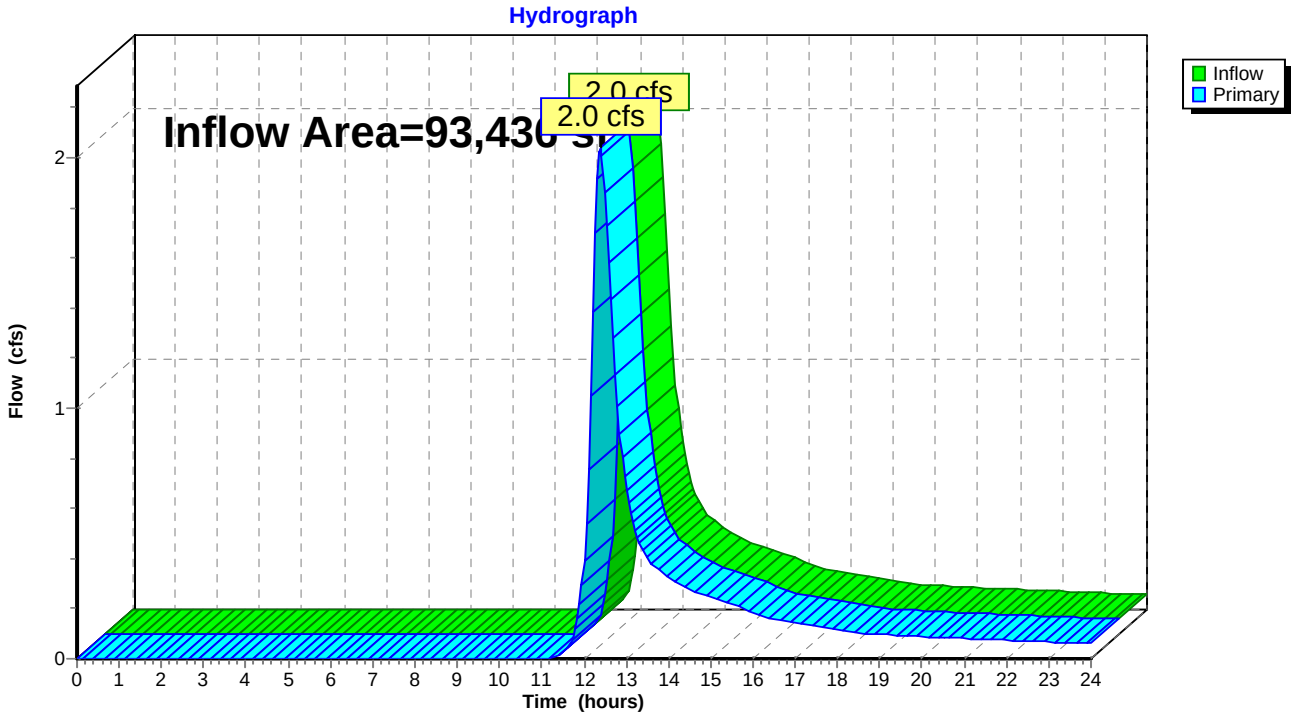


Summary for Link 15L: Wetland W

Inflow Area = 93,436 sf, 0.00% Impervious, Inflow Depth > 1.43" for 10-Year event
Inflow = 2.0 cfs @ 12.38 hrs, Volume= 11,125 cf
Primary = 2.0 cfs @ 12.38 hrs, Volume= 11,125 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

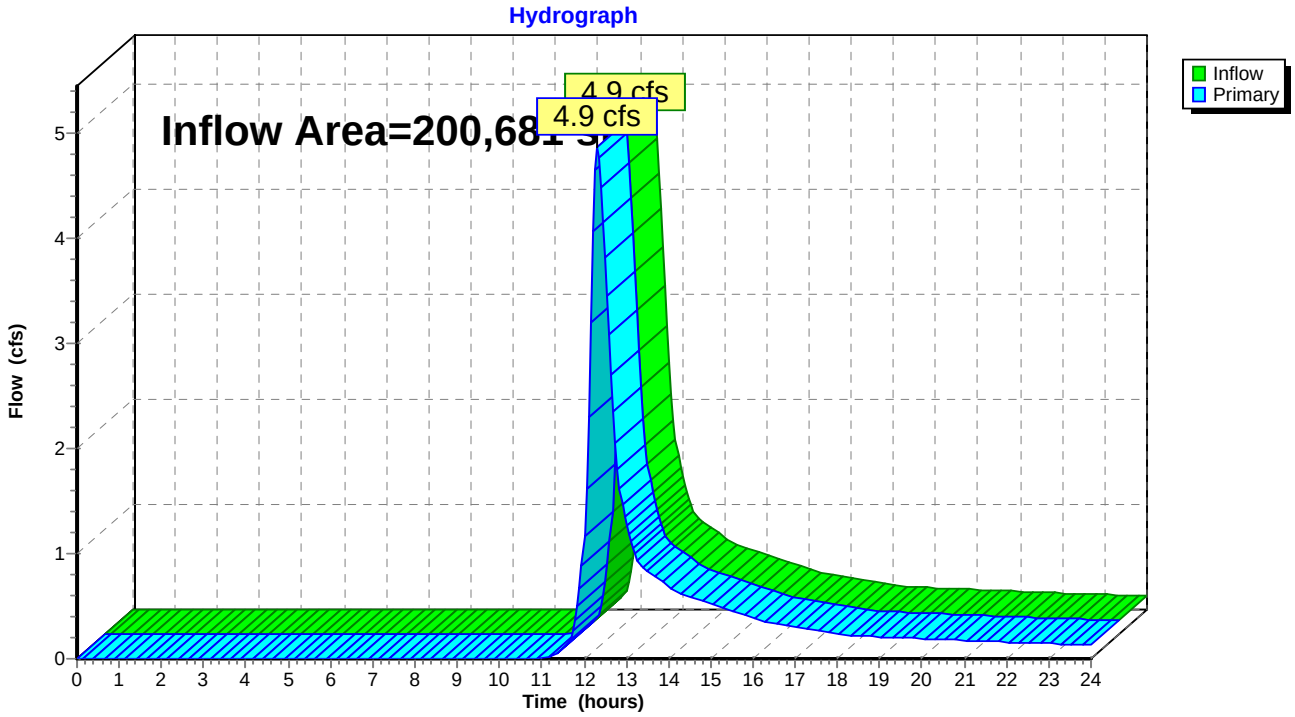


Summary for Link 16L: Wetland E

Inflow Area = 200,681 sf, 0.00% Impervious, Inflow Depth > 1.46" for 10-Year event
Inflow = 4.9 cfs @ 12.31 hrs, Volume= 24,364 cf
Primary = 4.9 cfs @ 12.31 hrs, Volume= 24,364 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 0.00% Impervious Runoff Depth>2.93"
Flow Length=239' Tc=13.7 min CN=74 Runoff=2.5 cfs 10,114 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 0.00% Impervious Runoff Depth>2.93"
Flow Length=179' Tc=14.1 min CN=74 Runoff=1.9 cfs 7,489 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 0.00% Impervious Runoff Depth>2.93"
Flow Length=204' Tc=14.6 min CN=74 Runoff=2.9 cfs 11,599 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 0.00% Impervious Runoff Depth>2.93"
Flow Length=222' Tc=14.3 min CN=74 Runoff=1.6 cfs 6,565 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 0.00% Impervious Runoff Depth>2.93"
Flow Length=752' Tc=15.2 min CN=74 Runoff=5.0 cfs 20,816 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 0.00% Impervious Runoff Depth>3.02"
Flow Length=459' Tc=10.0 min CN=75 Runoff=3.8 cfs 13,430 cf

Subcatchment 7S: Green Field W Runoff Area=2.145 ac 0.00% Impervious Runoff Depth>1.88"
Flow Length=472' Tc=24.7 min CN=62 Runoff=2.8 cfs 14,608 cf

Subcatchment 8S: Green Field E Runoff Area=2.890 ac 0.00% Impervious Runoff Depth>1.88"
Flow Length=305' Tc=20.6 min CN=62 Runoff=4.0 cfs 19,704 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.00% Impervious Runoff Depth>1.96"
Flow Length=247' Tc=19.4 min CN=63 Runoff=2.6 cfs 12,217 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.30' Max Vel=3.52 fps Inflow=5.0 cfs 20,816 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=4.9 cfs 20,755 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.27' Max Vel=3.46 fps Inflow=3.8 cfs 13,430 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=3.6 cfs 13,394 cf

Link 7L: Wetlands NW Inflow=1.9 cfs 7,489 cf
Primary=1.9 cfs 7,489 cf

Link 8L: Depression S Inflow=2.5 cfs 10,114 cf
Primary=2.5 cfs 10,114 cf

Link 9L: Wetlands NE Inflow=2.9 cfs 11,599 cf
Primary=2.9 cfs 11,599 cf

Link 10L: Wetlands N Inflow=1.6 cfs 6,565 cf
Primary=1.6 cfs 6,565 cf

Link 11L: Collection Swale W Inflow=4.9 cfs 20,755 cf
Primary=4.9 cfs 20,755 cf

Link 12L: Collection Swale W Inflow=3.6 cfs 13,394 cf
Primary=3.6 cfs 13,394 cf

Link 15L: Wetland W Inflow=2.8 cfs 14,608 cf
Primary=2.8 cfs 14,608 cf

Link 16L: Wetland E Inflow=6.6 cfs 31,922 cf
Primary=6.6 cfs 31,922 cf

Total Runoff Area = 579,479 sf Runoff Volume = 116,542 cf Average Runoff Depth = 2.41"
100.00% Pervious = 579,479 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

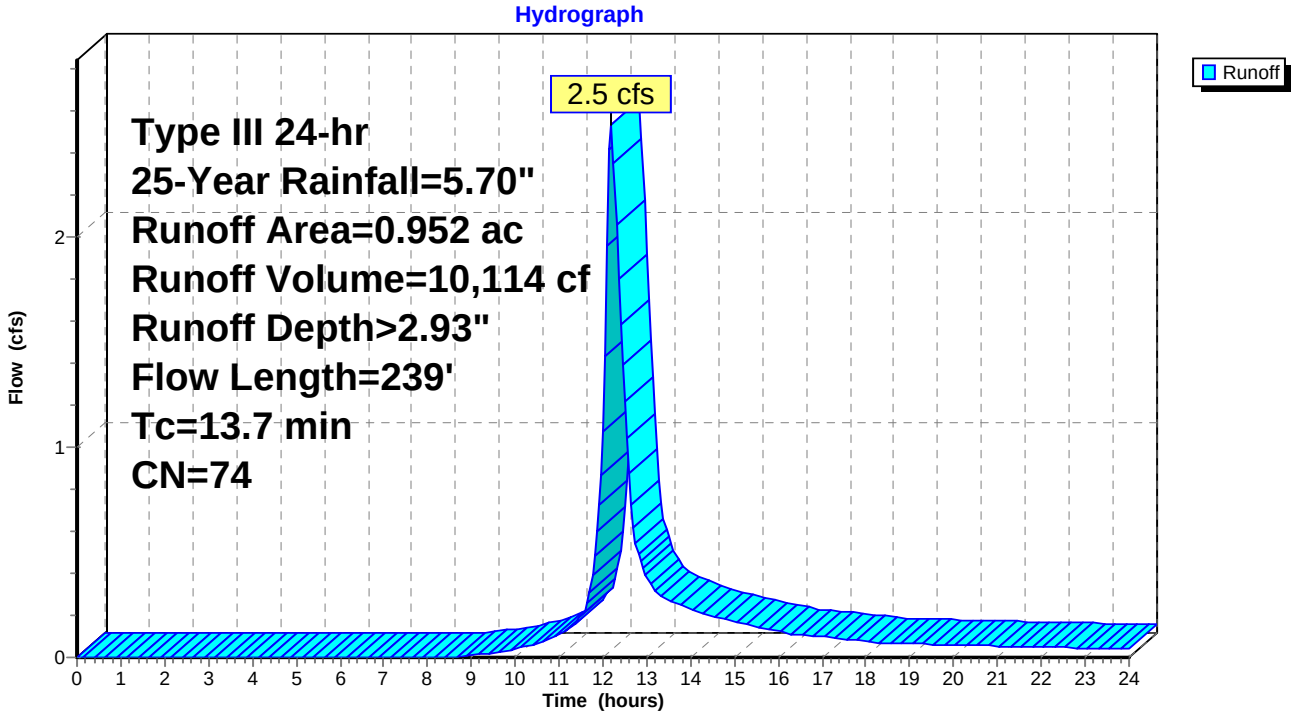
Runoff = 2.5 cfs @ 12.19 hrs, Volume= 10,114 cf, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.952	74	>75% Grass cover, Good, HSG C
0.952		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

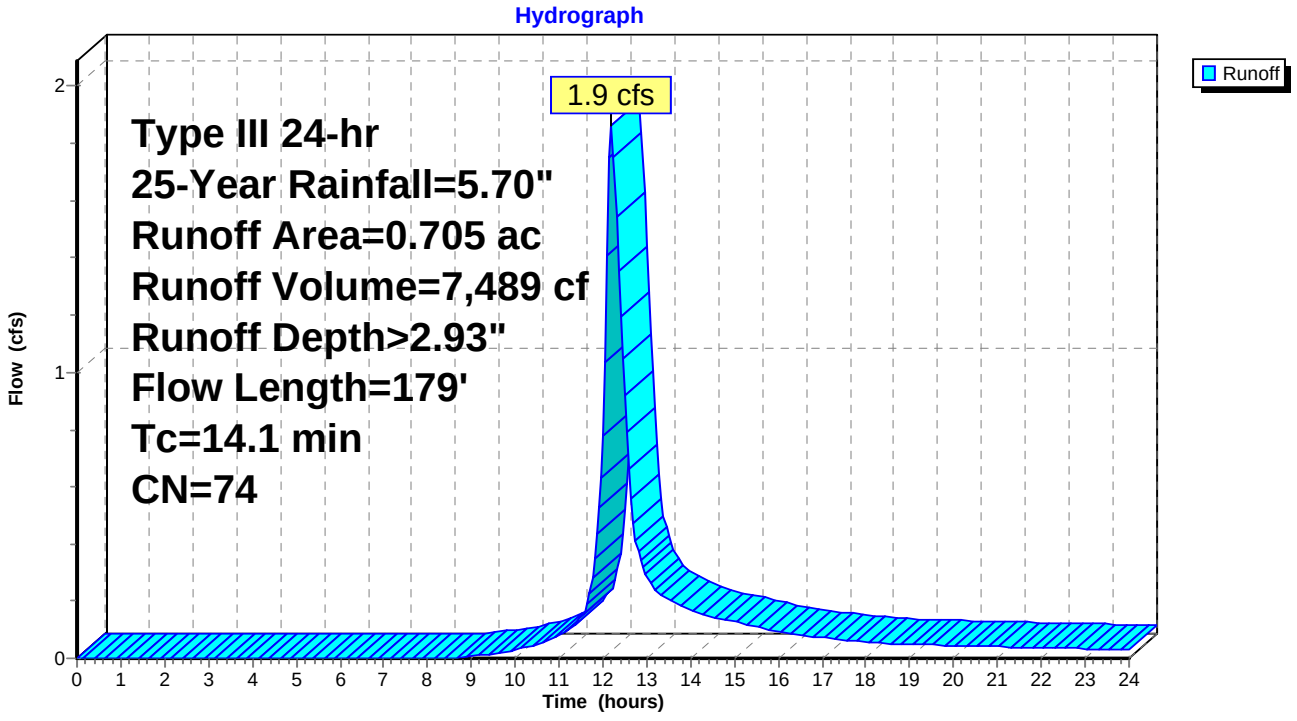
Runoff = 1.9 cfs @ 12.20 hrs, Volume= 7,489 cf, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.705	74	>75% Grass cover, Good, HSG C
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

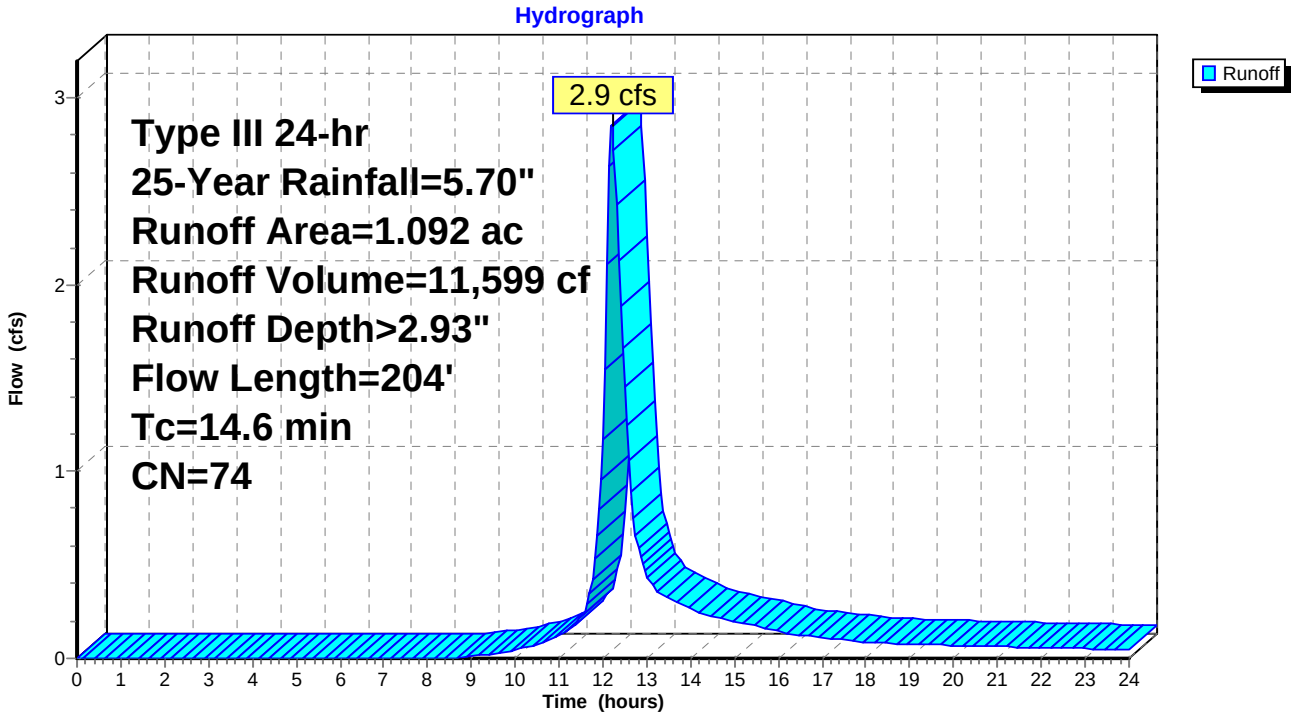
Runoff = 2.9 cfs @ 12.21 hrs, Volume= 11,599 cf, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
1.092	74	>75% Grass cover, Good, HSG C
1.092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

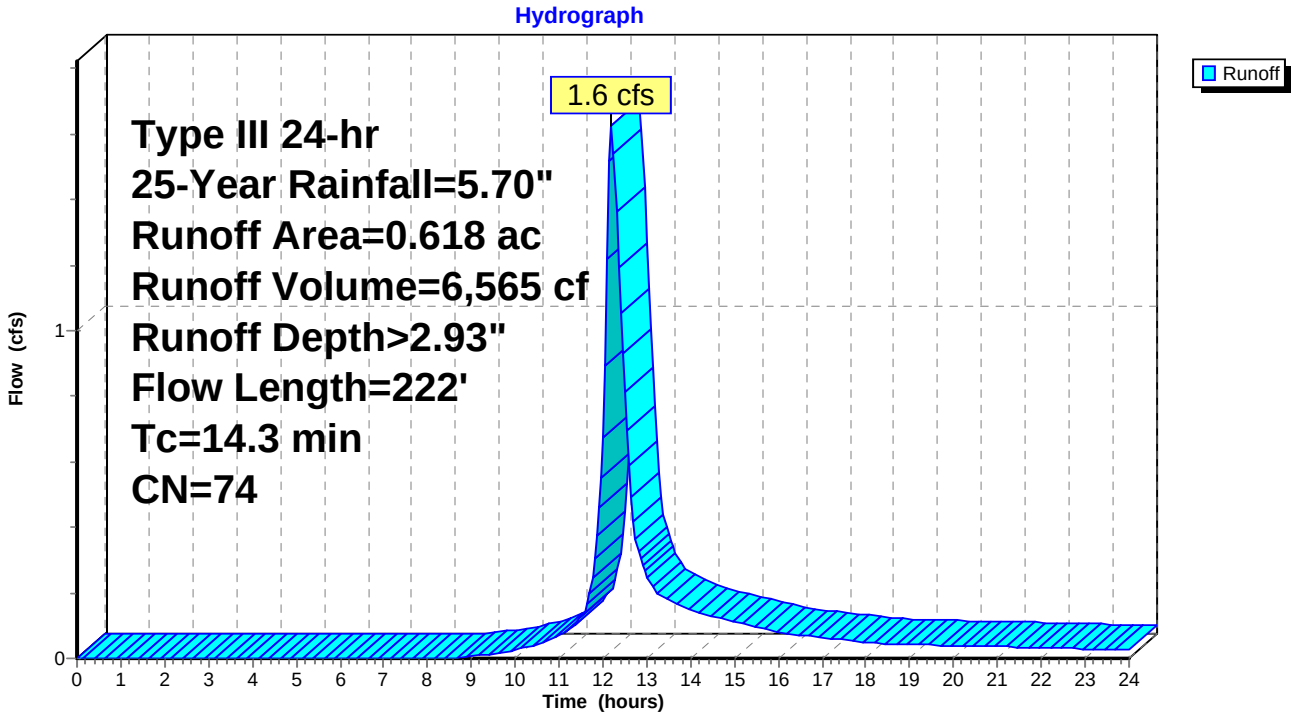
Runoff = 1.6 cfs @ 12.20 hrs, Volume= 6,565 cf, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.618	74	>75% Grass cover, Good, HSG C
0.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

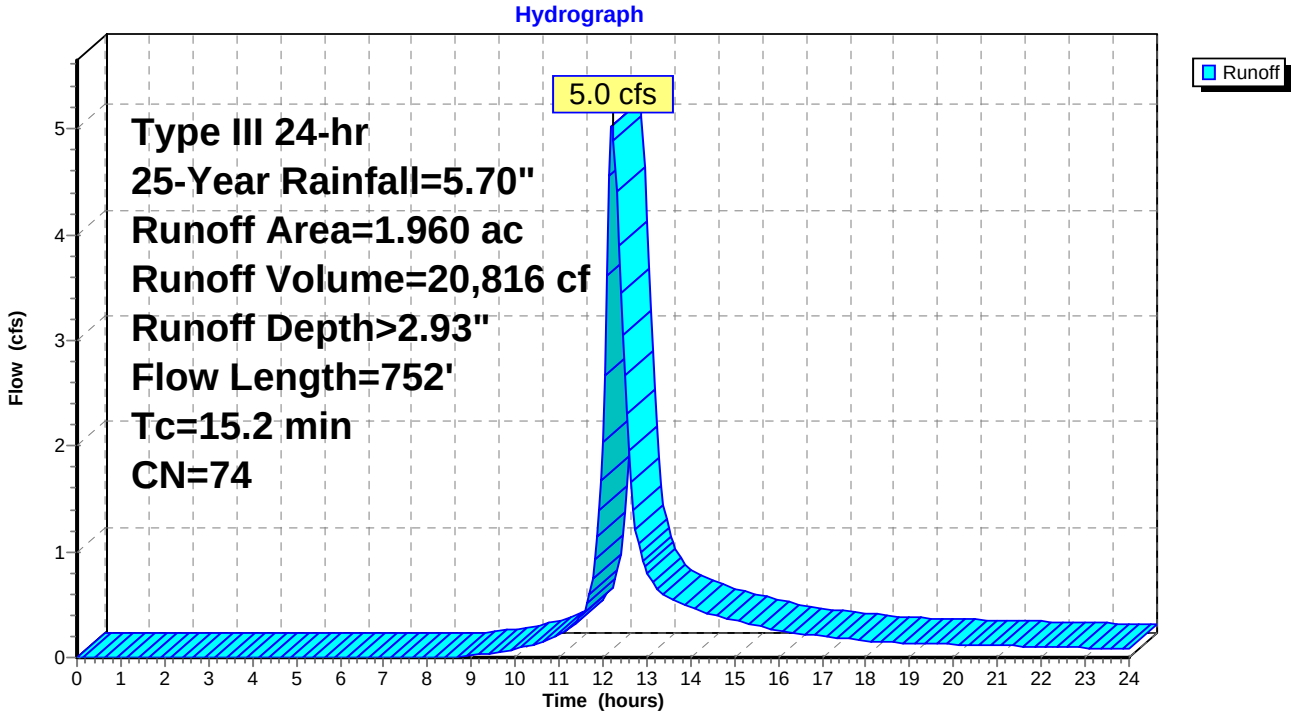
Runoff = 5.0 cfs @ 12.21 hrs, Volume= 20,816 cf, Depth> 2.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
1.960	74	>75% Grass cover, Good, HSG C
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

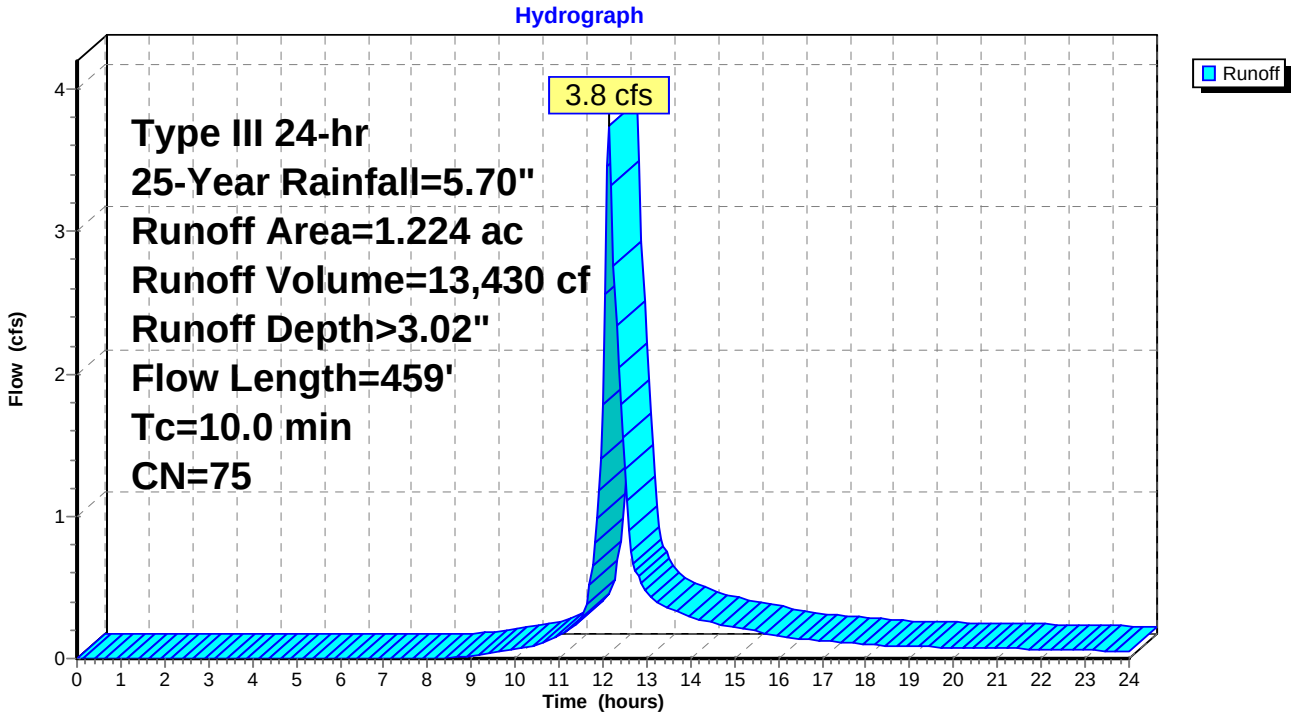
Runoff = 3.8 cfs @ 12.15 hrs, Volume= 13,430 cf, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
1.134	74	>75% Grass cover, Good, HSG C
0.090	89	Gravel roads, HSG C
1.224	75	Weighted Average
1.224		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

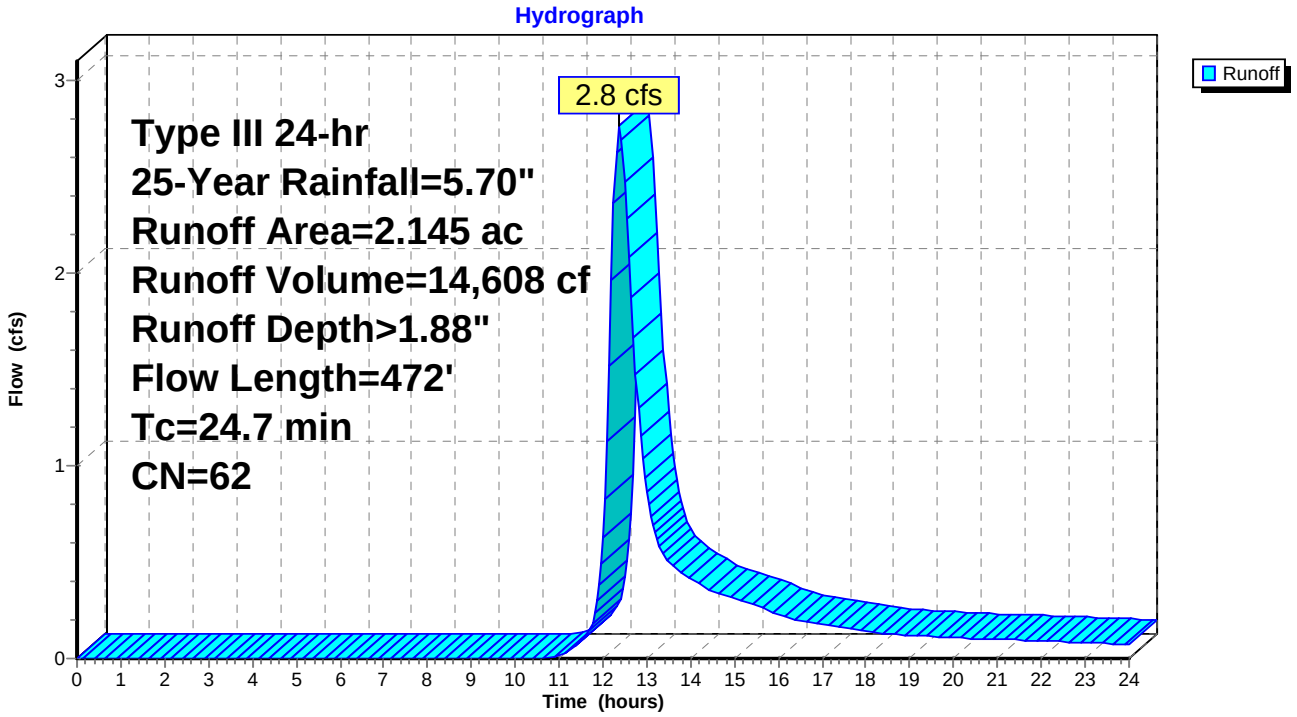
Runoff = 2.8 cfs @ 12.37 hrs, Volume= 14,608 cf, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.022	74	>75% Grass cover, Good, HSG C
0.089	80	>75% Grass cover, Good, HSG D
0.282	61	>75% Grass cover, Good, HSG B
1.752	61	>75% Grass cover, Good, HSG B
2.145	62	Weighted Average
2.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

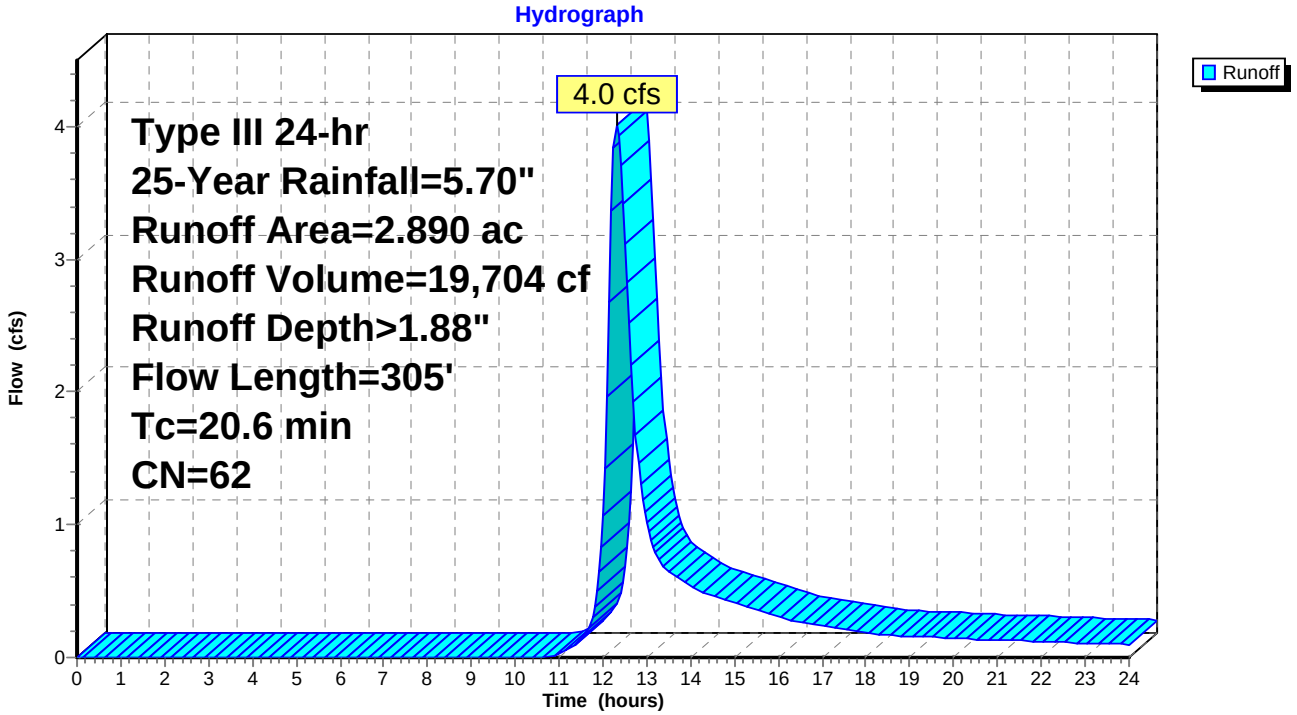
Runoff = 4.0 cfs @ 12.31 hrs, Volume= 19,704 cf, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
2.685	61	>75% Grass cover, Good, HSG B
0.072	80	>75% Grass cover, Good, HSG D
0.033	80	>75% Grass cover, Good, HSG D
0.100	61	>75% Grass cover, Good, HSG B
2.890	62	Weighted Average
2.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

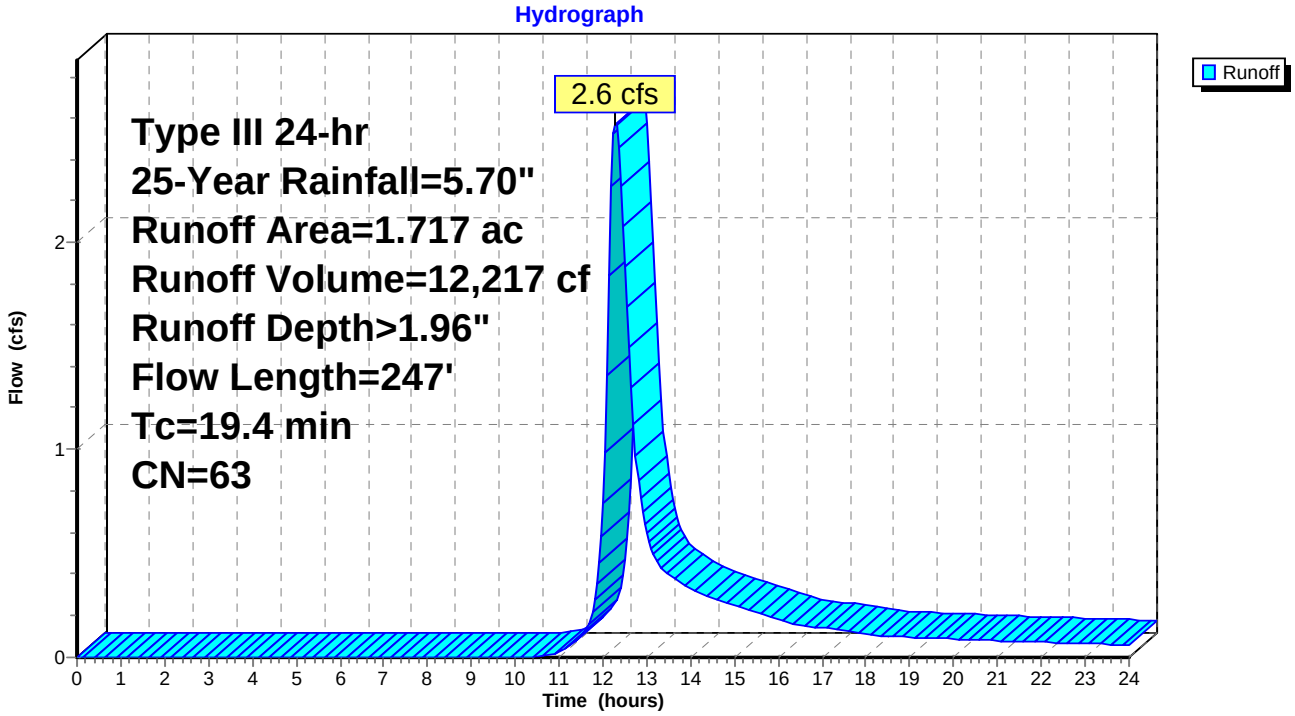
Runoff = 2.6 cfs @ 12.29 hrs, Volume= 12,217 cf, Depth> 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

Area (ac)	CN	Description
0.091	77	Woods, Good, HSG D
0.151	55	Woods, Good, HSG B
1.288	61	>75% Grass cover, Good, HSG B
0.187	80	>75% Grass cover, Good, HSG D
1.717	63	Weighted Average
1.717		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 2.93" for 25-Year event
Inflow = 5.0 cfs @ 12.21 hrs, Volume= 20,816 cf
Outflow = 4.9 cfs @ 12.26 hrs, Volume= 20,755 cf, Atten= 3%, Lag= 2.5 min

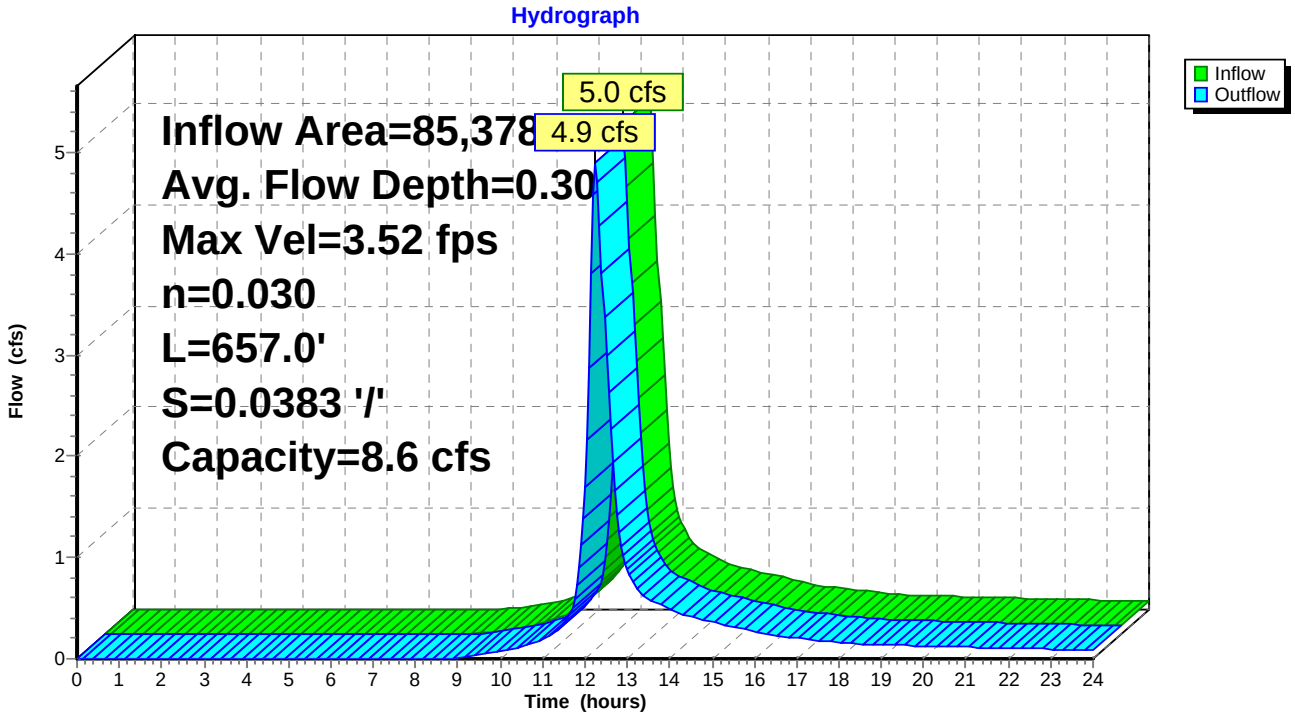
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.52 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 8.6 min

Peak Storage= 912 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 3.02" for 25-Year event
Inflow = 3.8 cfs @ 12.15 hrs, Volume= 13,430 cf
Outflow = 3.6 cfs @ 12.17 hrs, Volume= 13,394 cf, Atten= 3%, Lag= 1.8 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.46 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 7.9 min

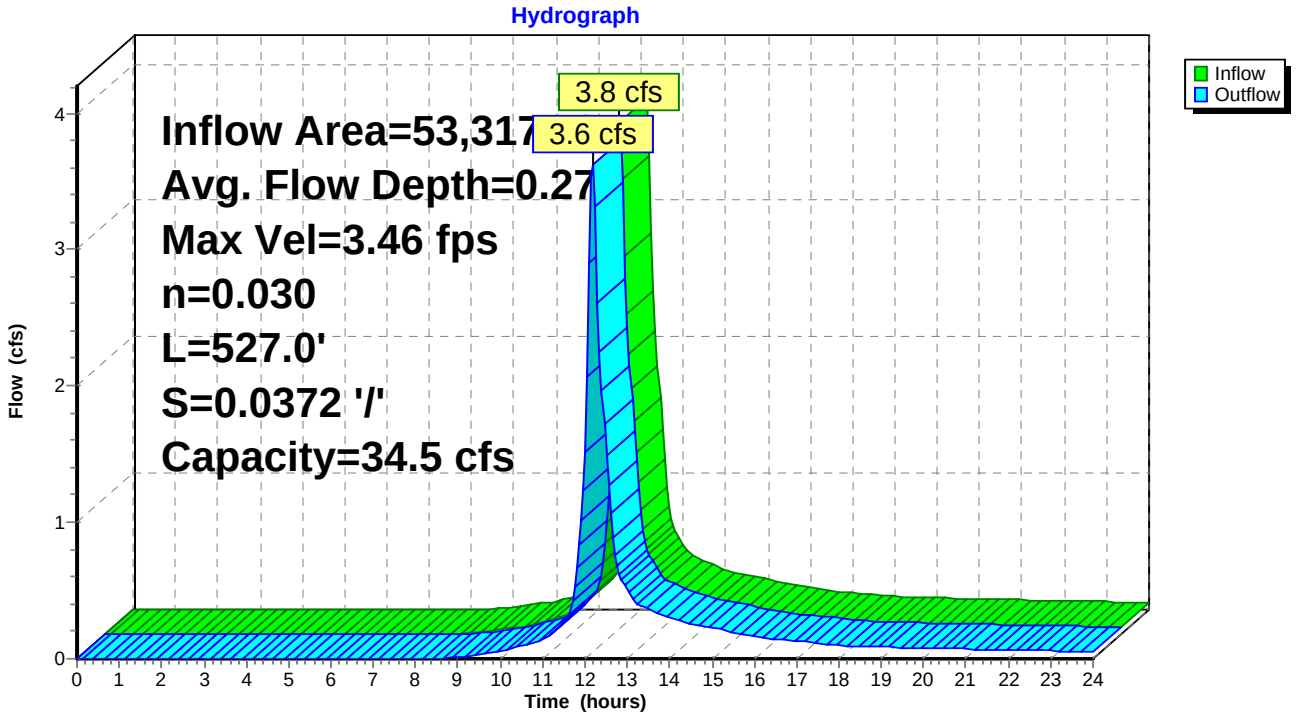
Peak Storage= 548 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

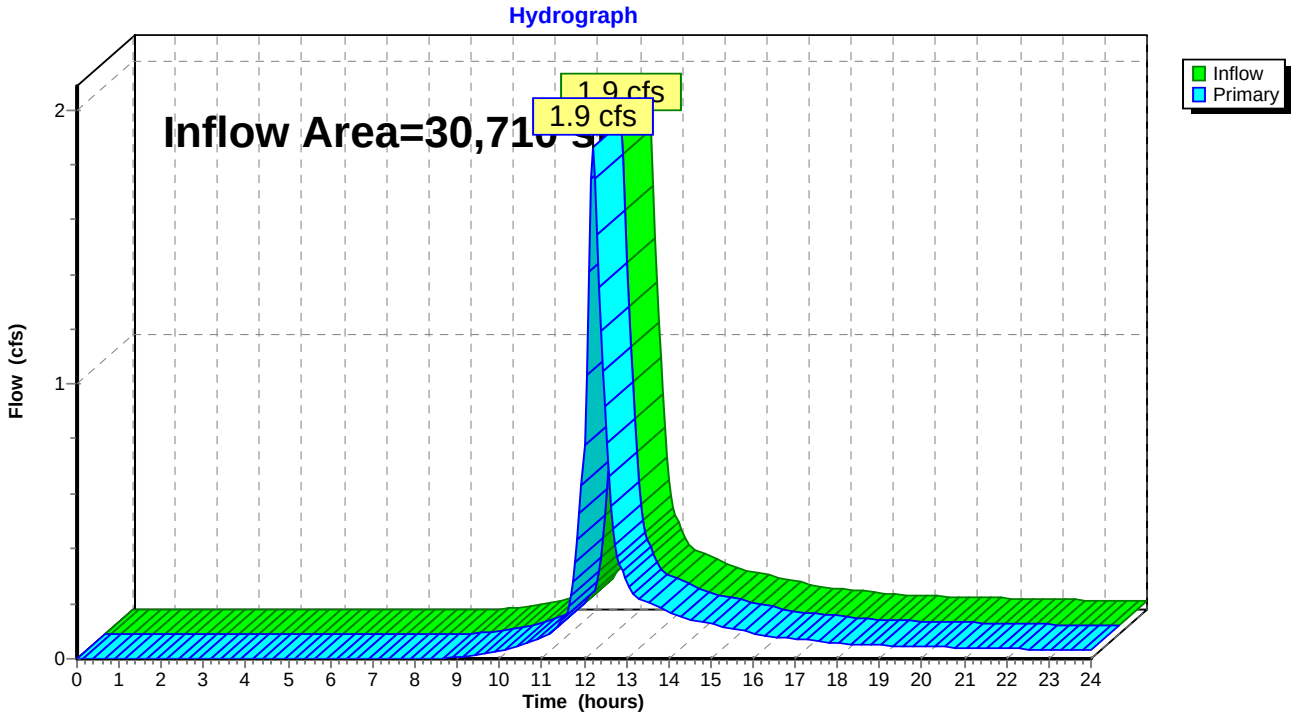


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 0.00% Impervious, Inflow Depth > 2.93" for 25-Year event
Inflow = 1.9 cfs @ 12.20 hrs, Volume= 7,489 cf
Primary = 1.9 cfs @ 12.20 hrs, Volume= 7,489 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

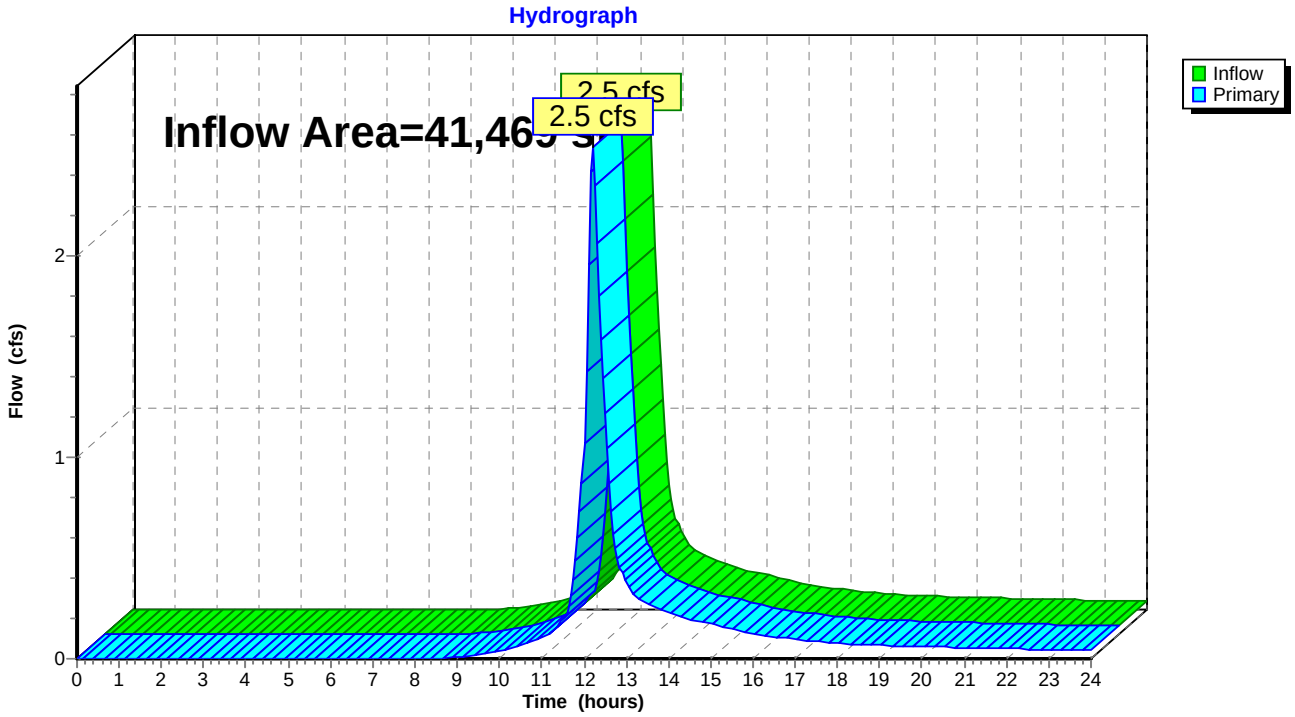


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 0.00% Impervious, Inflow Depth > 2.93" for 25-Year event
Inflow = 2.5 cfs @ 12.19 hrs, Volume= 10,114 cf
Primary = 2.5 cfs @ 12.19 hrs, Volume= 10,114 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

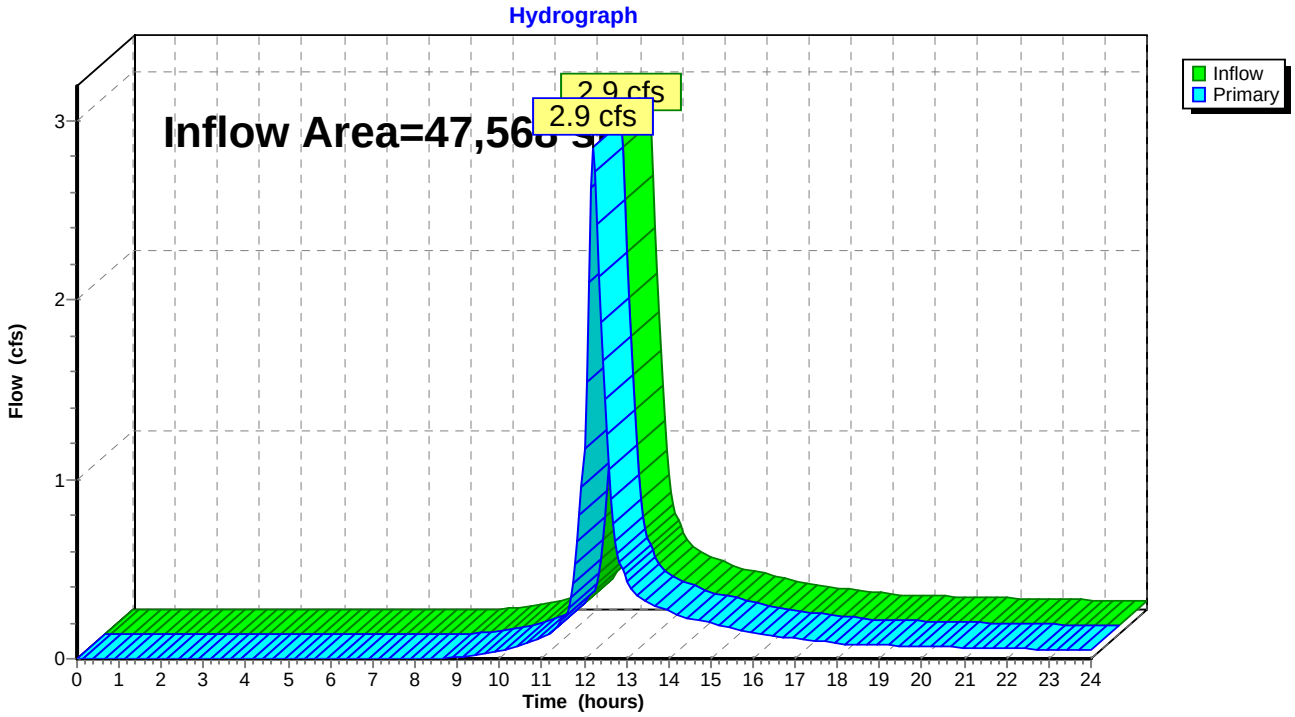


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 0.00% Impervious, Inflow Depth > 2.93" for 25-Year event
Inflow = 2.9 cfs @ 12.21 hrs, Volume= 11,599 cf
Primary = 2.9 cfs @ 12.21 hrs, Volume= 11,599 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

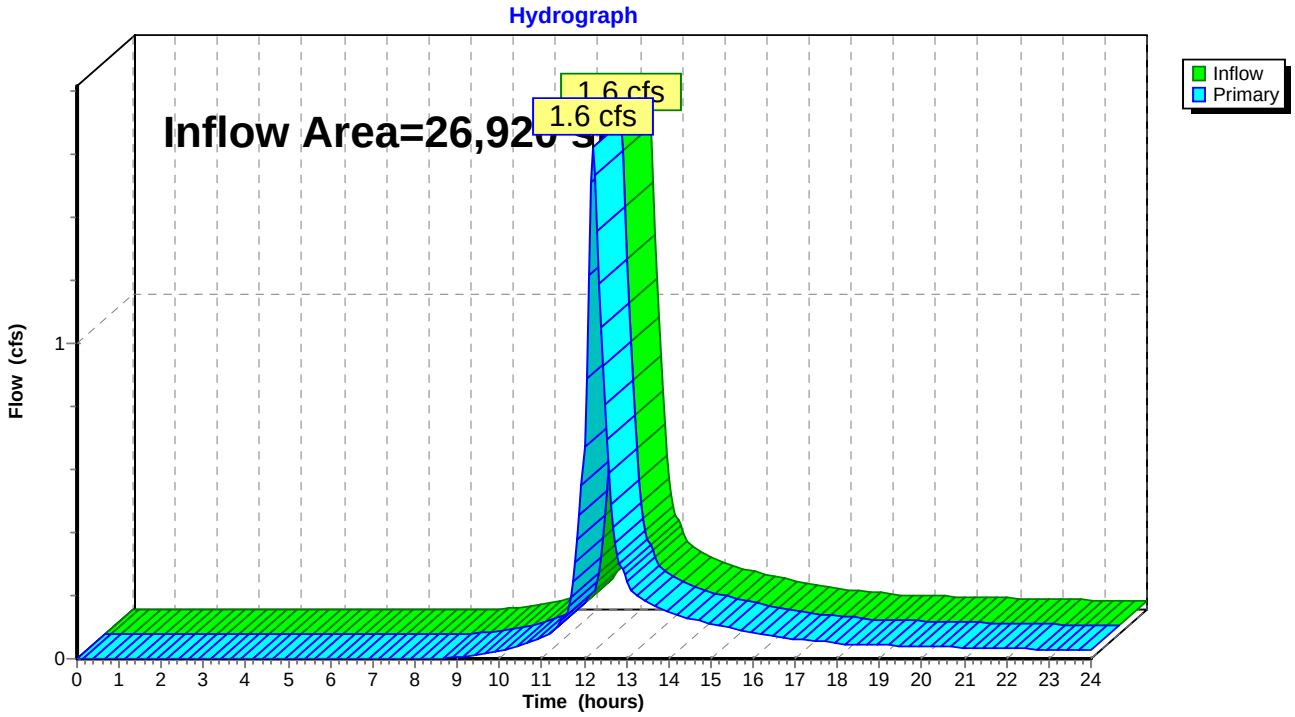


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 0.00% Impervious, Inflow Depth > 2.93" for 25-Year event
Inflow = 1.6 cfs @ 12.20 hrs, Volume= 6,565 cf
Primary = 1.6 cfs @ 12.20 hrs, Volume= 6,565 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

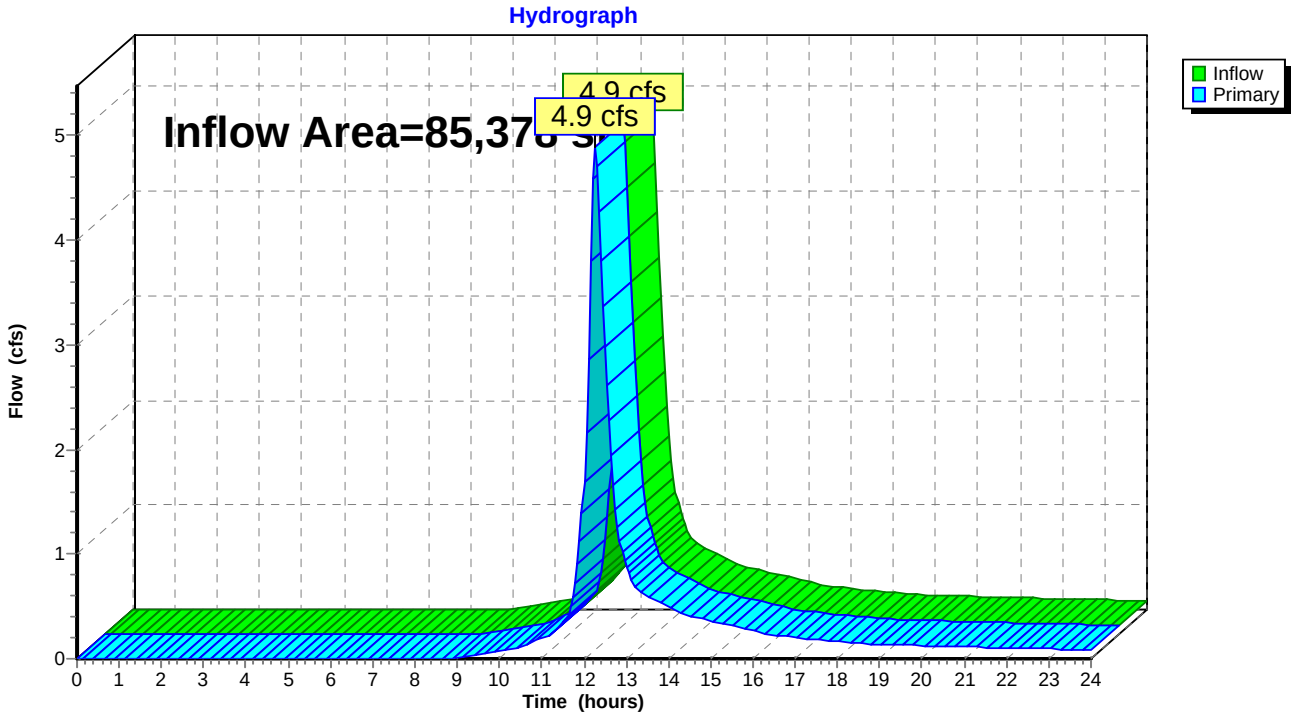


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 2.92" for 25-Year event
Inflow = 4.9 cfs @ 12.26 hrs, Volume= 20,755 cf
Primary = 4.9 cfs @ 12.26 hrs, Volume= 20,755 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

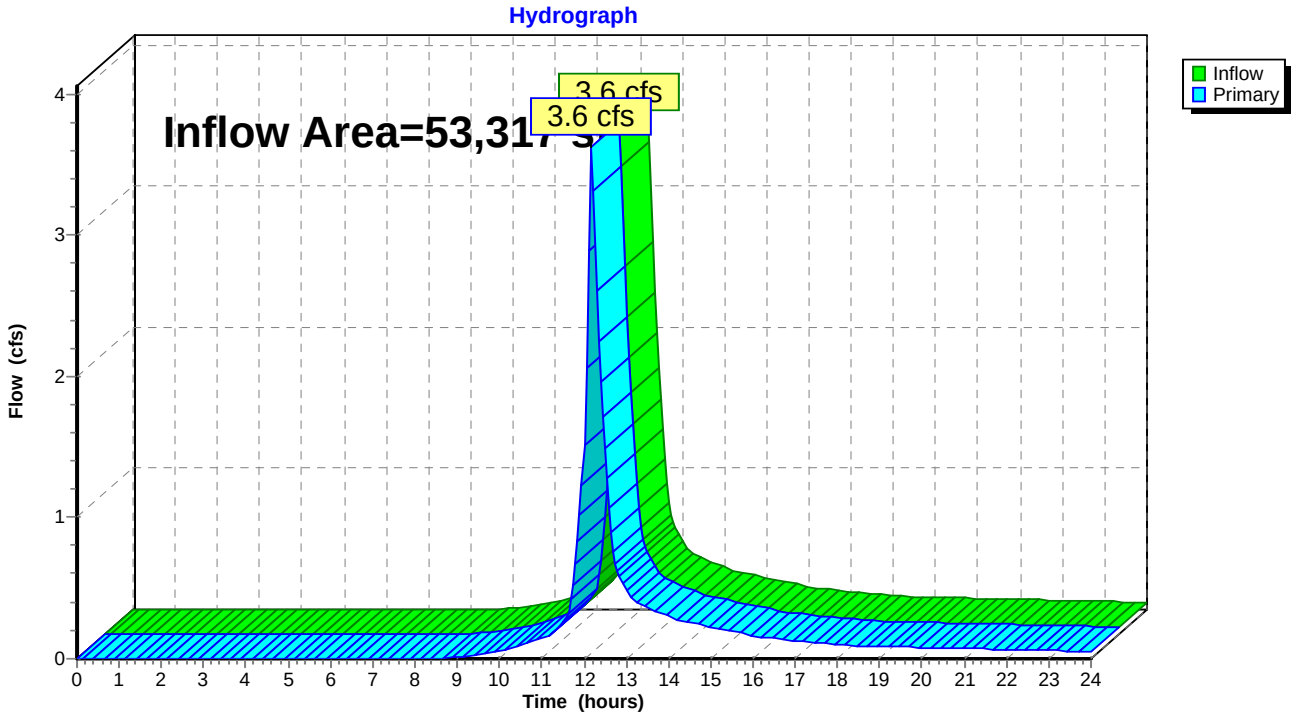


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 3.01" for 25-Year event
Inflow = 3.6 cfs @ 12.17 hrs, Volume= 13,394 cf
Primary = 3.6 cfs @ 12.17 hrs, Volume= 13,394 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

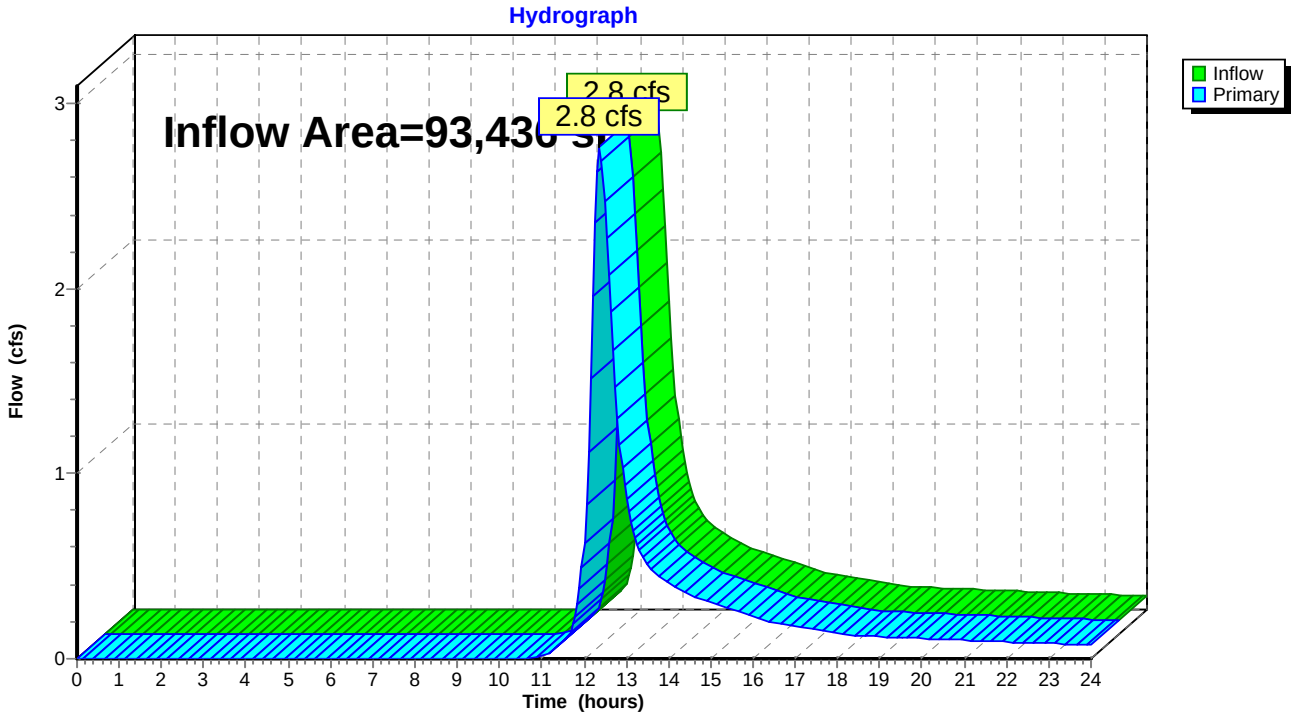


Summary for Link 15L: Wetland W

Inflow Area = 93,436 sf, 0.00% Impervious, Inflow Depth > 1.88" for 25-Year event
Inflow = 2.8 cfs @ 12.37 hrs, Volume= 14,608 cf
Primary = 2.8 cfs @ 12.37 hrs, Volume= 14,608 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

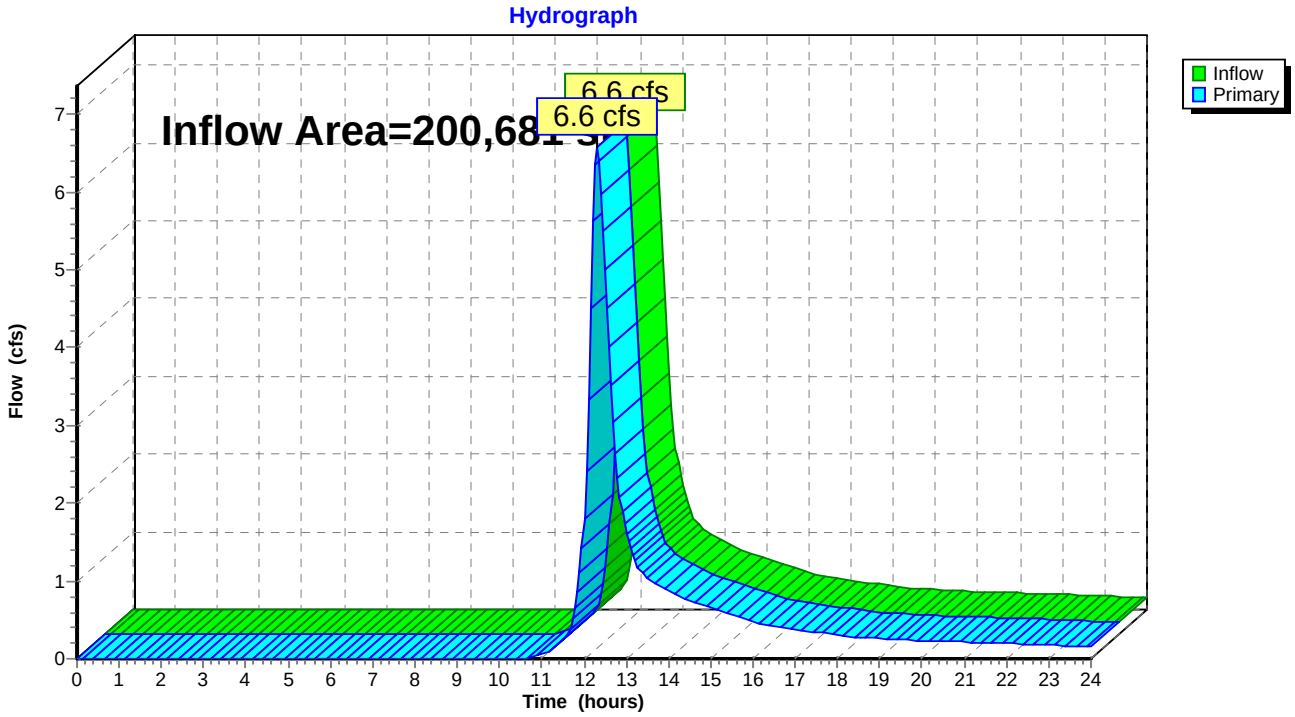


Summary for Link 16L: Wetland E

Inflow Area = 200,681 sf, 0.00% Impervious, Inflow Depth > 1.91" for 25-Year event
Inflow = 6.6 cfs @ 12.30 hrs, Volume= 31,922 cf
Primary = 6.6 cfs @ 12.30 hrs, Volume= 31,922 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 0.00% Impervious Runoff Depth>3.43"
Flow Length=239' Tc=13.7 min CN=74 Runoff=3.0 cfs 11,854 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 0.00% Impervious Runoff Depth>3.43"
Flow Length=179' Tc=14.1 min CN=74 Runoff=2.2 cfs 8,777 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 0.00% Impervious Runoff Depth>3.43"
Flow Length=204' Tc=14.6 min CN=74 Runoff=3.3 cfs 13,594 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 0.00% Impervious Runoff Depth>3.43"
Flow Length=222' Tc=14.3 min CN=74 Runoff=1.9 cfs 7,694 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 0.00% Impervious Runoff Depth>3.43"
Flow Length=752' Tc=15.2 min CN=74 Runoff=5.9 cfs 24,397 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 0.00% Impervious Runoff Depth>3.53"
Flow Length=459' Tc=10.0 min CN=75 Runoff=4.4 cfs 15,698 cf

Subcatchment 7S: Green Field W Runoff Area=2.145 ac 0.00% Impervious Runoff Depth>2.28"
Flow Length=472' Tc=24.7 min CN=62 Runoff=3.4 cfs 17,787 cf

Subcatchment 8S: Green Field E Runoff Area=2.890 ac 0.00% Impervious Runoff Depth>2.29"
Flow Length=305' Tc=20.6 min CN=62 Runoff=5.0 cfs 23,992 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.00% Impervious Runoff Depth>2.38"
Flow Length=247' Tc=19.4 min CN=63 Runoff=3.2 cfs 14,820 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.33' Max Vel=3.69 fps Inflow=5.9 cfs 24,397 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=5.8 cfs 24,331 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.30' Max Vel=3.64 fps Inflow=4.4 cfs 15,698 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=4.3 cfs 15,659 cf

Link 7L: Wetlands NW Inflow=2.2 cfs 8,777 cf
Primary=2.2 cfs 8,777 cf

Link 8L: Depression S Inflow=3.0 cfs 11,854 cf
Primary=3.0 cfs 11,854 cf

Link 9L: Wetlands NE Inflow=3.3 cfs 13,594 cf
Primary=3.3 cfs 13,594 cf

Link 10L: Wetlands N Inflow=1.9 cfs 7,694 cf
Primary=1.9 cfs 7,694 cf

Link 11L: Collection Swale W Inflow=5.8 cfs 24,331 cf
Primary=5.8 cfs 24,331 cf

Link 12L: Collection Swale W Inflow=4.3 cfs 15,659 cf
Primary=4.3 cfs 15,659 cf

Link 15L: Wetland W Inflow=3.4 cfs 17,787 cf
Primary=3.4 cfs 17,787 cf

Link 16L: Wetland E Inflow=8.1 cfs 38,811 cf
Primary=8.1 cfs 38,811 cf

Total Runoff Area = 579,479 sf Runoff Volume = 138,613 cf Average Runoff Depth = 2.87"
100.00% Pervious = 579,479 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

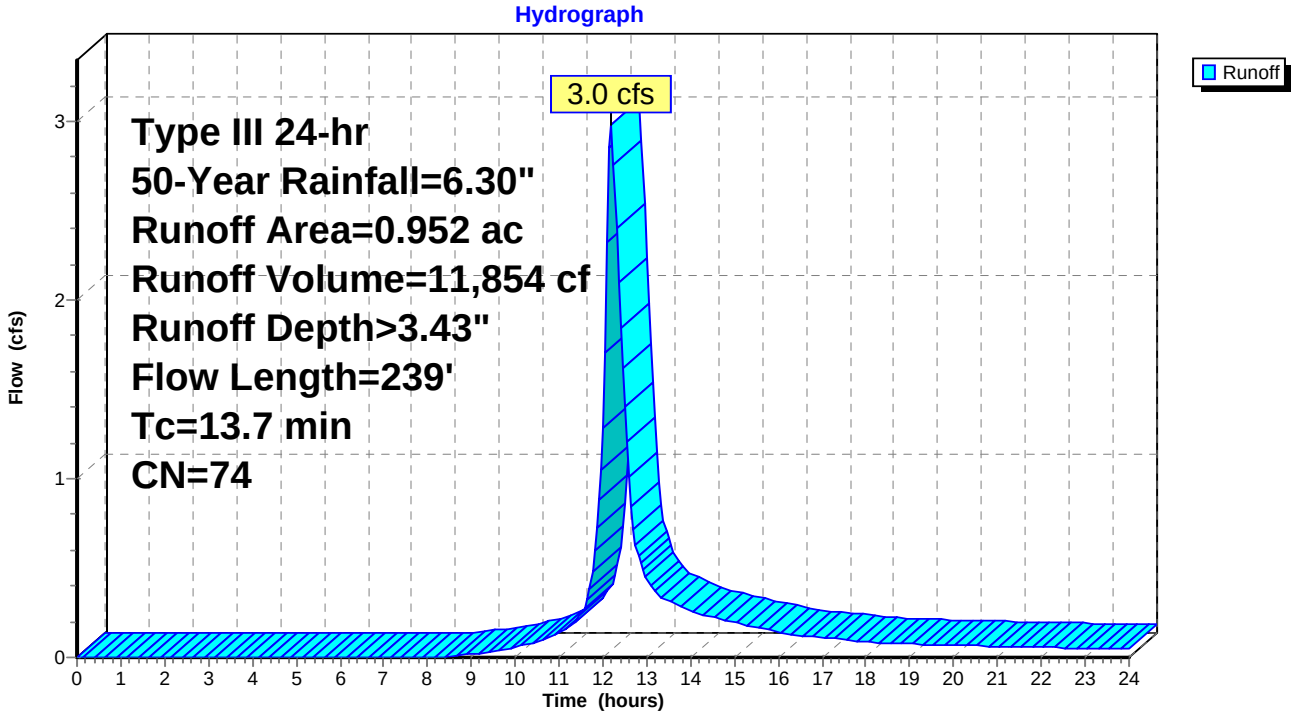
Runoff = 3.0 cfs @ 12.19 hrs, Volume= 11,854 cf, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
0.952	74	>75% Grass cover, Good, HSG C
0.952		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

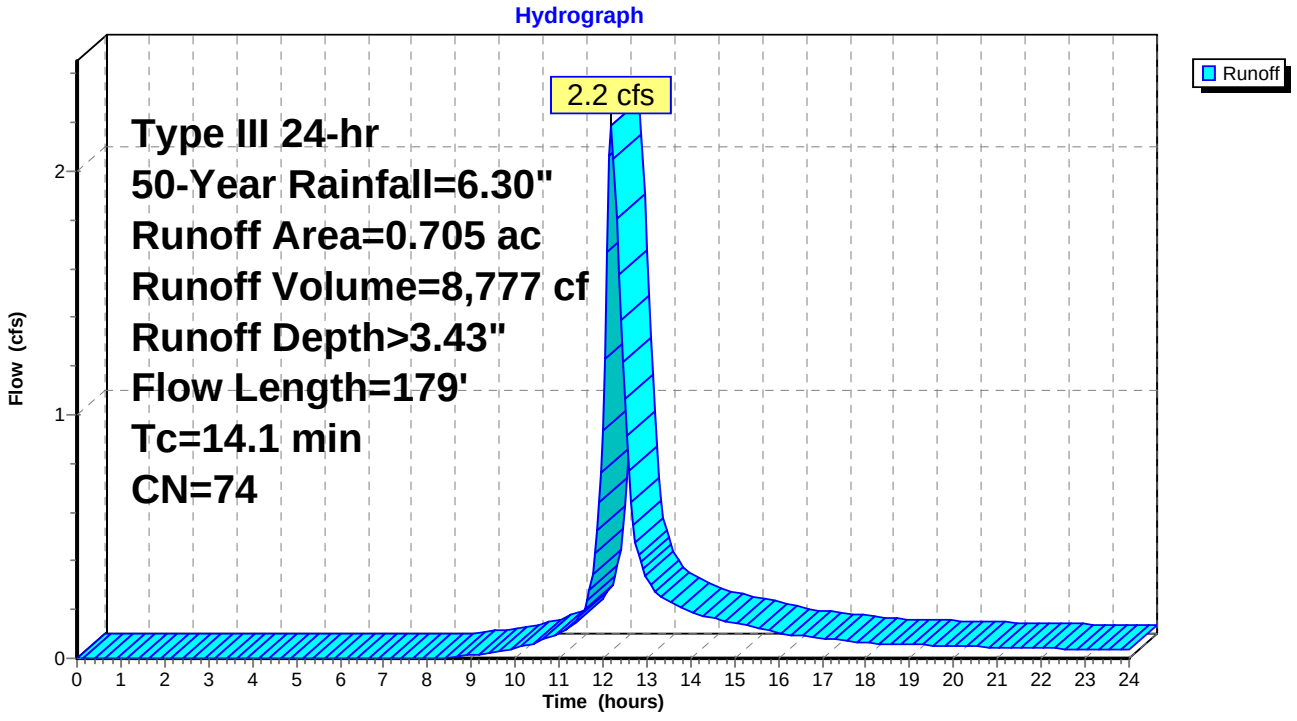
Runoff = 2.2 cfs @ 12.20 hrs, Volume= 8,777 cf, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
0.705	74	>75% Grass cover, Good, HSG C
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

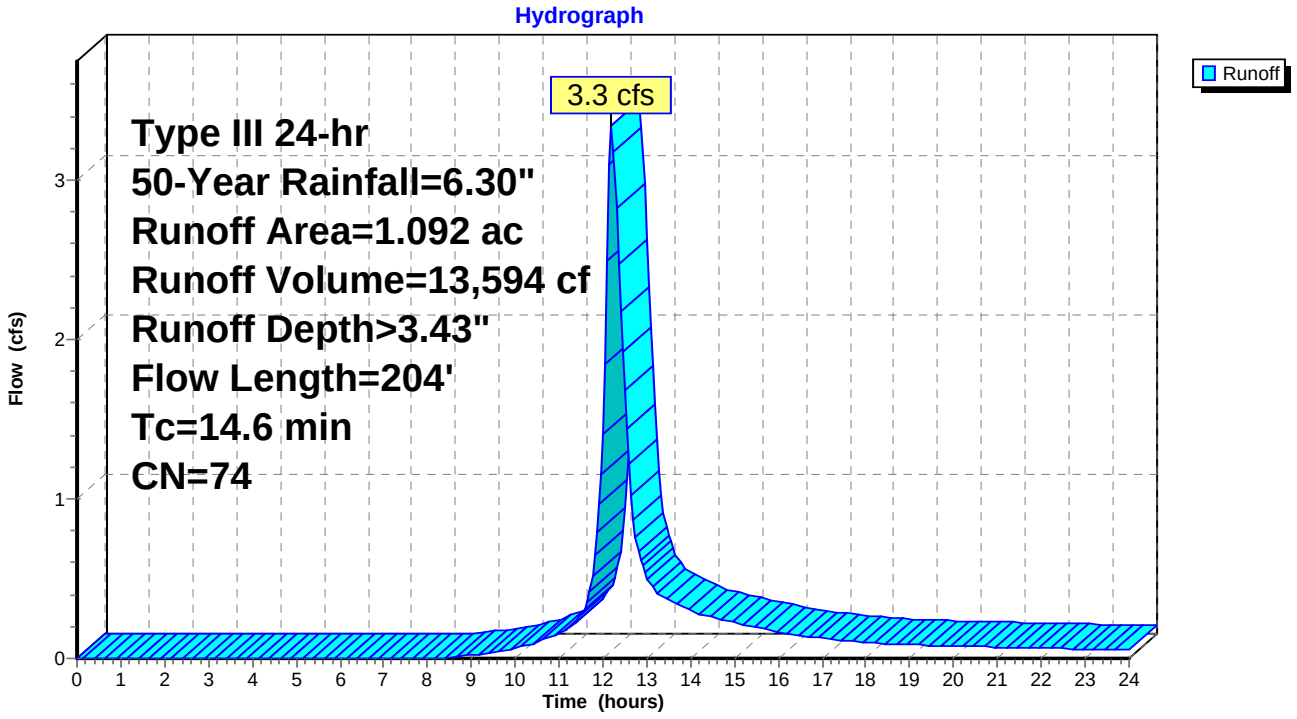
Runoff = 3.3 cfs @ 12.20 hrs, Volume= 13,594 cf, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
1.092	74	>75% Grass cover, Good, HSG C
1.092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

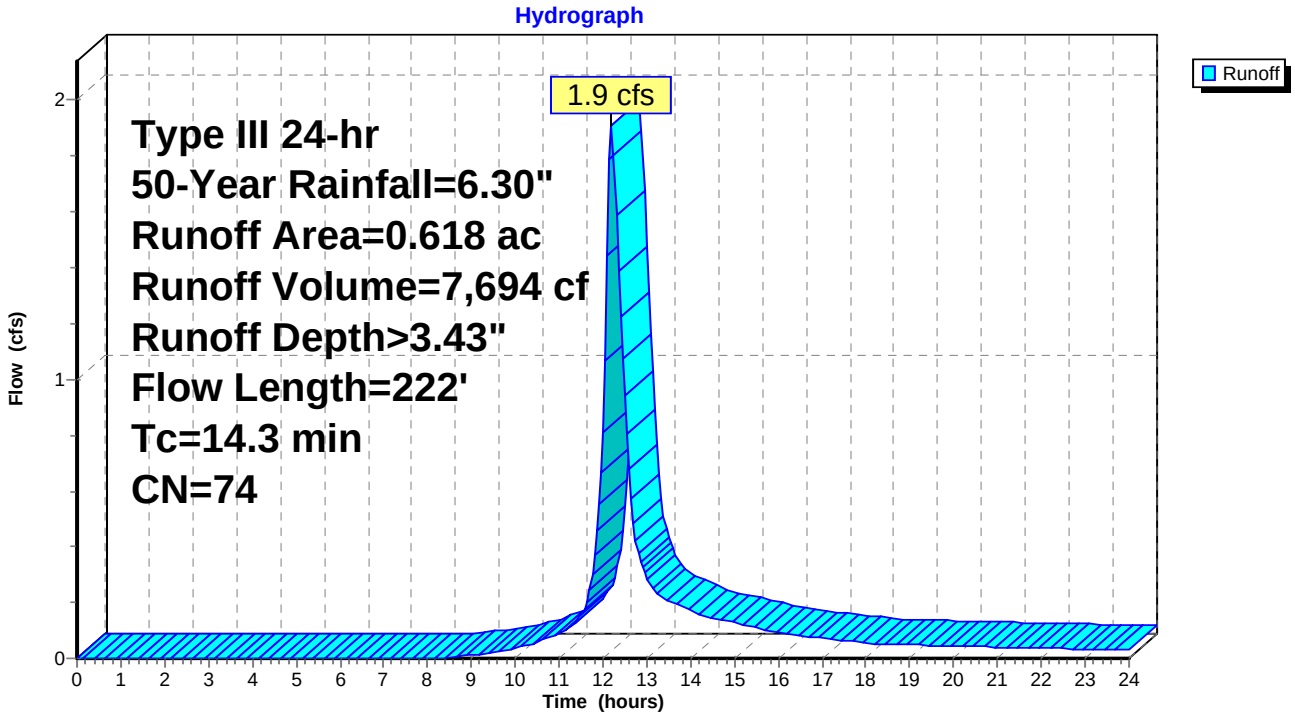
Runoff = 1.9 cfs @ 12.20 hrs, Volume= 7,694 cf, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
0.618	74	>75% Grass cover, Good, HSG C
0.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

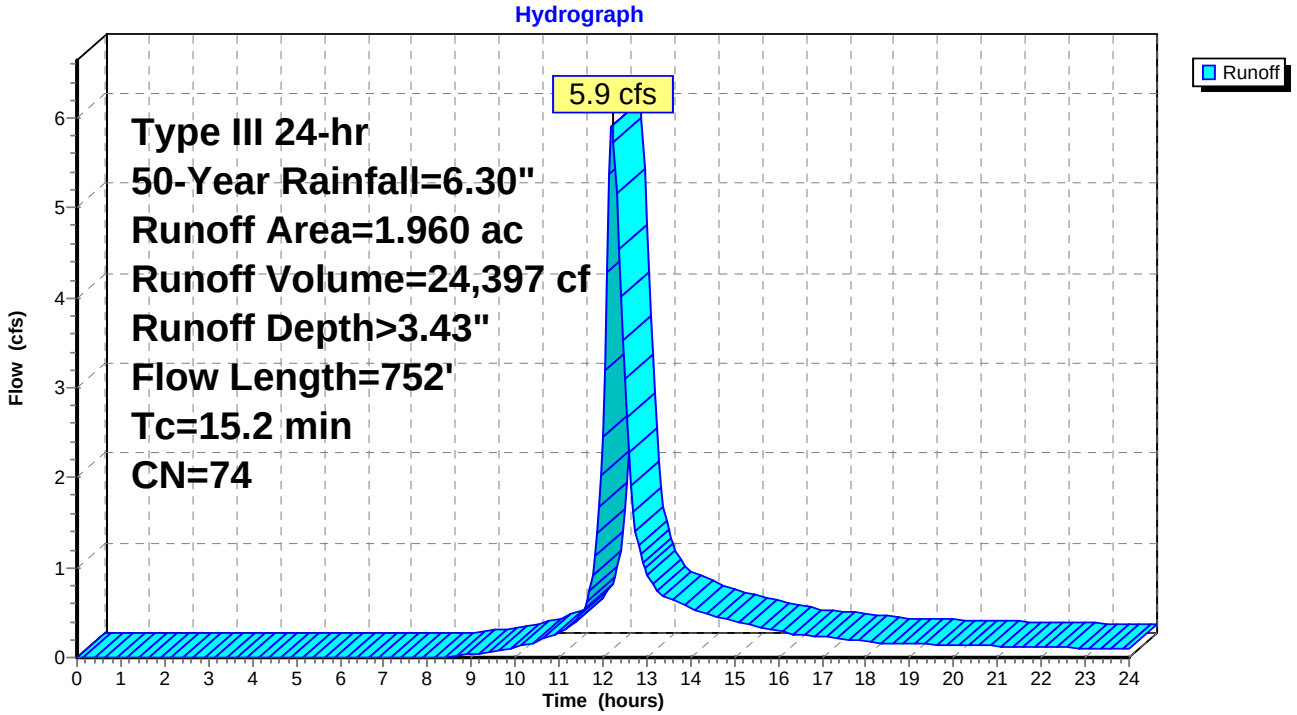
Runoff = 5.9 cfs @ 12.21 hrs, Volume= 24,397 cf, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
1.960	74	>75% Grass cover, Good, HSG C
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

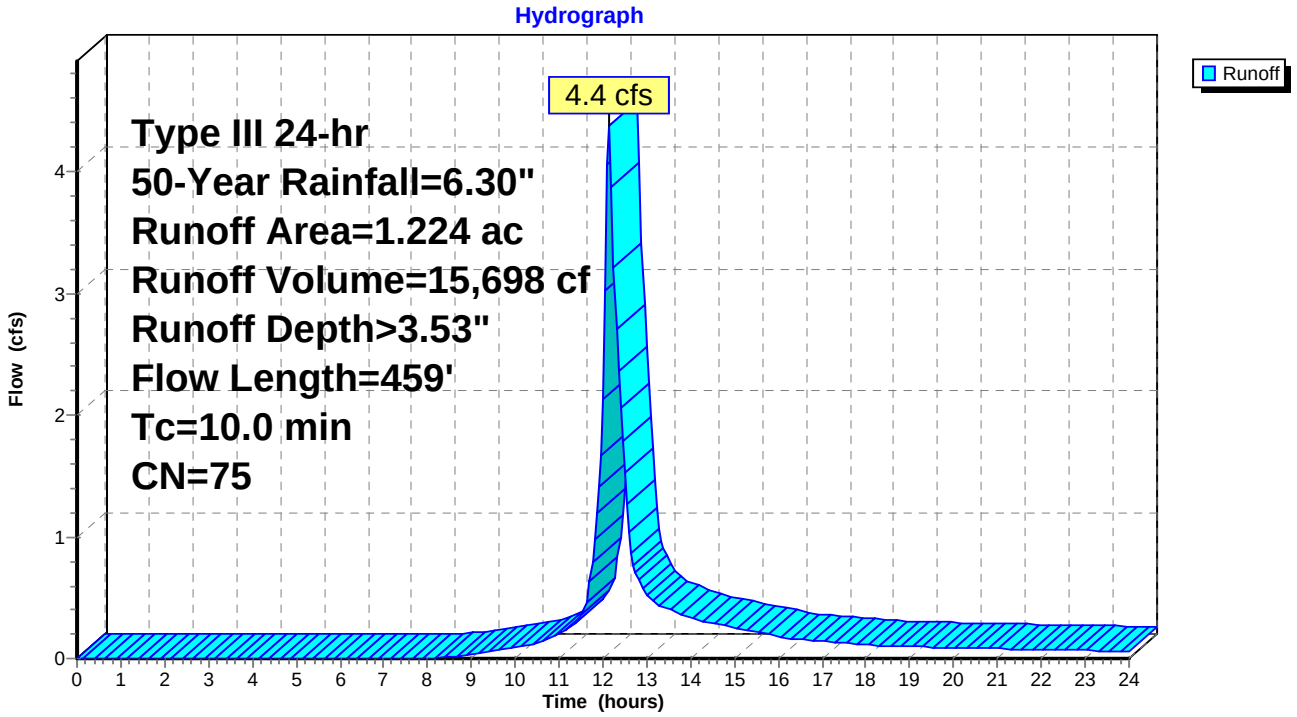
Runoff = 4.4 cfs @ 12.14 hrs, Volume= 15,698 cf, Depth> 3.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
1.134	74	>75% Grass cover, Good, HSG C
0.090	89	Gravel roads, HSG C
1.224	75	Weighted Average
1.224		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

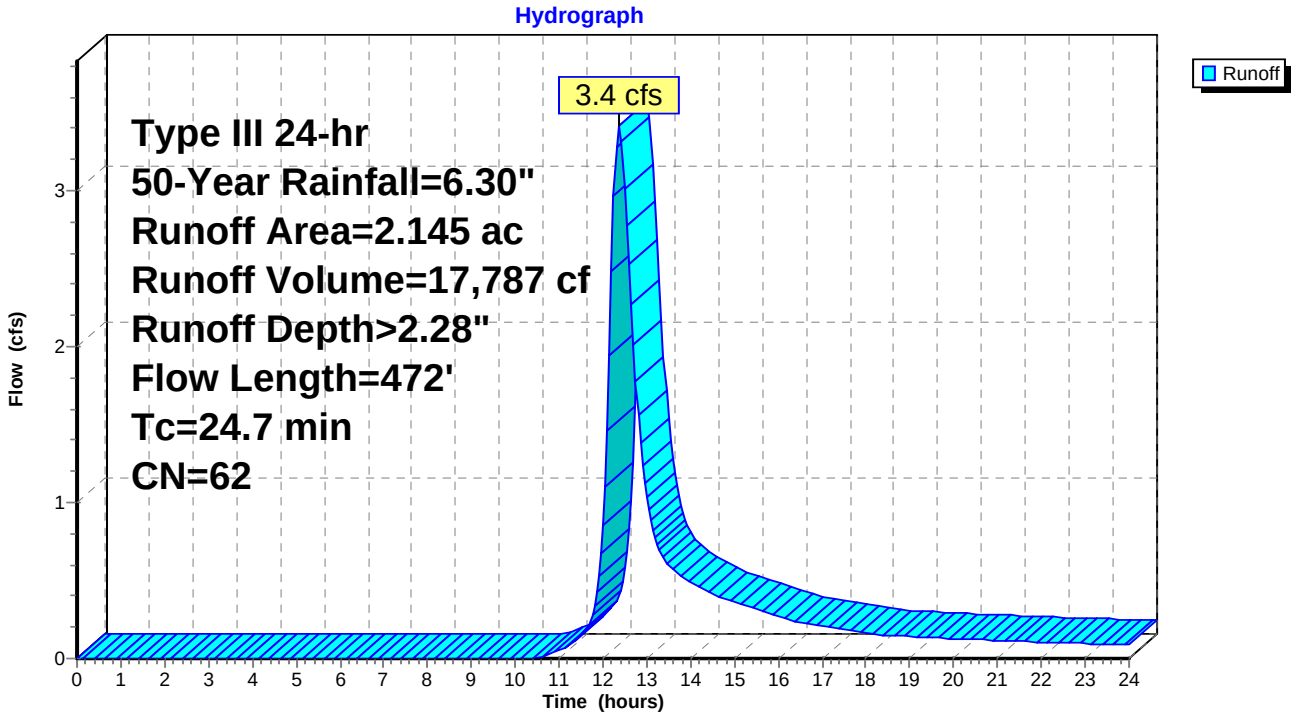
Runoff = 3.4 cfs @ 12.37 hrs, Volume= 17,787 cf, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
0.022	74	>75% Grass cover, Good, HSG C
0.089	80	>75% Grass cover, Good, HSG D
0.282	61	>75% Grass cover, Good, HSG B
1.752	61	>75% Grass cover, Good, HSG B
2.145	62	Weighted Average
2.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

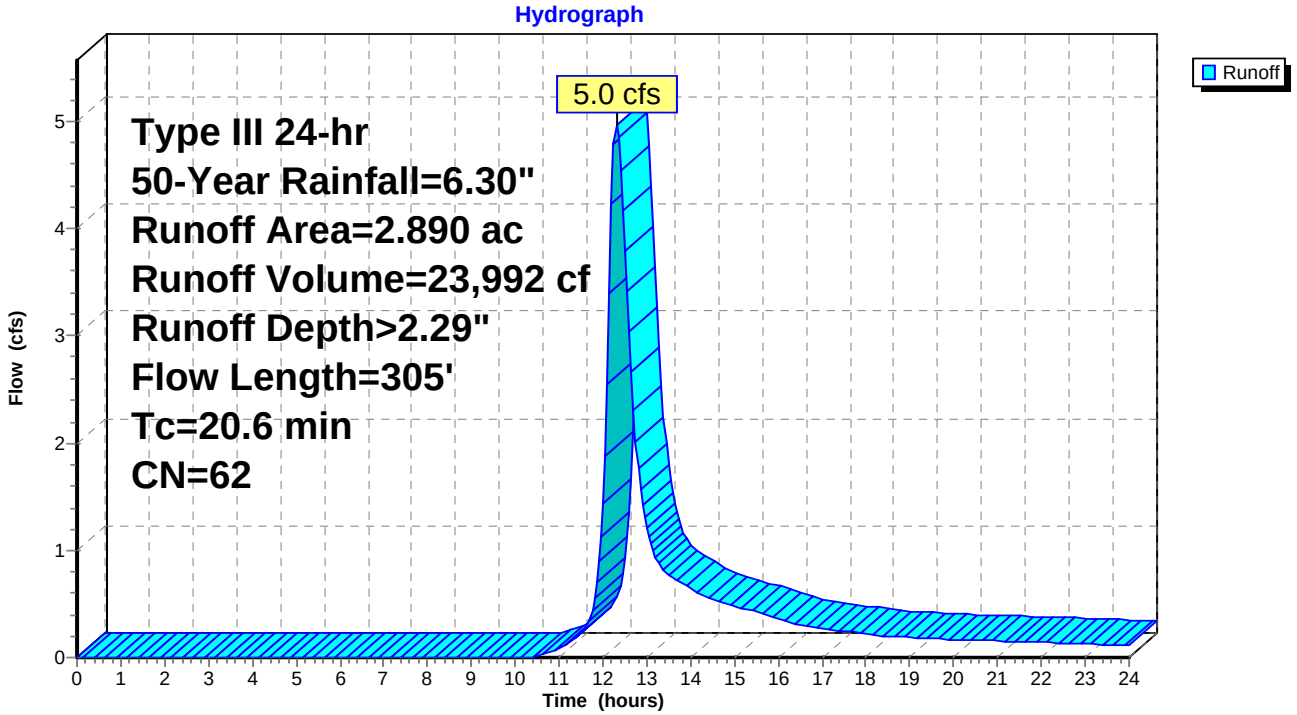
Runoff = 5.0 cfs @ 12.31 hrs, Volume= 23,992 cf, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
2.685	61	>75% Grass cover, Good, HSG B
0.072	80	>75% Grass cover, Good, HSG D
0.033	80	>75% Grass cover, Good, HSG D
0.100	61	>75% Grass cover, Good, HSG B
2.890	62	Weighted Average
2.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

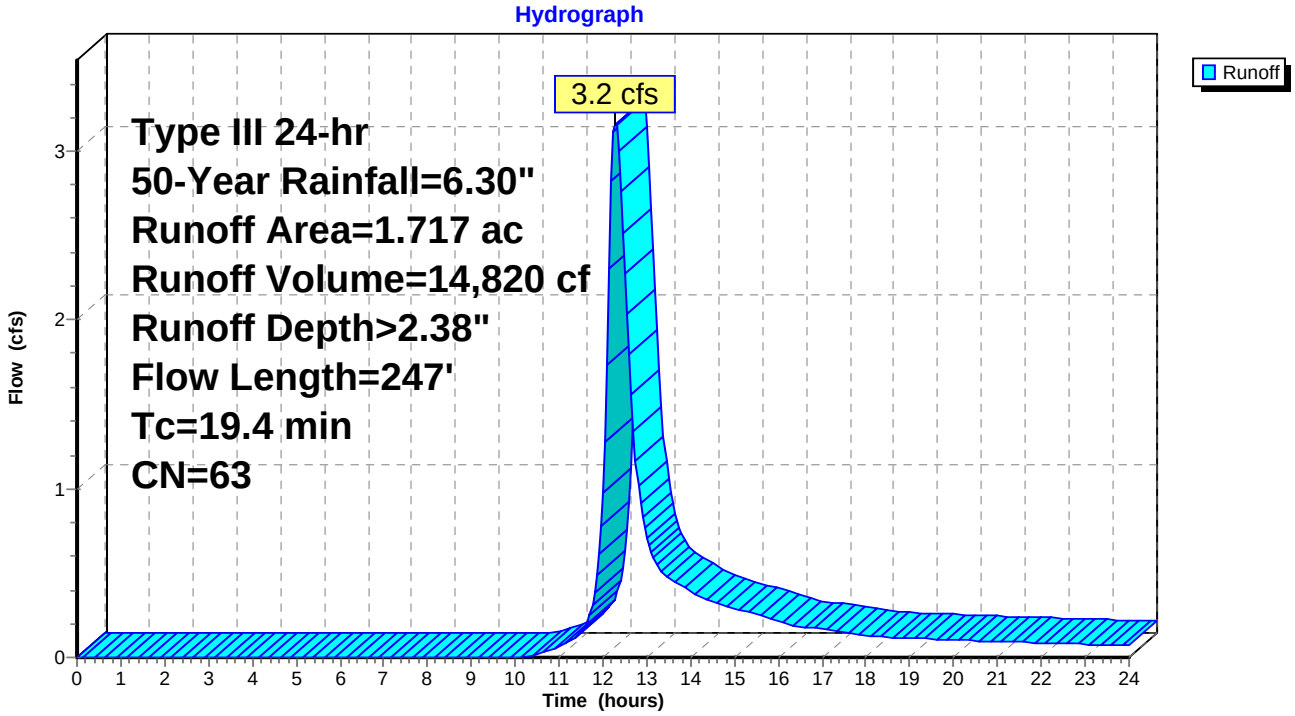
Runoff = 3.2 cfs @ 12.28 hrs, Volume= 14,820 cf, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

Area (ac)	CN	Description
0.091	77	Woods, Good, HSG D
0.151	55	Woods, Good, HSG B
1.288	61	>75% Grass cover, Good, HSG B
0.187	80	>75% Grass cover, Good, HSG D
1.717	63	Weighted Average
1.717		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 3.43" for 50-Year event
Inflow = 5.9 cfs @ 12.21 hrs, Volume= 24,397 cf
Outflow = 5.8 cfs @ 12.25 hrs, Volume= 24,331 cf, Atten= 3%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.69 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 1.32 fps, Avg. Travel Time= 8.3 min

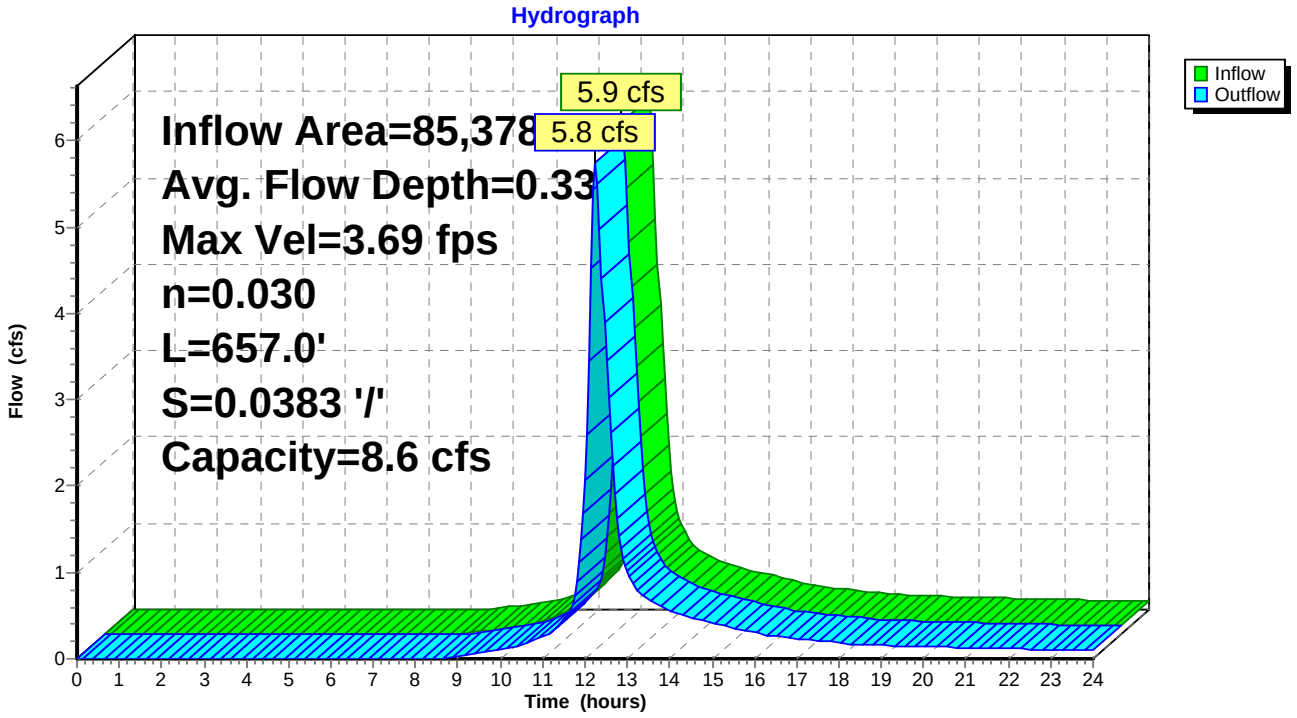
Peak Storage= 1,024 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡

Reach 19R: Riprap Swale



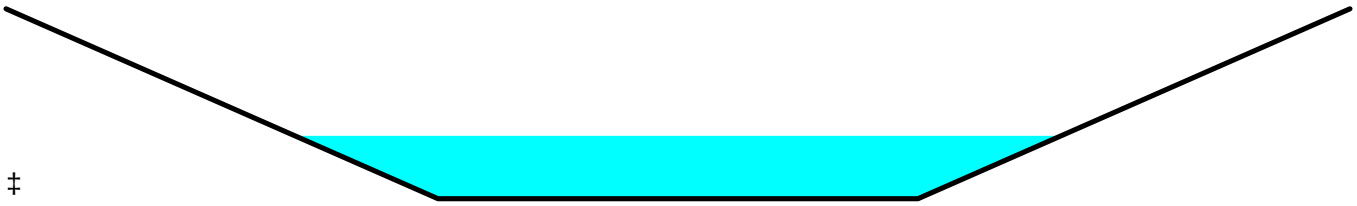
Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 3.53" for 50-Year event
Inflow = 4.4 cfs @ 12.14 hrs, Volume= 15,698 cf
Outflow = 4.3 cfs @ 12.17 hrs, Volume= 15,659 cf, Atten= 3%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.64 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 7.6 min

Peak Storage= 612 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



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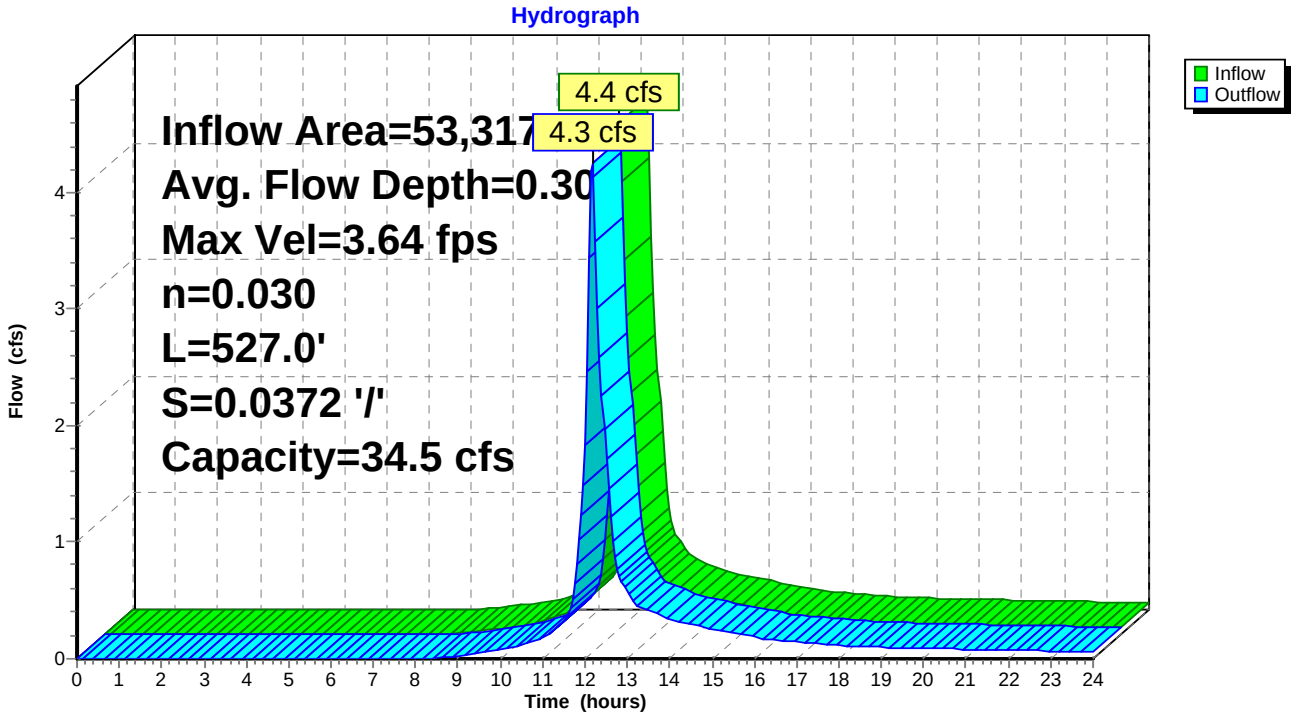
Reach 21R: Riprap Swale

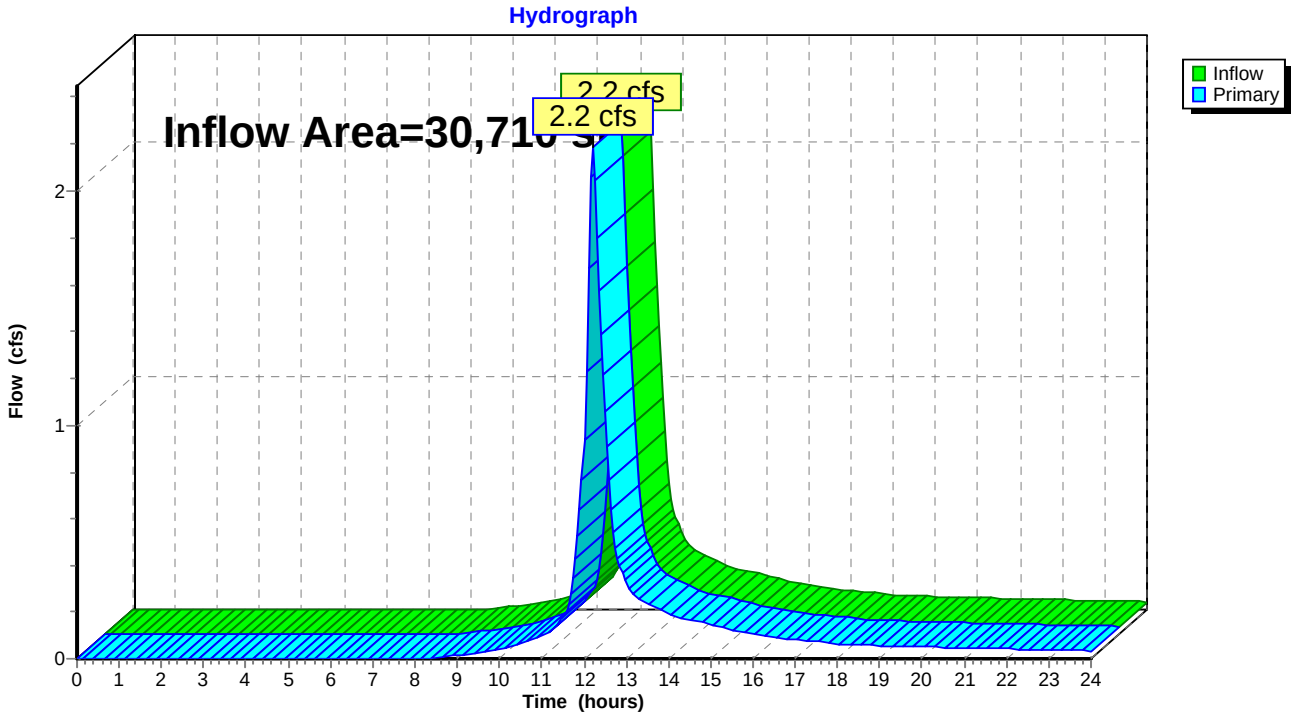


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 0.00% Impervious, Inflow Depth > 3.43" for 50-Year event
Inflow = 2.2 cfs @ 12.20 hrs, Volume= 8,777 cf
Primary = 2.2 cfs @ 12.20 hrs, Volume= 8,777 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

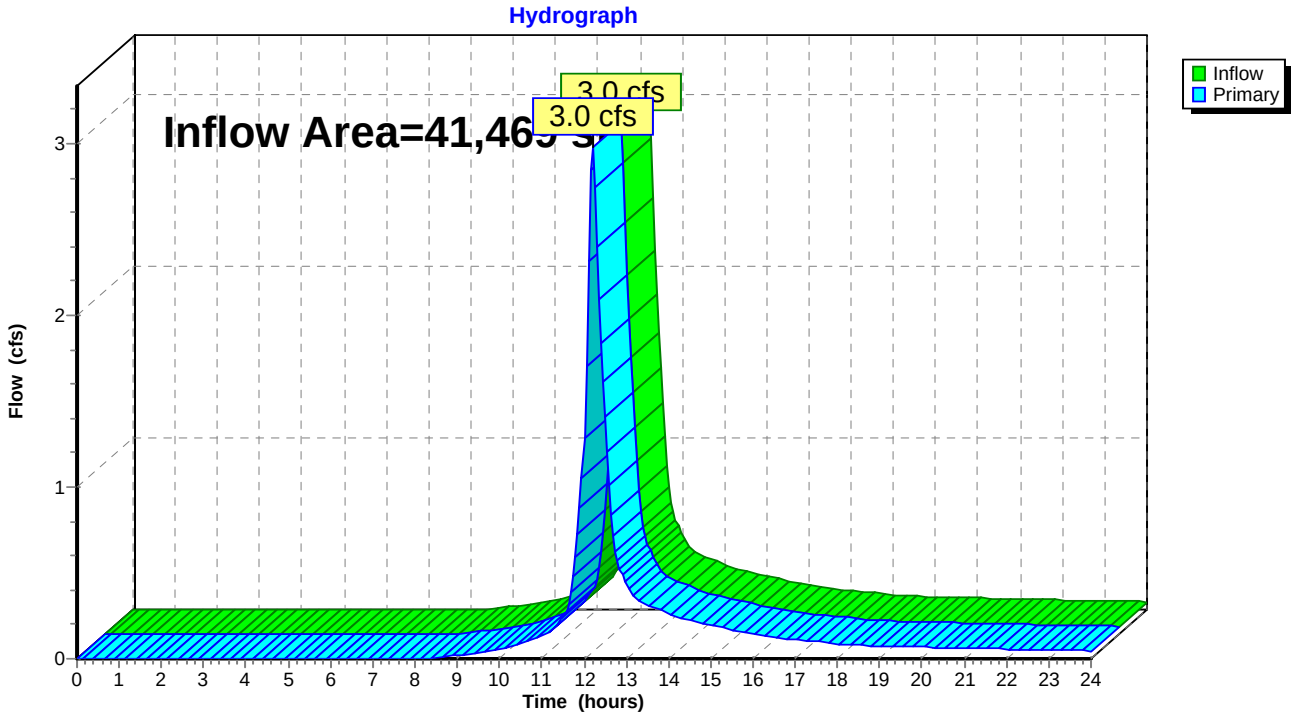


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 0.00% Impervious, Inflow Depth > 3.43" for 50-Year event
Inflow = 3.0 cfs @ 12.19 hrs, Volume= 11,854 cf
Primary = 3.0 cfs @ 12.19 hrs, Volume= 11,854 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

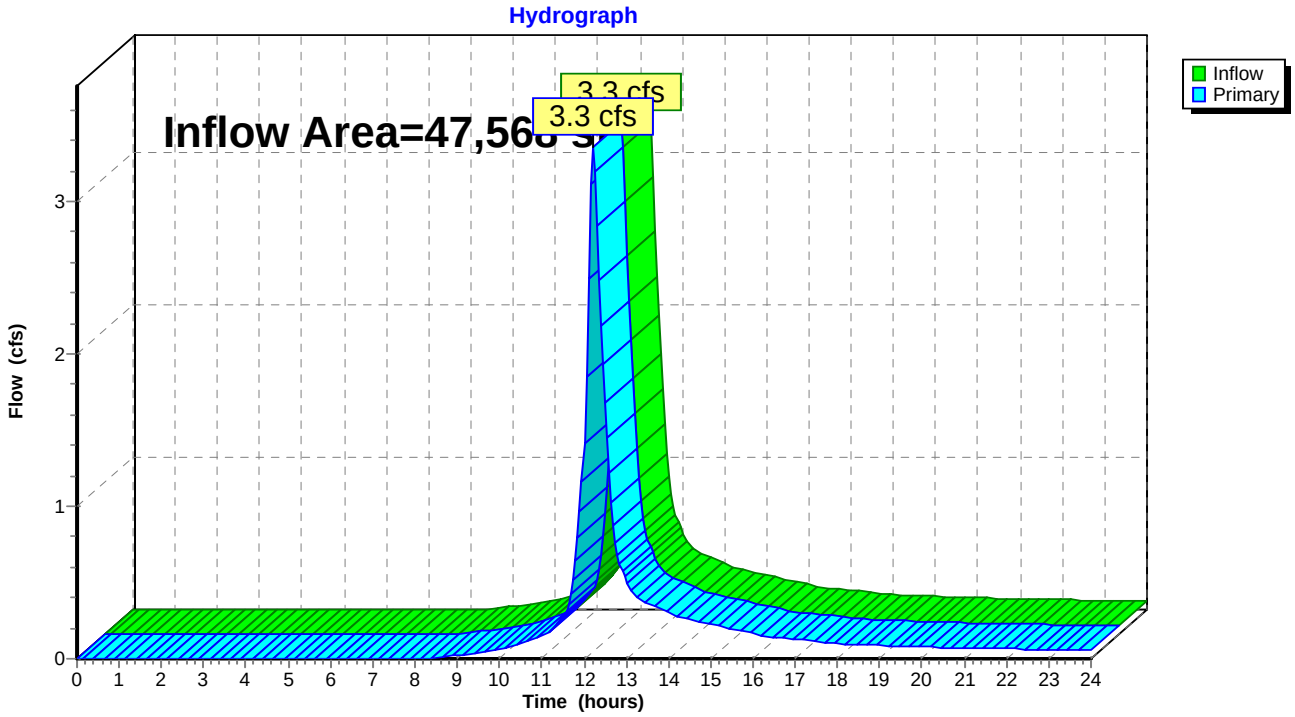


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 0.00% Impervious, Inflow Depth > 3.43" for 50-Year event
Inflow = 3.3 cfs @ 12.20 hrs, Volume= 13,594 cf
Primary = 3.3 cfs @ 12.20 hrs, Volume= 13,594 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

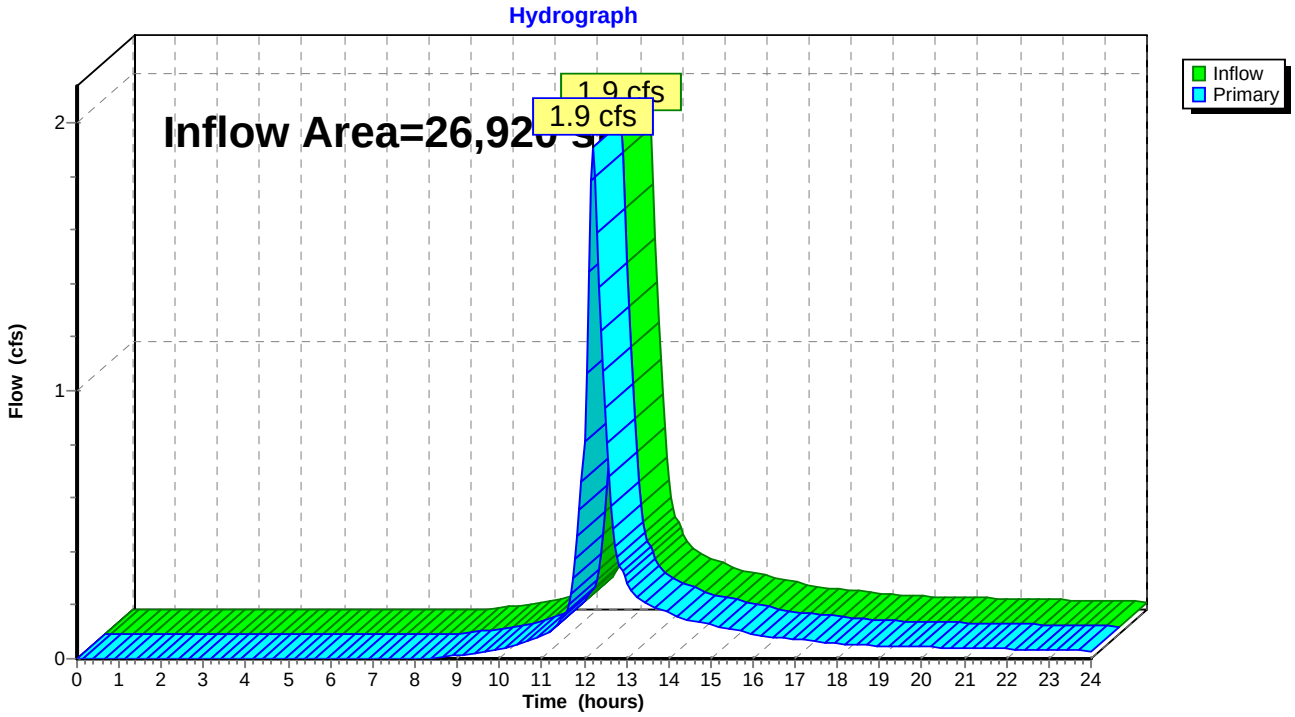


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 0.00% Impervious, Inflow Depth > 3.43" for 50-Year event
Inflow = 1.9 cfs @ 12.20 hrs, Volume= 7,694 cf
Primary = 1.9 cfs @ 12.20 hrs, Volume= 7,694 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

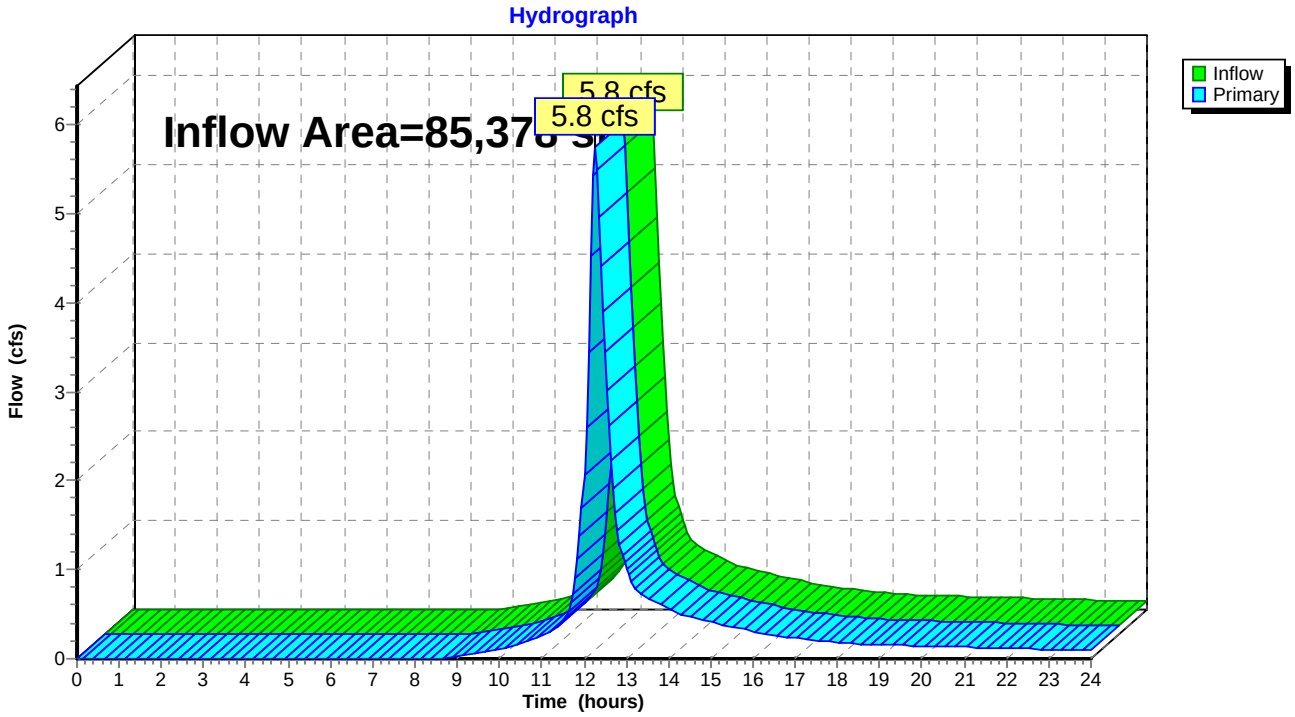


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 3.42" for 50-Year event
Inflow = 5.8 cfs @ 12.25 hrs, Volume= 24,331 cf
Primary = 5.8 cfs @ 12.25 hrs, Volume= 24,331 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

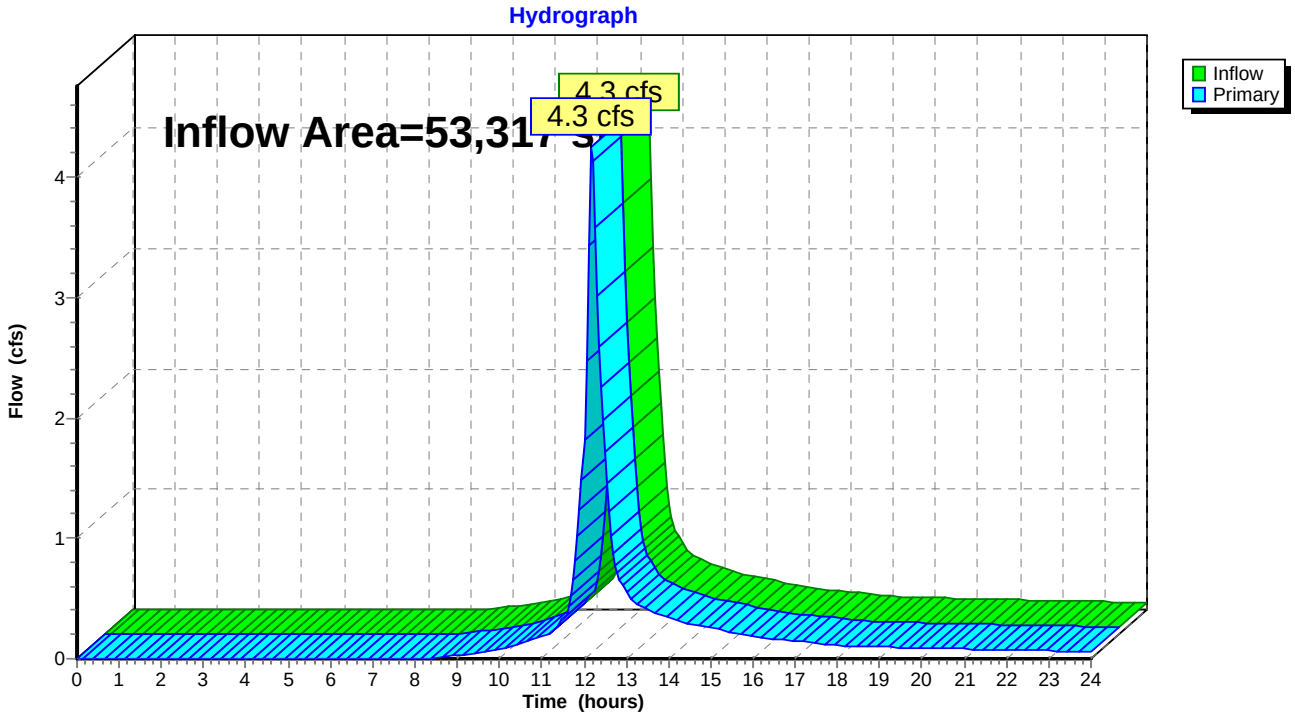


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 3.52" for 50-Year event
Inflow = 4.3 cfs @ 12.17 hrs, Volume= 15,659 cf
Primary = 4.3 cfs @ 12.17 hrs, Volume= 15,659 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

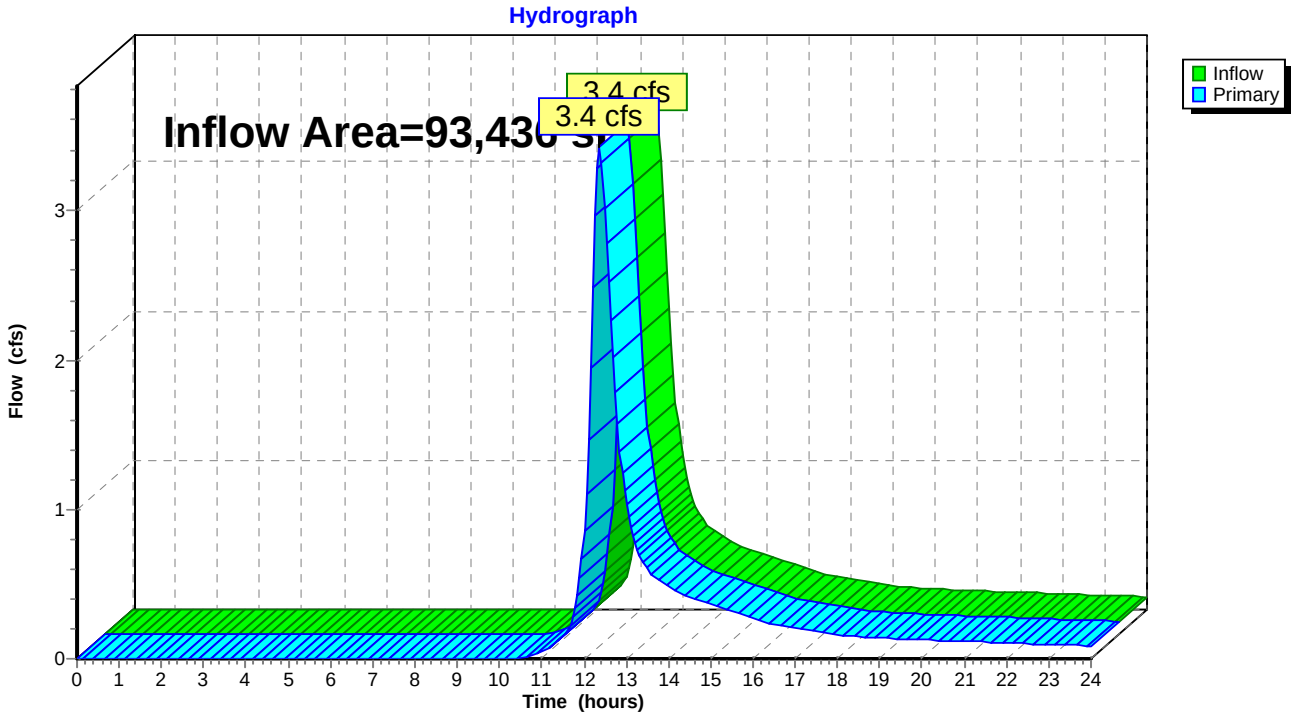


Summary for Link 15L: Wetland W

Inflow Area = 93,436 sf, 0.00% Impervious, Inflow Depth > 2.28" for 50-Year event
Inflow = 3.4 cfs @ 12.37 hrs, Volume= 17,787 cf
Primary = 3.4 cfs @ 12.37 hrs, Volume= 17,787 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

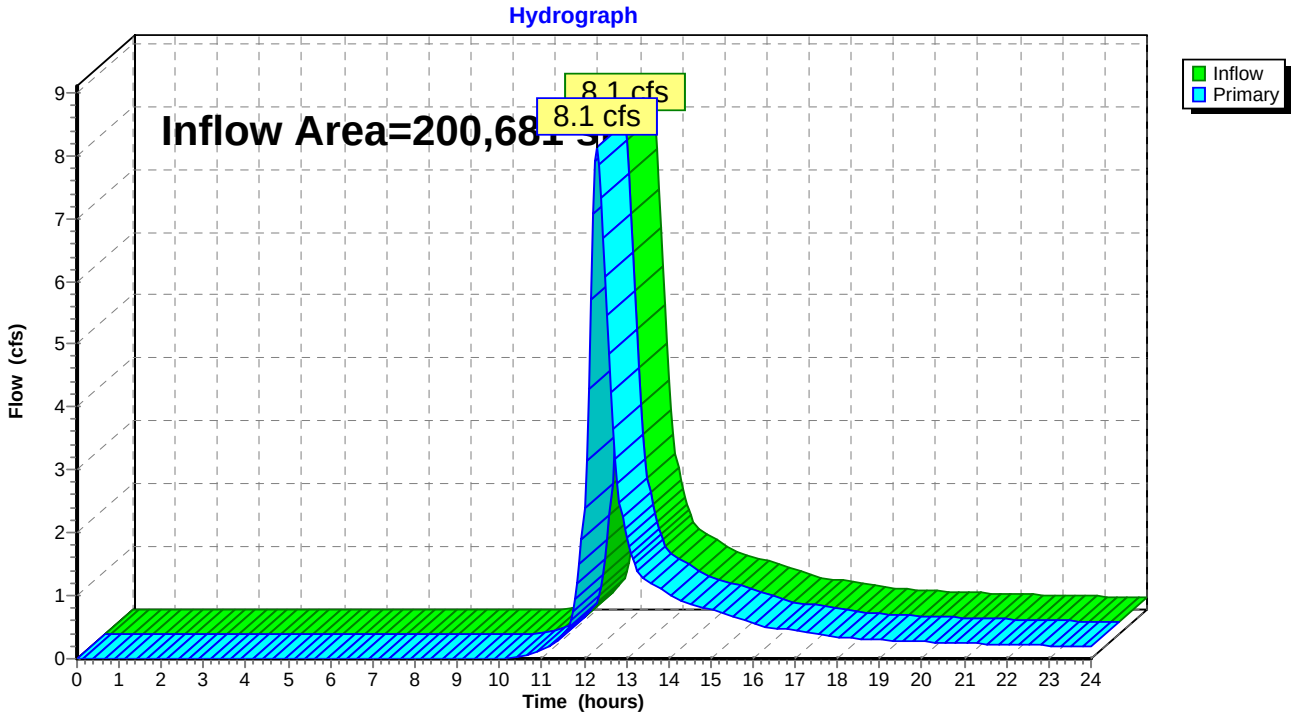


Summary for Link 16L: Wetland E

Inflow Area = 200,681 sf, 0.00% Impervious, Inflow Depth > 2.32" for 50-Year event
Inflow = 8.1 cfs @ 12.30 hrs, Volume= 38,811 cf
Primary = 8.1 cfs @ 12.30 hrs, Volume= 38,811 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 0.00% Impervious Runoff Depth>4.12"
Flow Length=239' Tc=13.7 min CN=74 Runoff=3.6 cfs 14,236 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 0.00% Impervious Runoff Depth>4.12"
Flow Length=179' Tc=14.1 min CN=74 Runoff=2.6 cfs 10,541 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 0.00% Impervious Runoff Depth>4.12"
Flow Length=204' Tc=14.6 min CN=74 Runoff=4.0 cfs 16,326 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 0.00% Impervious Runoff Depth>4.12"
Flow Length=222' Tc=14.3 min CN=74 Runoff=2.3 cfs 9,240 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 0.00% Impervious Runoff Depth>4.12"
Flow Length=752' Tc=15.2 min CN=74 Runoff=7.1 cfs 29,299 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 0.00% Impervious Runoff Depth>4.23"
Flow Length=459' Tc=10.0 min CN=75 Runoff=5.2 cfs 18,797 cf

Subcatchment 7S: Green Field W Runoff Area=2.145 ac 0.00% Impervious Runoff Depth>2.86"
Flow Length=472' Tc=24.7 min CN=62 Runoff=4.3 cfs 22,256 cf

Subcatchment 8S: Green Field E Runoff Area=2.890 ac 0.00% Impervious Runoff Depth>2.86"
Flow Length=305' Tc=20.6 min CN=62 Runoff=6.3 cfs 30,017 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.00% Impervious Runoff Depth>2.96"
Flow Length=247' Tc=19.4 min CN=63 Runoff=4.0 cfs 18,468 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.36' Max Vel=3.89 fps Inflow=7.1 cfs 29,299 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=6.9 cfs 29,227 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.33' Max Vel=3.86 fps Inflow=5.2 cfs 18,797 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=5.1 cfs 18,754 cf

Link 7L: Wetlands NW Inflow=2.6 cfs 10,541 cf
Primary=2.6 cfs 10,541 cf

Link 8L: Depression S Inflow=3.6 cfs 14,236 cf
Primary=3.6 cfs 14,236 cf

Link 9L: Wetlands NE Inflow=4.0 cfs 16,326 cf
Primary=4.0 cfs 16,326 cf

Link 10L: Wetlands N Inflow=2.3 cfs 9,240 cf
Primary=2.3 cfs 9,240 cf

Link 11L: Collection Swale W Inflow=6.9 cfs 29,227 cf
Primary=6.9 cfs 29,227 cf

Link 12L: Collection Swale W Inflow=5.1 cfs 18,754 cf
Primary=5.1 cfs 18,754 cf

Link 15L: Wetland W Inflow=4.3 cfs 22,256 cf
Primary=4.3 cfs 22,256 cf

Link 16L: Wetland E Inflow=10.3 cfs 48,486 cf
Primary=10.3 cfs 48,486 cf

Total Runoff Area = 579,479 sf Runoff Volume = 169,181 cf Average Runoff Depth = 3.50"
100.00% Pervious = 579,479 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

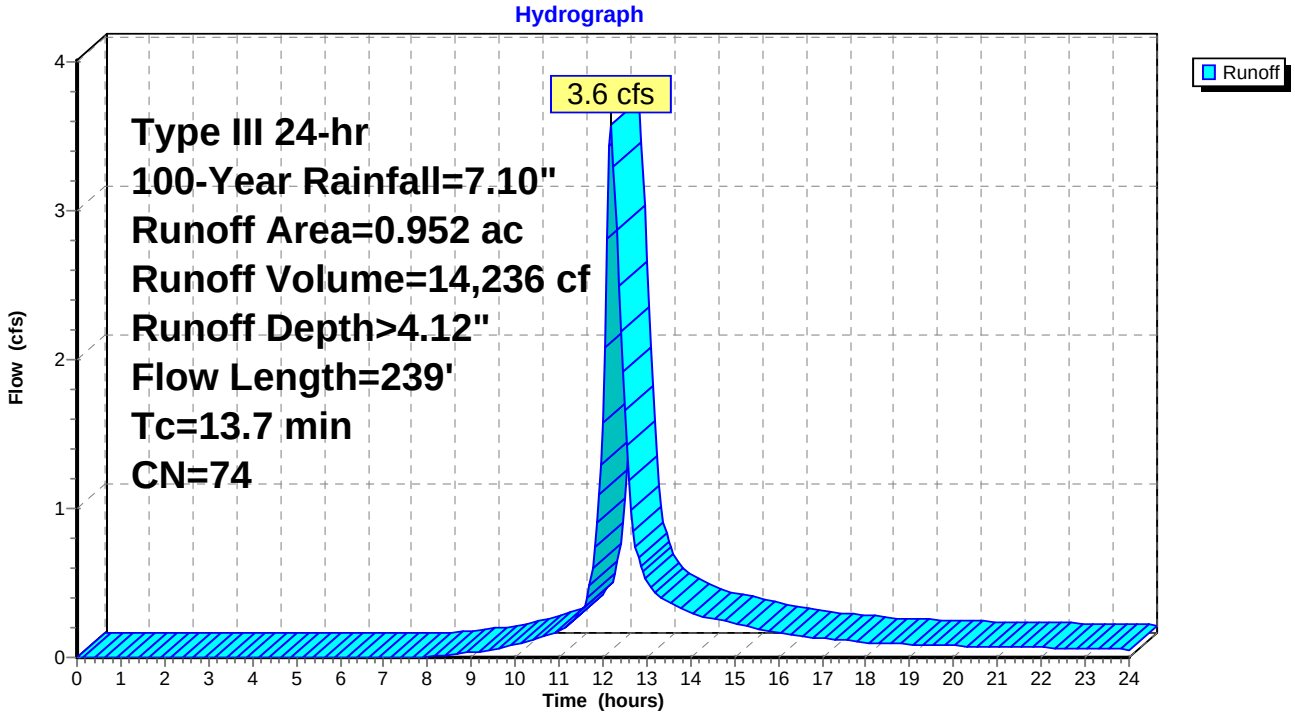
Runoff = 3.6 cfs @ 12.19 hrs, Volume= 14,236 cf, Depth> 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
0.952	74	>75% Grass cover, Good, HSG C
0.952		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

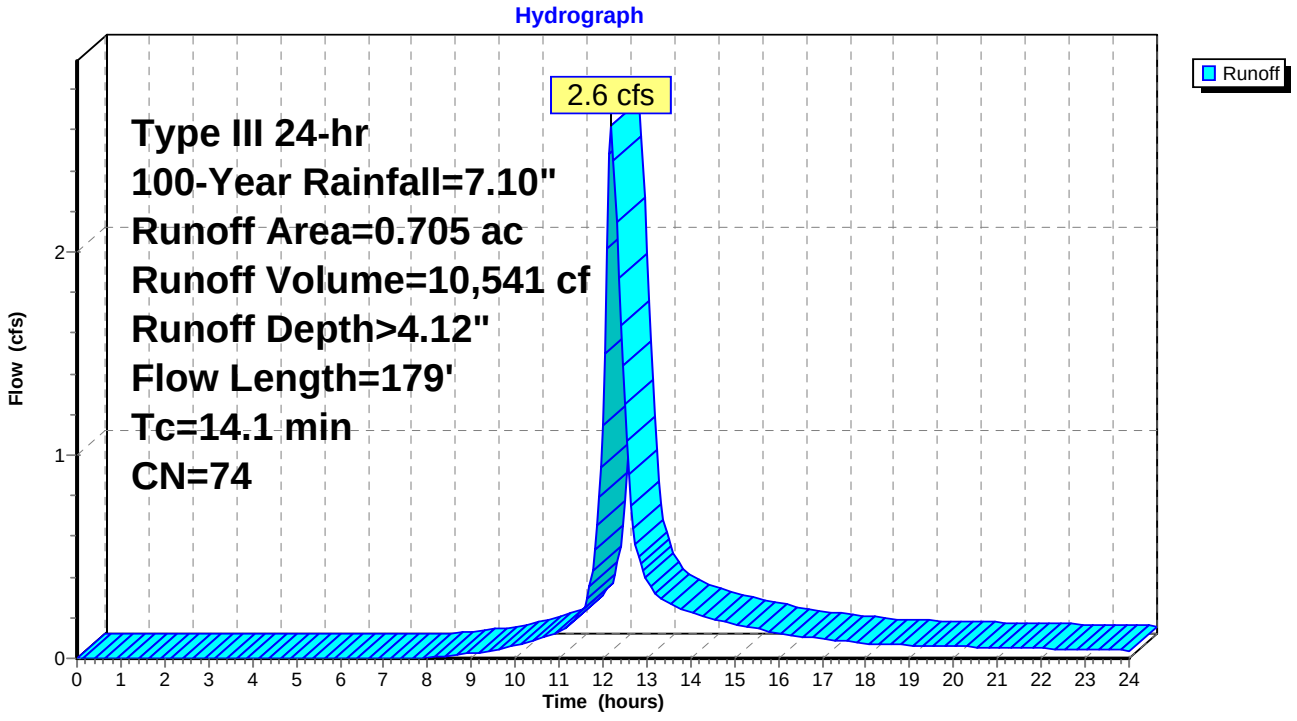
Runoff = 2.6 cfs @ 12.20 hrs, Volume= 10,541 cf, Depth> 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
0.705	74	>75% Grass cover, Good, HSG C
0.705		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

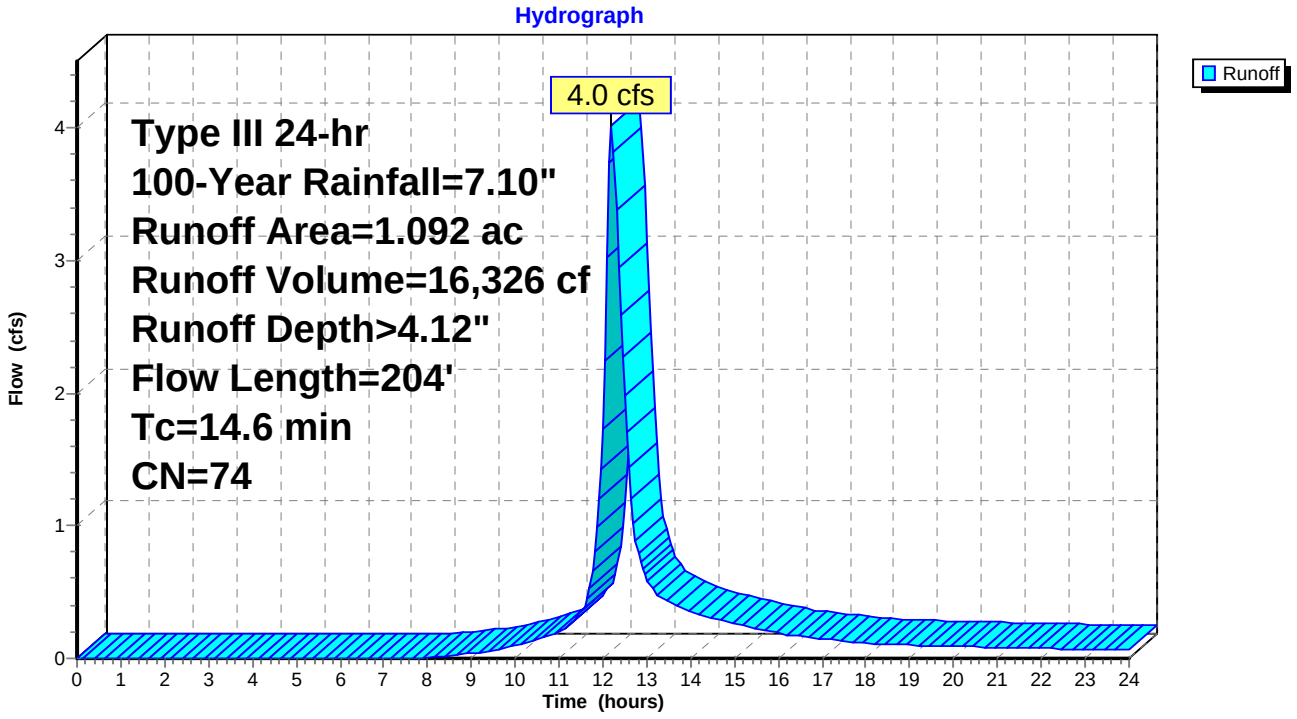
Runoff = 4.0 cfs @ 12.20 hrs, Volume= 16,326 cf, Depth> 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
1.092	74	>75% Grass cover, Good, HSG C
1.092		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

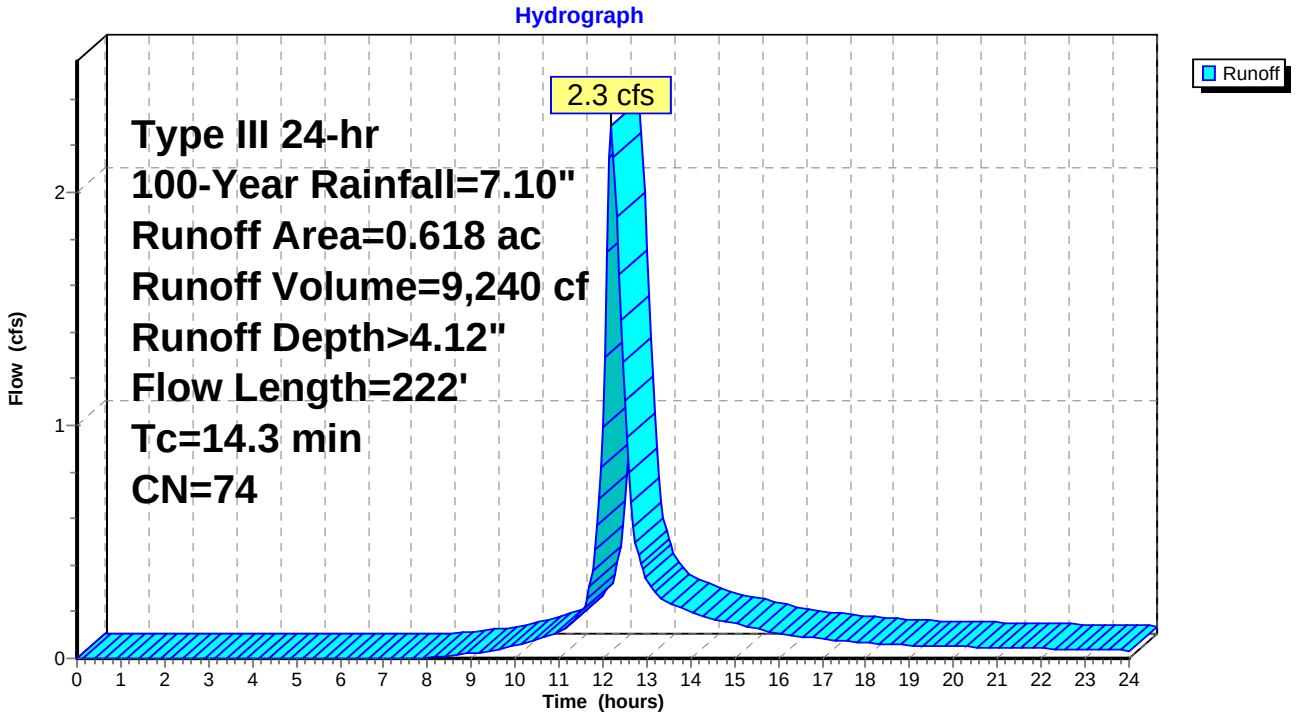
Runoff = 2.3 cfs @ 12.20 hrs, Volume= 9,240 cf, Depth> 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
0.618	74	>75% Grass cover, Good, HSG C
0.618		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

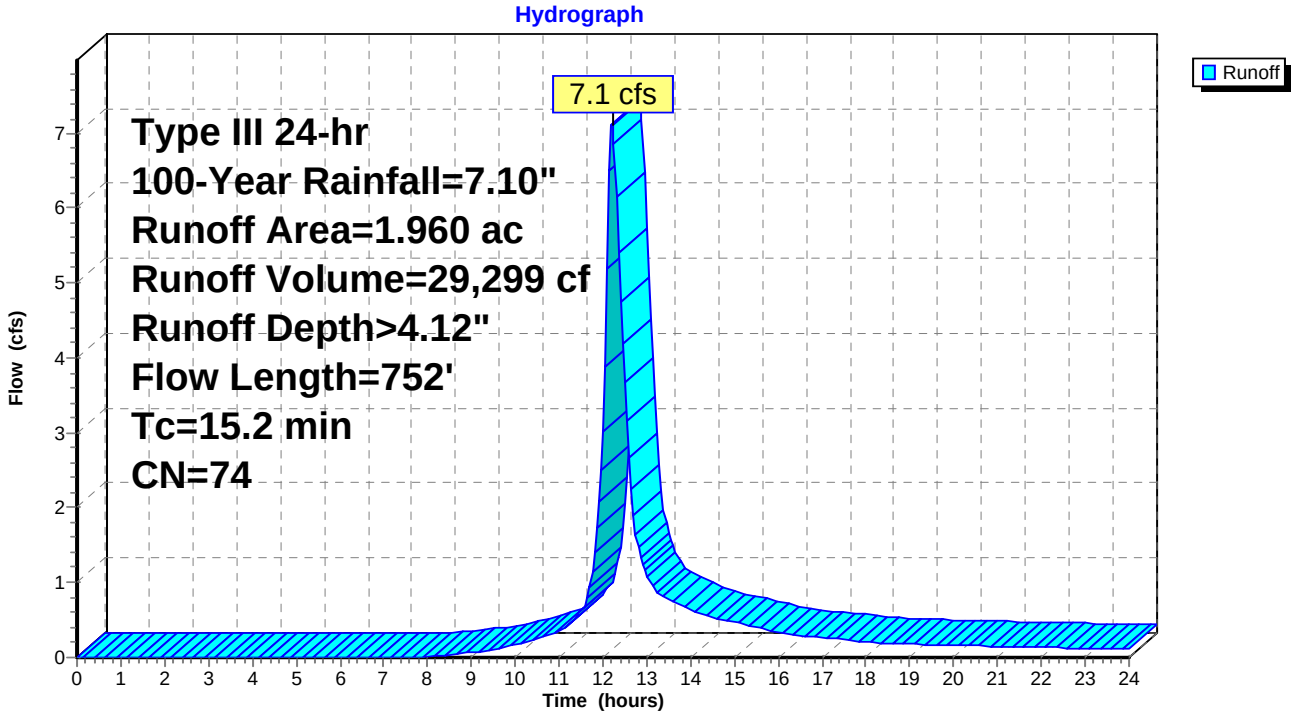
Runoff = 7.1 cfs @ 12.21 hrs, Volume= 29,299 cf, Depth> 4.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
1.960	74	>75% Grass cover, Good, HSG C
1.960		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

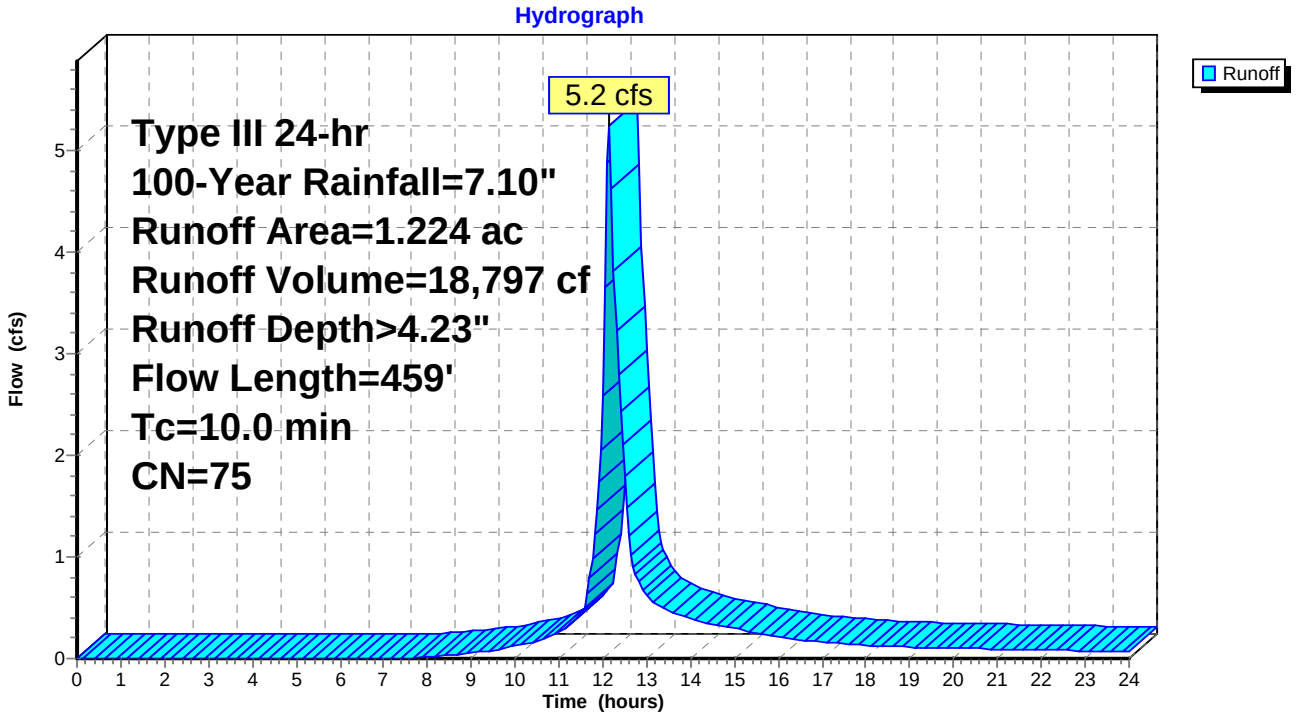
Runoff = 5.2 cfs @ 12.14 hrs, Volume= 18,797 cf, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
1.134	74	>75% Grass cover, Good, HSG C
0.090	89	Gravel roads, HSG C
1.224	75	Weighted Average
1.224		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

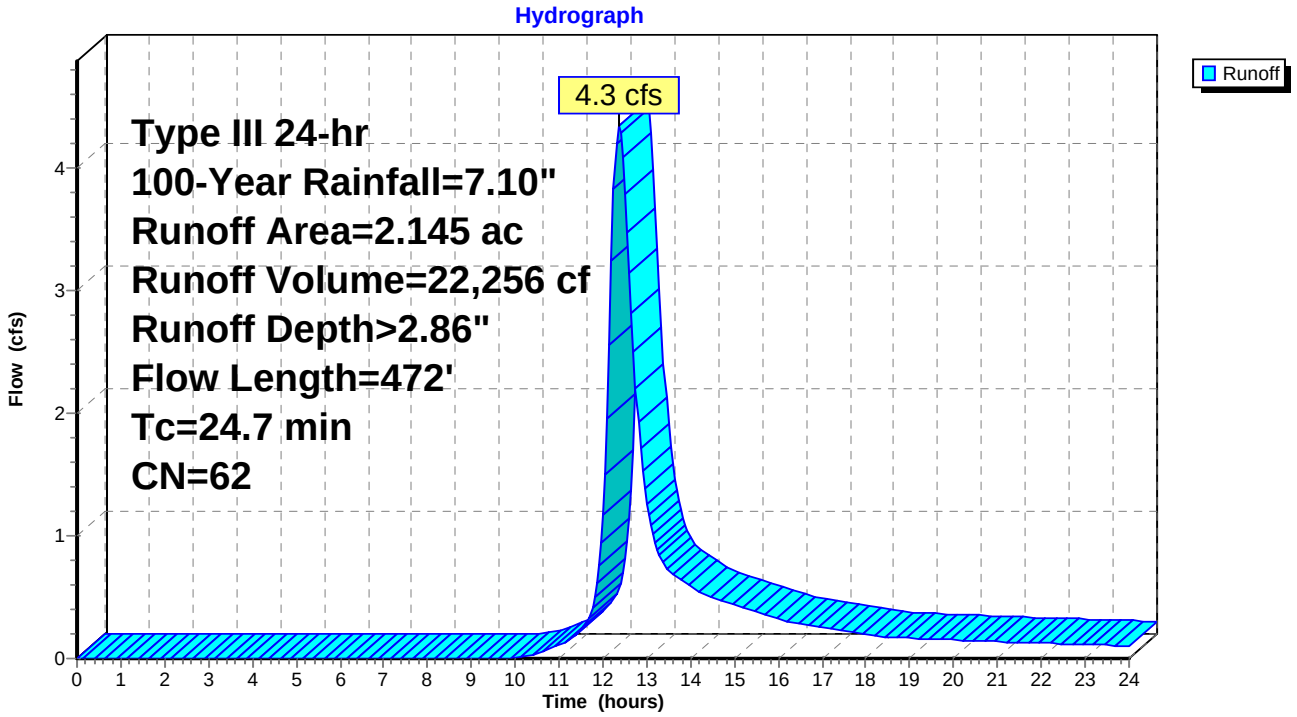
Runoff = 4.3 cfs @ 12.36 hrs, Volume= 22,256 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
0.022	74	>75% Grass cover, Good, HSG C
0.089	80	>75% Grass cover, Good, HSG D
0.282	61	>75% Grass cover, Good, HSG B
1.752	61	>75% Grass cover, Good, HSG B
2.145	62	Weighted Average
2.145		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

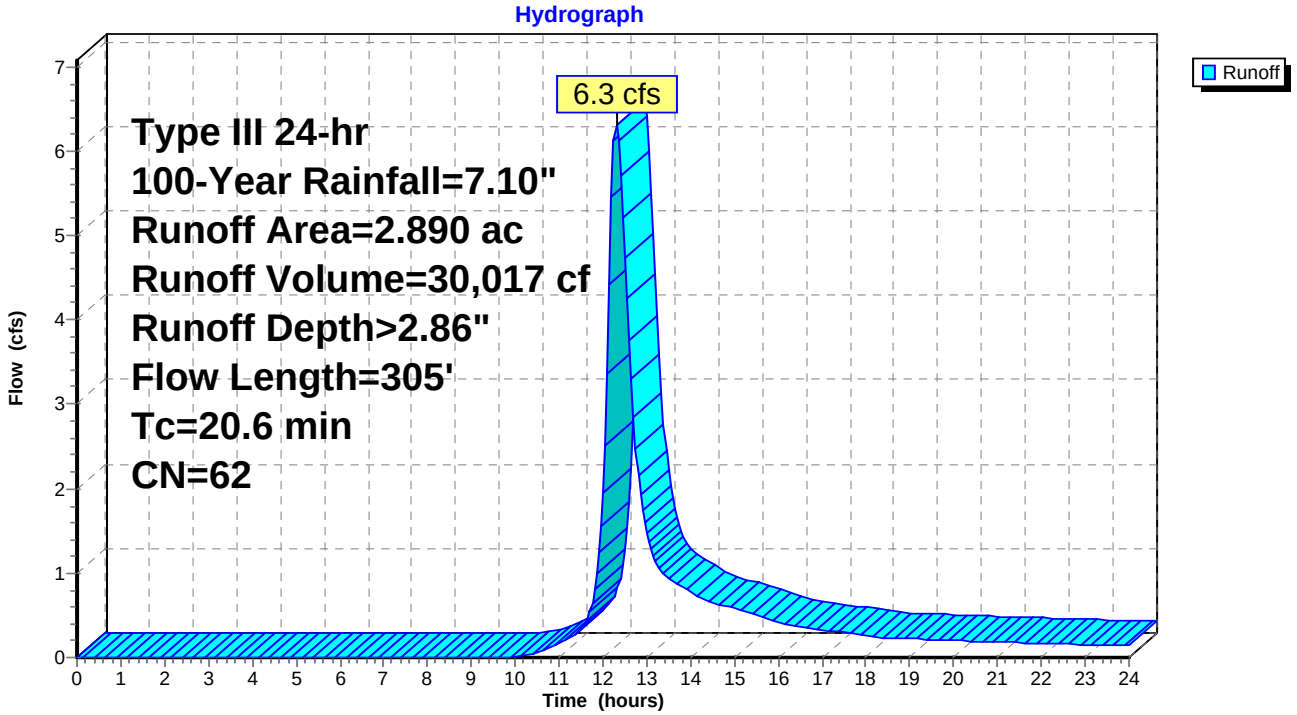
Runoff = 6.3 cfs @ 12.30 hrs, Volume= 30,017 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
2.685	61	>75% Grass cover, Good, HSG B
0.072	80	>75% Grass cover, Good, HSG D
0.033	80	>75% Grass cover, Good, HSG D
0.100	61	>75% Grass cover, Good, HSG B
2.890	62	Weighted Average
2.890		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

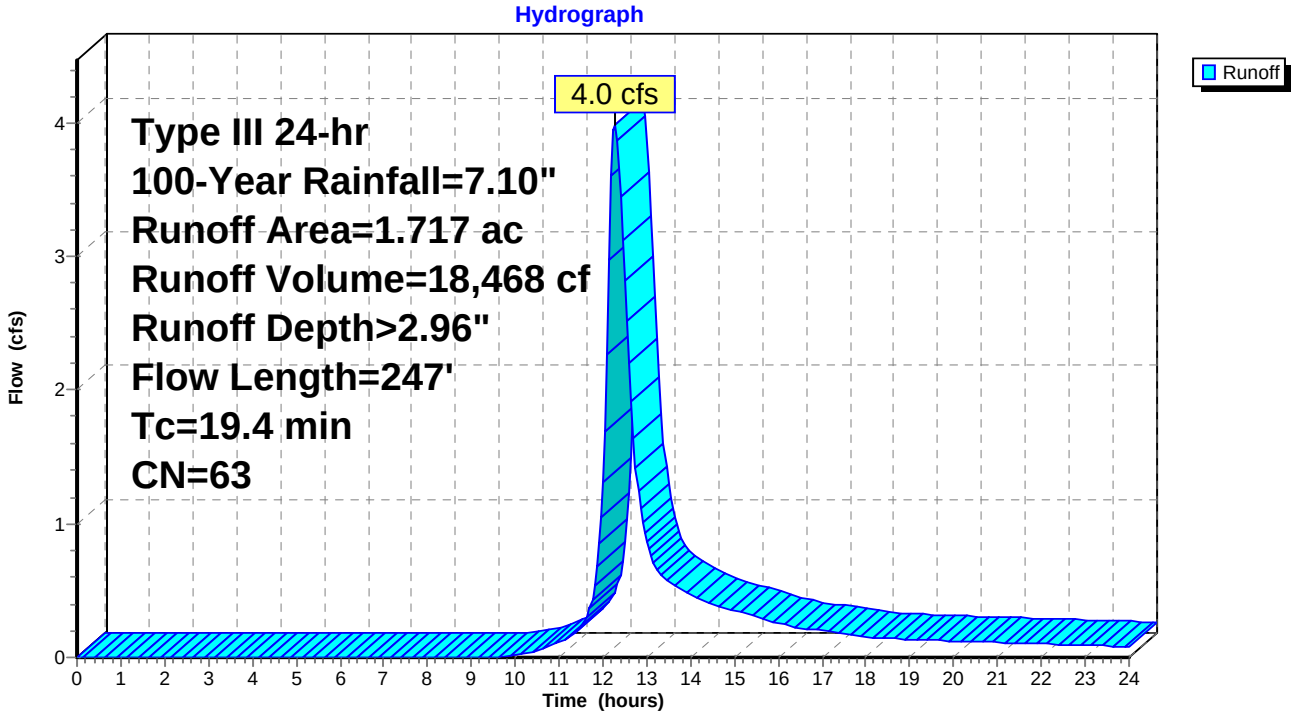
Runoff = 4.0 cfs @ 12.28 hrs, Volume= 18,468 cf, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

Area (ac)	CN	Description
0.091	77	Woods, Good, HSG D
0.151	55	Woods, Good, HSG B
1.288	61	>75% Grass cover, Good, HSG B
0.187	80	>75% Grass cover, Good, HSG D
1.717	63	Weighted Average
1.717		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 4.12" for 100-Year event
Inflow = 7.1 cfs @ 12.21 hrs, Volume= 29,299 cf
Outflow = 6.9 cfs @ 12.25 hrs, Volume= 29,227 cf, Atten= 3%, Lag= 2.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.89 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 7.9 min

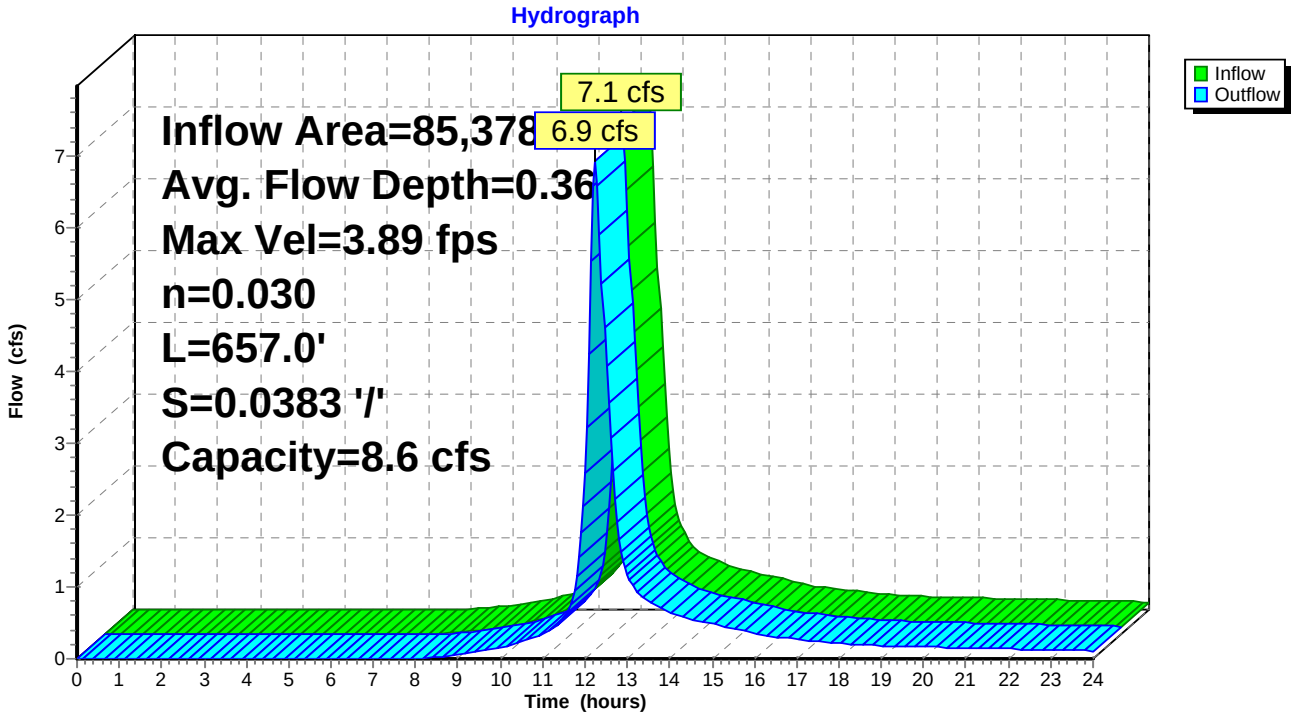
Peak Storage= 1,169 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'

‡



Reach 19R: Riprap Swale



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 4.23" for 100-Year event
Inflow = 5.2 cfs @ 12.14 hrs, Volume= 18,797 cf
Outflow = 5.1 cfs @ 12.17 hrs, Volume= 18,754 cf, Atten= 3%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.86 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 7.2 min

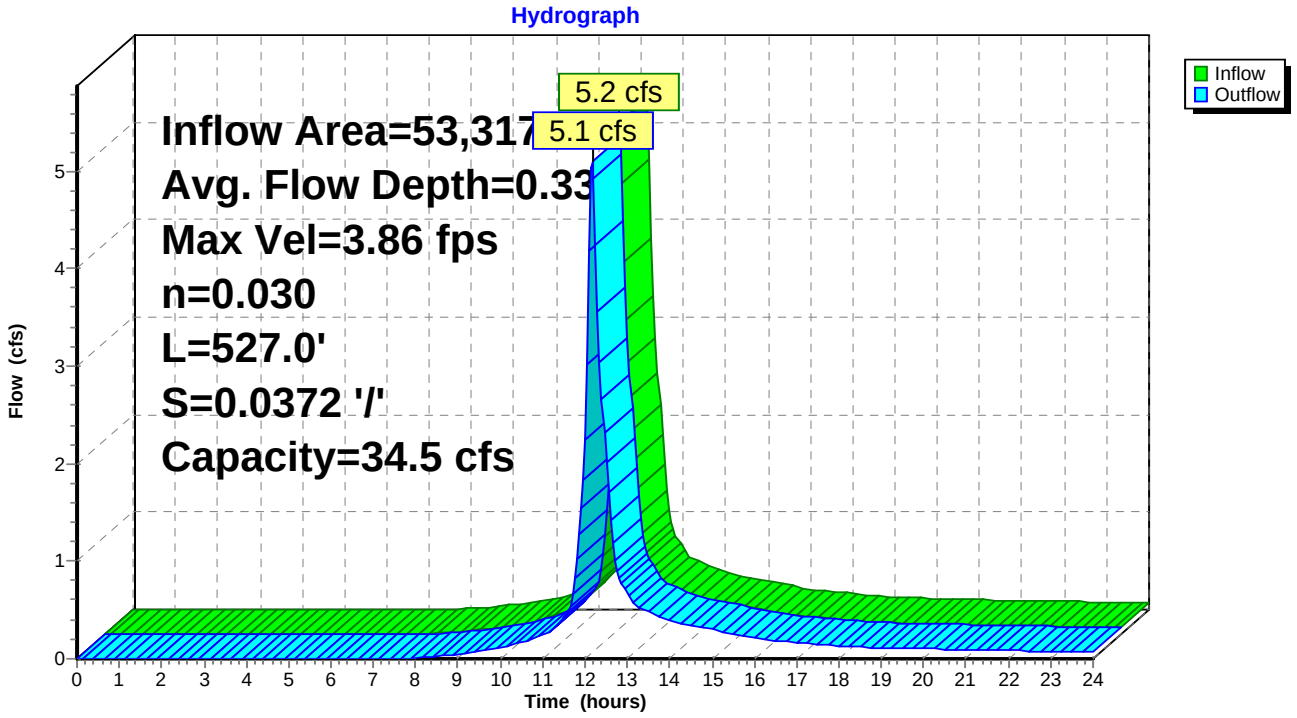
Peak Storage= 693 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

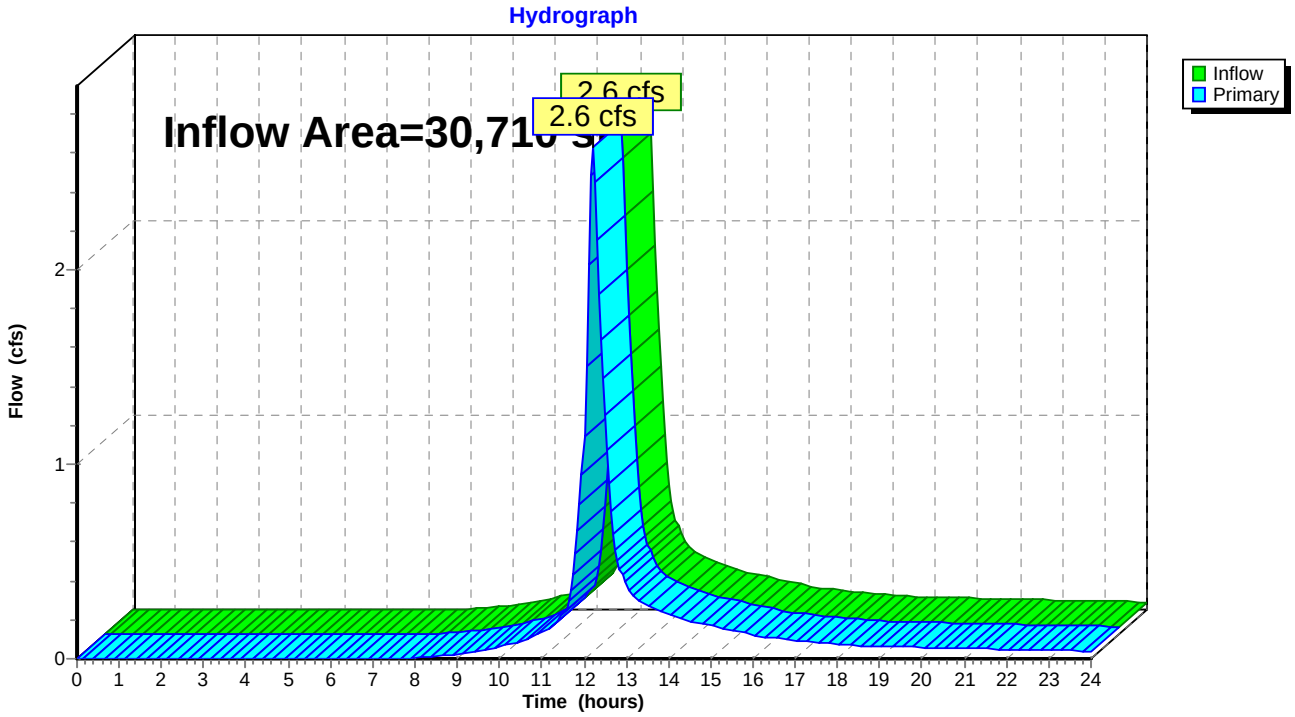


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 0.00% Impervious, Inflow Depth > 4.12" for 100-Year event
Inflow = 2.6 cfs @ 12.20 hrs, Volume= 10,541 cf
Primary = 2.6 cfs @ 12.20 hrs, Volume= 10,541 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

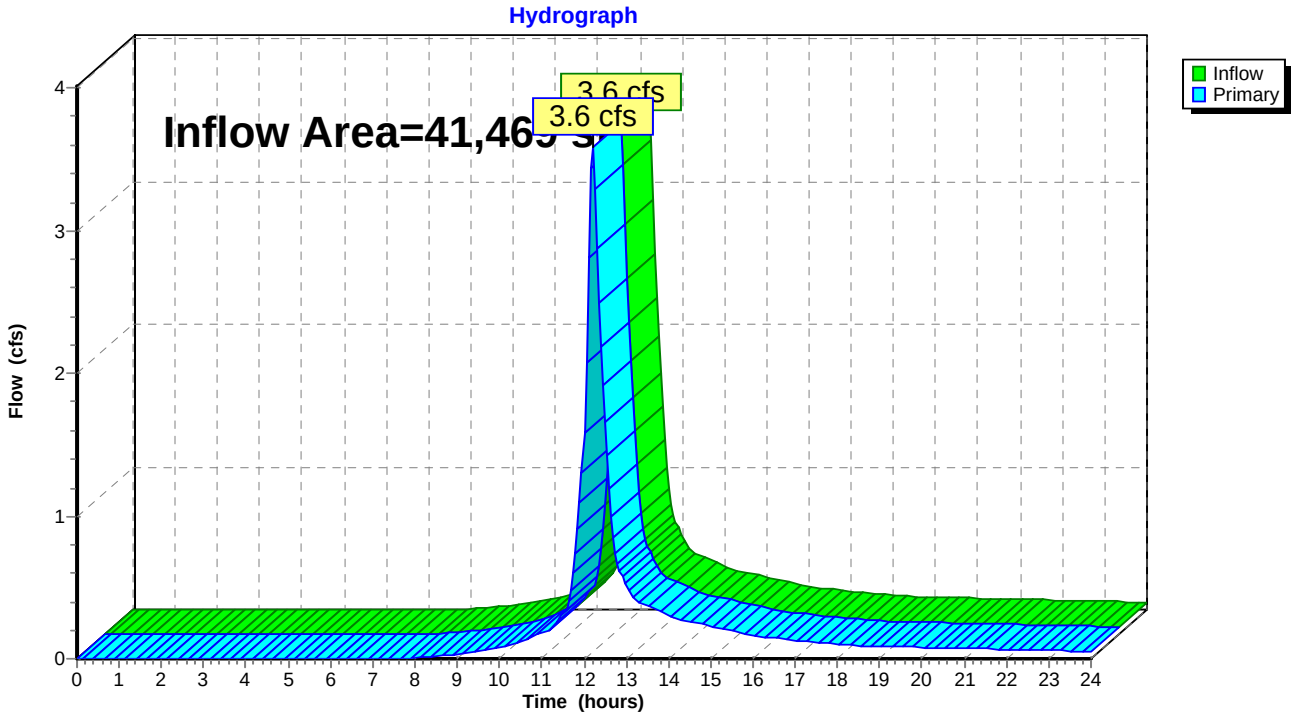


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 0.00% Impervious, Inflow Depth > 4.12" for 100-Year event
Inflow = 3.6 cfs @ 12.19 hrs, Volume= 14,236 cf
Primary = 3.6 cfs @ 12.19 hrs, Volume= 14,236 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

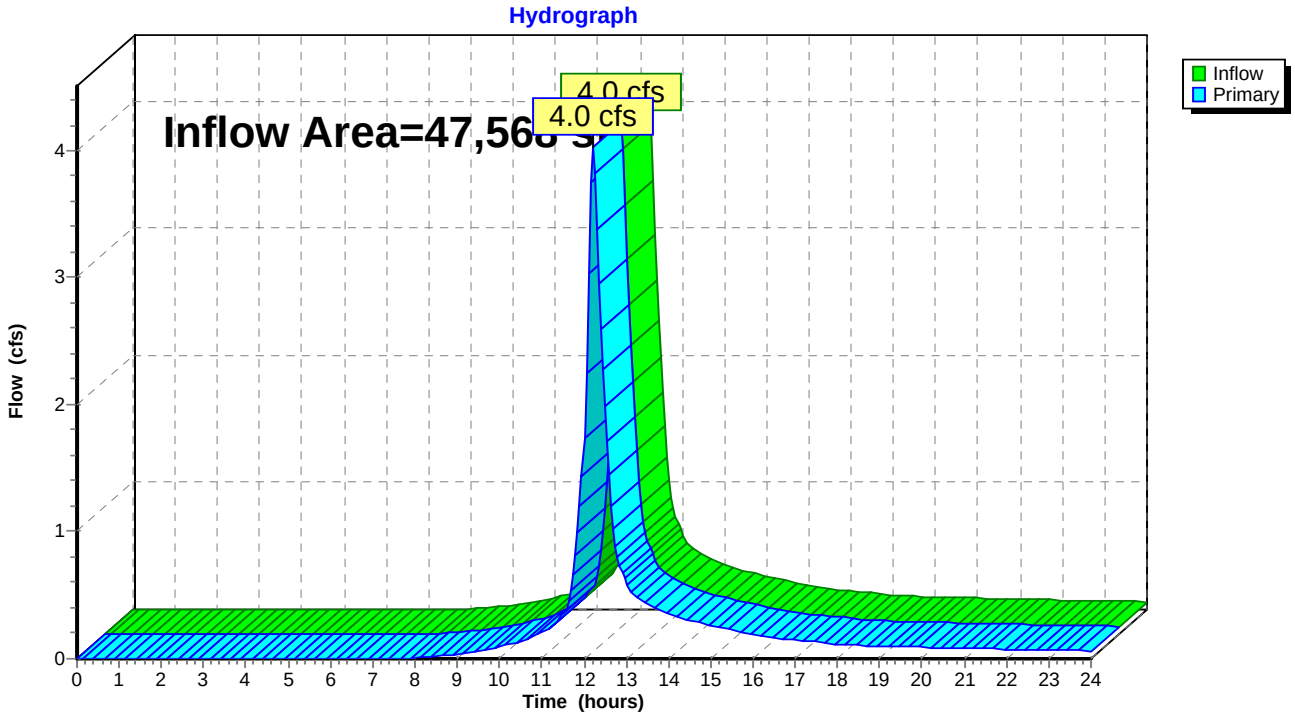


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 0.00% Impervious, Inflow Depth > 4.12" for 100-Year event
Inflow = 4.0 cfs @ 12.20 hrs, Volume= 16,326 cf
Primary = 4.0 cfs @ 12.20 hrs, Volume= 16,326 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

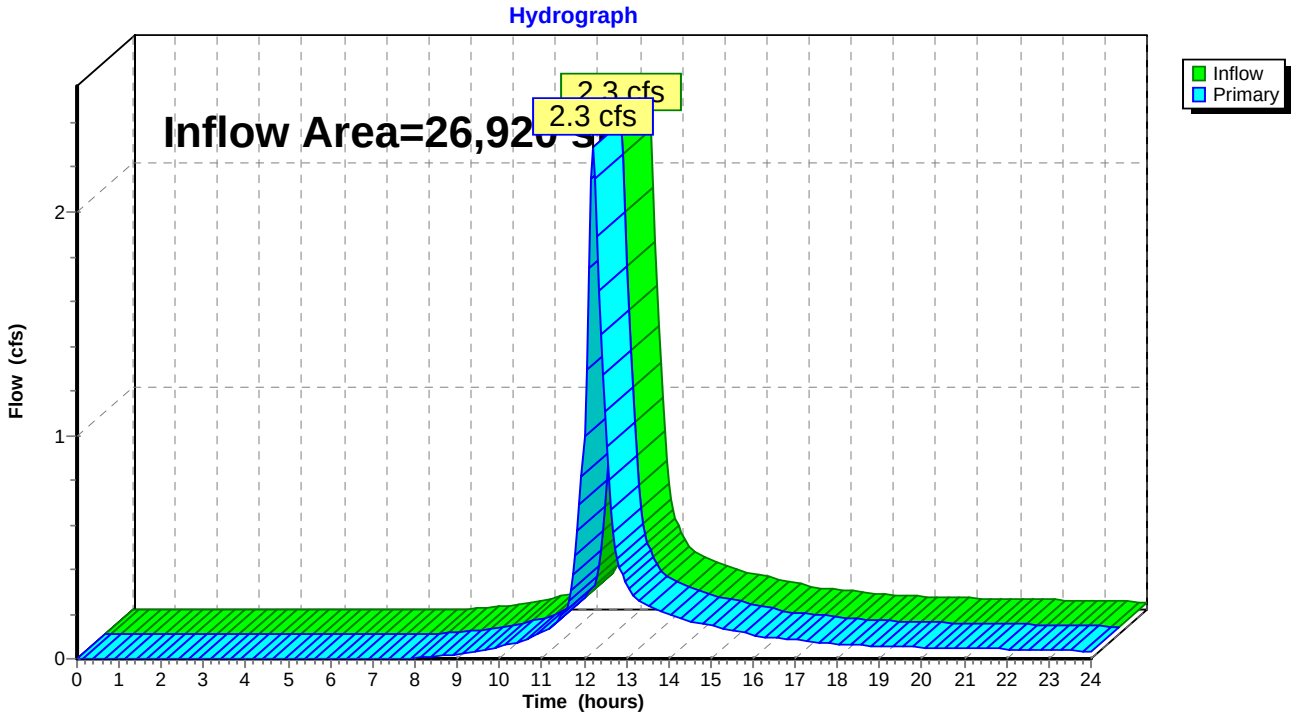


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 0.00% Impervious, Inflow Depth > 4.12" for 100-Year event
Inflow = 2.3 cfs @ 12.20 hrs, Volume= 9,240 cf
Primary = 2.3 cfs @ 12.20 hrs, Volume= 9,240 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

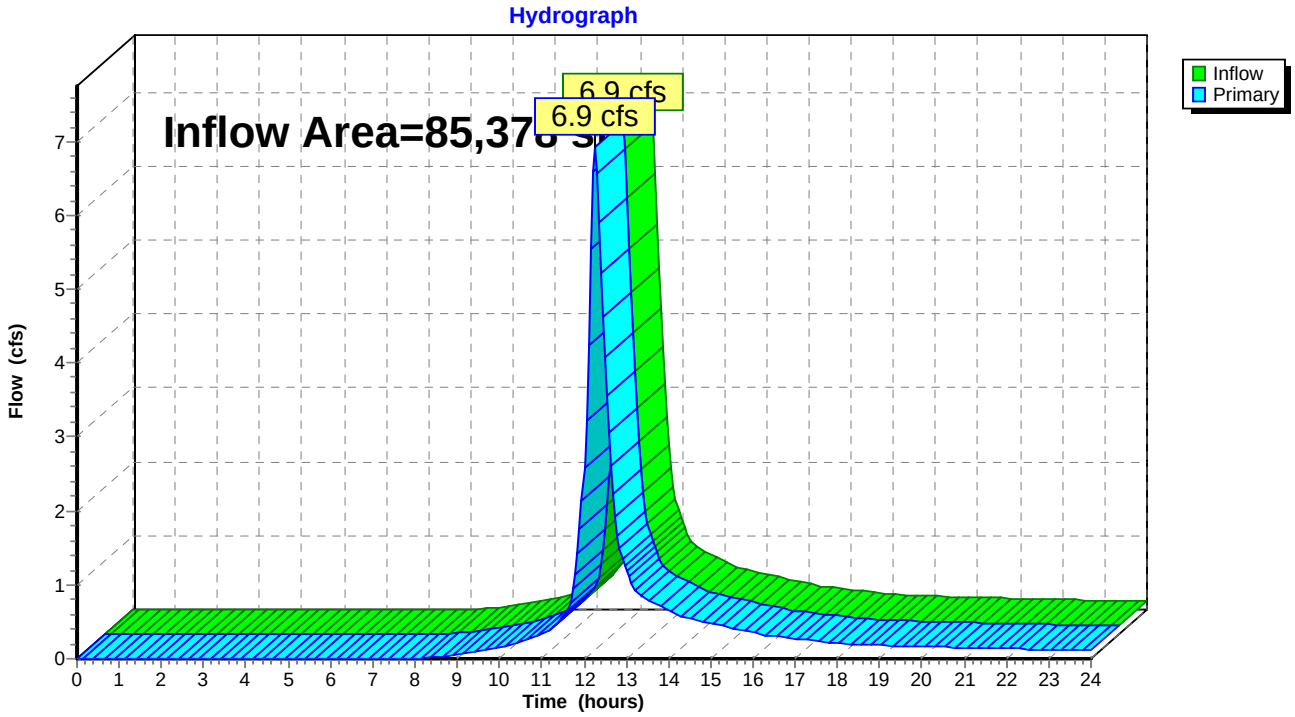


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 0.00% Impervious, Inflow Depth > 4.11" for 100-Year event
Inflow = 6.9 cfs @ 12.25 hrs, Volume= 29,227 cf
Primary = 6.9 cfs @ 12.25 hrs, Volume= 29,227 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

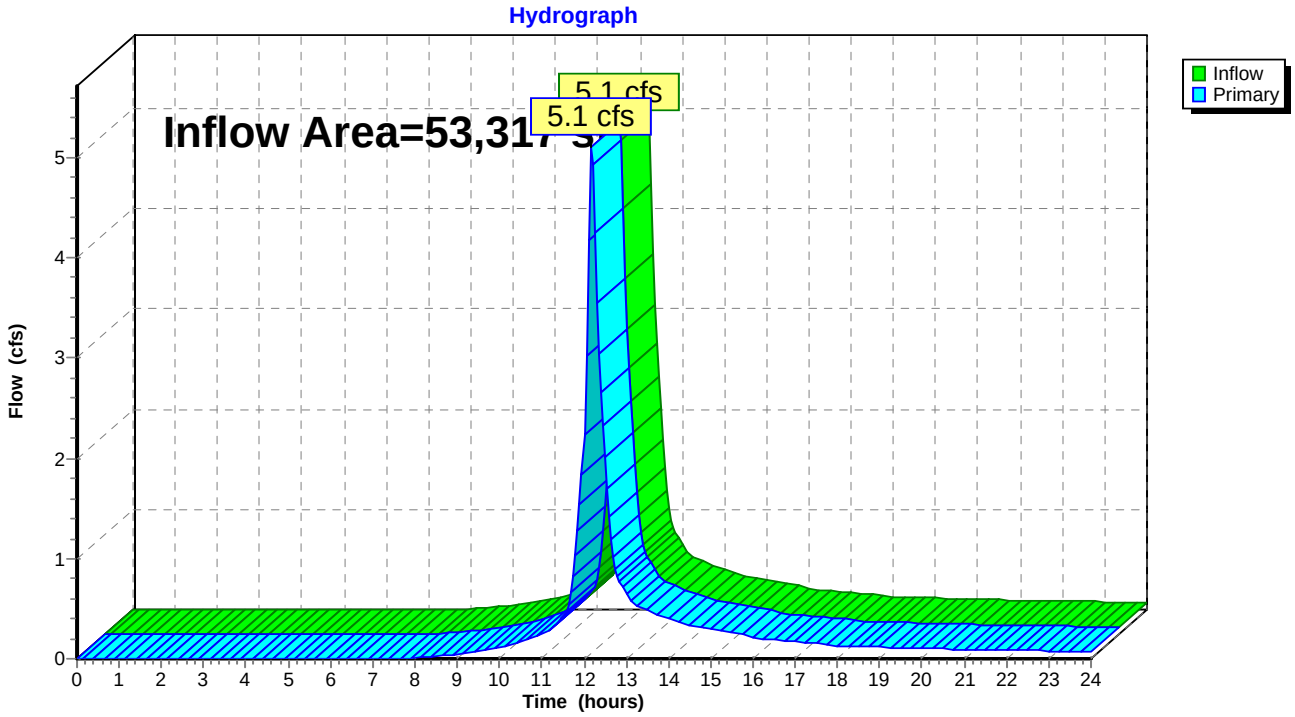


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 0.00% Impervious, Inflow Depth > 4.22" for 100-Year event
Inflow = 5.1 cfs @ 12.17 hrs, Volume= 18,754 cf
Primary = 5.1 cfs @ 12.17 hrs, Volume= 18,754 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

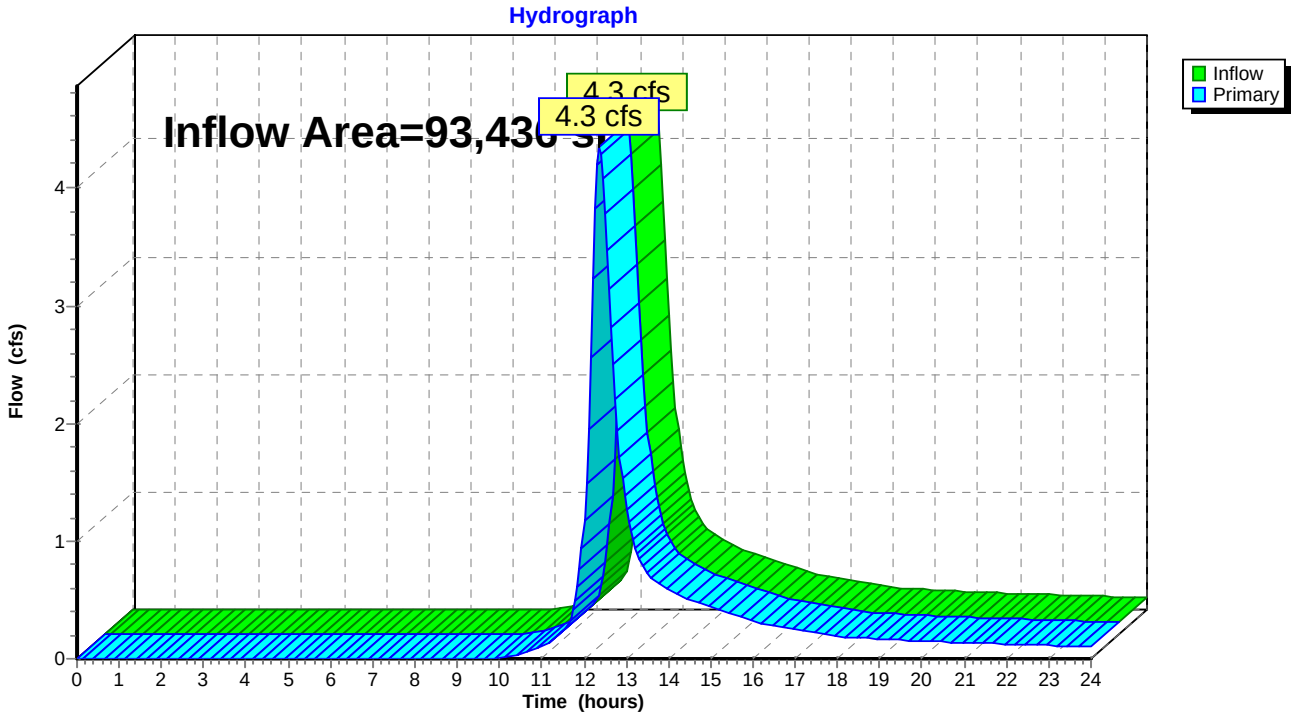


Summary for Link 15L: Wetland W

Inflow Area = 93,436 sf, 0.00% Impervious, Inflow Depth > 2.86" for 100-Year event
Inflow = 4.3 cfs @ 12.36 hrs, Volume= 22,256 cf
Primary = 4.3 cfs @ 12.36 hrs, Volume= 22,256 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

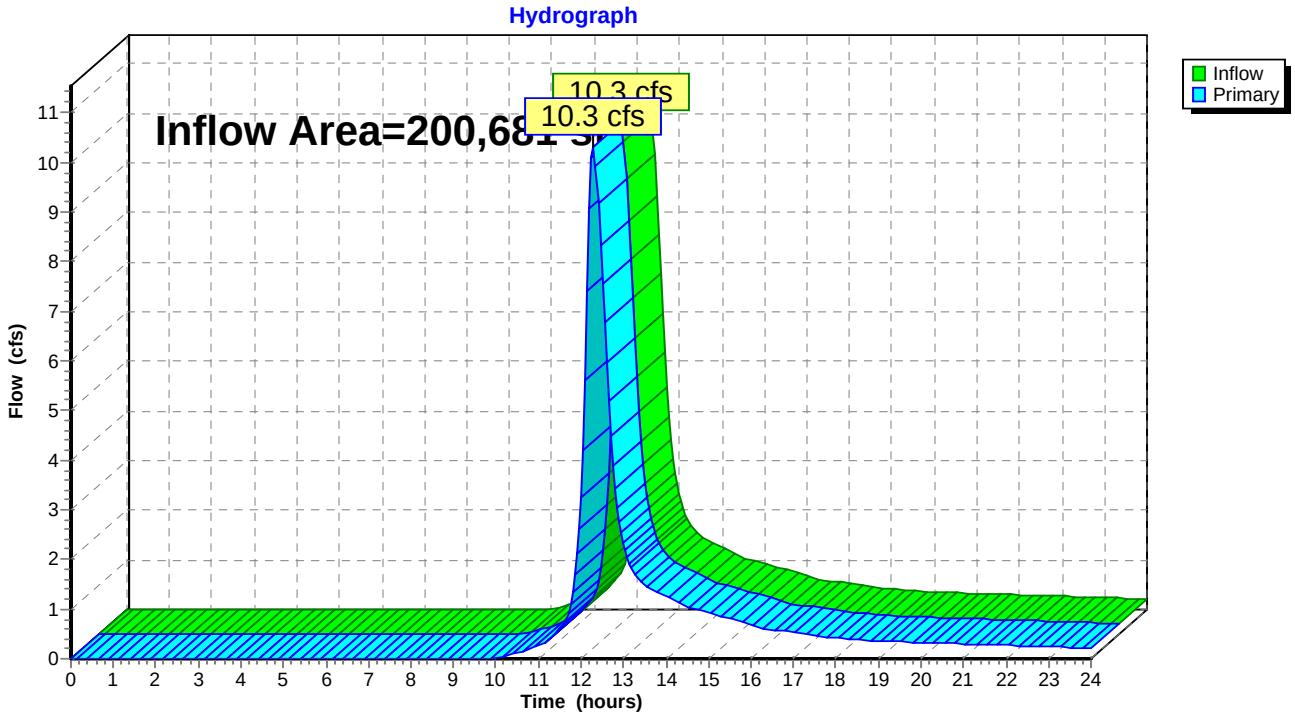


Summary for Link 16L: Wetland E

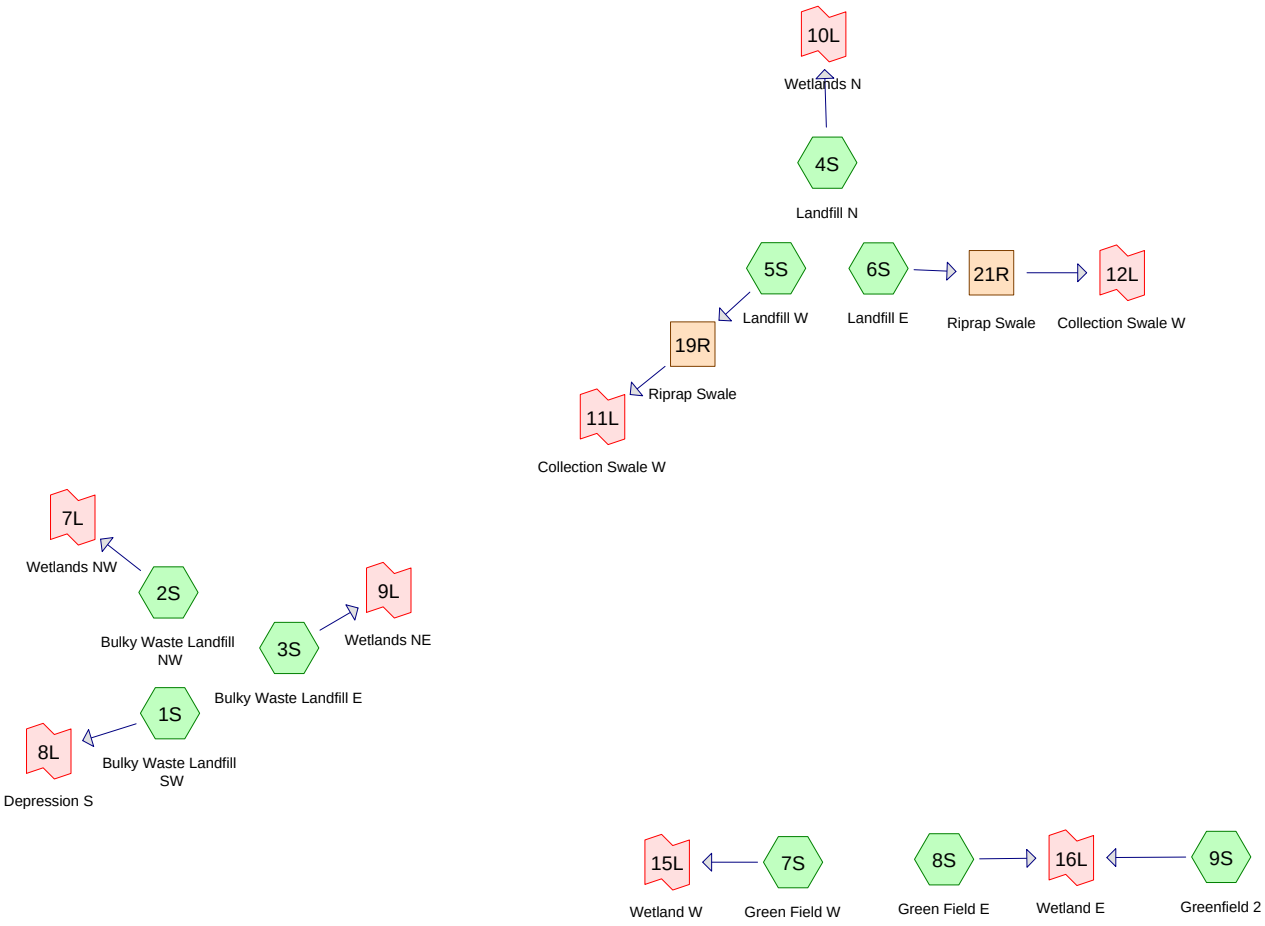
Inflow Area = 200,681 sf, 0.00% Impervious, Inflow Depth > 2.90" for 100-Year event
Inflow = 10.3 cfs @ 12.29 hrs, Volume= 48,486 cf
Primary = 10.3 cfs @ 12.29 hrs, Volume= 48,486 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Proposed Conditions Results



Subcat Reach Pond Link

Routing Diagram for Rogers Road Proposed Conditions
Prepared by Boundaries LLC - DCM, Printed 8/27/2015
HydroCAD® 10.00-13 s/n 04031 © 2014 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
265,413	61	>75% Grass cover, Good, HSG B (7S, 8S, 9S)
266,243	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 4S, 5S, 6S, 7S)
16,588	80	>75% Grass cover, Good, HSG D (7S, 8S, 9S)
131	98	Concrete Equipment Pad, HSG C (6S)
230	98	Equipment Pad, HSG B (7S)
131	98	Equipment Pad, HSG C (1S)
8,015	89	Gravel roads, HSG C (1S, 2S, 6S)
218	98	Paved parking, HSG B (9S)
340	98	Paved parking, HSG C (7S)
9	98	Solar Array Posts, HSG B (7S, 8S)
1,742	98	Solar array Ballasts, HSG C (1S)
9,932	98	Solar array ballasts, HSG C (2S, 3S, 4S, 5S, 6S)
6,578	55	Woods, Good, HSG B (9S)
3,964	77	Woods, Good, HSG D (9S)
579,533	**69**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
272,448	HSG B	7S, 8S, 9S
286,534	HSG C	1S, 2S, 3S, 4S, 5S, 6S, 7S
20,552	HSG D	7S, 8S, 9S
0	Other	
579,533		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
0	265,413	266,243	16,588	0	548,244	>75% Grass cover, Good	
0	0	131	0	0	131	Concrete Equipment Pad	
0	230	131	0	0	361	Equipment Pad	
0	0	8,015	0	0	8,015	Gravel roads	
0	218	340	0	0	558	Paved parking	
0	9	0	0	0	9	Solar Array Posts	
0	0	1,742	0	0	1,742	Solar array Ballasts	
0	0	9,932	0	0	9,932	Solar array ballasts	
0	6,578	0	3,964	0	10,542	Woods, Good	
0	**272,448**	**286,534**	**20,552**	**0**	**579,533**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 4.52% Impervious Runoff Depth>1.29"
Flow Length=239' Tc=13.7 min CN=76 Runoff=1.1 cfs 4,456 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 4.54% Impervious Runoff Depth>1.23"
Flow Length=179' Tc=14.1 min CN=75 Runoff=0.8 cfs 3,141 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 5.31% Impervious Runoff Depth>1.23"
Flow Length=204' Tc=14.6 min CN=75 Runoff=1.2 cfs 4,865 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 4.53% Impervious Runoff Depth>1.23"
Flow Length=222' Tc=14.3 min CN=75 Runoff=0.7 cfs 2,754 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 3.27% Impervious Runoff Depth>1.23"
Flow Length=752' Tc=15.2 min CN=75 Runoff=2.0 cfs 8,731 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 4.00% Impervious Runoff Depth>1.29"
Flow Length=459' Tc=10.0 min CN=76 Runoff=1.6 cfs 5,734 cf

Subcatchment 7S: Green Field W Runoff Area=93,438 sf 0.61% Impervious Runoff Depth>0.56"
Flow Length=472' Tc=24.7 min CN=62 Runoff=0.7 cfs 4,395 cf

Subcatchment 8S: Green Field E Runoff Area=125,941 sf 0.00% Impervious Runoff Depth>0.57"
Flow Length=305' Tc=20.6 min CN=62 Runoff=0.9 cfs 5,934 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.29% Impervious Runoff Depth>0.61"
Flow Length=247' Tc=19.4 min CN=63 Runoff=0.6 cfs 3,787 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.18' Max Vel=2.66 fps Inflow=2.0 cfs 8,731 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=1.9 cfs 8,691 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.16' Max Vel=2.59 fps Inflow=1.6 cfs 5,734 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=1.5 cfs 5,710 cf

Link 7L: Wetlands NW Inflow=0.8 cfs 3,141 cf
Primary=0.8 cfs 3,141 cf

Link 8L: Depression S Inflow=1.1 cfs 4,456 cf
Primary=1.1 cfs 4,456 cf

Link 9L: Wetlands NE Inflow=1.2 cfs 4,865 cf
Primary=1.2 cfs 4,865 cf

Link 10L: Wetlands N Inflow=0.7 cfs 2,754 cf
Primary=0.7 cfs 2,754 cf

Link 11L: Collection Swale W Inflow=1.9 cfs 8,691 cf
Primary=1.9 cfs 8,691 cf

Link 12L: Collection Swale W Inflow=1.5 cfs 5,710 cf
Primary=1.5 cfs 5,710 cf

Link 15L: Wetland W Inflow=0.7 cfs 4,395 cf
Primary=0.7 cfs 4,395 cf

Link 16L: Wetland E Inflow=1.6 cfs 9,721 cf
Primary=1.6 cfs 9,721 cf

Total Runoff Area = 579,533 sf Runoff Volume = 43,798 cf Average Runoff Depth = 0.91"
97.80% Pervious = 566,801 sf 2.20% Impervious = 12,732 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

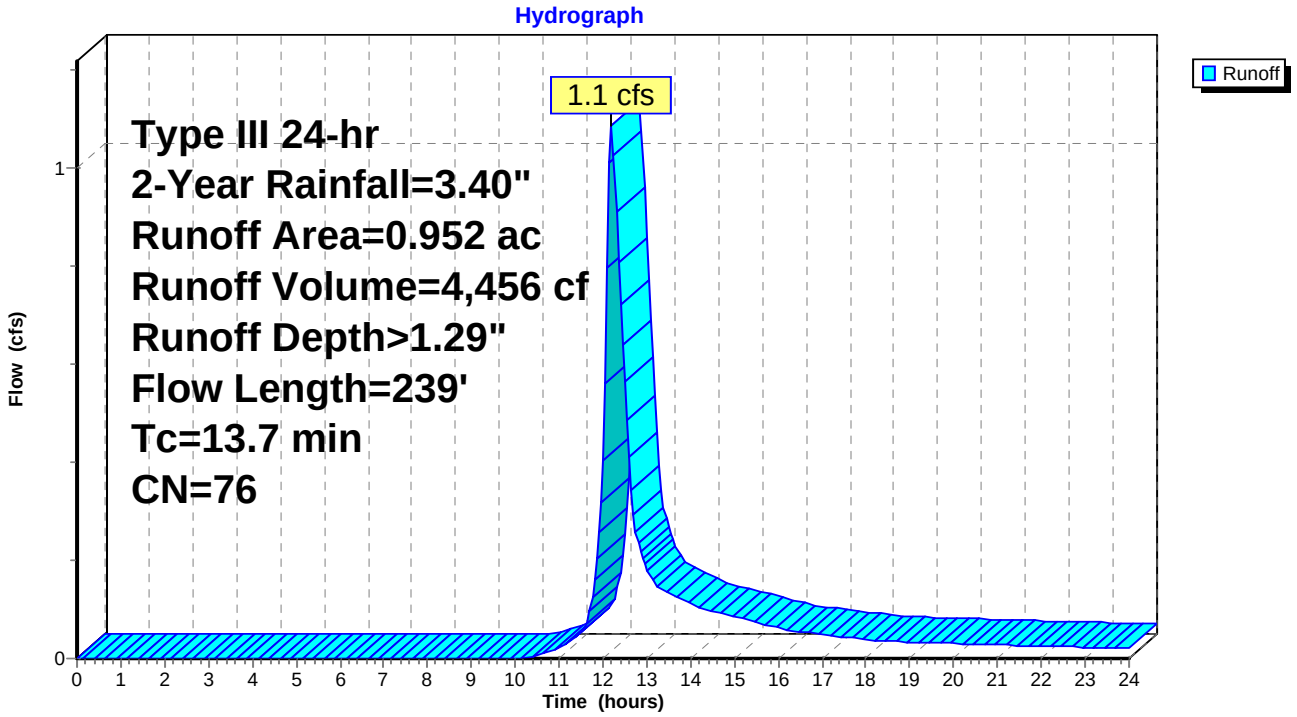
Runoff = 1.1 cfs @ 12.20 hrs, Volume= 4,456 cf, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (ac)	CN	Description
	0.829	74	>75% Grass cover, Good, HSG C
	0.080	89	Gravel roads, HSG C
*	0.003	98	Equipment Pad, HSG C
*	0.040	98	Solar array Ballasts, HSG C
	0.952	76	Weighted Average
	0.909		95.48% Pervious Area
	0.043		4.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

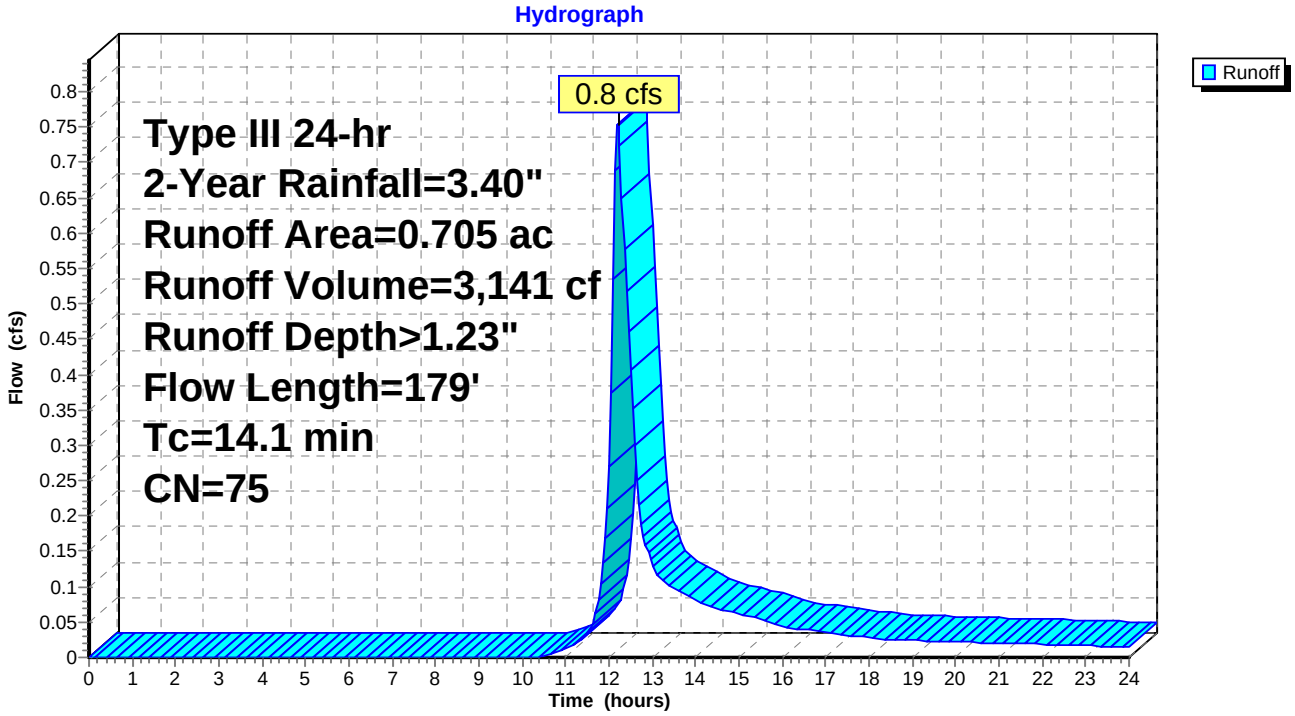
Runoff = 0.8 cfs @ 12.21 hrs, Volume= 3,141 cf, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (ac)	CN	Description
	0.659	74	>75% Grass cover, Good, HSG C
*	0.032	98	Solar array ballasts, HSG C
	0.014	89	Gravel roads, HSG C
	0.705	75	Weighted Average
	0.673		95.46% Pervious Area
	0.032		4.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

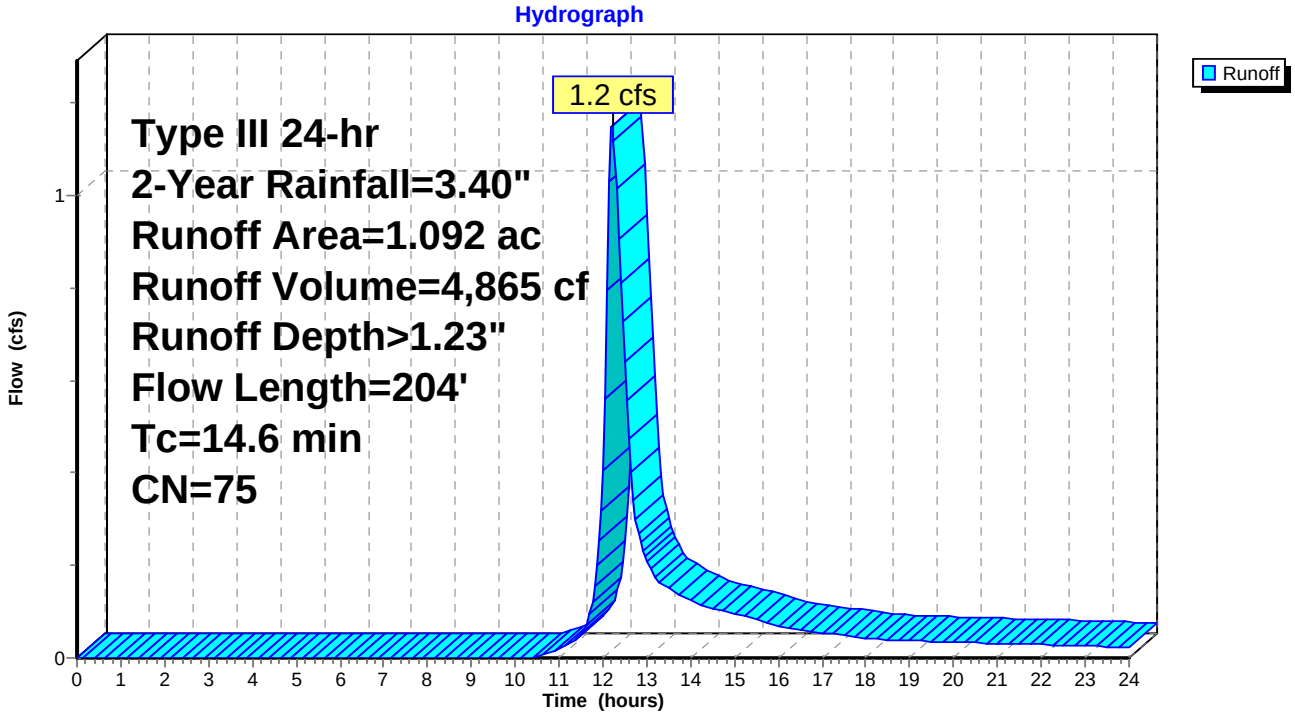
Runoff = 1.2 cfs @ 12.22 hrs, Volume= 4,865 cf, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (ac)	CN	Description
	1.034	74	>75% Grass cover, Good, HSG C
*	0.058	98	Solar array ballasts, HSG C
	1.092	75	Weighted Average
	1.034		94.69% Pervious Area
	0.058		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

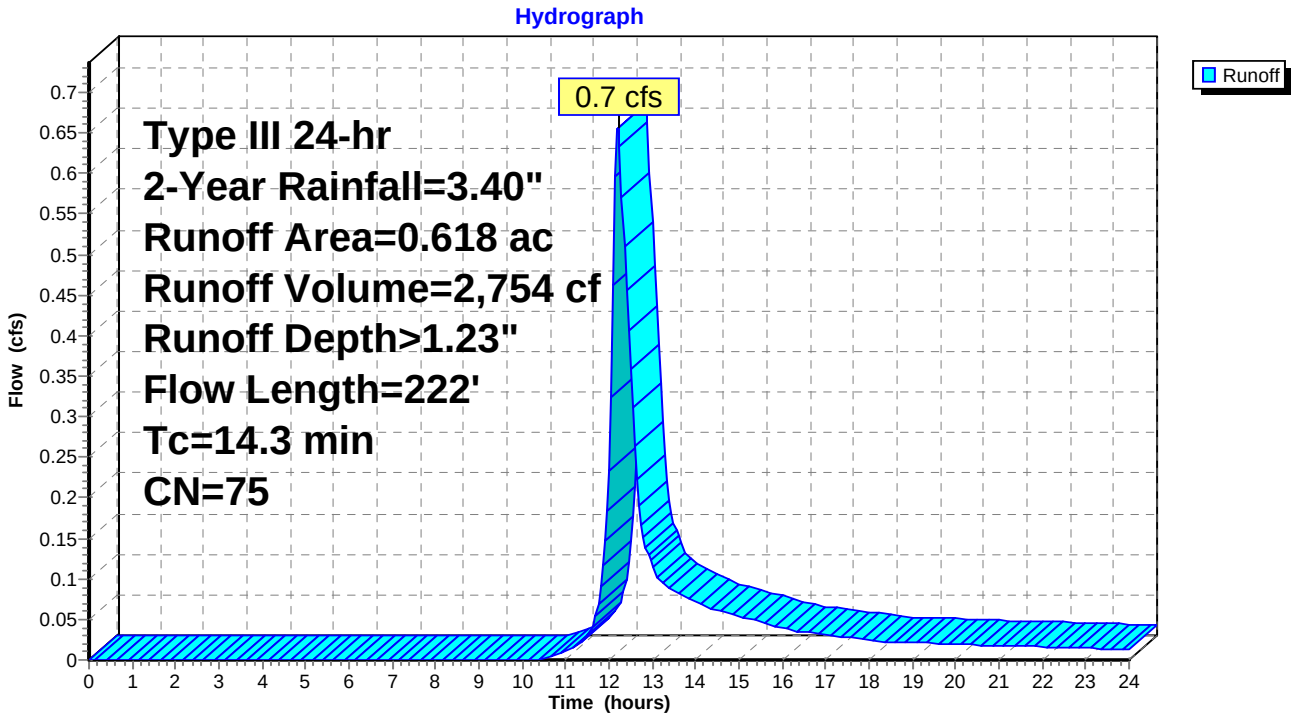
Runoff = 0.7 cfs @ 12.21 hrs, Volume= 2,754 cf, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (ac)	CN	Description
	0.590	74	>75% Grass cover, Good, HSG C
*	0.028	98	Solar array ballasts, HSG C
	0.618	75	Weighted Average
	0.590		95.47% Pervious Area
	0.028		4.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

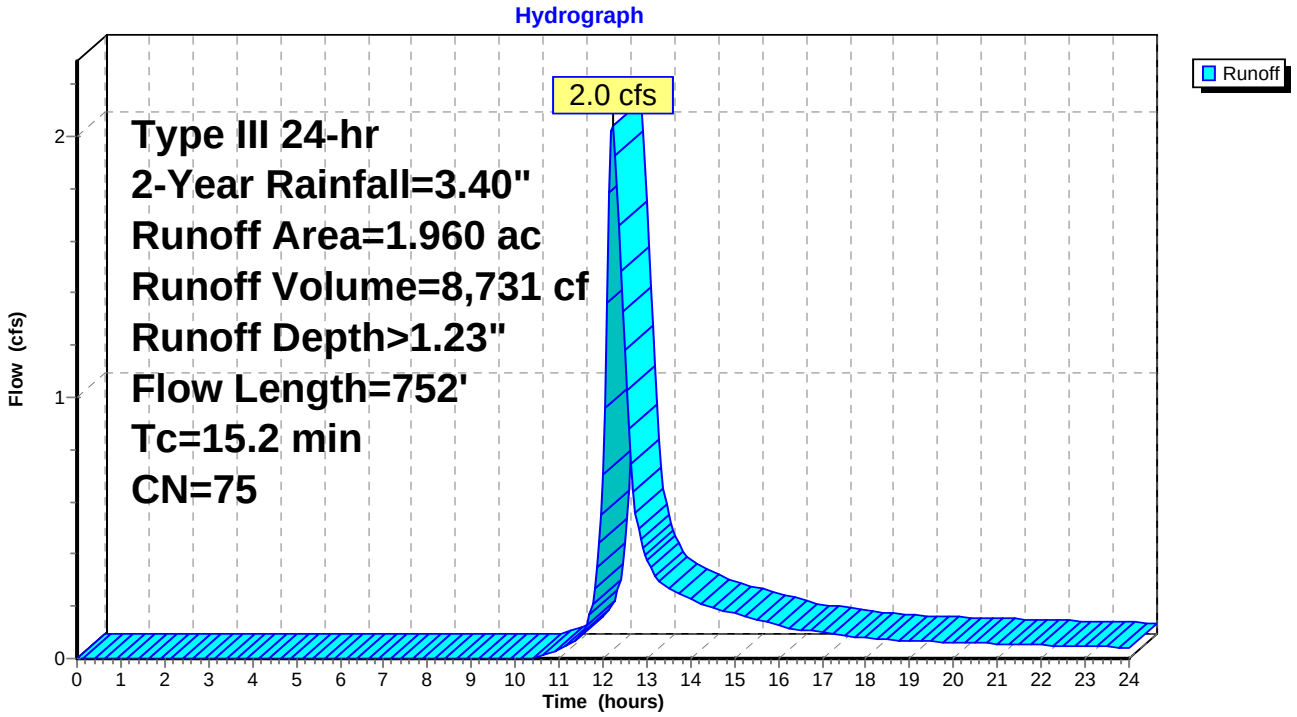
Runoff = 2.0 cfs @ 12.22 hrs, Volume= 8,731 cf, Depth> 1.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (ac)	CN	Description
	1.896	74	>75% Grass cover, Good, HSG C
*	0.064	98	Solar array ballasts, HSG C
	1.960	75	Weighted Average
	1.896		96.73% Pervious Area
	0.064		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

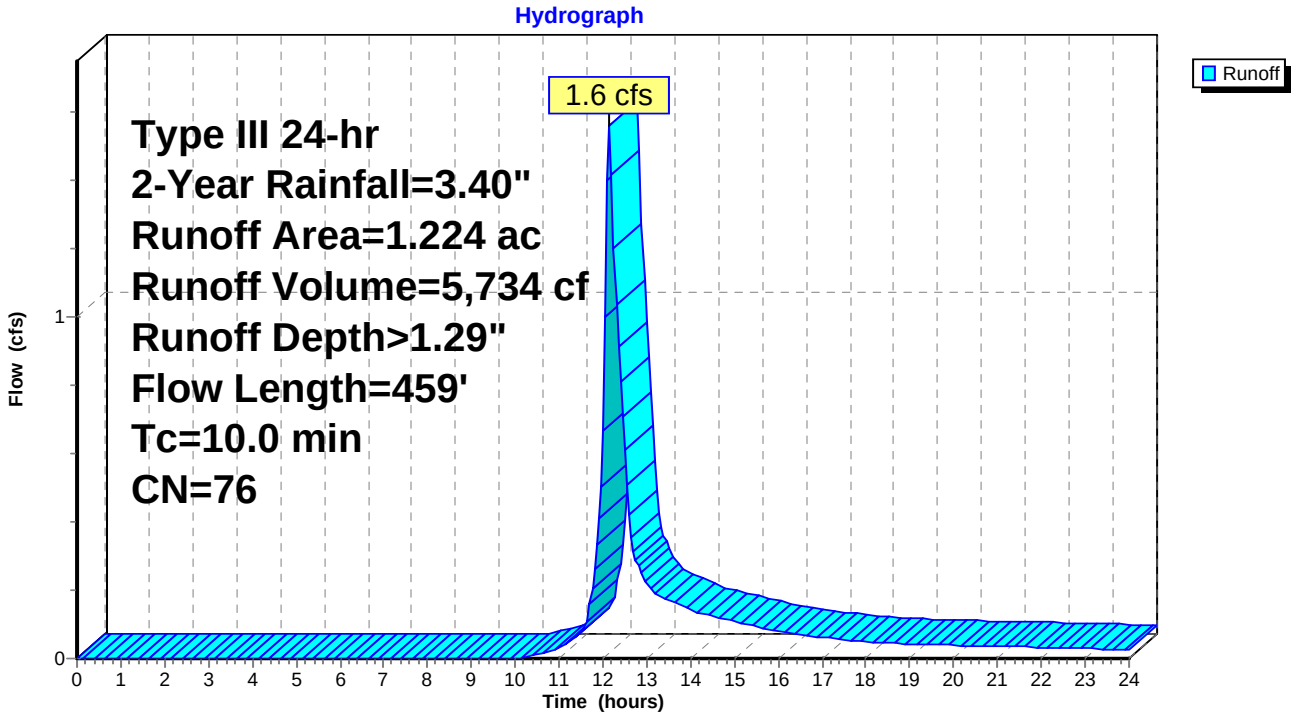
Runoff = 1.6 cfs @ 12.15 hrs, Volume= 5,734 cf, Depth> 1.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (ac)	CN	Description
	1.085	74	>75% Grass cover, Good, HSG C
	0.090	89	Gravel roads, HSG C
*	0.046	98	Solar array ballasts, HSG C
*	0.003	98	Concrete Equipment Pad, HSG C
	1.224	76	Weighted Average
	1.175		96.00% Pervious Area
	0.049		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

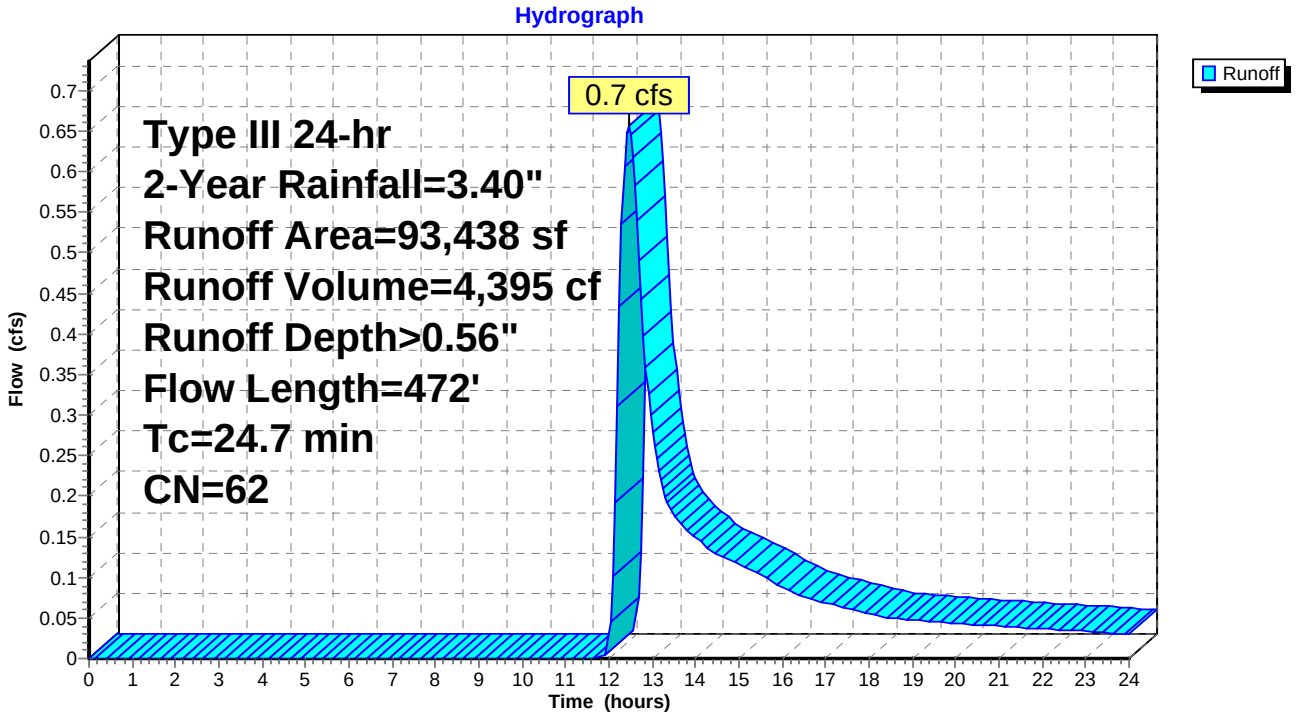
Runoff = 0.7 cfs @ 12.45 hrs, Volume= 4,395 cf, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
	832	74	>75% Grass cover, Good, HSG C
	3,861	80	>75% Grass cover, Good, HSG D
	21,955	61	>75% Grass cover, Good, HSG B
	66,216	61	>75% Grass cover, Good, HSG B
	340	98	Paved parking, HSG C
*	4	98	Solar Array Posts, HSG B
*	230	98	Equipment Pad, HSG B
	93,438	62	Weighted Average
	92,864		99.39% Pervious Area
	574		0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

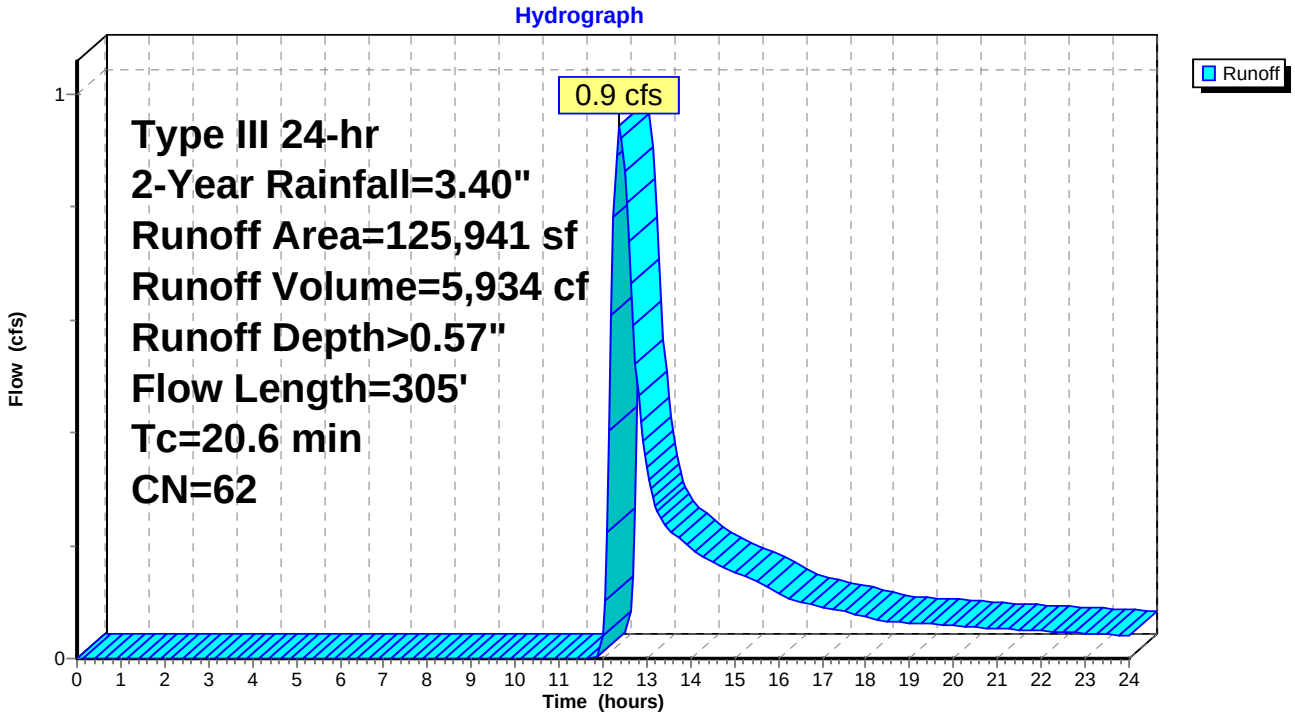
Runoff = 0.9 cfs @ 12.37 hrs, Volume= 5,934 cf, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (sf)	CN	Description
	116,936	61	>75% Grass cover, Good, HSG B
	3,129	80	>75% Grass cover, Good, HSG D
	1,452	80	>75% Grass cover, Good, HSG D
	4,419	61	>75% Grass cover, Good, HSG B
*	5	98	Solar Array Posts, HSG B
	125,941	62	Weighted Average
	125,936		100.00% Pervious Area
	5		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

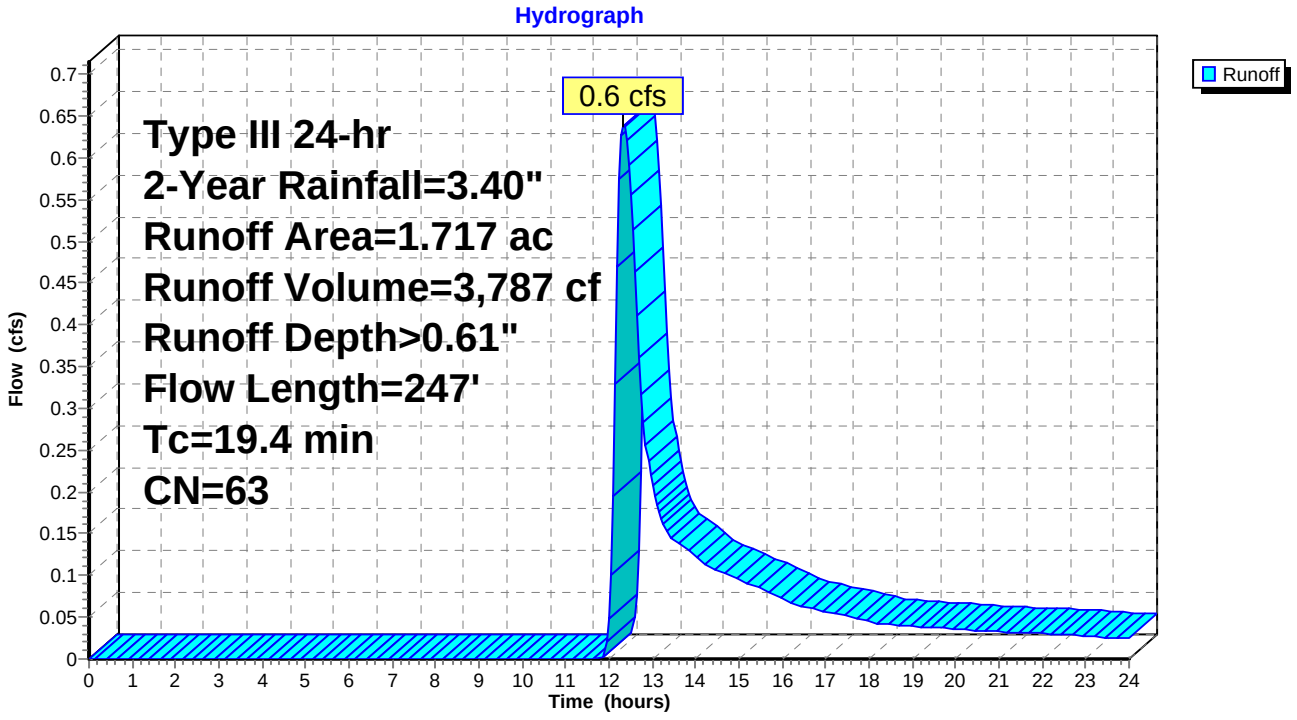
Runoff = 0.6 cfs @ 12.34 hrs, Volume= 3,787 cf, Depth> 0.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 2-Year Rainfall=3.40"

	Area (ac)	CN	Description
	0.091	77	Woods, Good, HSG D
	0.151	55	Woods, Good, HSG B
	1.283	61	>75% Grass cover, Good, HSG B
	0.187	80	>75% Grass cover, Good, HSG D
*	0.000	98	Solar Array Posts, HSG B
	0.005	98	Paved parking, HSG B
	1.717	63	Weighted Average
	1.712		99.71% Pervious Area
	0.005		0.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 1.23" for 2-Year event
Inflow = 2.0 cfs @ 12.22 hrs, Volume= 8,731 cf
Outflow = 1.9 cfs @ 12.28 hrs, Volume= 8,691 cf, Atten= 5%, Lag= 3.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 2.66 fps, Min. Travel Time= 4.1 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 11.0 min

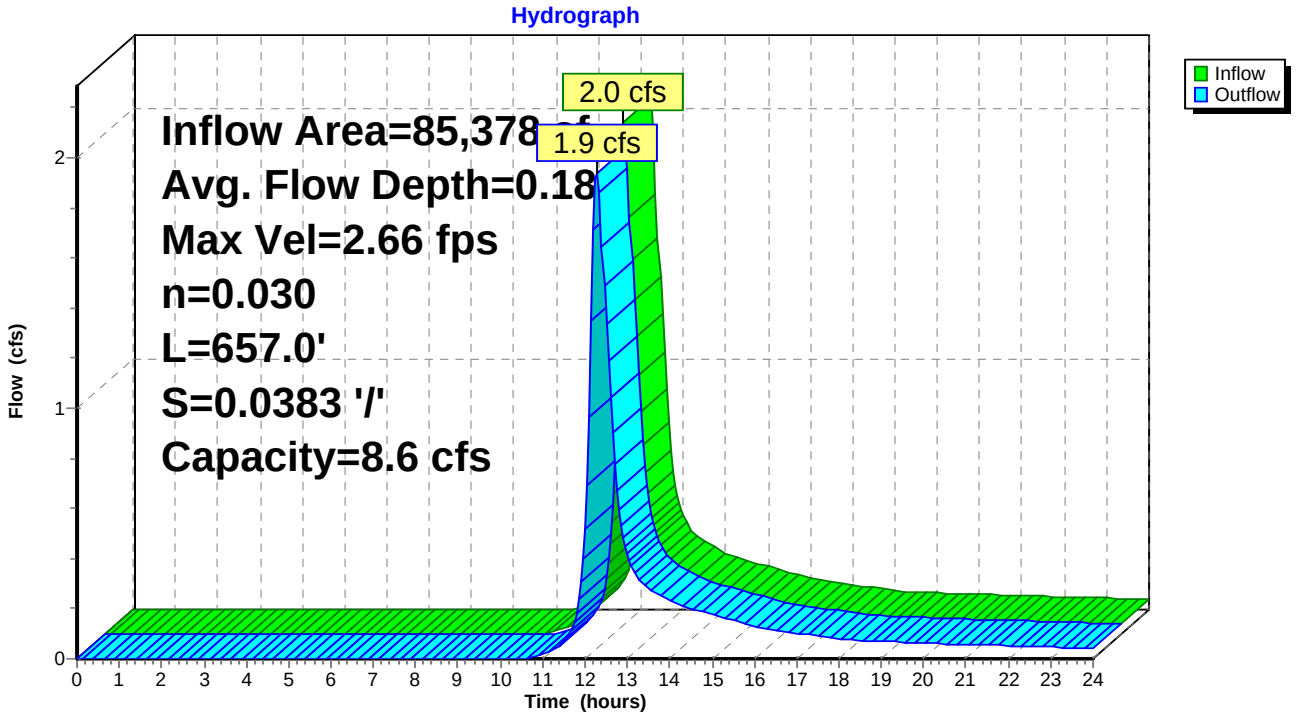
Peak Storage= 477 cf @ 12.28 hrs
Average Depth at Peak Storage= 0.18'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡

Reach 19R: Riprap Swale



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 1.6 cfs @ 12.15 hrs, Volume= 5,734 cf
Outflow = 1.5 cfs @ 12.19 hrs, Volume= 5,710 cf, Atten= 6%, Lag= 2.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 2.59 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 10.1 min

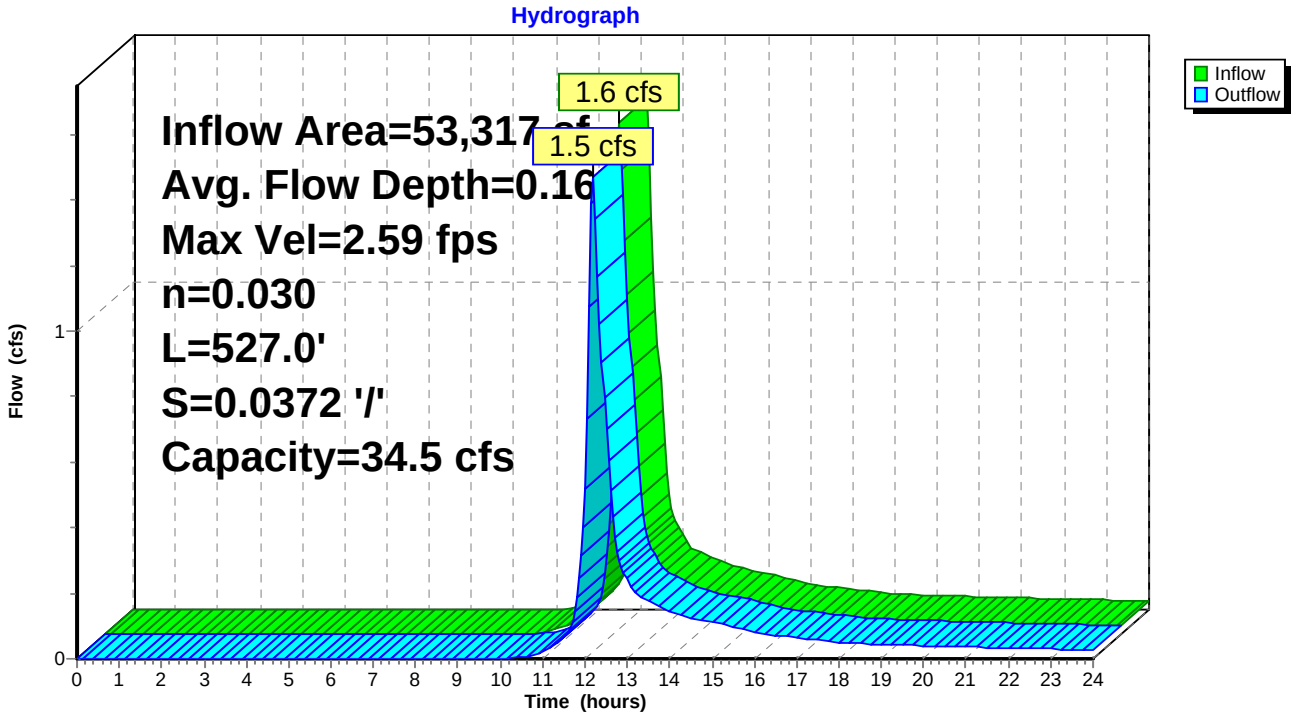
Peak Storage= 299 cf @ 12.19 hrs
Average Depth at Peak Storage= 0.16'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

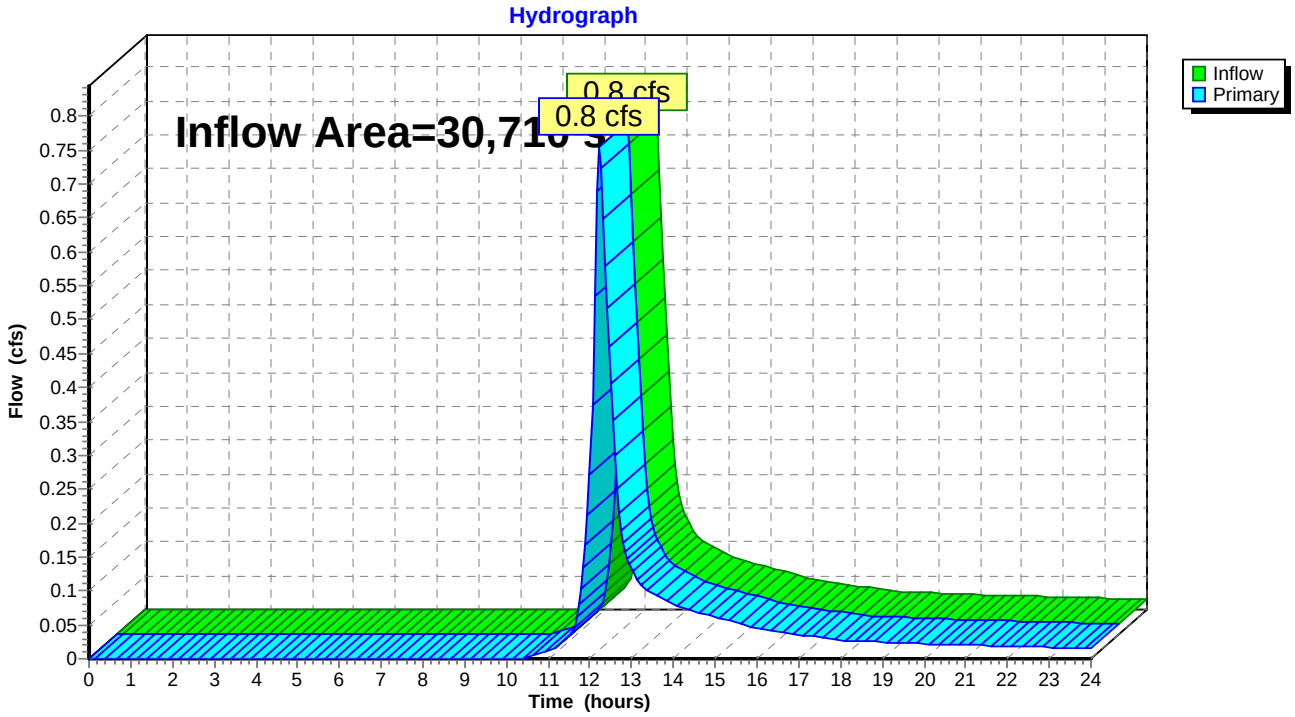


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 4.54% Impervious, Inflow Depth > 1.23" for 2-Year event
Inflow = 0.8 cfs @ 12.21 hrs, Volume= 3,141 cf
Primary = 0.8 cfs @ 12.21 hrs, Volume= 3,141 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

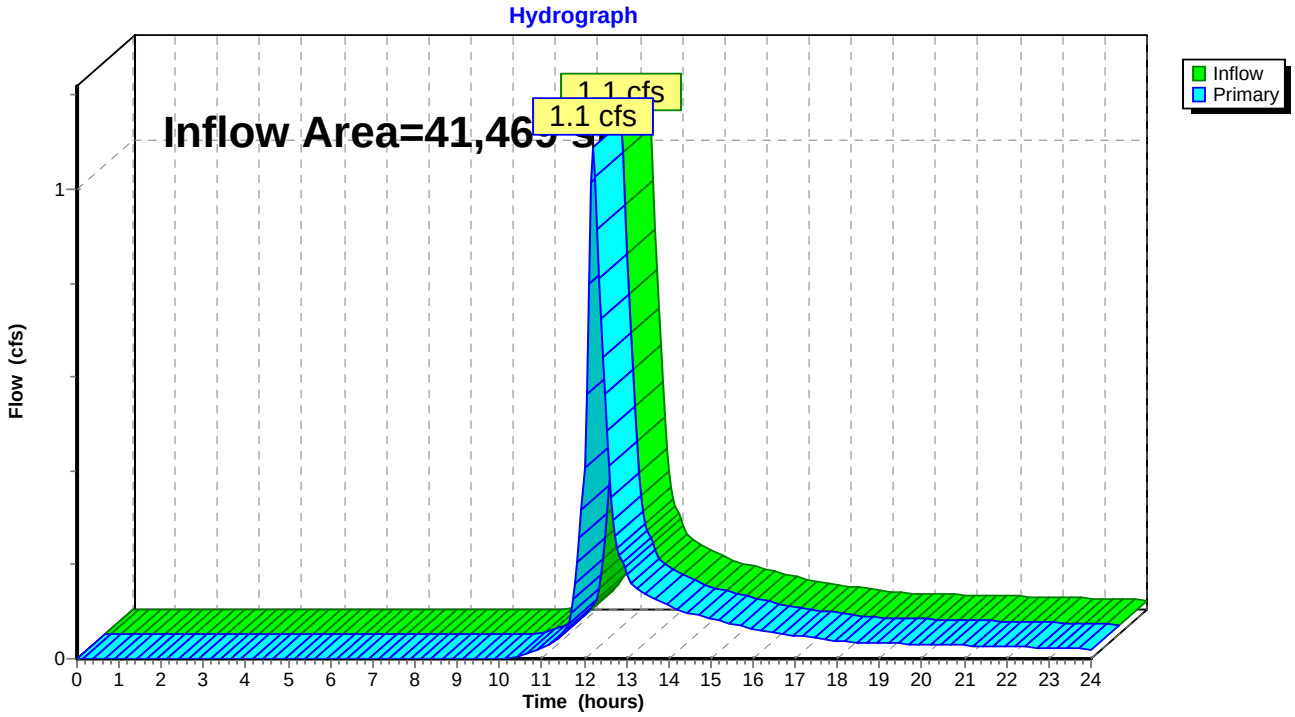


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 4.52% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 1.1 cfs @ 12.20 hrs, Volume= 4,456 cf
Primary = 1.1 cfs @ 12.20 hrs, Volume= 4,456 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

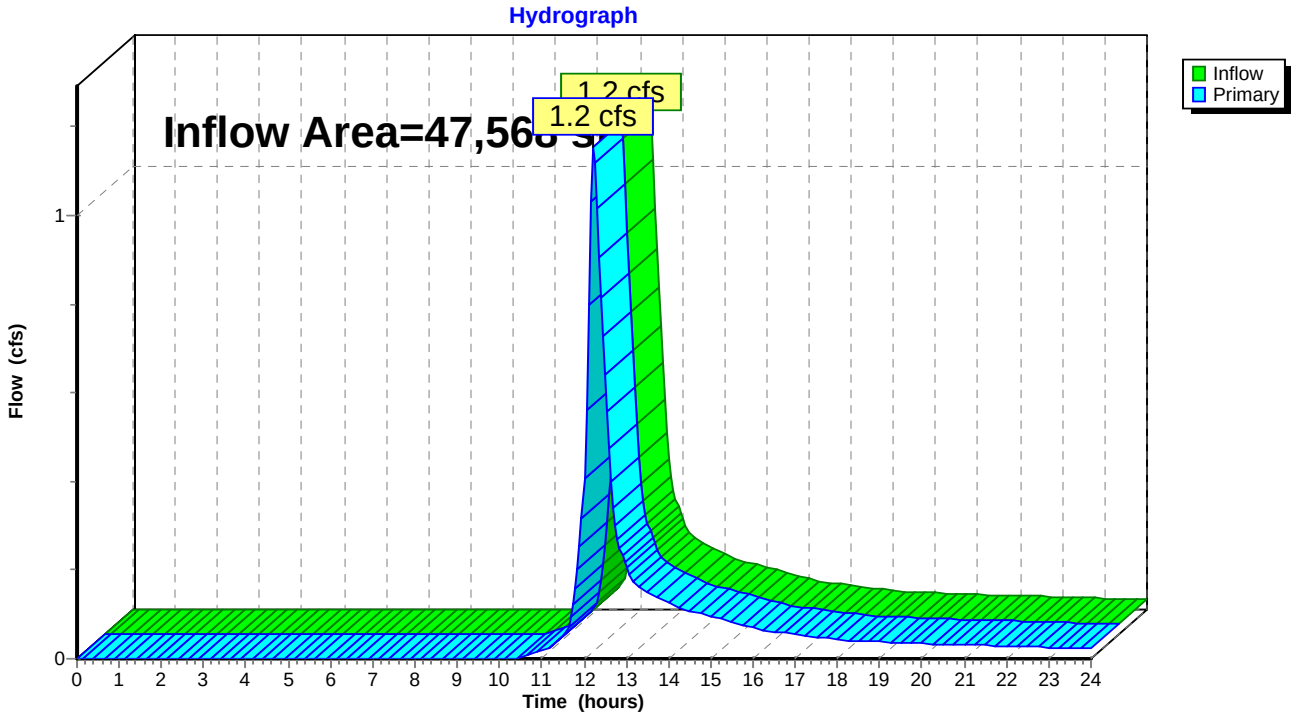


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 5.31% Impervious, Inflow Depth > 1.23" for 2-Year event
Inflow = 1.2 cfs @ 12.22 hrs, Volume= 4,865 cf
Primary = 1.2 cfs @ 12.22 hrs, Volume= 4,865 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

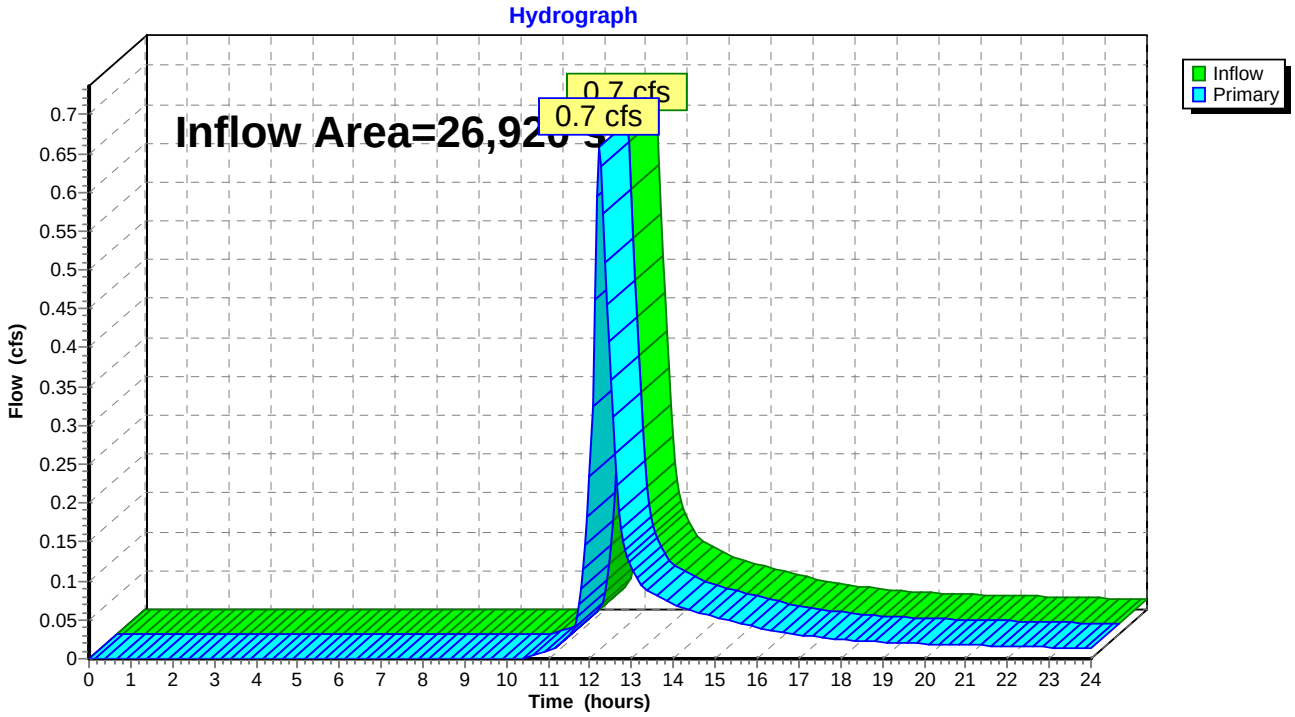


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 4.53% Impervious, Inflow Depth > 1.23" for 2-Year event
Inflow = 0.7 cfs @ 12.21 hrs, Volume= 2,754 cf
Primary = 0.7 cfs @ 12.21 hrs, Volume= 2,754 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

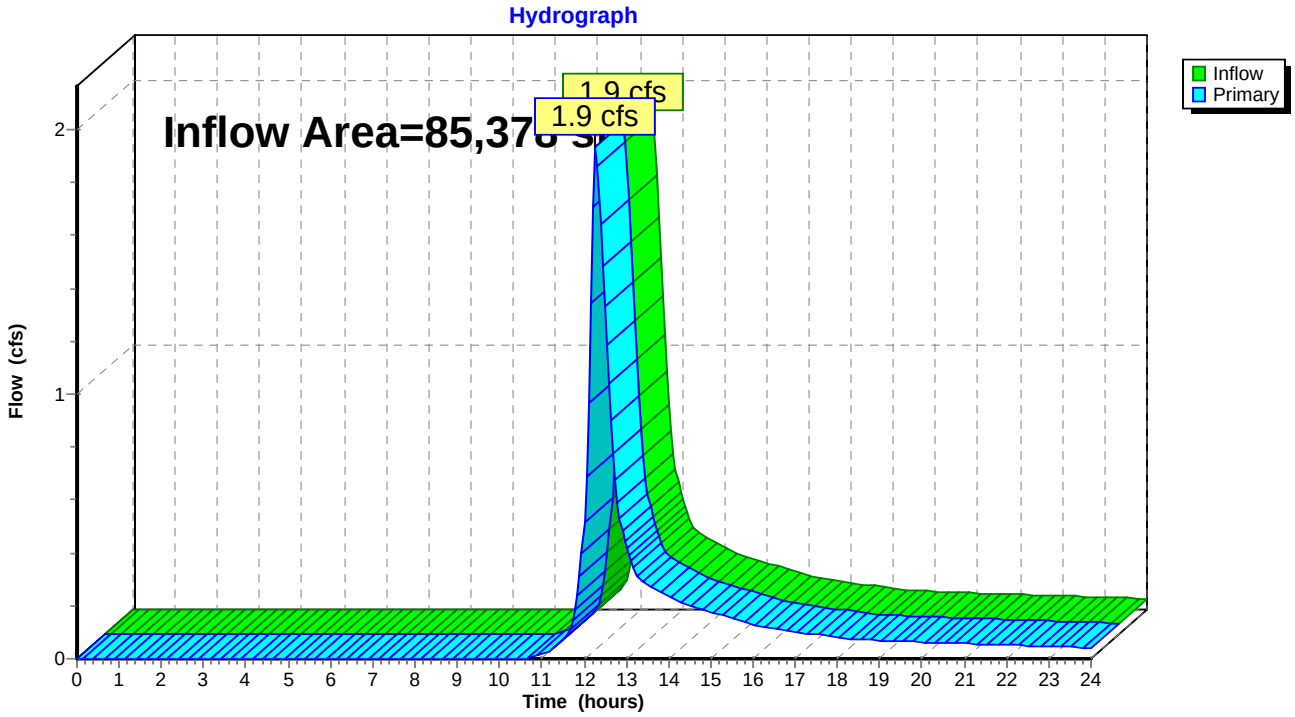


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 1.22" for 2-Year event
Inflow = 1.9 cfs @ 12.28 hrs, Volume= 8,691 cf
Primary = 1.9 cfs @ 12.28 hrs, Volume= 8,691 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

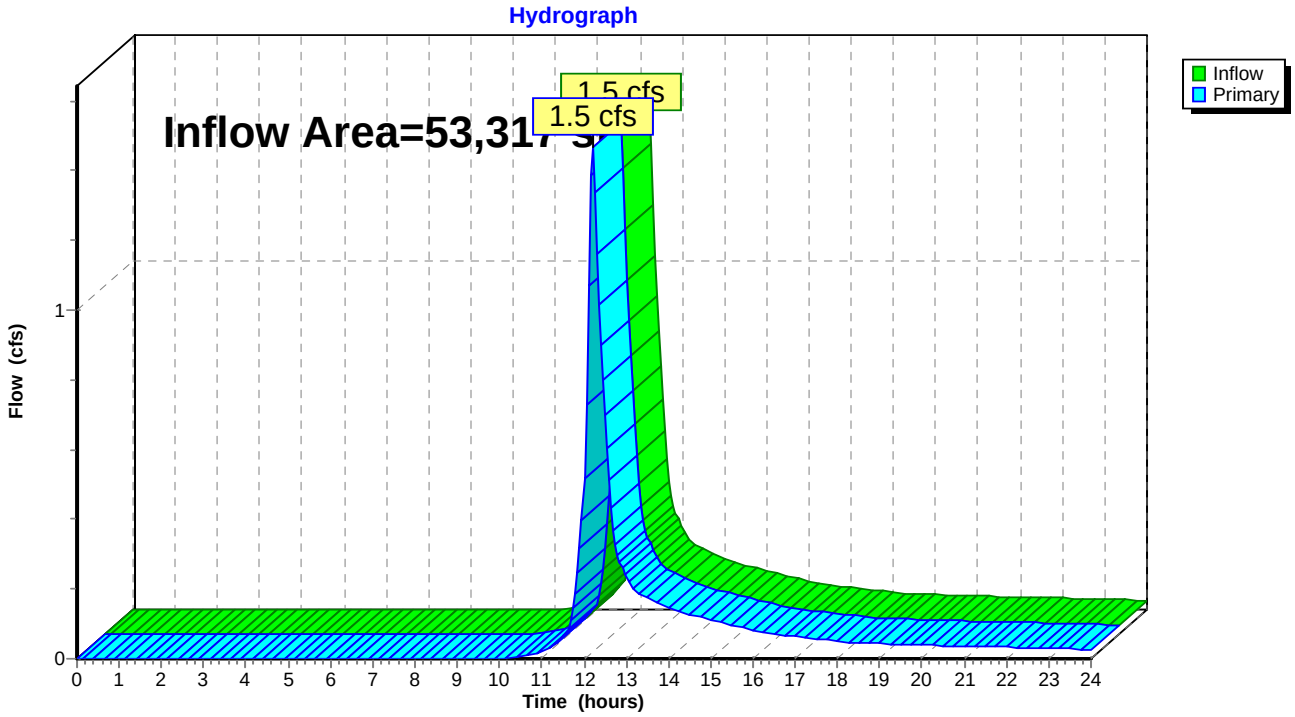


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 1.29" for 2-Year event
Inflow = 1.5 cfs @ 12.19 hrs, Volume= 5,710 cf
Primary = 1.5 cfs @ 12.19 hrs, Volume= 5,710 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

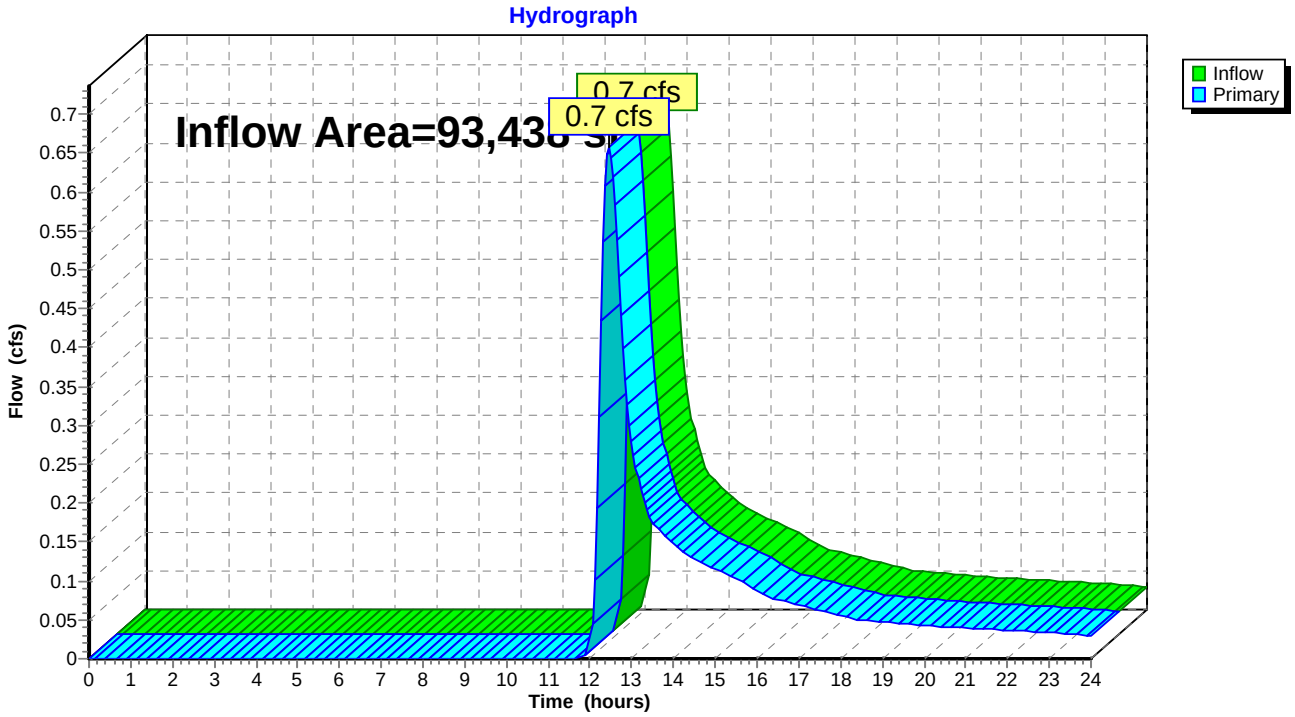


Summary for Link 15L: Wetland W

Inflow Area = 93,438 sf, 0.61% Impervious, Inflow Depth > 0.56" for 2-Year event
Inflow = 0.7 cfs @ 12.45 hrs, Volume= 4,395 cf
Primary = 0.7 cfs @ 12.45 hrs, Volume= 4,395 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

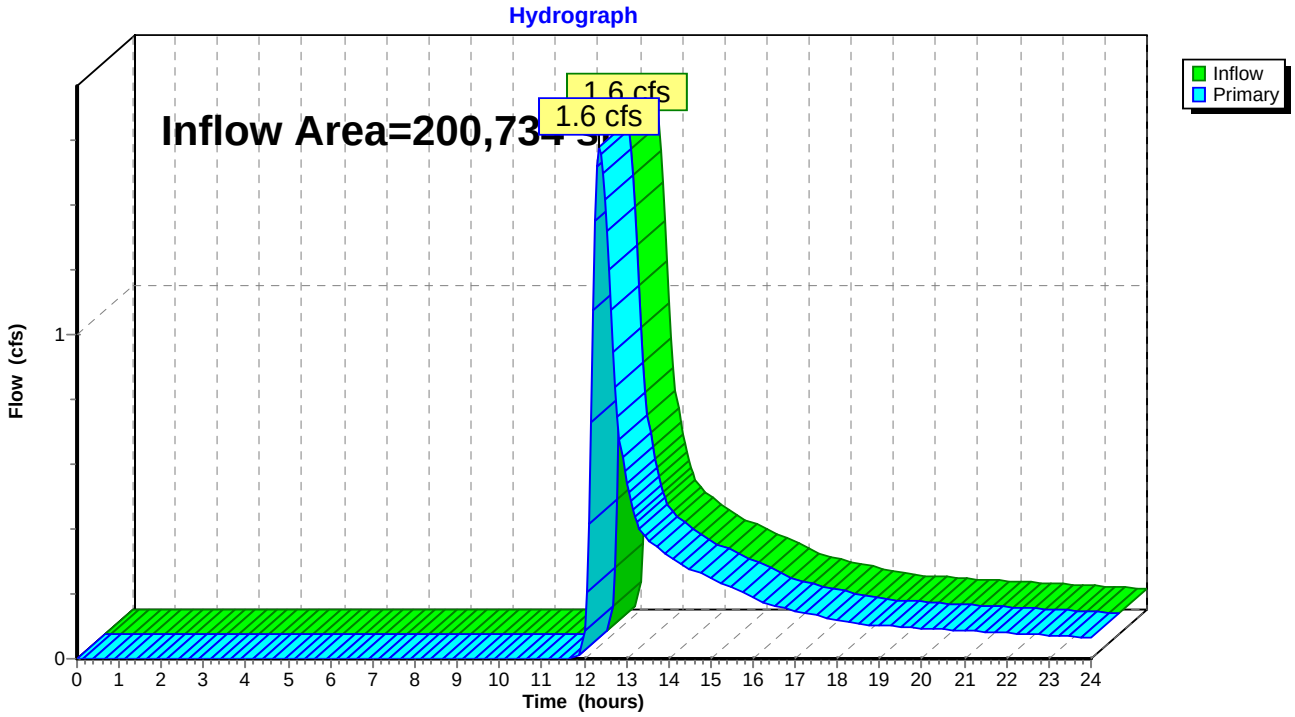


Summary for Link 16L: Wetland E

Inflow Area = 200,734 sf, 0.11% Impervious, Inflow Depth > 0.58" for 2-Year event
Inflow = 1.6 cfs @ 12.36 hrs, Volume= 9,721 cf
Primary = 1.6 cfs @ 12.36 hrs, Volume= 9,721 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 4.52% Impervious Runoff Depth>1.97"
Flow Length=239' Tc=13.7 min CN=76 Runoff=1.7 cfs 6,794 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 4.54% Impervious Runoff Depth>1.89"
Flow Length=179' Tc=14.1 min CN=75 Runoff=1.2 cfs 4,835 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 5.31% Impervious Runoff Depth>1.89"
Flow Length=204' Tc=14.6 min CN=75 Runoff=1.8 cfs 7,489 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 4.53% Impervious Runoff Depth>1.89"
Flow Length=222' Tc=14.3 min CN=75 Runoff=1.0 cfs 4,238 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 3.27% Impervious Runoff Depth>1.89"
Flow Length=752' Tc=15.2 min CN=75 Runoff=3.2 cfs 13,439 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 4.00% Impervious Runoff Depth>1.97"
Flow Length=459' Tc=10.0 min CN=76 Runoff=2.4 cfs 8,742 cf

Subcatchment 7S: Green Field W Runoff Area=93,438 sf 0.61% Impervious Runoff Depth>1.02"
Flow Length=472' Tc=24.7 min CN=62 Runoff=1.4 cfs 7,938 cf

Subcatchment 8S: Green Field E Runoff Area=125,941 sf 0.00% Impervious Runoff Depth>1.02"
Flow Length=305' Tc=20.6 min CN=62 Runoff=2.0 cfs 10,713 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.29% Impervious Runoff Depth>1.08"
Flow Length=247' Tc=19.4 min CN=63 Runoff=1.3 cfs 6,729 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.23' Max Vel=3.07 fps Inflow=3.2 cfs 13,439 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=3.1 cfs 13,390 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.21' Max Vel=3.00 fps Inflow=2.4 cfs 8,742 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=2.3 cfs 8,713 cf

Link 7L: Wetlands NW Inflow=1.2 cfs 4,835 cf
Primary=1.2 cfs 4,835 cf

Link 8L: Depression S Inflow=1.7 cfs 6,794 cf
Primary=1.7 cfs 6,794 cf

Link 9L: Wetlands NE Inflow=1.8 cfs 7,489 cf
Primary=1.8 cfs 7,489 cf

Link 10L: Wetlands N Inflow=1.0 cfs 4,238 cf
Primary=1.0 cfs 4,238 cf

Link 11L: Collection Swale W Inflow=3.1 cfs 13,390 cf
Primary=3.1 cfs 13,390 cf

Link 12L: Collection Swale W Inflow=2.3 cfs 8,713 cf
Primary=2.3 cfs 8,713 cf

Link 15L: Wetland W Inflow=1.4 cfs 7,938 cf
Primary=1.4 cfs 7,938 cf

Link 16L: Wetland E Inflow=3.3 cfs 17,442 cf
Primary=3.3 cfs 17,442 cf

Total Runoff Area = 579,533 sf Runoff Volume = 70,917 cf Average Runoff Depth = 1.47"
97.80% Pervious = 566,801 sf 2.20% Impervious = 12,732 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

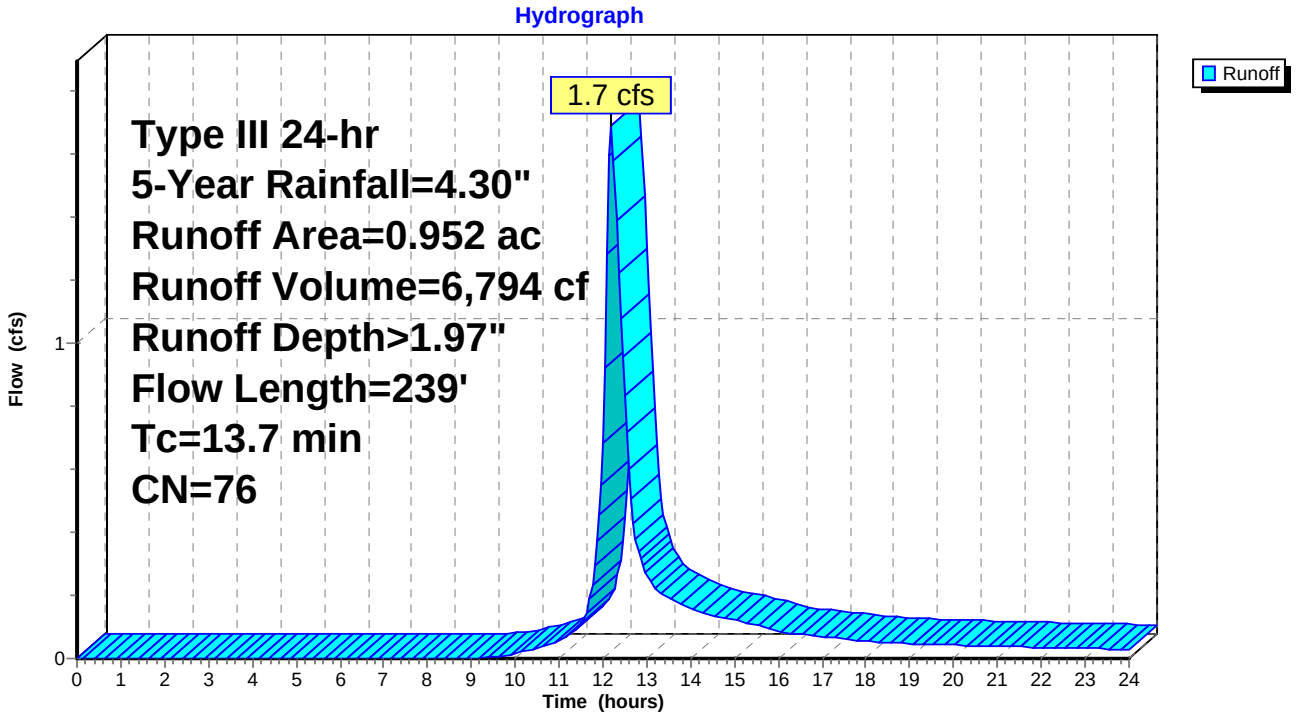
Runoff = 1.7 cfs @ 12.20 hrs, Volume= 6,794 cf, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (ac)	CN	Description
	0.829	74	>75% Grass cover, Good, HSG C
	0.080	89	Gravel roads, HSG C
*	0.003	98	Equipment Pad, HSG C
*	0.040	98	Solar array Ballasts, HSG C
	0.952	76	Weighted Average
	0.909		95.48% Pervious Area
	0.043		4.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

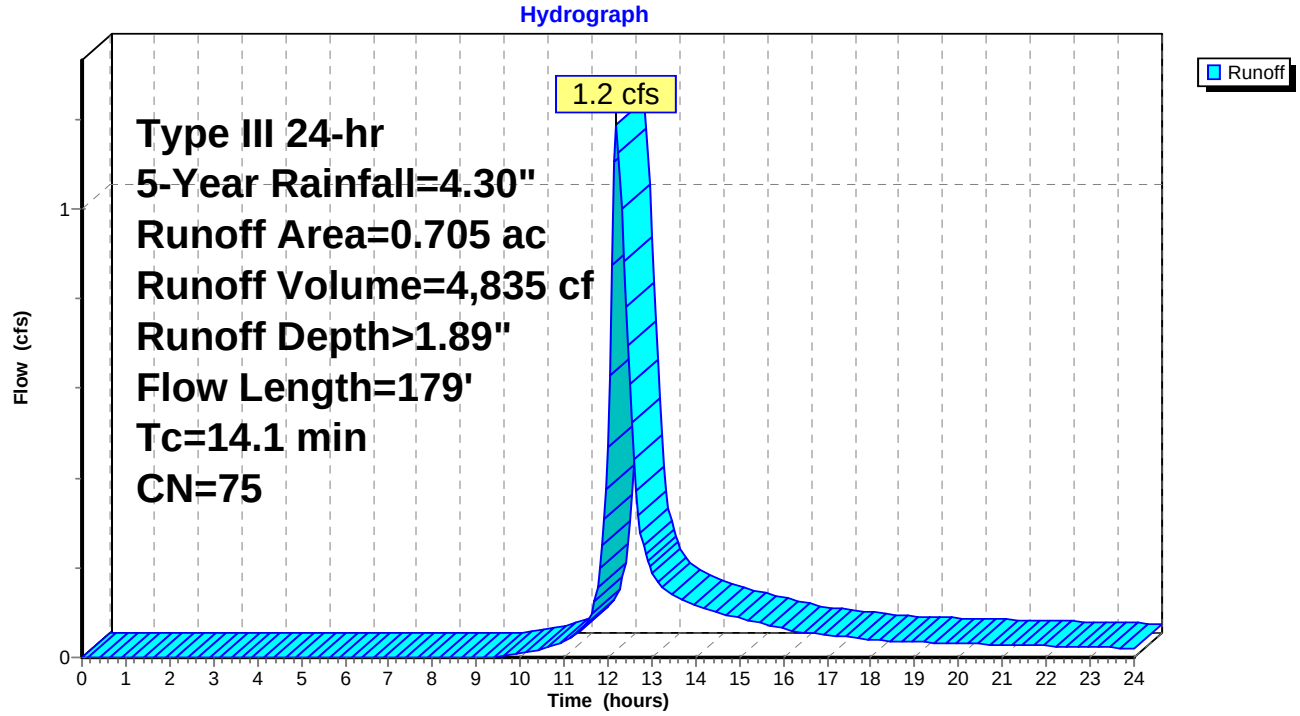
Runoff = 1.2 cfs @ 12.20 hrs, Volume= 4,835 cf, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (ac)	CN	Description
	0.659	74	>75% Grass cover, Good, HSG C
*	0.032	98	Solar array ballasts, HSG C
	0.014	89	Gravel roads, HSG C
	0.705	75	Weighted Average
	0.673		95.46% Pervious Area
	0.032		4.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

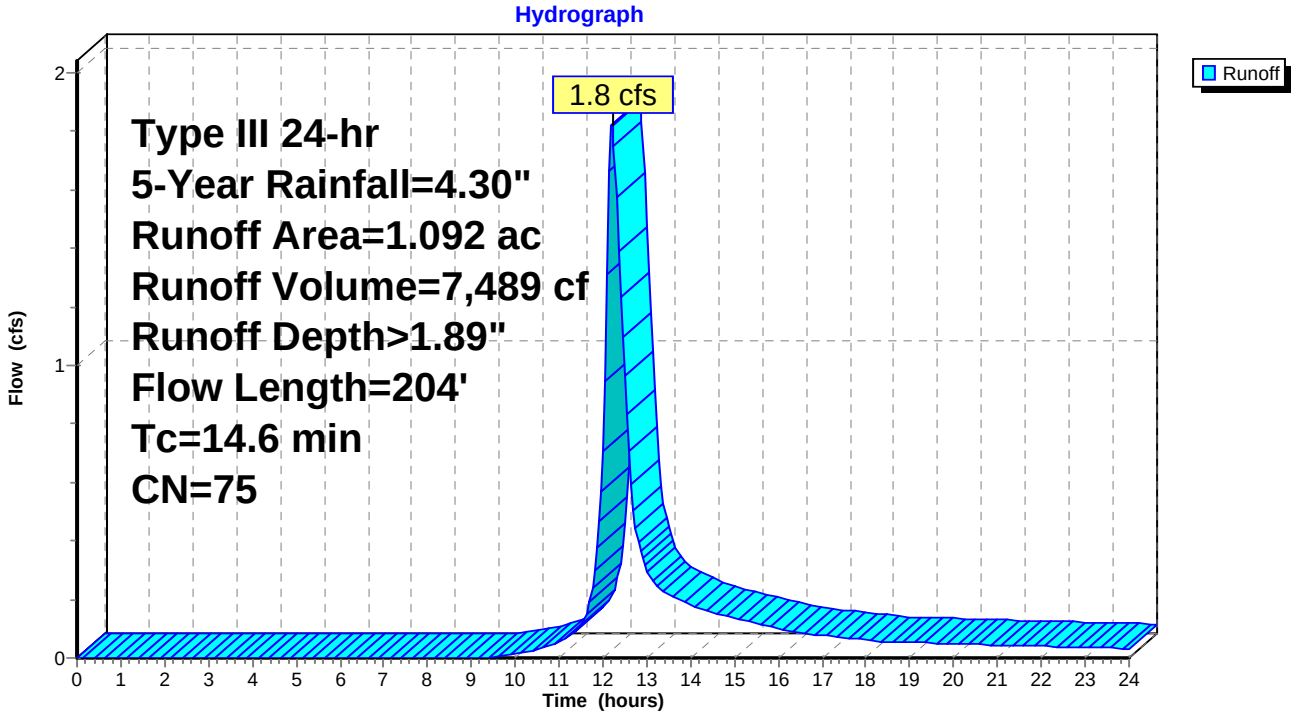
Runoff = 1.8 cfs @ 12.21 hrs, Volume= 7,489 cf, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (ac)	CN	Description
	1.034	74	>75% Grass cover, Good, HSG C
*	0.058	98	Solar array ballasts, HSG C
	1.092	75	Weighted Average
	1.034		94.69% Pervious Area
	0.058		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

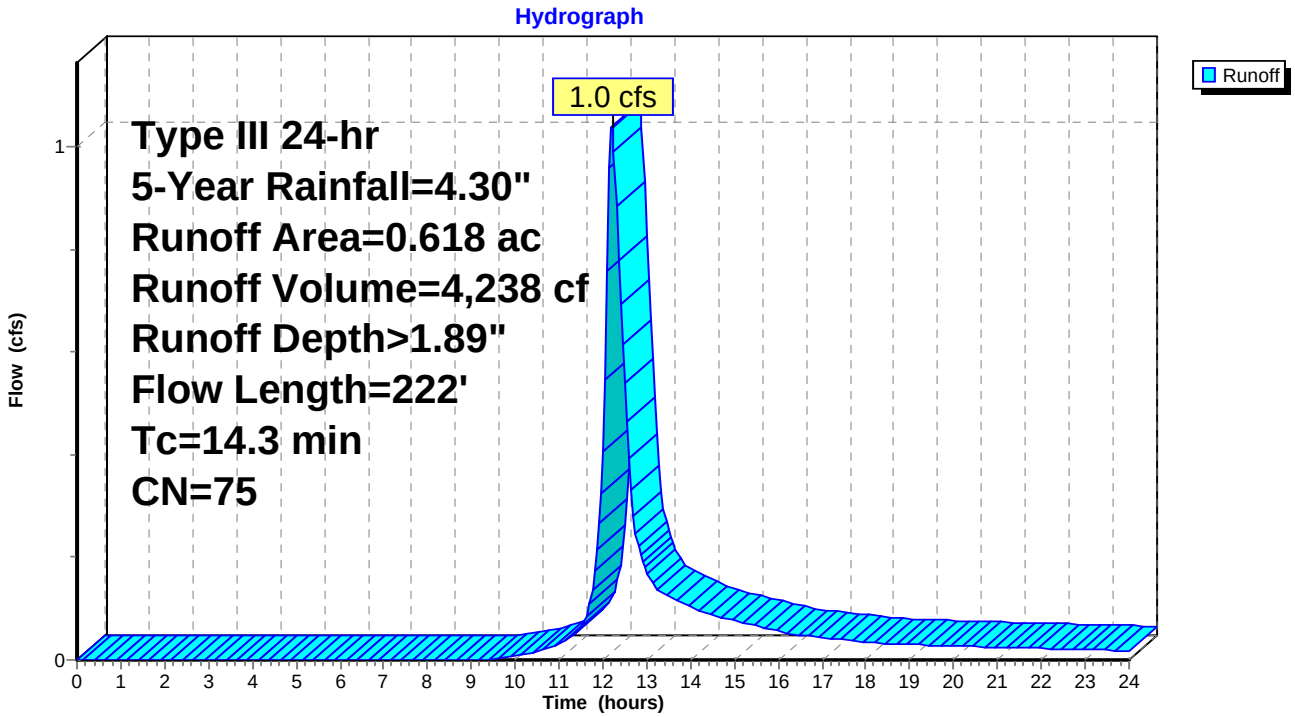
Runoff = 1.0 cfs @ 12.21 hrs, Volume= 4,238 cf, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (ac)	CN	Description
	0.590	74	>75% Grass cover, Good, HSG C
*	0.028	98	Solar array ballasts, HSG C
	0.618	75	Weighted Average
	0.590		95.47% Pervious Area
	0.028		4.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

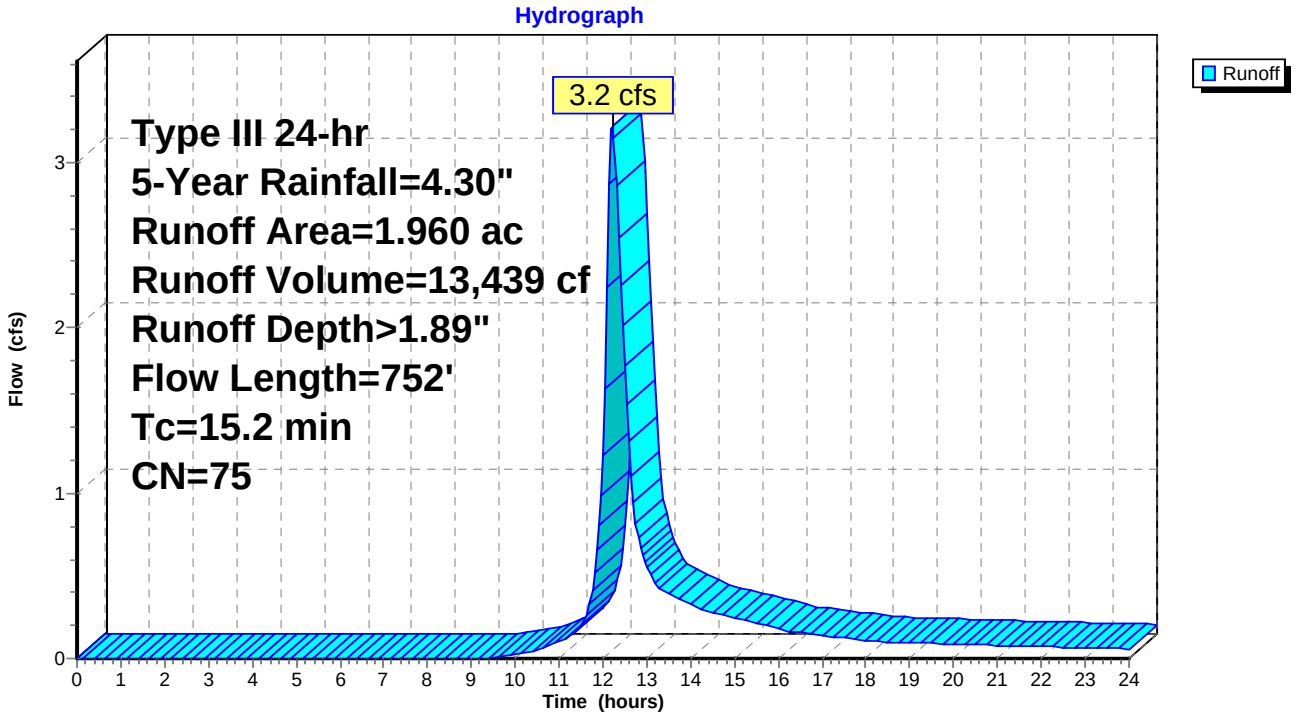
Runoff = 3.2 cfs @ 12.22 hrs, Volume= 13,439 cf, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (ac)	CN	Description
	1.896	74	>75% Grass cover, Good, HSG C
*	0.064	98	Solar array ballasts, HSG C
	1.960	75	Weighted Average
	1.896		96.73% Pervious Area
	0.064		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

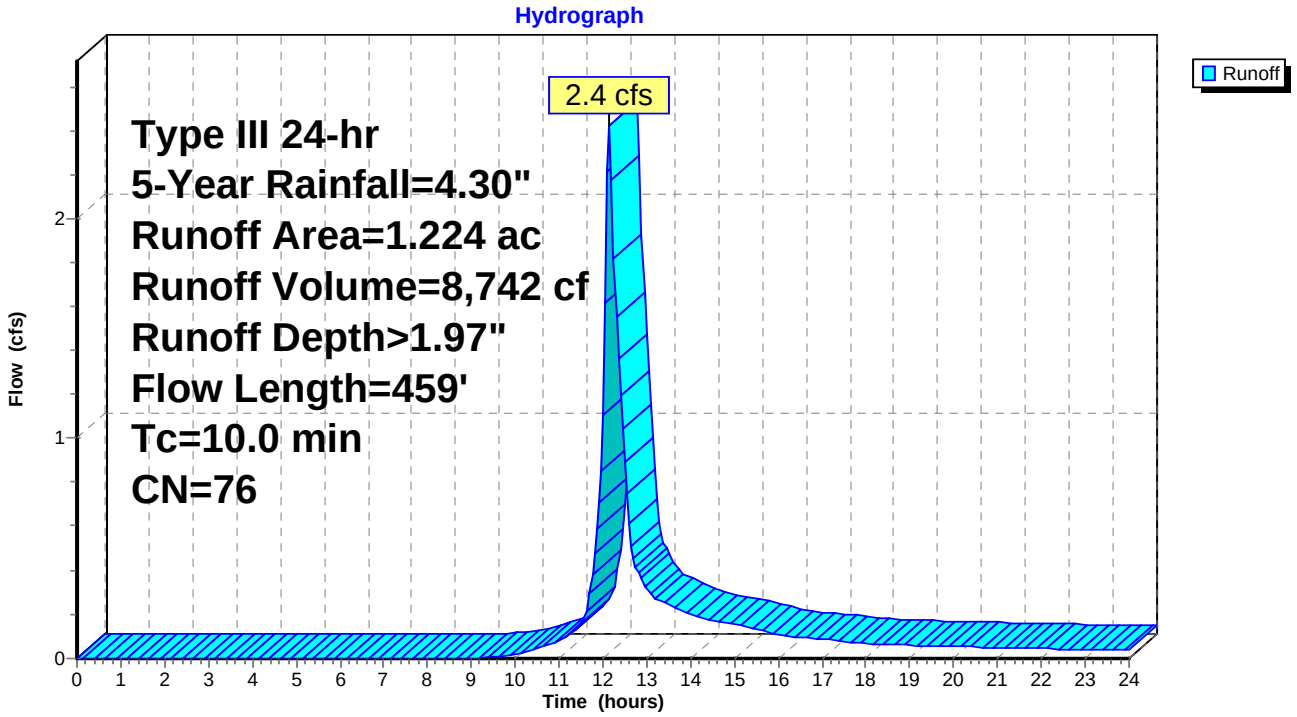
Runoff = 2.4 cfs @ 12.15 hrs, Volume= 8,742 cf, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (ac)	CN	Description
	1.085	74	>75% Grass cover, Good, HSG C
	0.090	89	Gravel roads, HSG C
*	0.046	98	Solar array ballasts, HSG C
*	0.003	98	Concrete Equipment Pad, HSG C
	1.224	76	Weighted Average
	1.175		96.00% Pervious Area
	0.049		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

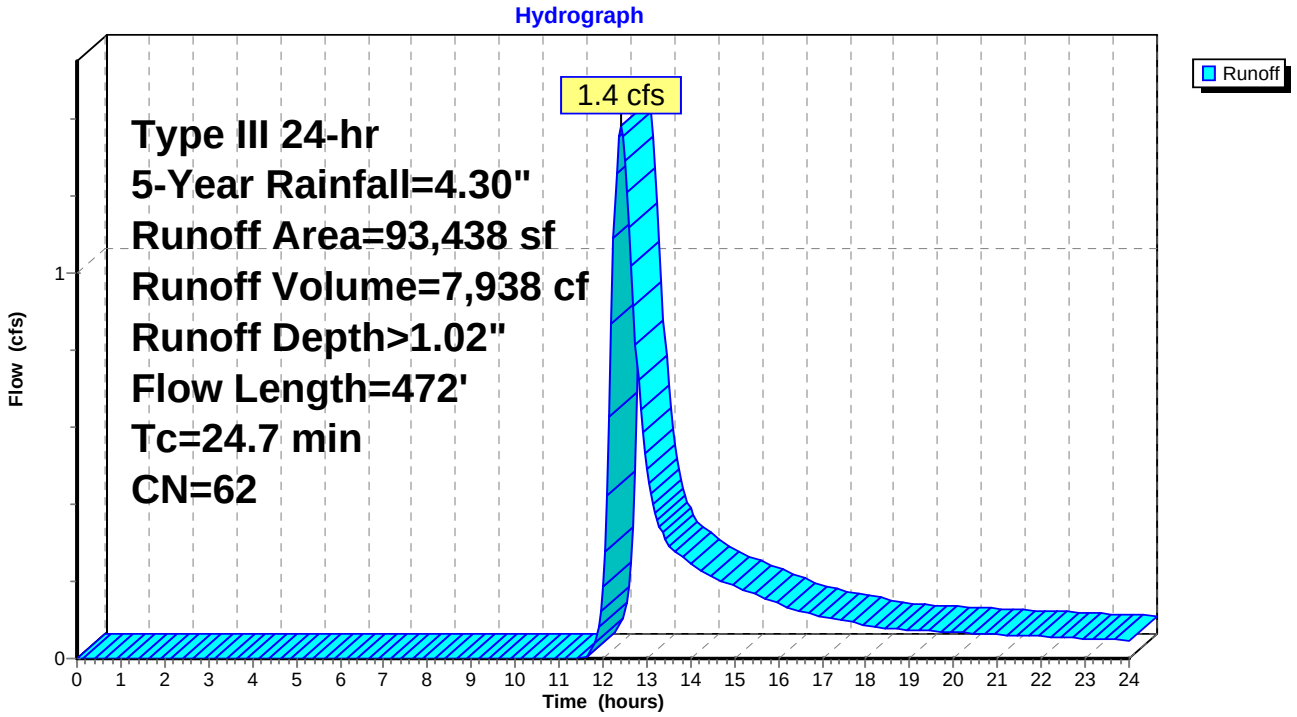
Runoff = 1.4 cfs @ 12.40 hrs, Volume= 7,938 cf, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (sf)	CN	Description
	832	74	>75% Grass cover, Good, HSG C
	3,861	80	>75% Grass cover, Good, HSG D
	21,955	61	>75% Grass cover, Good, HSG B
	66,216	61	>75% Grass cover, Good, HSG B
	340	98	Paved parking, HSG C
*	4	98	Solar Array Posts, HSG B
*	230	98	Equipment Pad, HSG B
	93,438	62	Weighted Average
	92,864		99.39% Pervious Area
	574		0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

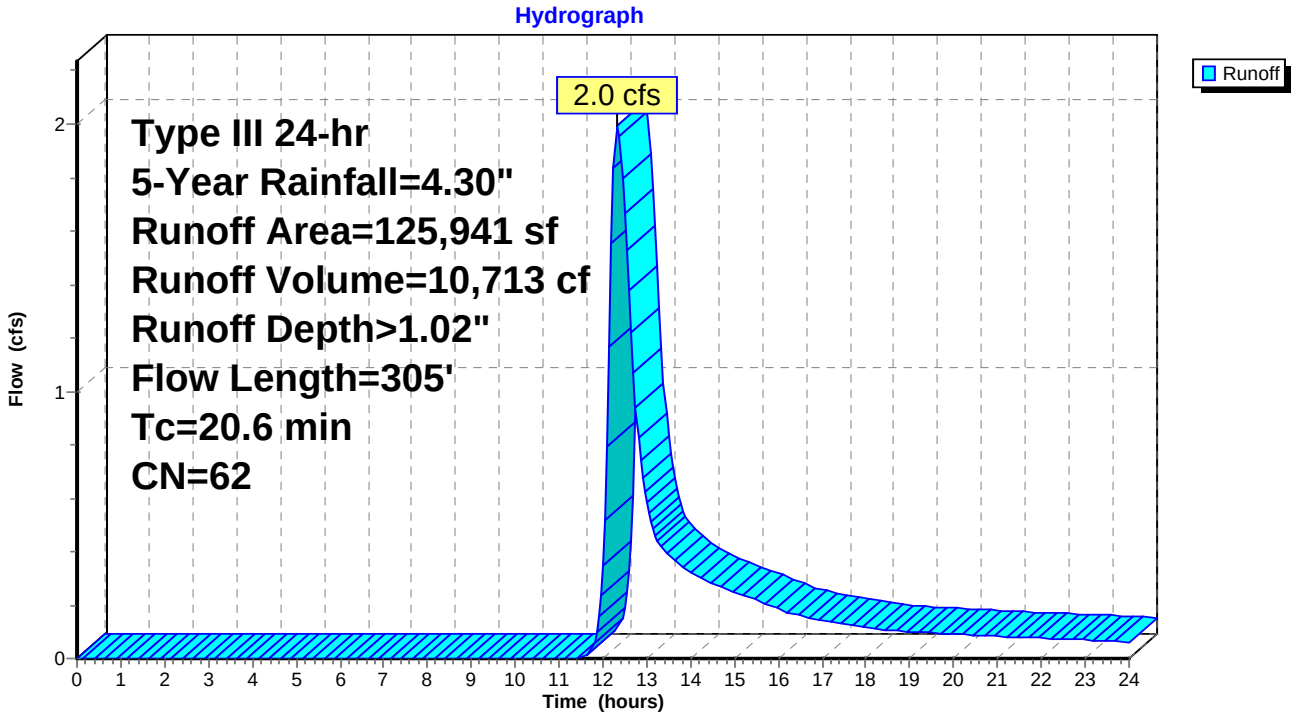
Runoff = 2.0 cfs @ 12.33 hrs, Volume= 10,713 cf, Depth> 1.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (sf)	CN	Description
	116,936	61	>75% Grass cover, Good, HSG B
	3,129	80	>75% Grass cover, Good, HSG D
	1,452	80	>75% Grass cover, Good, HSG D
	4,419	61	>75% Grass cover, Good, HSG B
*	5	98	Solar Array Posts, HSG B
	125,941	62	Weighted Average
	125,936		100.00% Pervious Area
	5		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

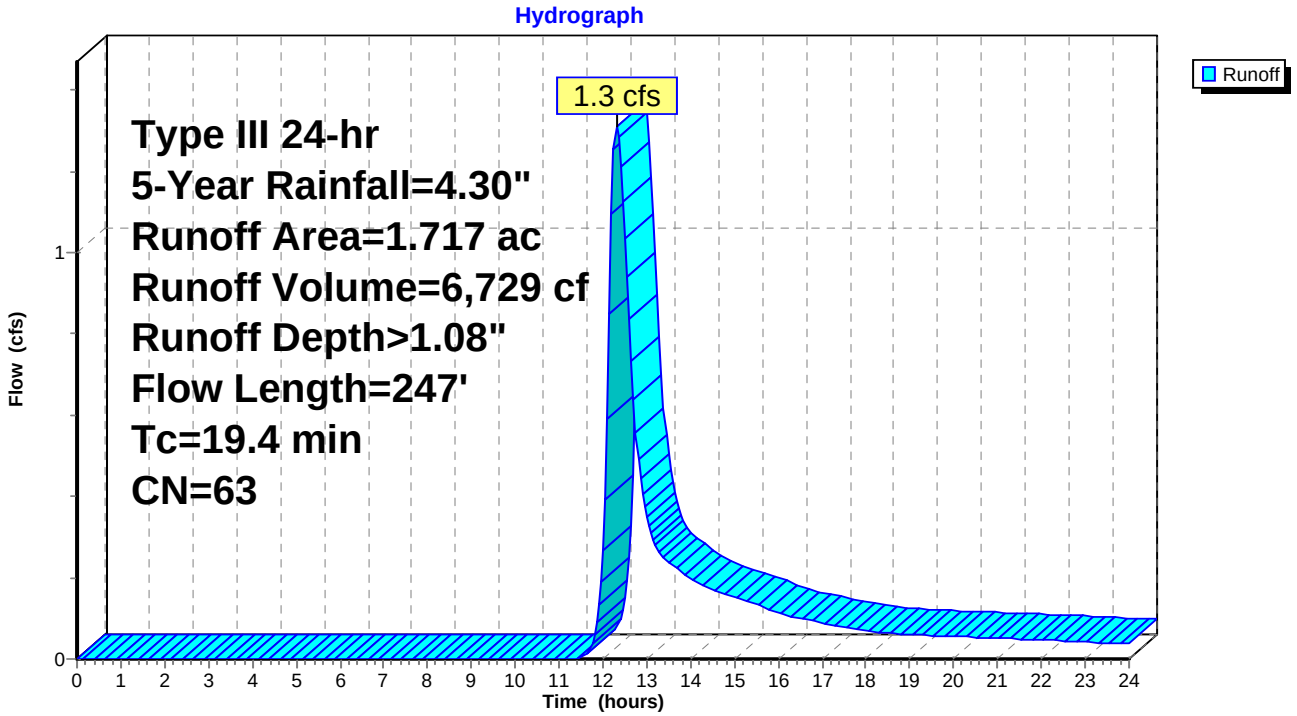
Runoff = 1.3 cfs @ 12.31 hrs, Volume= 6,729 cf, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 5-Year Rainfall=4.30"

	Area (ac)	CN	Description
	0.091	77	Woods, Good, HSG D
	0.151	55	Woods, Good, HSG B
	1.283	61	>75% Grass cover, Good, HSG B
	0.187	80	>75% Grass cover, Good, HSG D
*	0.000	98	Solar Array Posts, HSG B
	0.005	98	Paved parking, HSG B
	1.717	63	Weighted Average
	1.712		99.71% Pervious Area
	0.005		0.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 1.89" for 5-Year event
Inflow = 3.2 cfs @ 12.22 hrs, Volume= 13,439 cf
Outflow = 3.1 cfs @ 12.26 hrs, Volume= 13,390 cf, Atten= 4%, Lag= 2.8 min

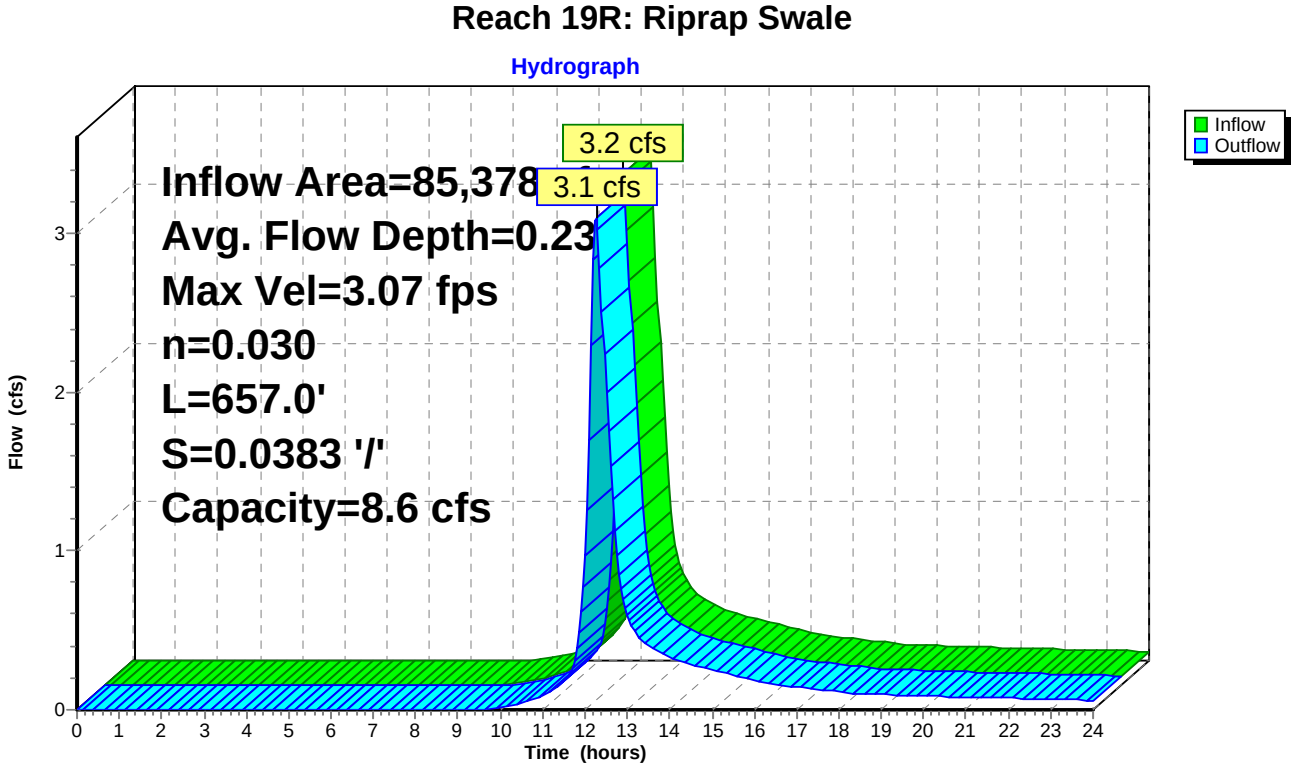
Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.07 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.12 fps, Avg. Travel Time= 9.8 min

Peak Storage= 661 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 1.97" for 5-Year event
Inflow = 2.4 cfs @ 12.15 hrs, Volume= 8,742 cf
Outflow = 2.3 cfs @ 12.18 hrs, Volume= 8,713 cf, Atten= 5%, Lag= 2.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.00 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 0.98 fps, Avg. Travel Time= 9.0 min

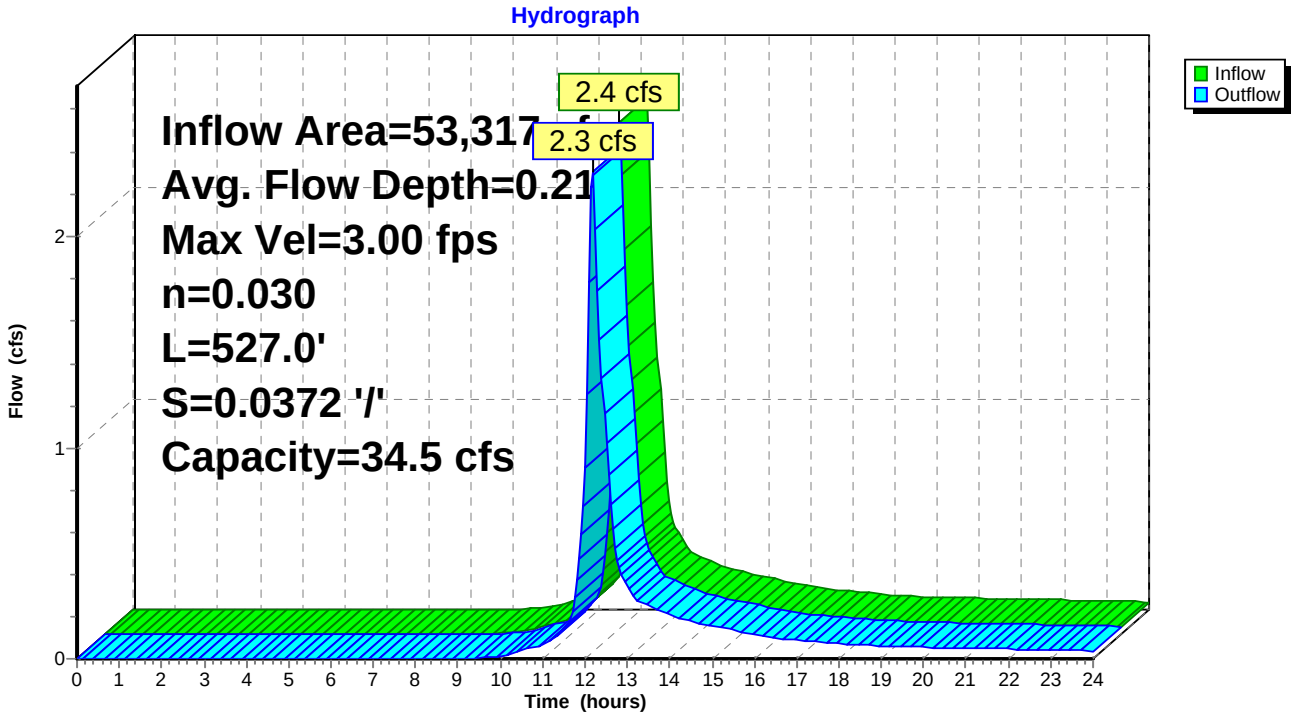
Peak Storage= 404 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.21'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

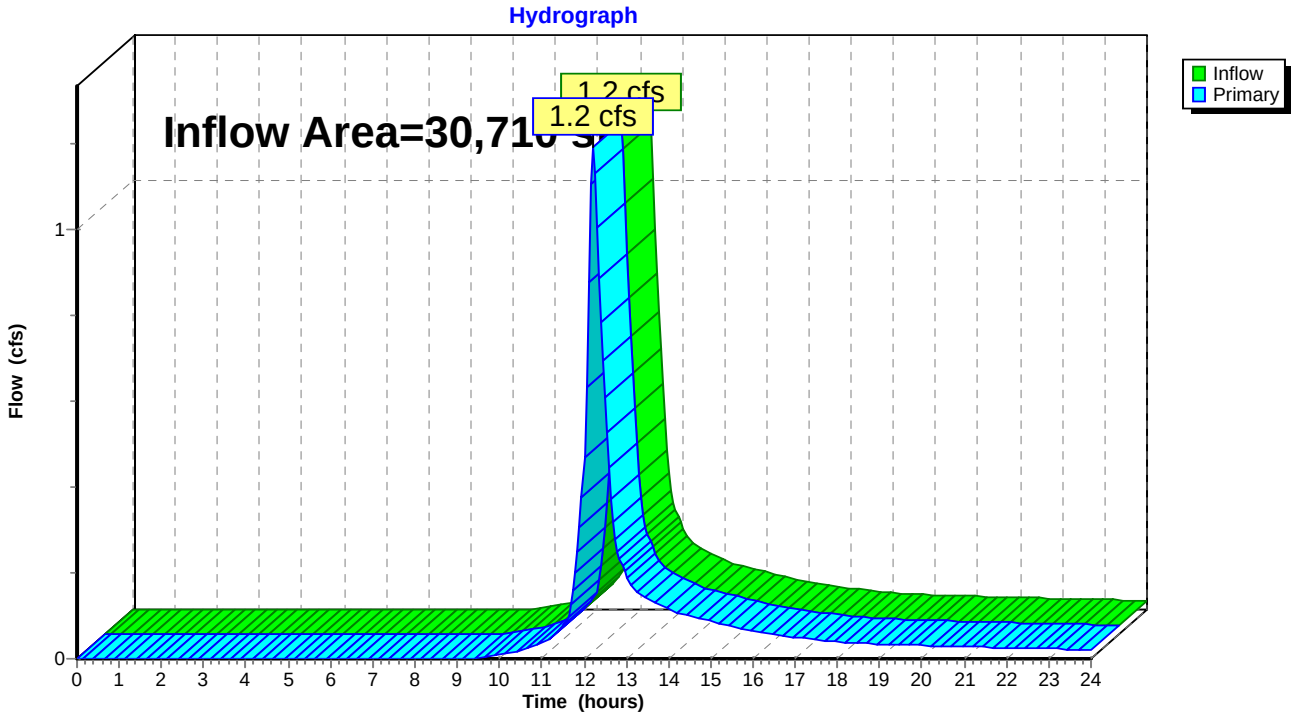


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 4.54% Impervious, Inflow Depth > 1.89" for 5-Year event
Inflow = 1.2 cfs @ 12.20 hrs, Volume= 4,835 cf
Primary = 1.2 cfs @ 12.20 hrs, Volume= 4,835 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

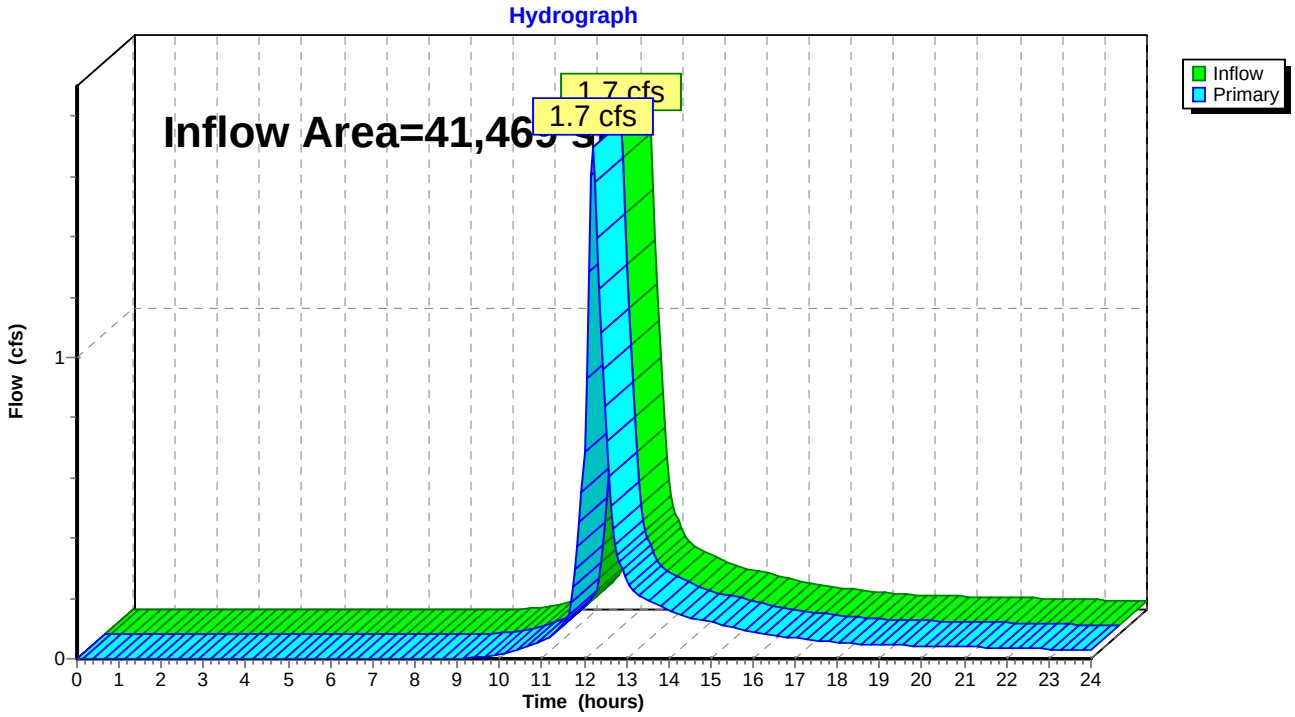


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 4.52% Impervious, Inflow Depth > 1.97" for 5-Year event
Inflow = 1.7 cfs @ 12.20 hrs, Volume= 6,794 cf
Primary = 1.7 cfs @ 12.20 hrs, Volume= 6,794 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

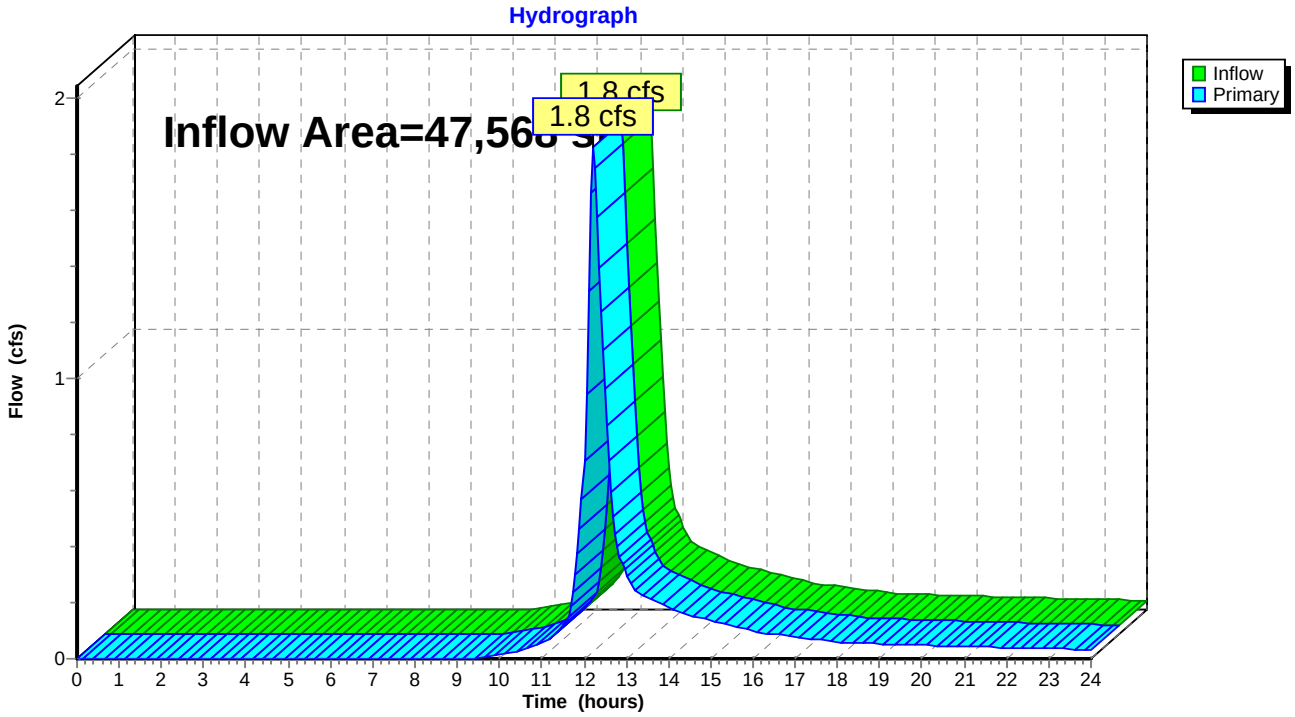


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 5.31% Impervious, Inflow Depth > 1.89" for 5-Year event
Inflow = 1.8 cfs @ 12.21 hrs, Volume= 7,489 cf
Primary = 1.8 cfs @ 12.21 hrs, Volume= 7,489 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

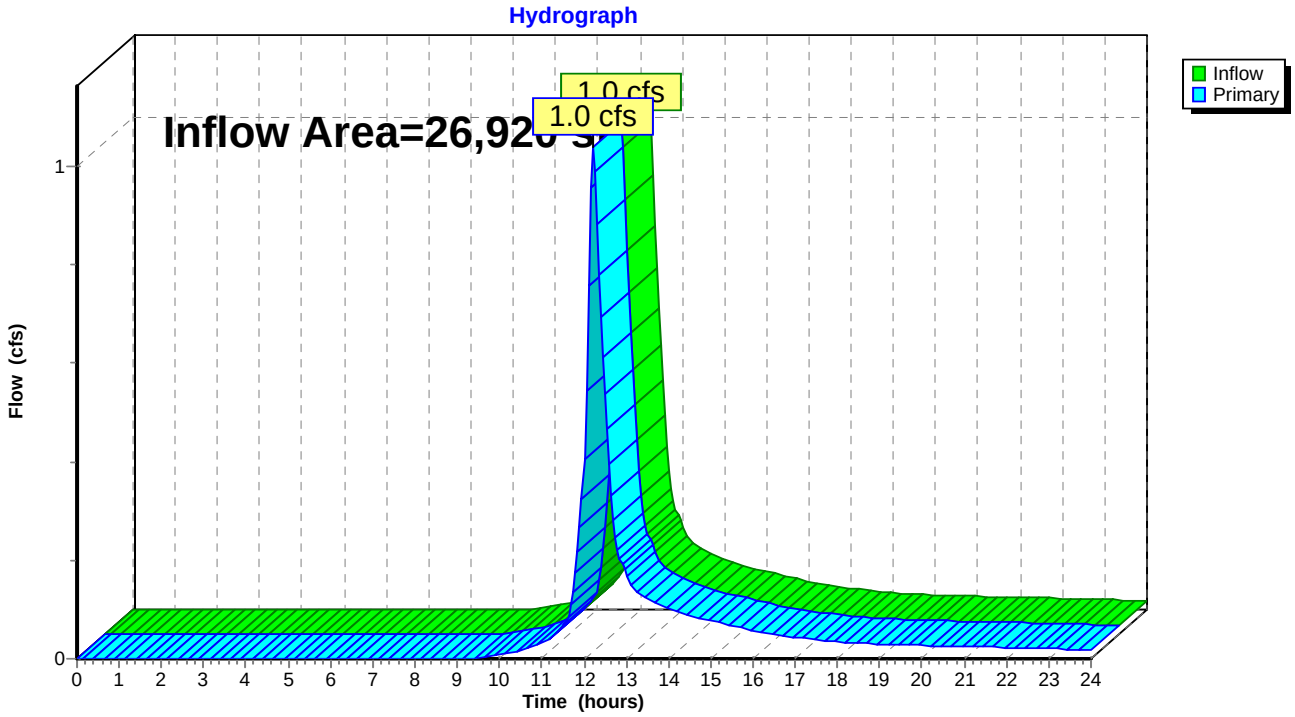


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 4.53% Impervious, Inflow Depth > 1.89" for 5-Year event
Inflow = 1.0 cfs @ 12.21 hrs, Volume= 4,238 cf
Primary = 1.0 cfs @ 12.21 hrs, Volume= 4,238 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

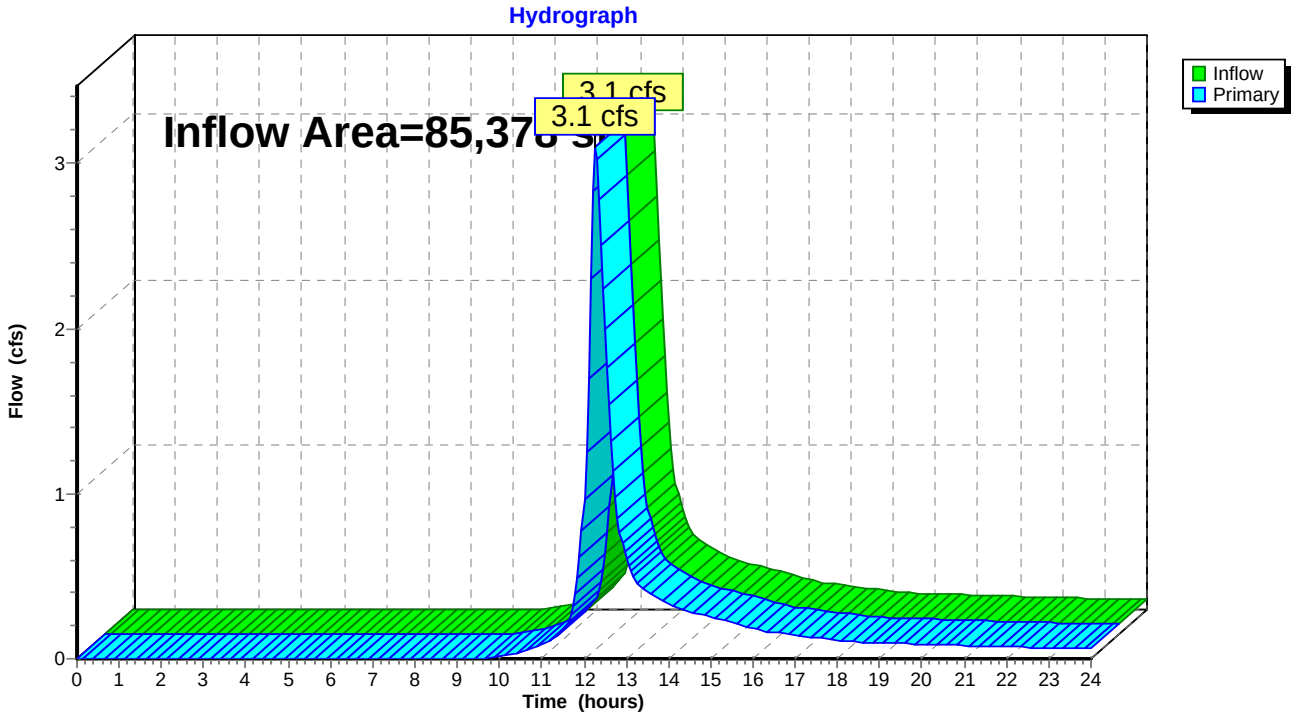


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 1.88" for 5-Year event
Inflow = 3.1 cfs @ 12.26 hrs, Volume= 13,390 cf
Primary = 3.1 cfs @ 12.26 hrs, Volume= 13,390 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

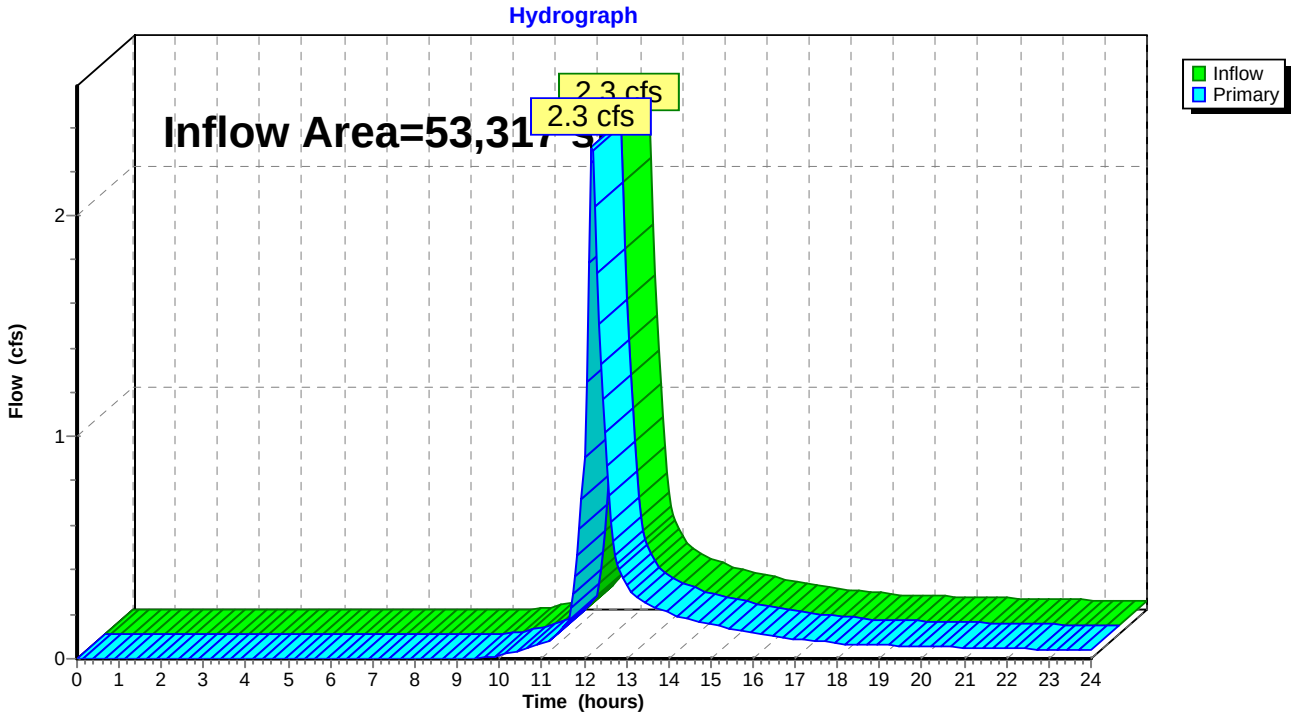


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 1.96" for 5-Year event
Inflow = 2.3 cfs @ 12.18 hrs, Volume= 8,713 cf
Primary = 2.3 cfs @ 12.18 hrs, Volume= 8,713 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

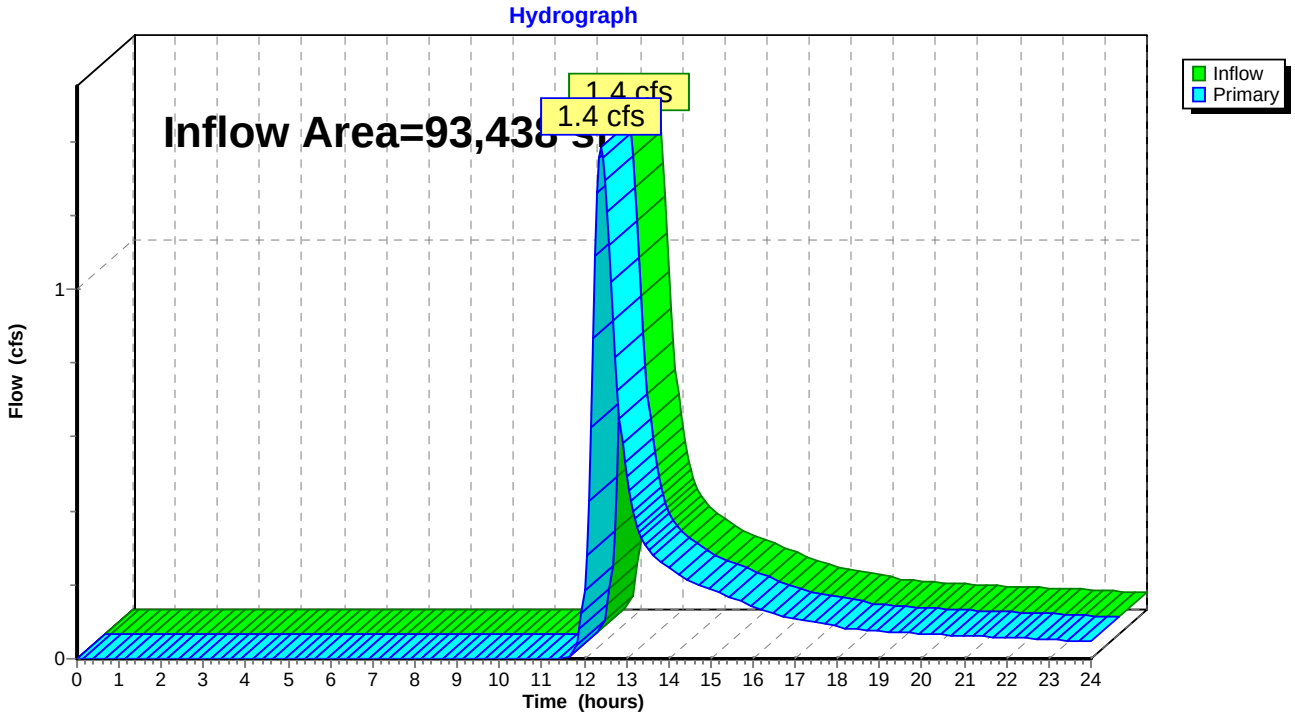


Summary for Link 15L: Wetland W

Inflow Area = 93,438 sf, 0.61% Impervious, Inflow Depth > 1.02" for 5-Year event
Inflow = 1.4 cfs @ 12.40 hrs, Volume= 7,938 cf
Primary = 1.4 cfs @ 12.40 hrs, Volume= 7,938 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

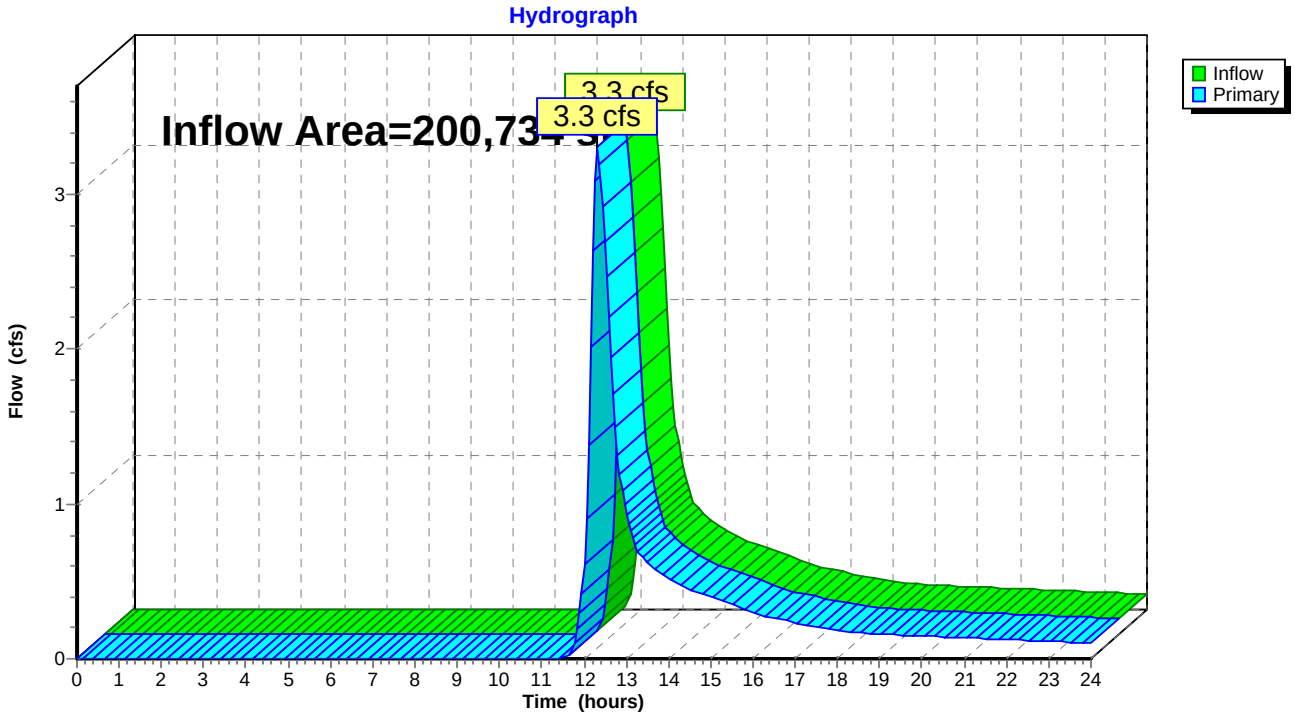


Summary for Link 16L: Wetland E

Inflow Area = 200,734 sf, 0.11% Impervious, Inflow Depth > 1.04" for 5-Year event
Inflow = 3.3 cfs @ 12.32 hrs, Volume= 17,442 cf
Primary = 3.3 cfs @ 12.32 hrs, Volume= 17,442 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 4.52% Impervious Runoff Depth>2.53"
Flow Length=239' Tc=13.7 min CN=76 Runoff=2.2 cfs 8,739 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 4.54% Impervious Runoff Depth>2.44"
Flow Length=179' Tc=14.1 min CN=75 Runoff=1.6 cfs 6,251 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 5.31% Impervious Runoff Depth>2.44"
Flow Length=204' Tc=14.6 min CN=75 Runoff=2.4 cfs 9,681 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 4.53% Impervious Runoff Depth>2.44"
Flow Length=222' Tc=14.3 min CN=75 Runoff=1.4 cfs 5,479 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 3.27% Impervious Runoff Depth>2.44"
Flow Length=752' Tc=15.2 min CN=75 Runoff=4.2 cfs 17,374 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 4.00% Impervious Runoff Depth>2.53"
Flow Length=459' Tc=10.0 min CN=76 Runoff=3.1 cfs 11,245 cf

Subcatchment 7S: Green Field W Runoff Area=93,438 sf 0.61% Impervious Runoff Depth>1.43"
Flow Length=472' Tc=24.7 min CN=62 Runoff=2.0 cfs 11,125 cf

Subcatchment 8S: Green Field E Runoff Area=125,941 sf 0.00% Impervious Runoff Depth>1.43"
Flow Length=305' Tc=20.6 min CN=62 Runoff=3.0 cfs 15,013 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.29% Impervious Runoff Depth>1.50"
Flow Length=247' Tc=19.4 min CN=63 Runoff=1.9 cfs 9,357 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.27' Max Vel=3.33 fps Inflow=4.2 cfs 17,374 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=4.1 cfs 17,318 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.24' Max Vel=3.27 fps Inflow=3.1 cfs 11,245 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=3.0 cfs 11,212 cf

Link 7L: Wetlands NW Inflow=1.6 cfs 6,251 cf
Primary=1.6 cfs 6,251 cf

Link 8L: Depression S Inflow=2.2 cfs 8,739 cf
Primary=2.2 cfs 8,739 cf

Link 9L: Wetlands NE Inflow=2.4 cfs 9,681 cf
Primary=2.4 cfs 9,681 cf

Link 10L: Wetlands N Inflow=1.4 cfs 5,479 cf
Primary=1.4 cfs 5,479 cf

Link 11L: Collection Swale W Inflow=4.1 cfs 17,318 cf
Primary=4.1 cfs 17,318 cf

Link 12L: Collection Swale W Inflow=3.0 cfs 11,212 cf
Primary=3.0 cfs 11,212 cf

Link 15L: Wetland W Inflow=2.0 cfs 11,125 cf
Primary=2.0 cfs 11,125 cf

Link 16L: Wetland E Inflow=4.9 cfs 24,370 cf
Primary=4.9 cfs 24,370 cf

Total Runoff Area = 579,533 sf Runoff Volume = 94,264 cf Average Runoff Depth = 1.95"
97.80% Pervious = 566,801 sf 2.20% Impervious = 12,732 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

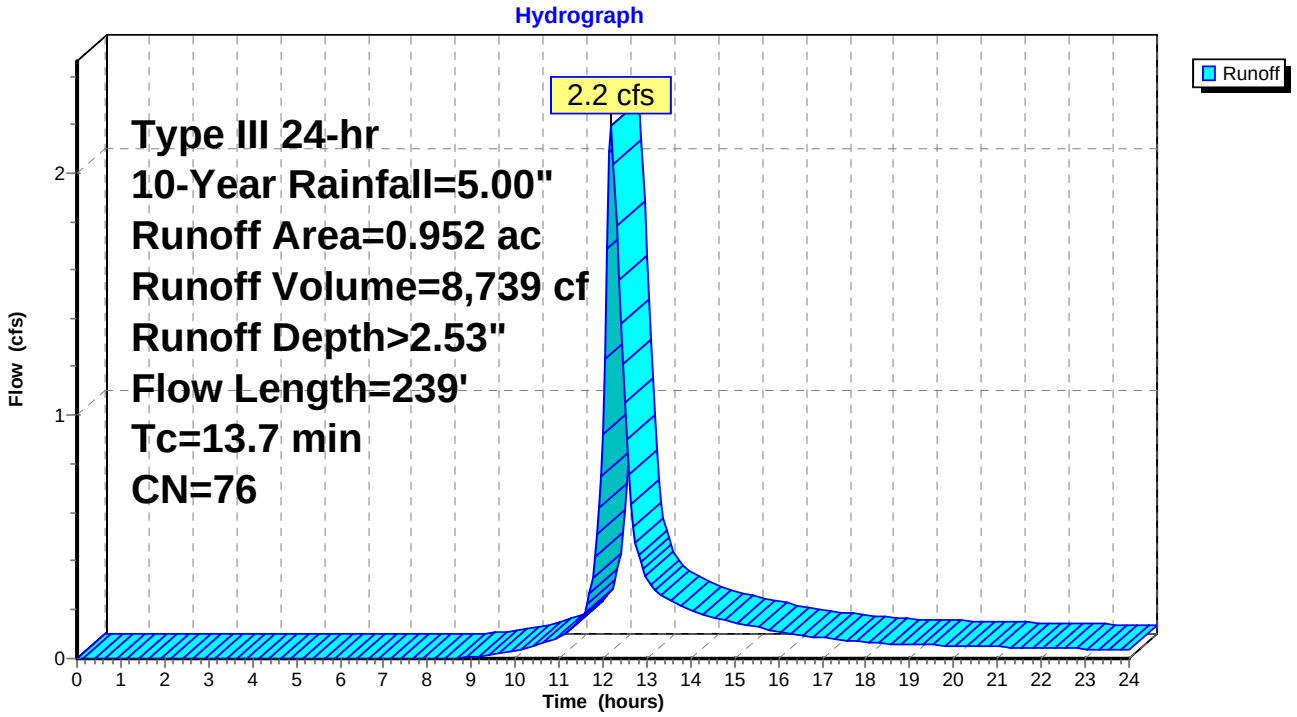
Runoff = 2.2 cfs @ 12.20 hrs, Volume= 8,739 cf, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (ac)	CN	Description
	0.829	74	>75% Grass cover, Good, HSG C
	0.080	89	Gravel roads, HSG C
*	0.003	98	Equipment Pad, HSG C
*	0.040	98	Solar array Ballasts, HSG C
	0.952	76	Weighted Average
	0.909		95.48% Pervious Area
	0.043		4.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

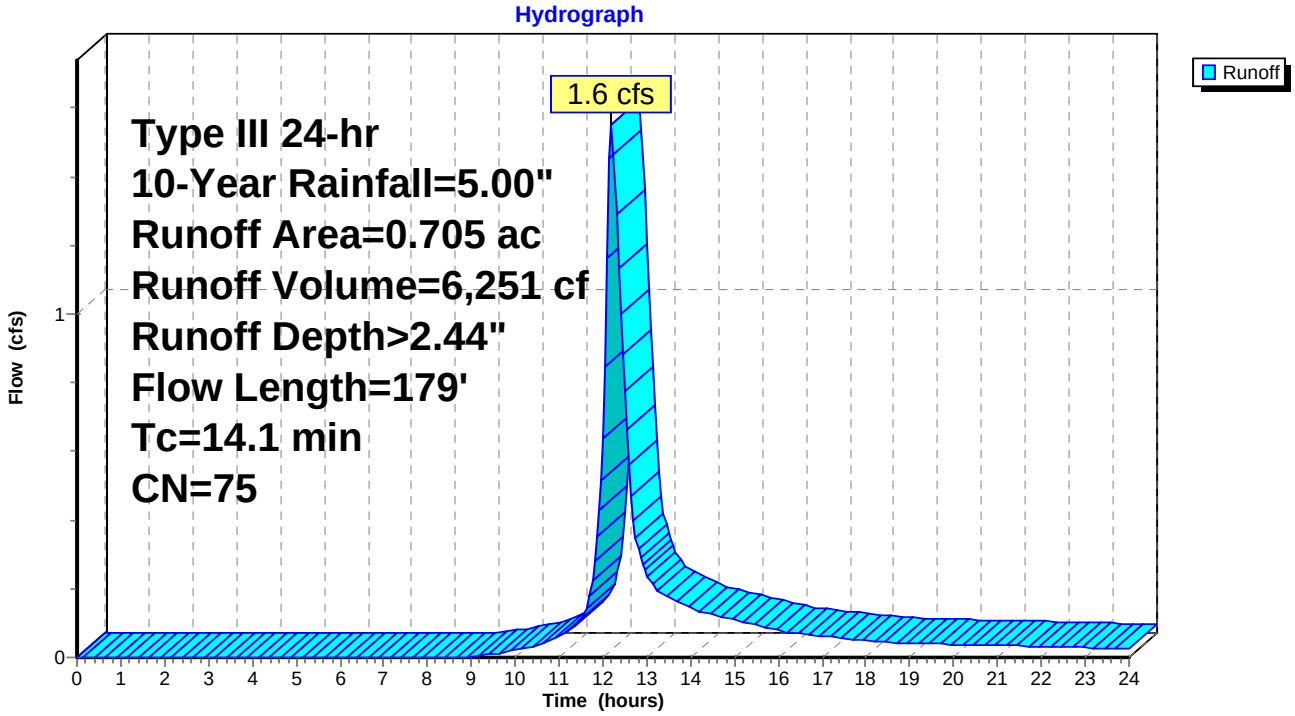
Runoff = 1.6 cfs @ 12.20 hrs, Volume= 6,251 cf, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (ac)	CN	Description
	0.659	74	>75% Grass cover, Good, HSG C
*	0.032	98	Solar array ballasts, HSG C
	0.014	89	Gravel roads, HSG C
	0.705	75	Weighted Average
	0.673		95.46% Pervious Area
	0.032		4.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

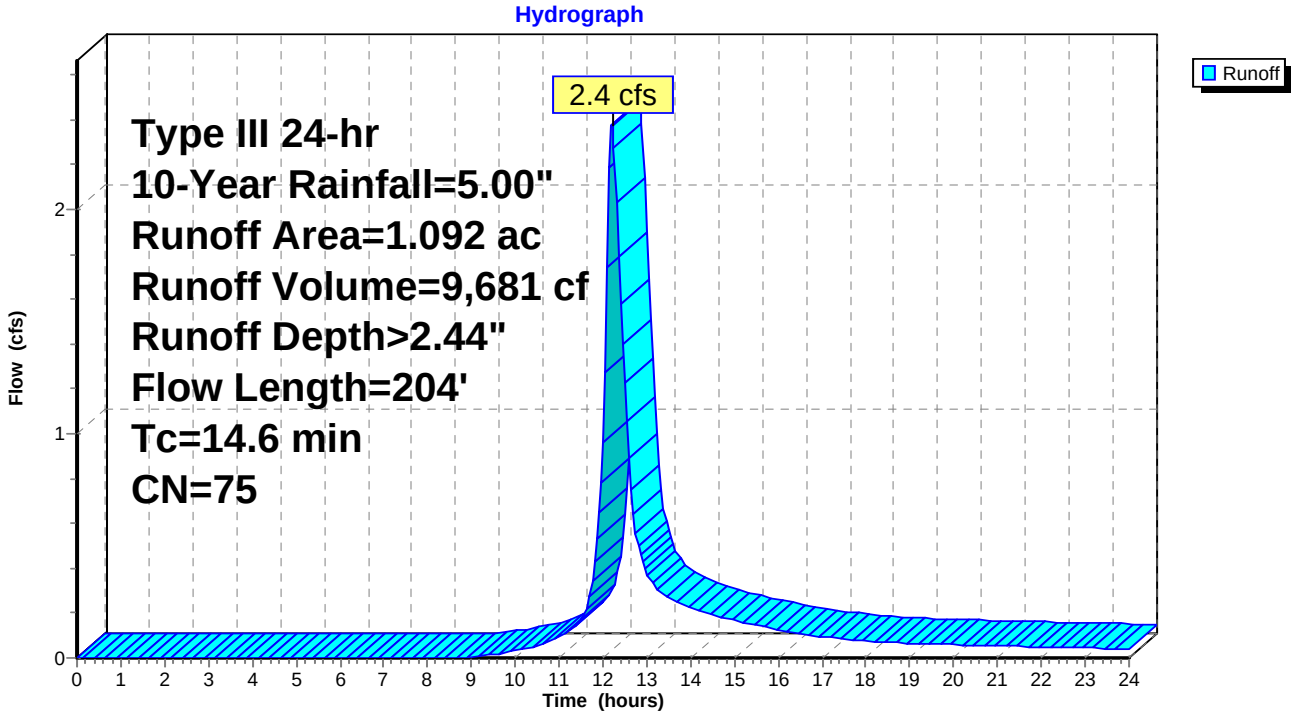
Runoff = 2.4 cfs @ 12.21 hrs, Volume= 9,681 cf, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (ac)	CN	Description
	1.034	74	>75% Grass cover, Good, HSG C
*	0.058	98	Solar array ballasts, HSG C
	1.092	75	Weighted Average
	1.034		94.69% Pervious Area
	0.058		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

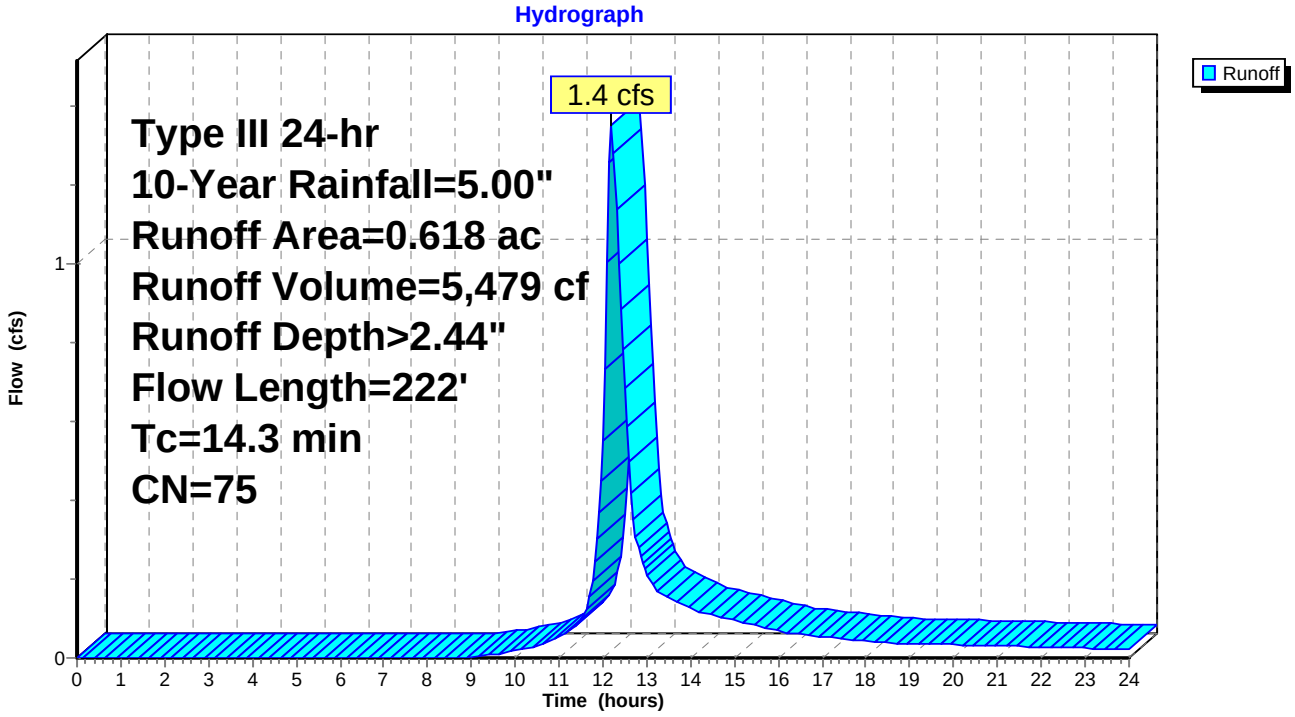
Runoff = 1.4 cfs @ 12.20 hrs, Volume= 5,479 cf, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (ac)	CN	Description
	0.590	74	>75% Grass cover, Good, HSG C
*	0.028	98	Solar array ballasts, HSG C
	0.618	75	Weighted Average
	0.590		95.47% Pervious Area
	0.028		4.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

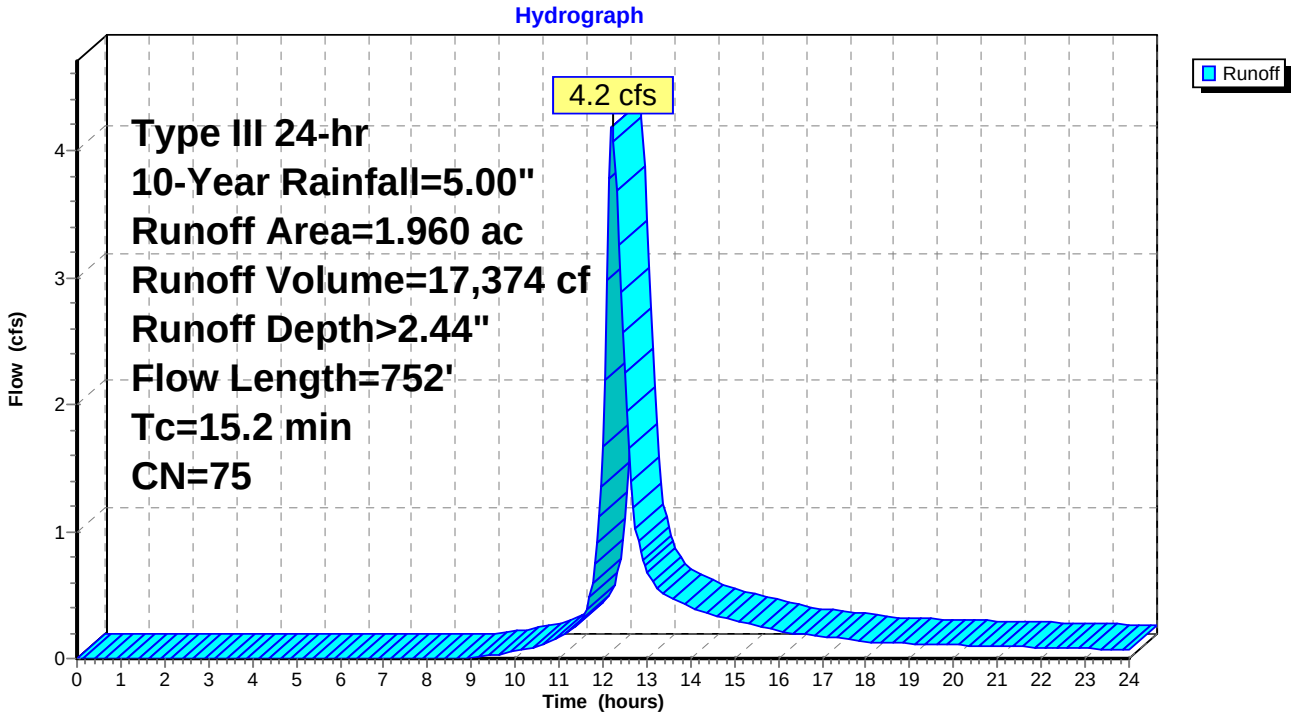
Runoff = 4.2 cfs @ 12.21 hrs, Volume= 17,374 cf, Depth> 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (ac)	CN	Description
	1.896	74	>75% Grass cover, Good, HSG C
*	0.064	98	Solar array ballasts, HSG C
	1.960	75	Weighted Average
	1.896		96.73% Pervious Area
	0.064		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

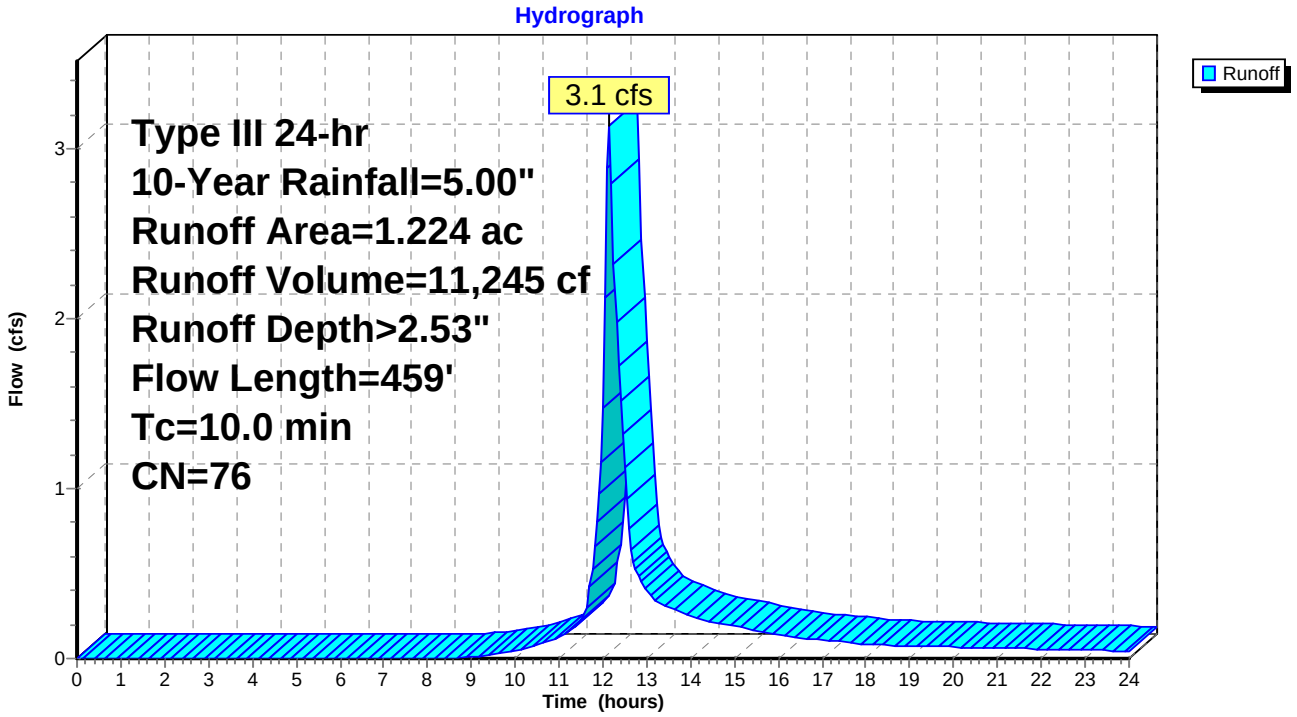
Runoff = 3.1 cfs @ 12.15 hrs, Volume= 11,245 cf, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (ac)	CN	Description
	1.085	74	>75% Grass cover, Good, HSG C
	0.090	89	Gravel roads, HSG C
*	0.046	98	Solar array ballasts, HSG C
*	0.003	98	Concrete Equipment Pad, HSG C
	1.224	76	Weighted Average
	1.175		96.00% Pervious Area
	0.049		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

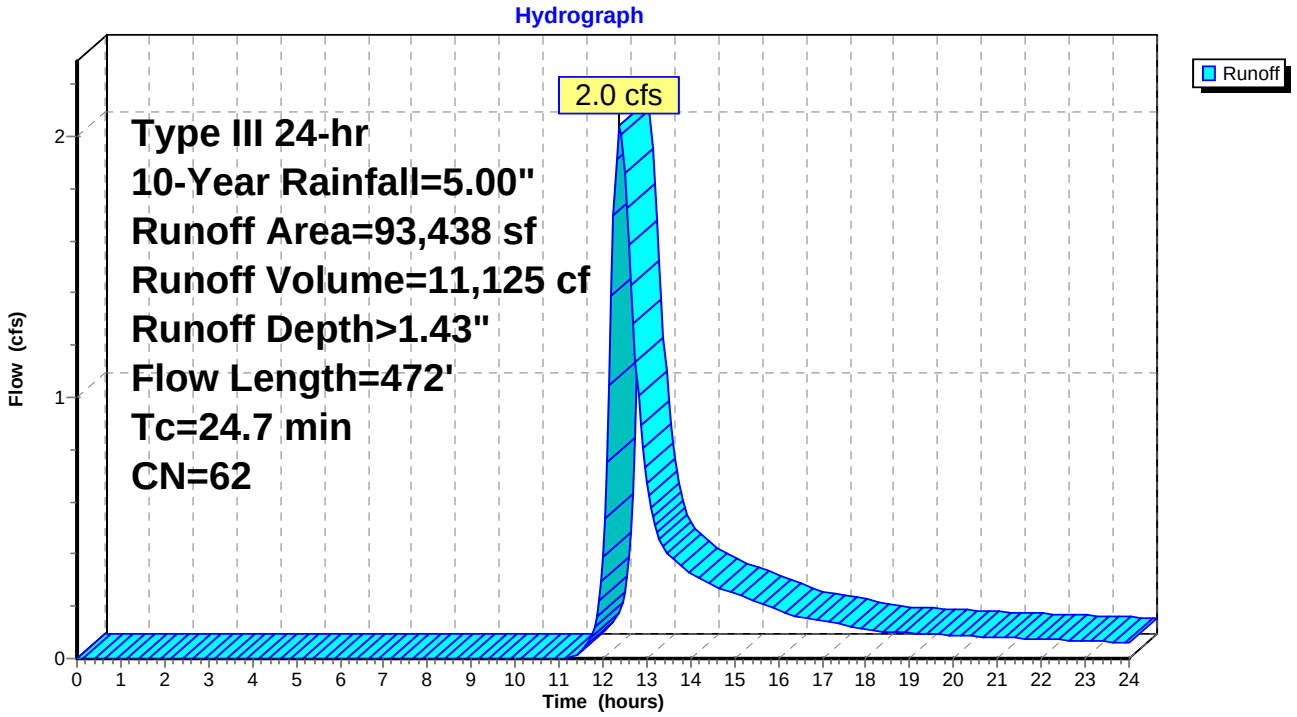
Runoff = 2.0 cfs @ 12.38 hrs, Volume= 11,125 cf, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
	832	74	>75% Grass cover, Good, HSG C
	3,861	80	>75% Grass cover, Good, HSG D
	21,955	61	>75% Grass cover, Good, HSG B
	66,216	61	>75% Grass cover, Good, HSG B
	340	98	Paved parking, HSG C
*	4	98	Solar Array Posts, HSG B
*	230	98	Equipment Pad, HSG B
	93,438	62	Weighted Average
	92,864		99.39% Pervious Area
	574		0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field**
					Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field**
					Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

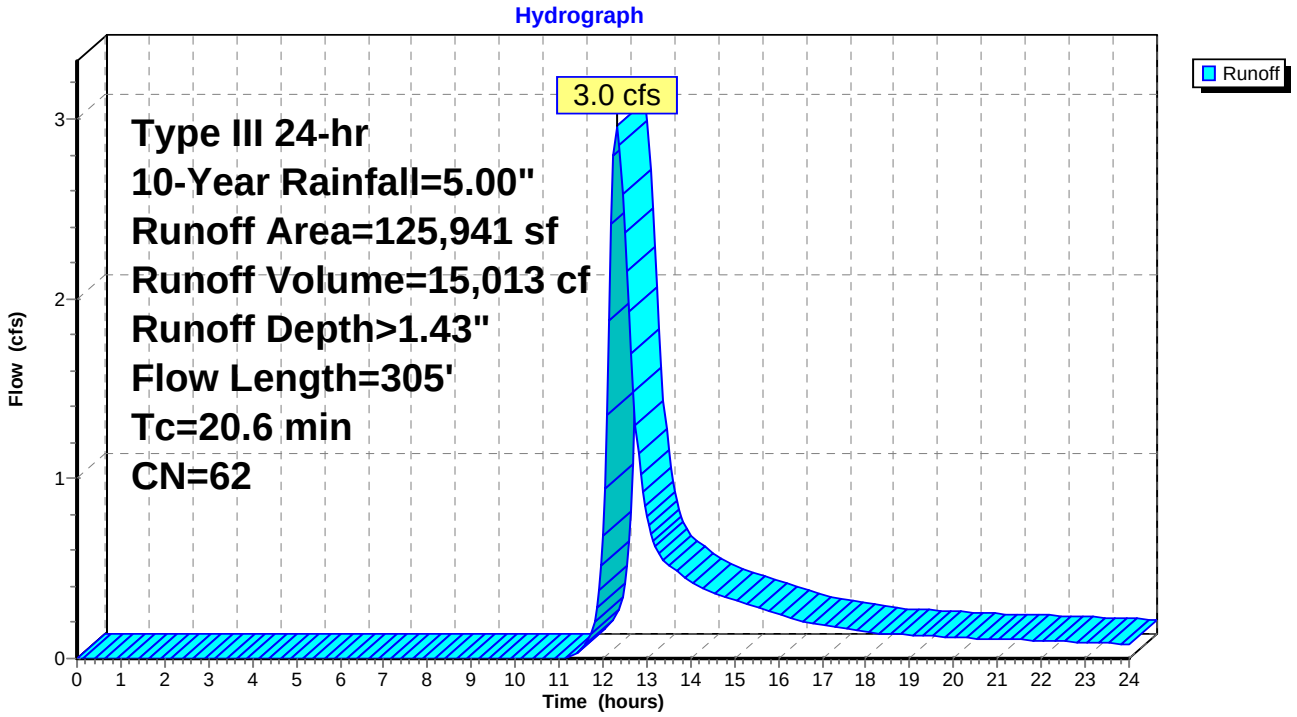
Runoff = 3.0 cfs @ 12.32 hrs, Volume= 15,013 cf, Depth> 1.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (sf)	CN	Description
	116,936	61	>75% Grass cover, Good, HSG B
	3,129	80	>75% Grass cover, Good, HSG D
	1,452	80	>75% Grass cover, Good, HSG D
	4,419	61	>75% Grass cover, Good, HSG B
*	5	98	Solar Array Posts, HSG B
	125,941	62	Weighted Average
	125,936		100.00% Pervious Area
	5		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

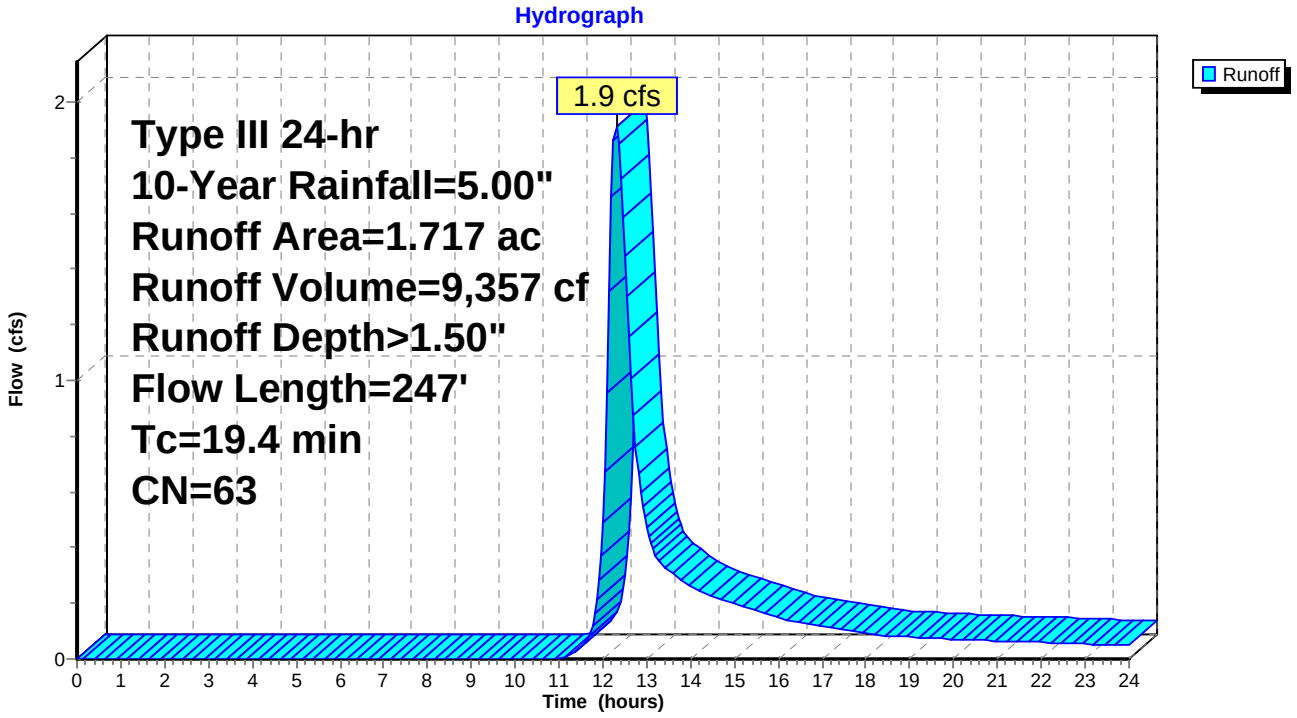
Runoff = 1.9 cfs @ 12.30 hrs, Volume= 9,357 cf, Depth> 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 10-Year Rainfall=5.00"

	Area (ac)	CN	Description
	0.091	77	Woods, Good, HSG D
	0.151	55	Woods, Good, HSG B
	1.283	61	>75% Grass cover, Good, HSG B
	0.187	80	>75% Grass cover, Good, HSG D
*	0.000	98	Solar Array Posts, HSG B
	0.005	98	Paved parking, HSG B
	1.717	63	Weighted Average
	1.712		99.71% Pervious Area
	0.005		0.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 2.44" for 10-Year event
Inflow = 4.2 cfs @ 12.21 hrs, Volume= 17,374 cf
Outflow = 4.1 cfs @ 12.26 hrs, Volume= 17,318 cf, Atten= 3%, Lag= 2.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.33 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 1.20 fps, Avg. Travel Time= 9.1 min

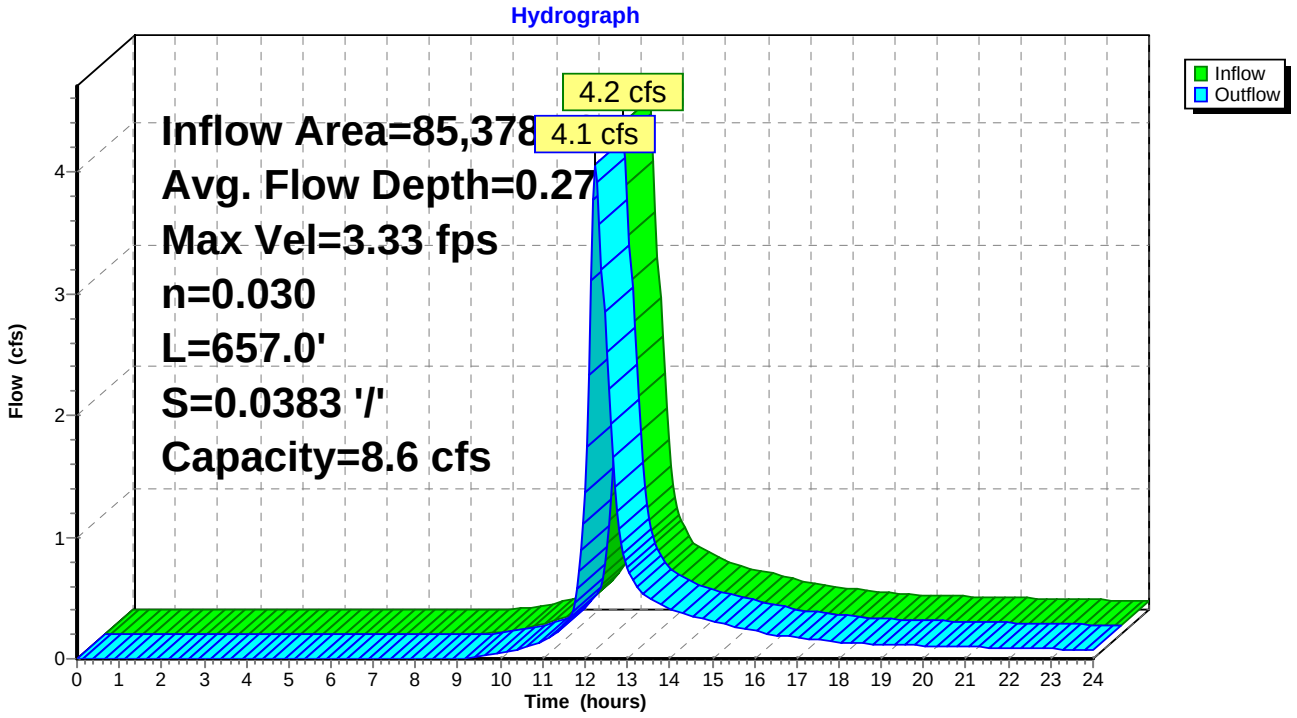
Peak Storage= 800 cf @ 12.26 hrs
Average Depth at Peak Storage= 0.27'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡

Reach 19R: Riprap Swale



Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 2.53" for 10-Year event
Inflow = 3.1 cfs @ 12.15 hrs, Volume= 11,245 cf
Outflow = 3.0 cfs @ 12.18 hrs, Volume= 11,212 cf, Atten= 4%, Lag= 1.9 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.27 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.05 fps, Avg. Travel Time= 8.4 min

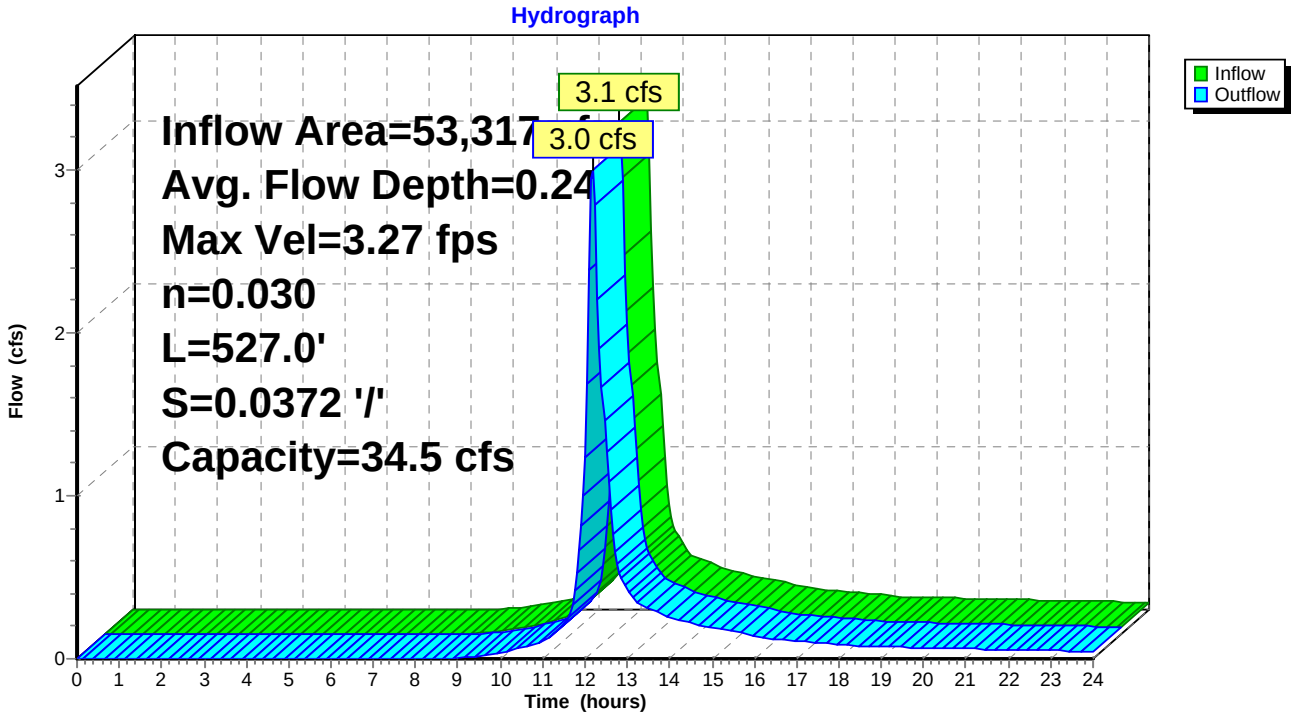
Peak Storage= 482 cf @ 12.18 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



‡

Reach 21R: Riprap Swale

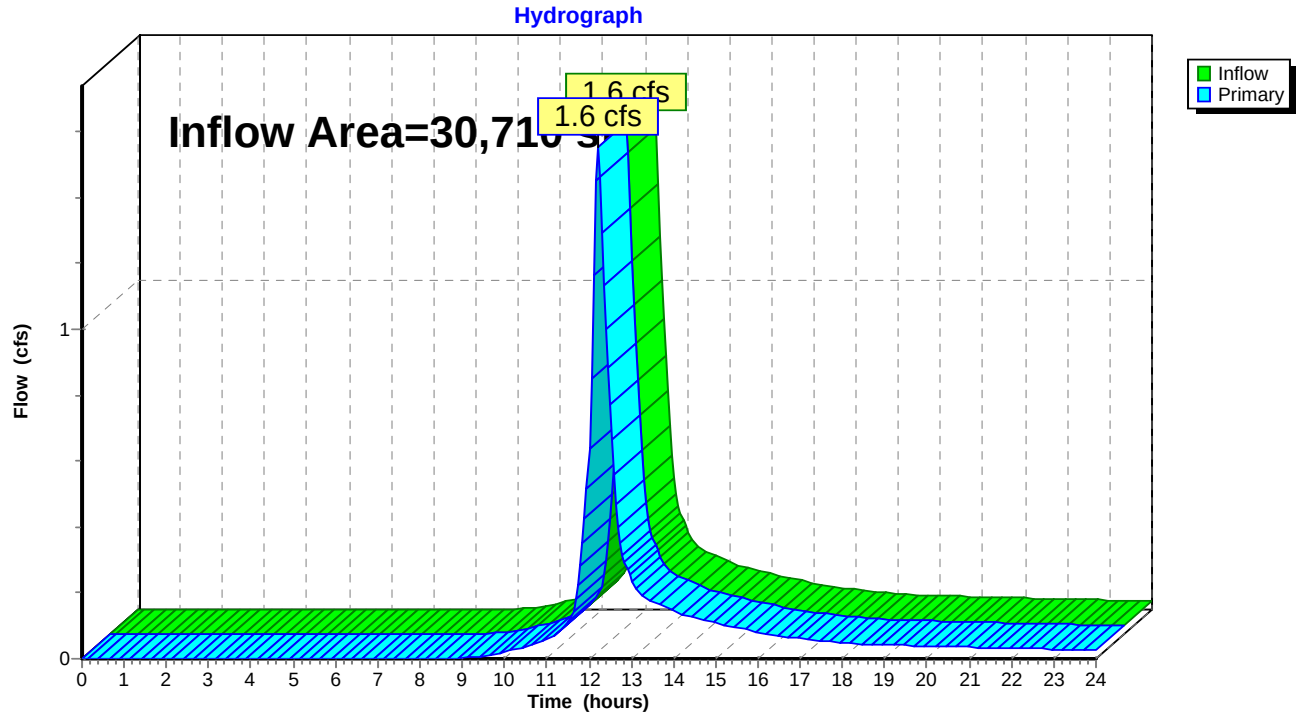


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 4.54% Impervious, Inflow Depth > 2.44" for 10-Year event
Inflow = 1.6 cfs @ 12.20 hrs, Volume= 6,251 cf
Primary = 1.6 cfs @ 12.20 hrs, Volume= 6,251 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

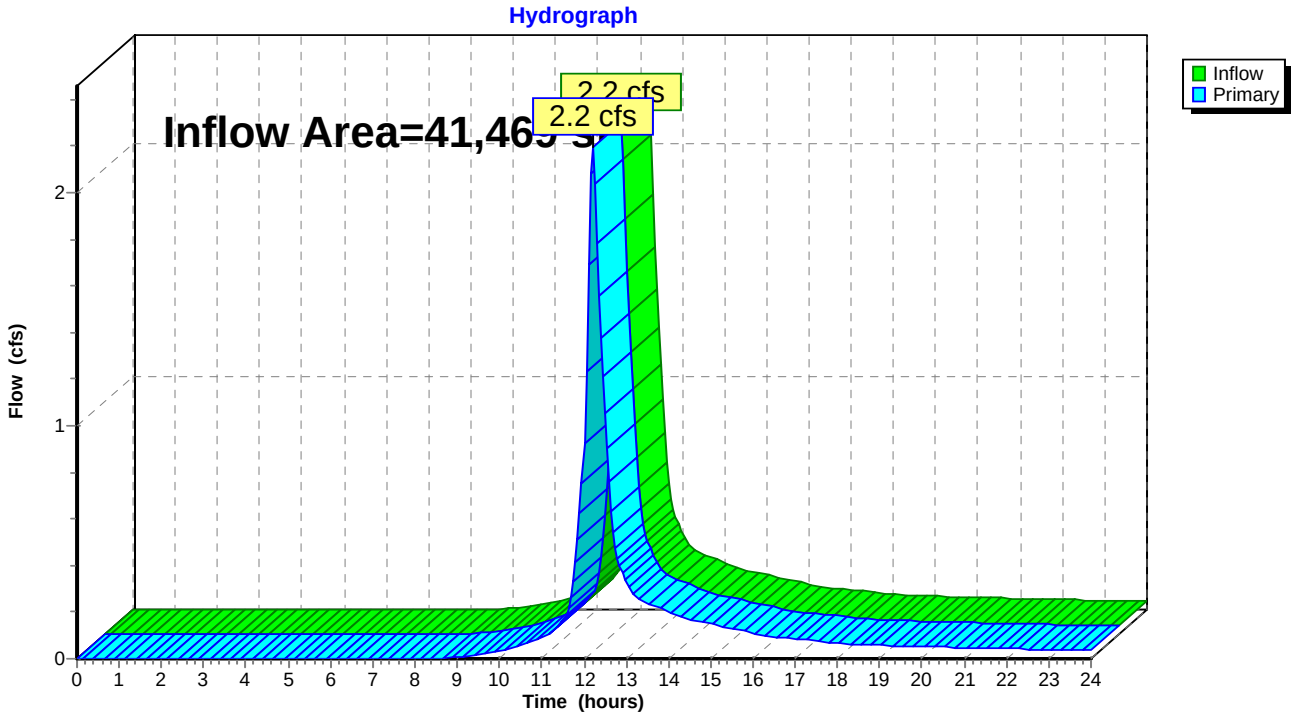


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 4.52% Impervious, Inflow Depth > 2.53" for 10-Year event
Inflow = 2.2 cfs @ 12.20 hrs, Volume= 8,739 cf
Primary = 2.2 cfs @ 12.20 hrs, Volume= 8,739 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

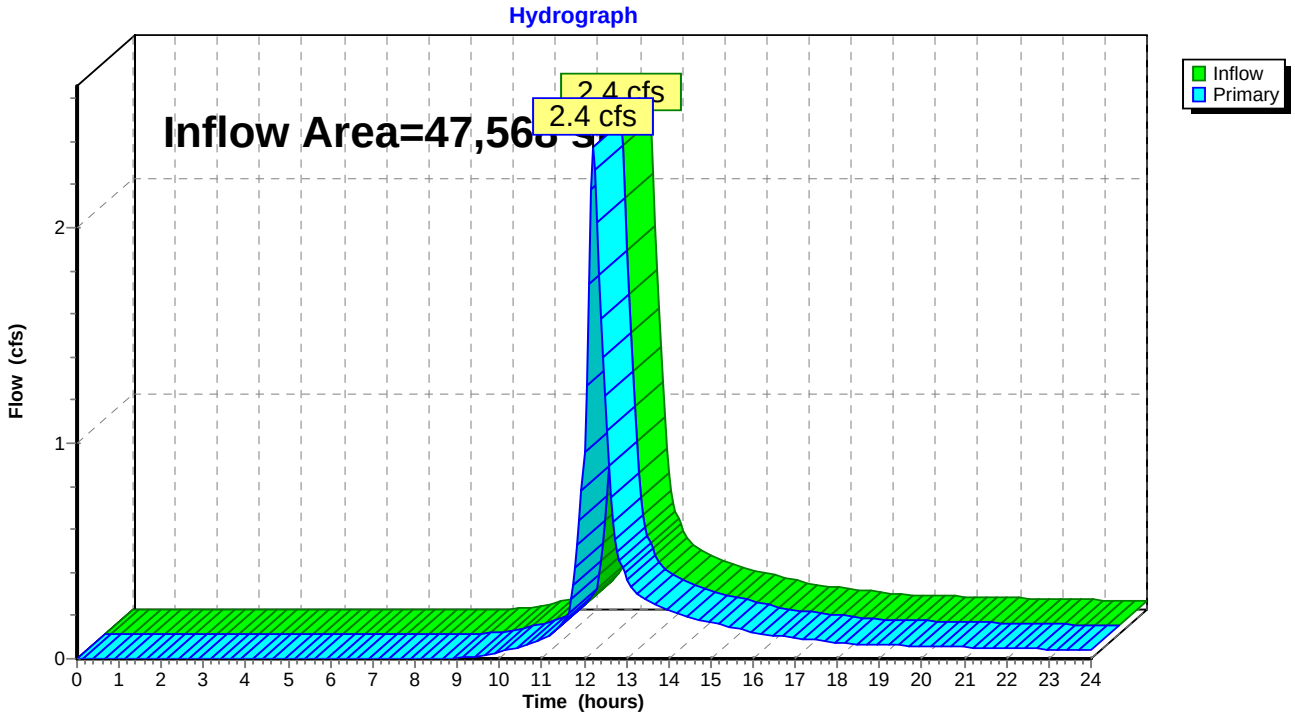


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 5.31% Impervious, Inflow Depth > 2.44" for 10-Year event
Inflow = 2.4 cfs @ 12.21 hrs, Volume= 9,681 cf
Primary = 2.4 cfs @ 12.21 hrs, Volume= 9,681 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

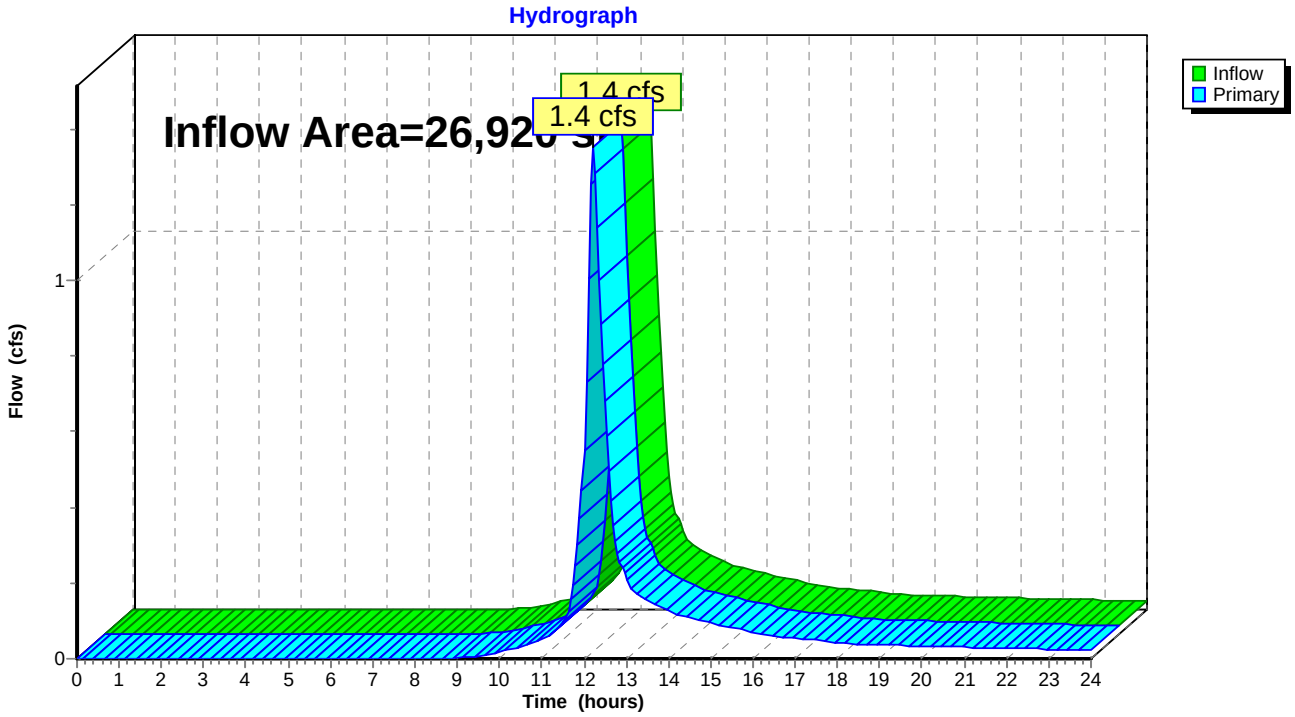


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 4.53% Impervious, Inflow Depth > 2.44" for 10-Year event
Inflow = 1.4 cfs @ 12.20 hrs, Volume= 5,479 cf
Primary = 1.4 cfs @ 12.20 hrs, Volume= 5,479 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

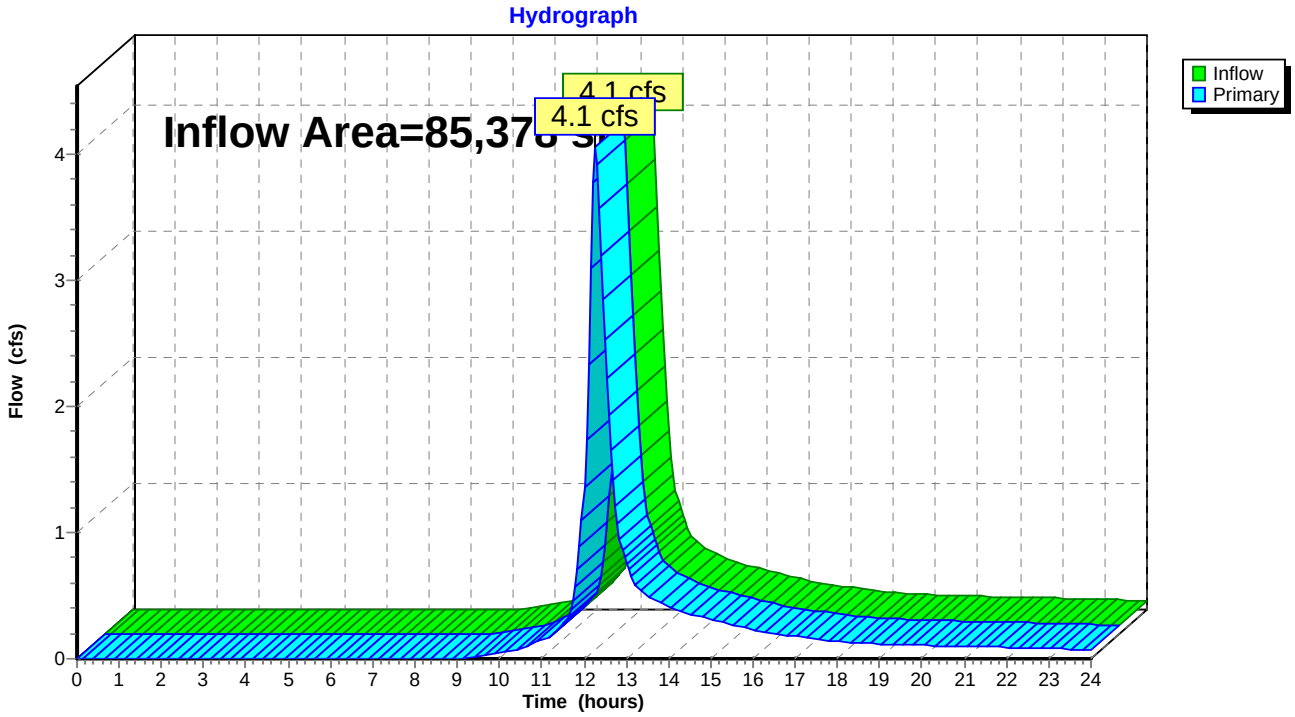


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 2.43" for 10-Year event
Inflow = 4.1 cfs @ 12.26 hrs, Volume= 17,318 cf
Primary = 4.1 cfs @ 12.26 hrs, Volume= 17,318 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

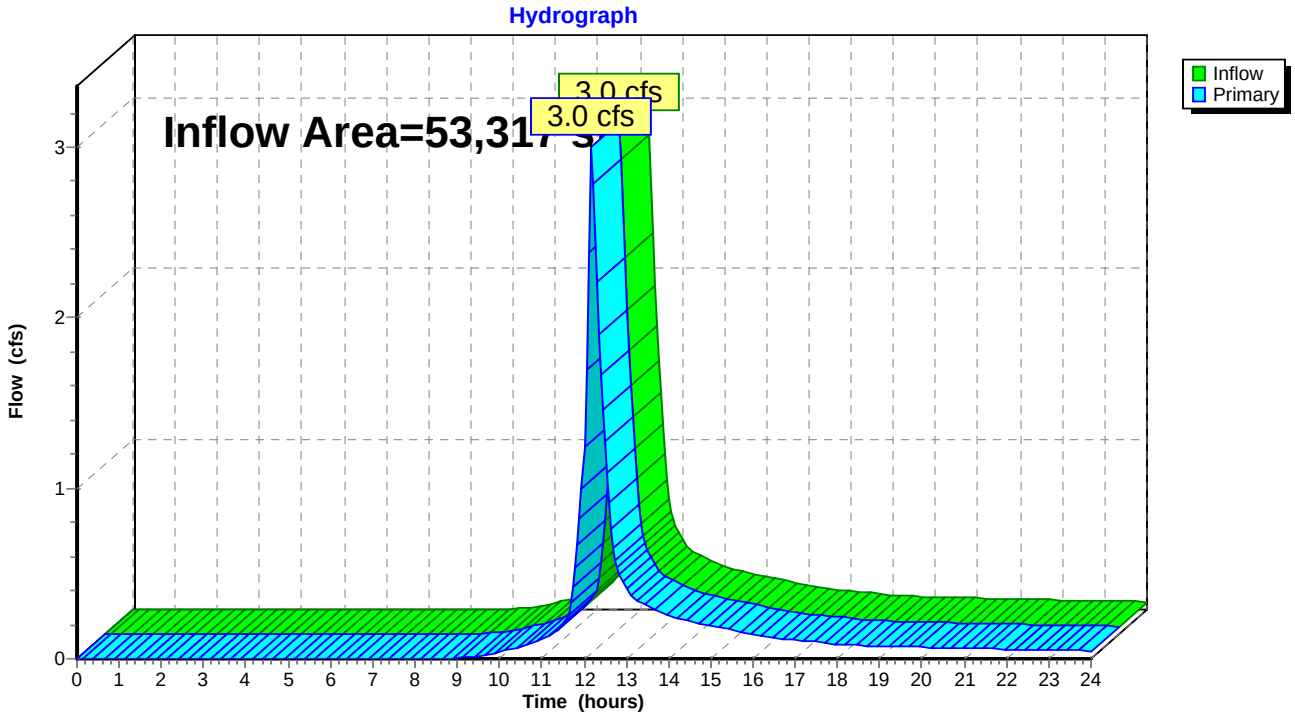


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 2.52" for 10-Year event
Inflow = 3.0 cfs @ 12.18 hrs, Volume= 11,212 cf
Primary = 3.0 cfs @ 12.18 hrs, Volume= 11,212 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

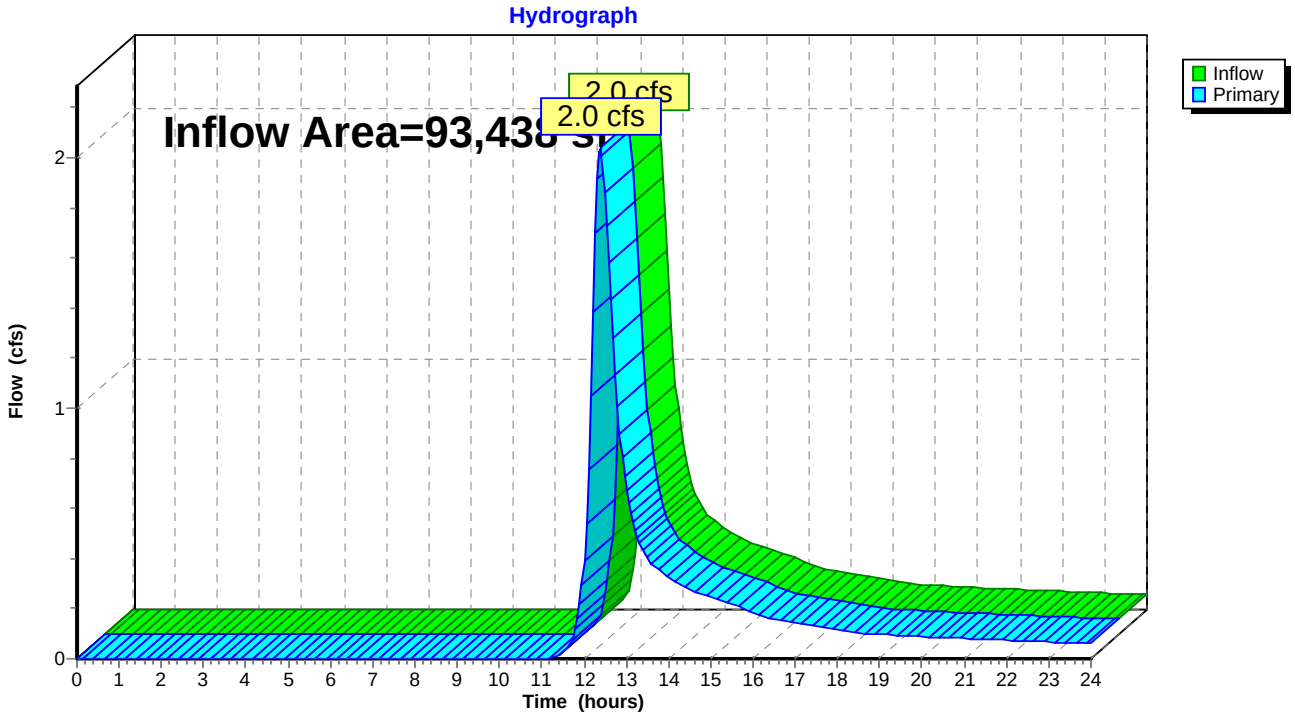


Summary for Link 15L: Wetland W

Inflow Area = 93,438 sf, 0.61% Impervious, Inflow Depth > 1.43" for 10-Year event
Inflow = 2.0 cfs @ 12.38 hrs, Volume= 11,125 cf
Primary = 2.0 cfs @ 12.38 hrs, Volume= 11,125 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

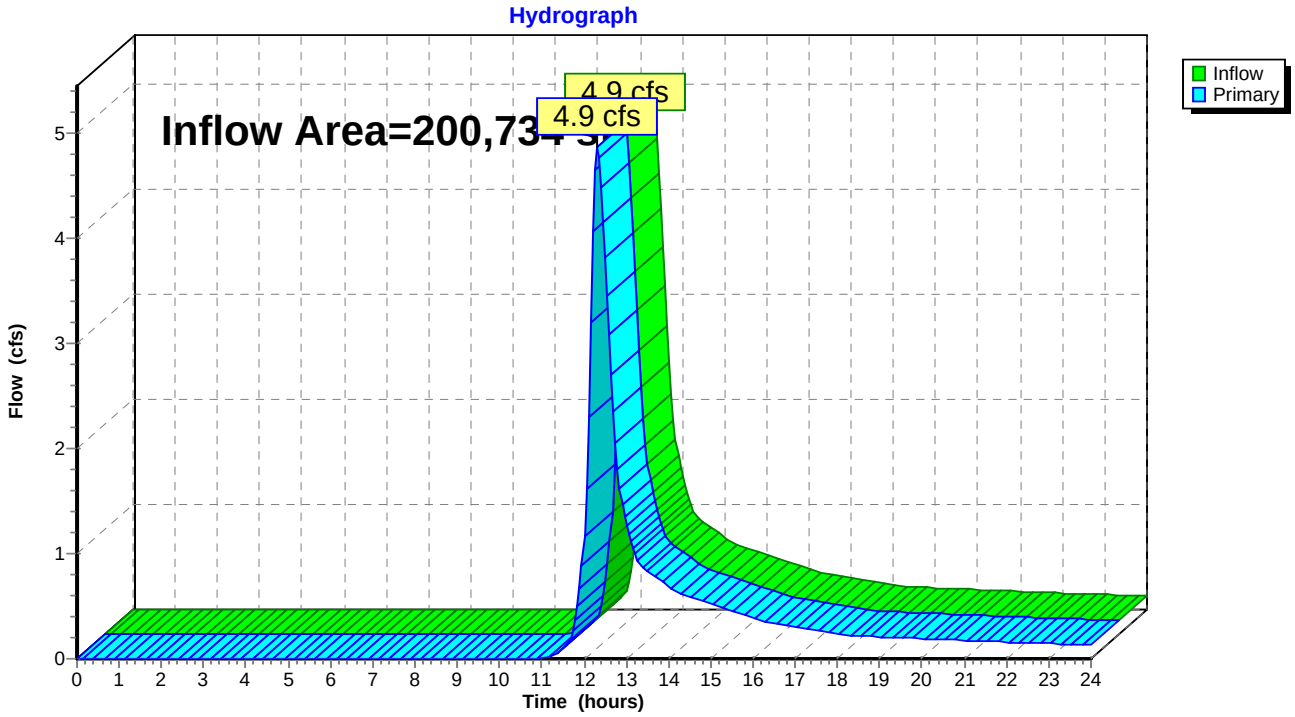


Summary for Link 16L: Wetland E

Inflow Area = 200,734 sf, 0.11% Impervious, Inflow Depth > 1.46" for 10-Year event
Inflow = 4.9 cfs @ 12.31 hrs, Volume= 24,370 cf
Primary = 4.9 cfs @ 12.31 hrs, Volume= 24,370 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 4.52% Impervious Runoff Depth>3.11"
Flow Length=239' Tc=13.7 min CN=76 Runoff=2.7 cfs 10,764 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 4.54% Impervious Runoff Depth>3.02"
Flow Length=179' Tc=14.1 min CN=75 Runoff=1.9 cfs 7,729 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 5.31% Impervious Runoff Depth>3.02"
Flow Length=204' Tc=14.6 min CN=75 Runoff=2.9 cfs 11,970 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 4.53% Impervious Runoff Depth>3.02"
Flow Length=222' Tc=14.3 min CN=75 Runoff=1.7 cfs 6,775 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 3.27% Impervious Runoff Depth>3.02"
Flow Length=752' Tc=15.2 min CN=75 Runoff=5.2 cfs 21,482 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 4.00% Impervious Runoff Depth>3.12"
Flow Length=459' Tc=10.0 min CN=76 Runoff=3.9 cfs 13,851 cf

Subcatchment 7S: Green Field W Runoff Area=93,438 sf 0.61% Impervious Runoff Depth>1.88"
Flow Length=472' Tc=24.7 min CN=62 Runoff=2.8 cfs 14,608 cf

Subcatchment 8S: Green Field E Runoff Area=125,941 sf 0.00% Impervious Runoff Depth>1.88"
Flow Length=305' Tc=20.6 min CN=62 Runoff=4.0 cfs 19,713 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.29% Impervious Runoff Depth>1.96"
Flow Length=247' Tc=19.4 min CN=63 Runoff=2.6 cfs 12,217 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.30' Max Vel=3.55 fps Inflow=5.2 cfs 21,482 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=5.1 cfs 21,420 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.28' Max Vel=3.50 fps Inflow=3.9 cfs 13,851 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=3.7 cfs 13,814 cf

Link 7L: Wetlands NW Inflow=1.9 cfs 7,729 cf
Primary=1.9 cfs 7,729 cf

Link 8L: Depression S Inflow=2.7 cfs 10,764 cf
Primary=2.7 cfs 10,764 cf

Link 9L: Wetlands NE Inflow=2.9 cfs 11,970 cf
Primary=2.9 cfs 11,970 cf

Link 10L: Wetlands N Inflow=1.7 cfs 6,775 cf
Primary=1.7 cfs 6,775 cf

Link 11L: Collection Swale W Inflow=5.1 cfs 21,420 cf
Primary=5.1 cfs 21,420 cf

Link 12L: Collection Swale W Inflow=3.7 cfs 13,814 cf
Primary=3.7 cfs 13,814 cf

Link 15L: Wetland W Inflow=2.8 cfs 14,608 cf
Primary=2.8 cfs 14,608 cf

Link 16L: Wetland E Inflow=6.6 cfs 31,930 cf
Primary=6.6 cfs 31,930 cf

Total Runoff Area = 579,533 sf Runoff Volume = 119,109 cf Average Runoff Depth = 2.47"
97.80% Pervious = 566,801 sf 2.20% Impervious = 12,732 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

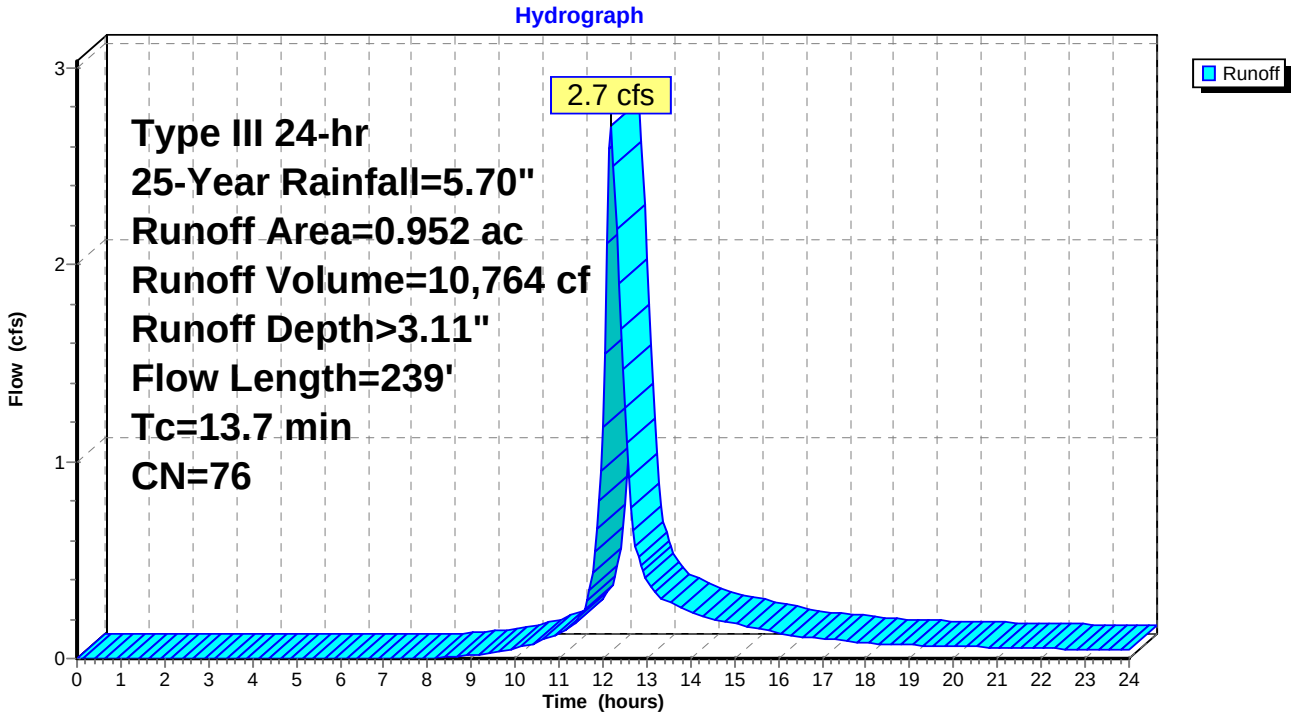
Runoff = 2.7 cfs @ 12.19 hrs, Volume= 10,764 cf, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (ac)	CN	Description
	0.829	74	>75% Grass cover, Good, HSG C
	0.080	89	Gravel roads, HSG C
*	0.003	98	Equipment Pad, HSG C
*	0.040	98	Solar array Ballasts, HSG C
	0.952	76	Weighted Average
	0.909		95.48% Pervious Area
	0.043		4.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

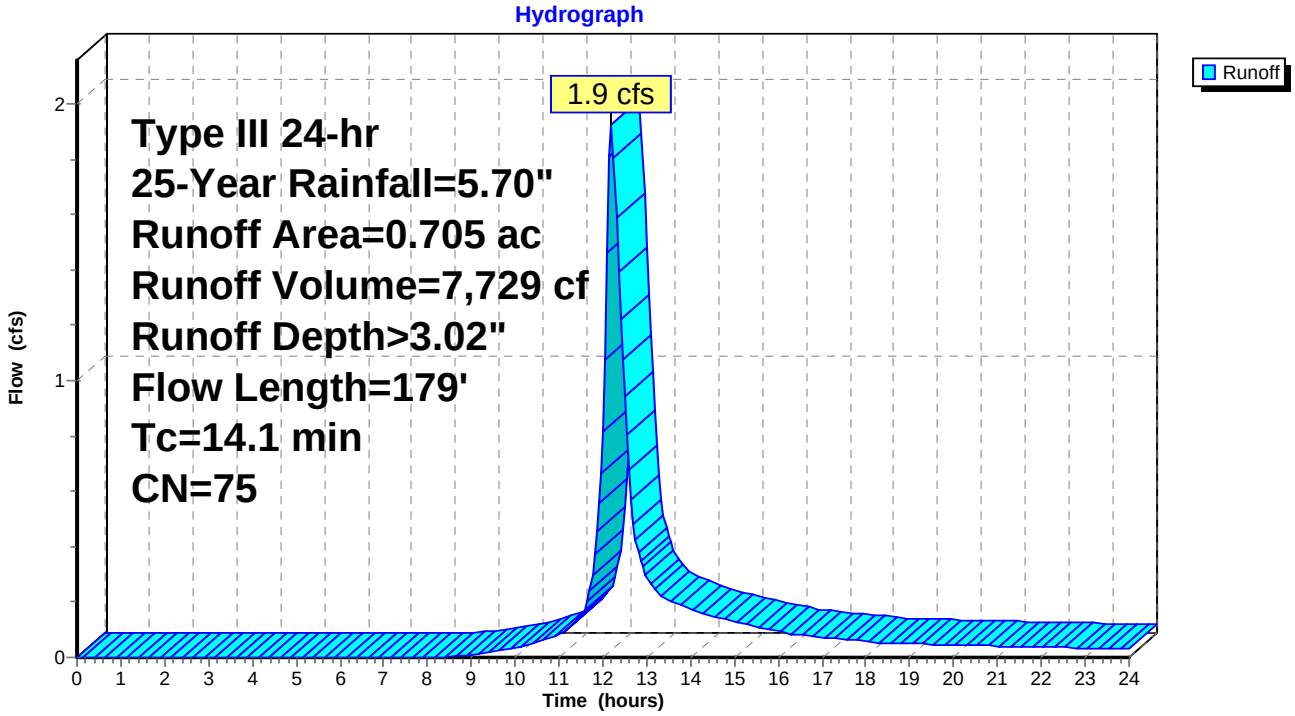
Runoff = 1.9 cfs @ 12.20 hrs, Volume= 7,729 cf, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (ac)	CN	Description
	0.659	74	>75% Grass cover, Good, HSG C
*	0.032	98	Solar array ballasts, HSG C
	0.014	89	Gravel roads, HSG C
	0.705	75	Weighted Average
	0.673		95.46% Pervious Area
	0.032		4.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

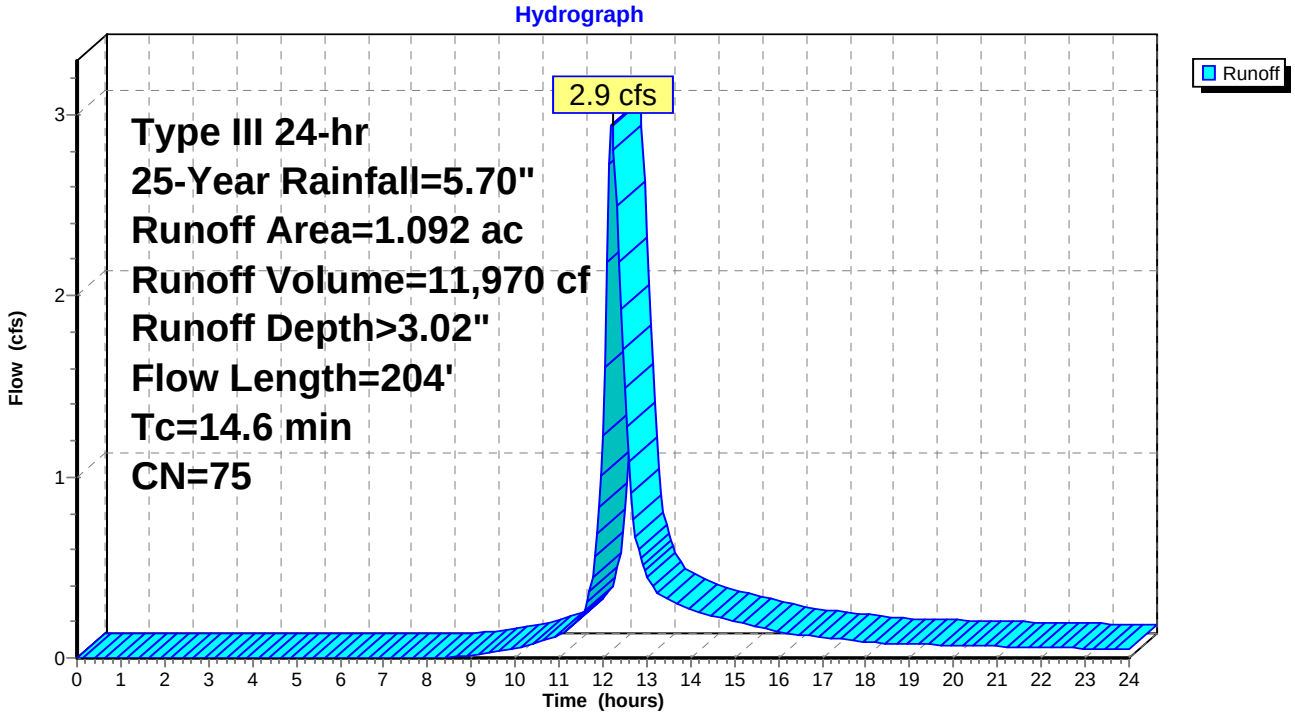
Runoff = 2.9 cfs @ 12.21 hrs, Volume= 11,970 cf, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (ac)	CN	Description
	1.034	74	>75% Grass cover, Good, HSG C
*	0.058	98	Solar array ballasts, HSG C
	1.092	75	Weighted Average
	1.034		94.69% Pervious Area
	0.058		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

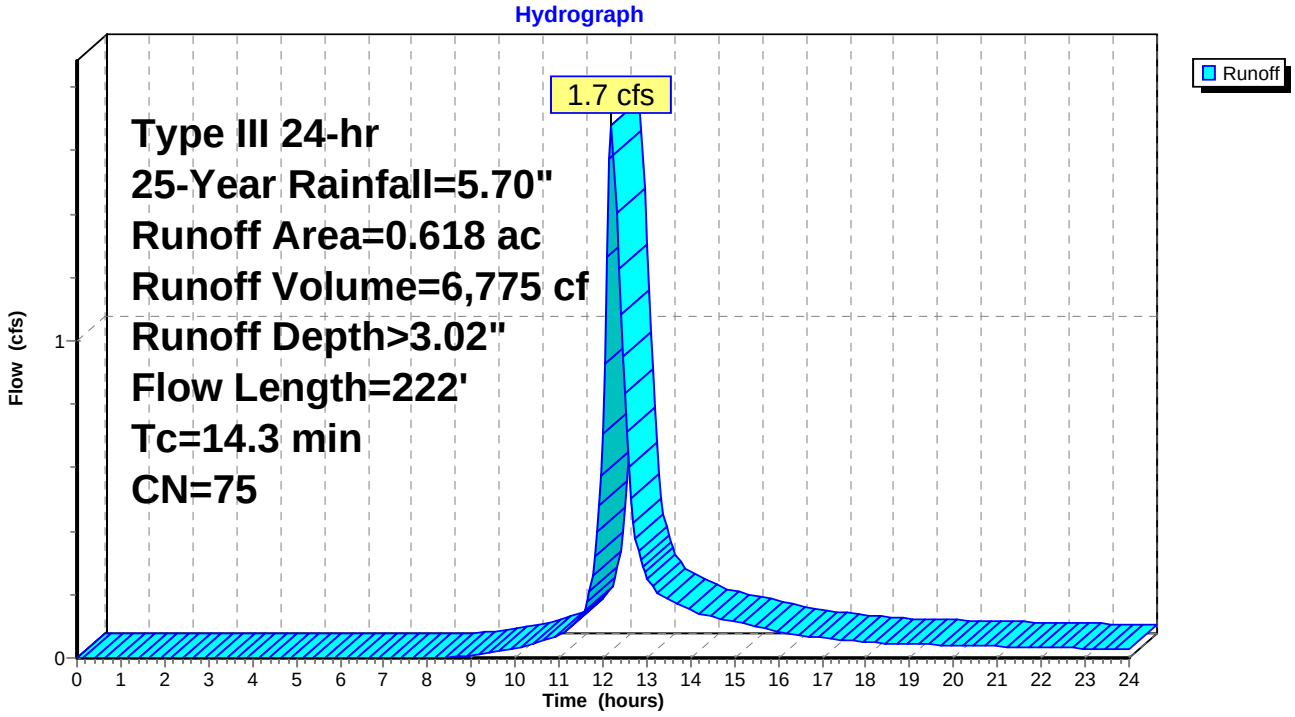
Runoff = 1.7 cfs @ 12.20 hrs, Volume= 6,775 cf, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (ac)	CN	Description
	0.590	74	>75% Grass cover, Good, HSG C
*	0.028	98	Solar array ballasts, HSG C
	0.618	75	Weighted Average
	0.590		95.47% Pervious Area
	0.028		4.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

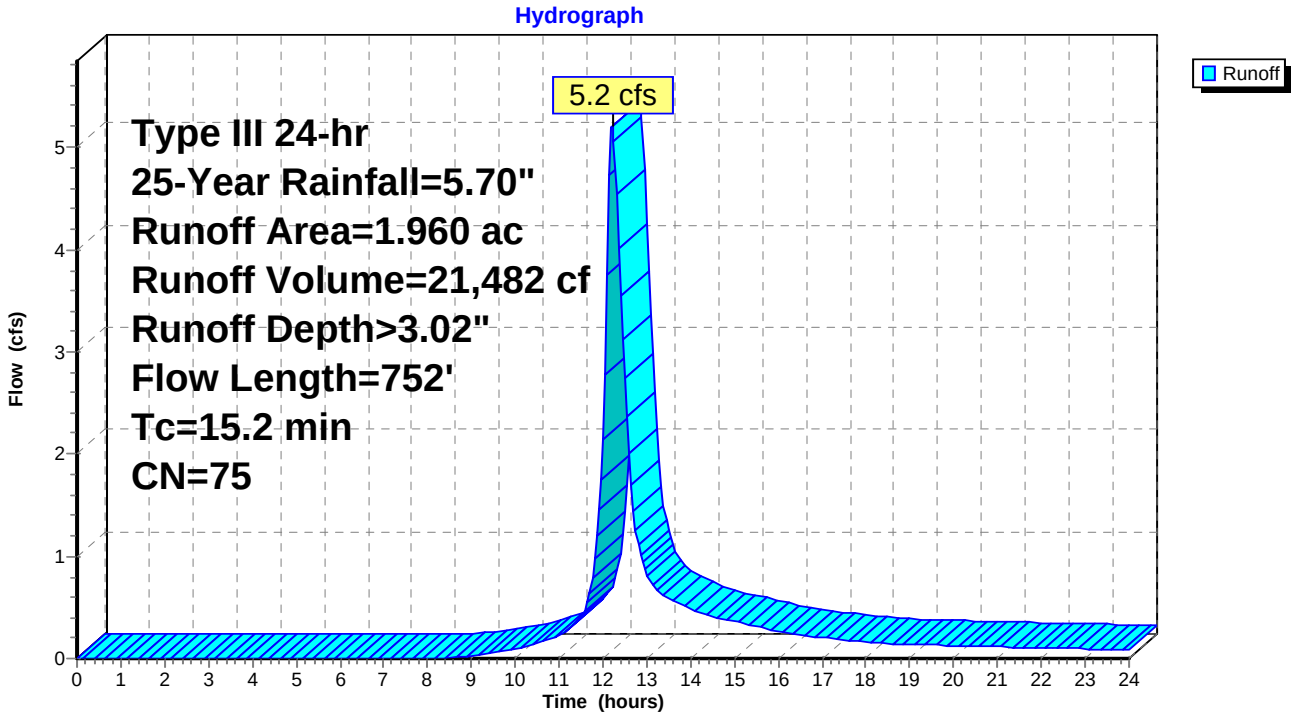
Runoff = 5.2 cfs @ 12.21 hrs, Volume= 21,482 cf, Depth> 3.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (ac)	CN	Description
	1.896	74	>75% Grass cover, Good, HSG C
*	0.064	98	Solar array ballasts, HSG C
	1.960	75	Weighted Average
	1.896		96.73% Pervious Area
	0.064		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

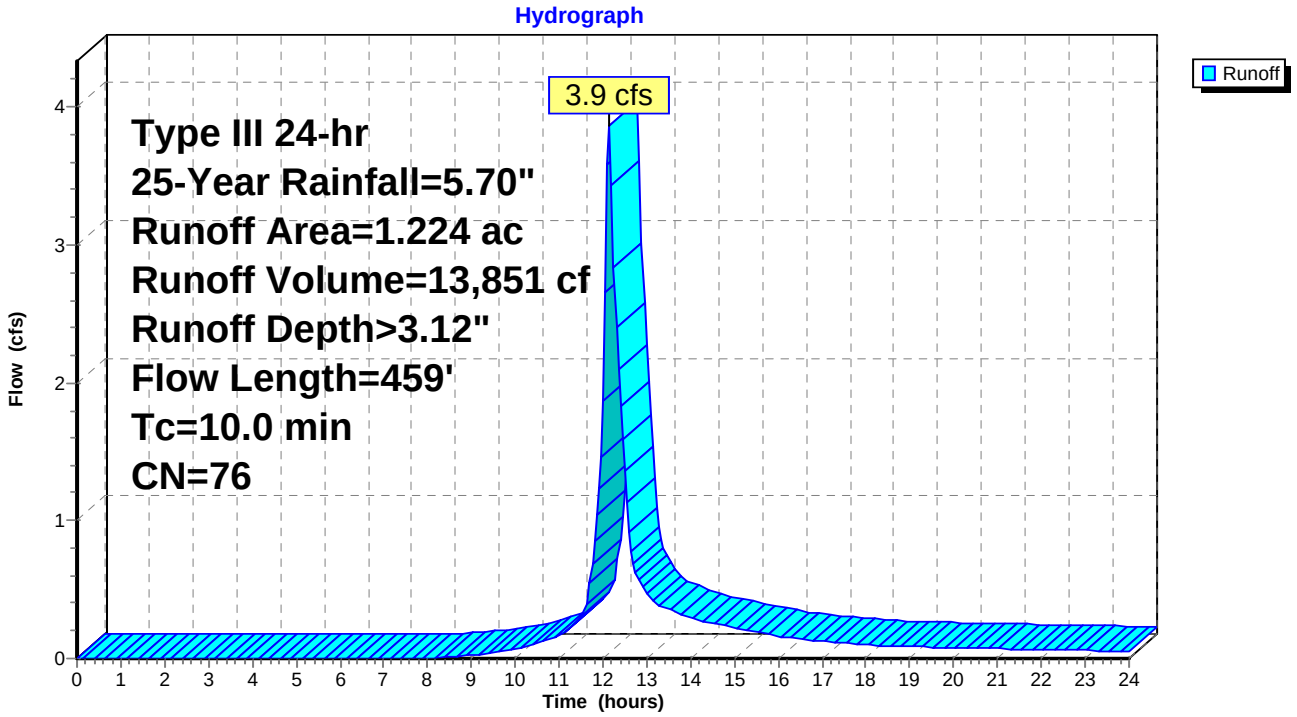
Runoff = 3.9 cfs @ 12.14 hrs, Volume= 13,851 cf, Depth> 3.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (ac)	CN	Description
	1.085	74	>75% Grass cover, Good, HSG C
	0.090	89	Gravel roads, HSG C
*	0.046	98	Solar array ballasts, HSG C
*	0.003	98	Concrete Equipment Pad, HSG C
	1.224	76	Weighted Average
	1.175		96.00% Pervious Area
	0.049		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

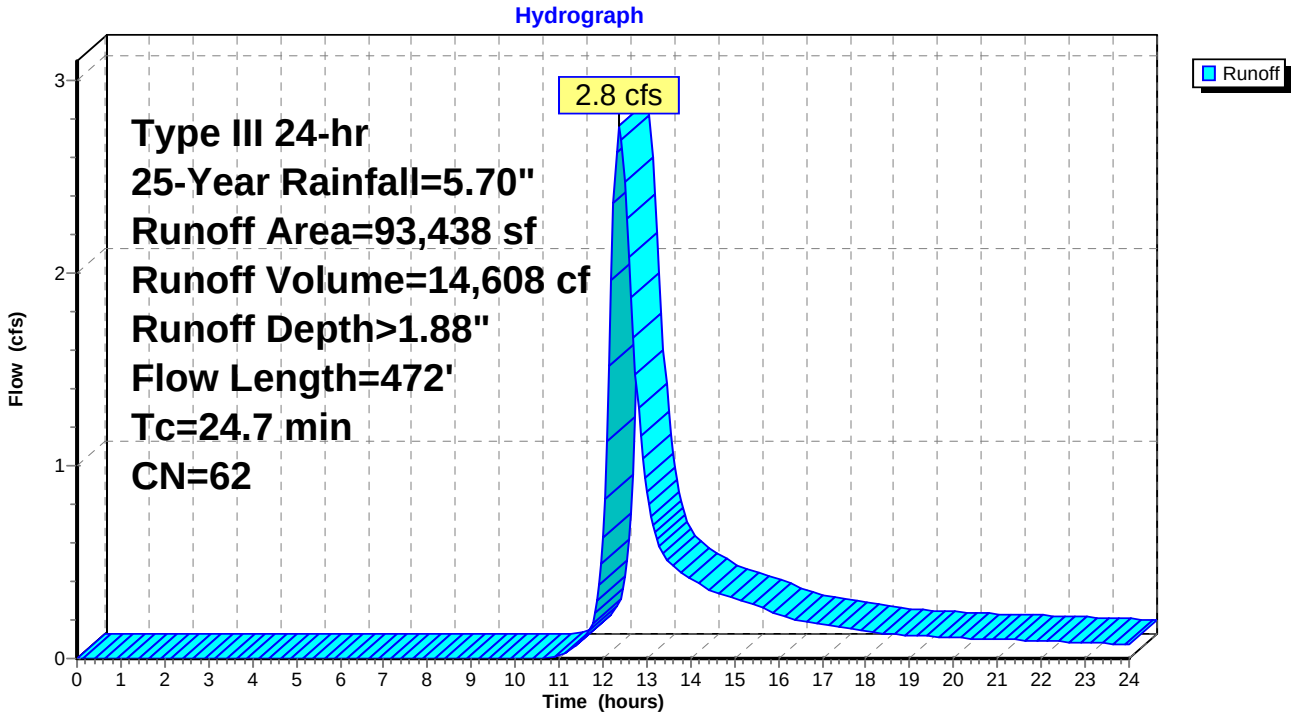
Runoff = 2.8 cfs @ 12.37 hrs, Volume= 14,608 cf, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
	832	74	>75% Grass cover, Good, HSG C
	3,861	80	>75% Grass cover, Good, HSG D
	21,955	61	>75% Grass cover, Good, HSG B
	66,216	61	>75% Grass cover, Good, HSG B
	340	98	Paved parking, HSG C
*	4	98	Solar Array Posts, HSG B
*	230	98	Equipment Pad, HSG B
	93,438	62	Weighted Average
	92,864		99.39% Pervious Area
	574		0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

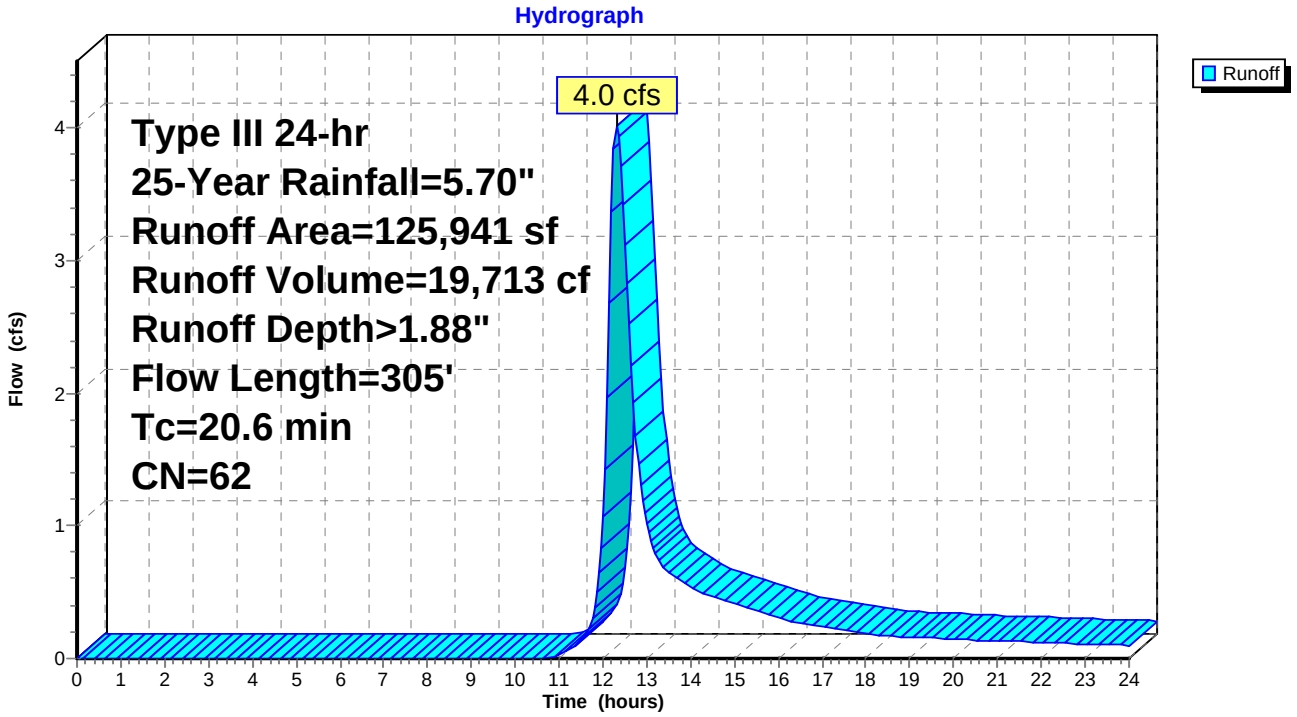
Runoff = 4.0 cfs @ 12.31 hrs, Volume= 19,713 cf, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (sf)	CN	Description
	116,936	61	>75% Grass cover, Good, HSG B
	3,129	80	>75% Grass cover, Good, HSG D
	1,452	80	>75% Grass cover, Good, HSG D
	4,419	61	>75% Grass cover, Good, HSG B
*	5	98	Solar Array Posts, HSG B
	125,941	62	Weighted Average
	125,936		100.00% Pervious Area
	5		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

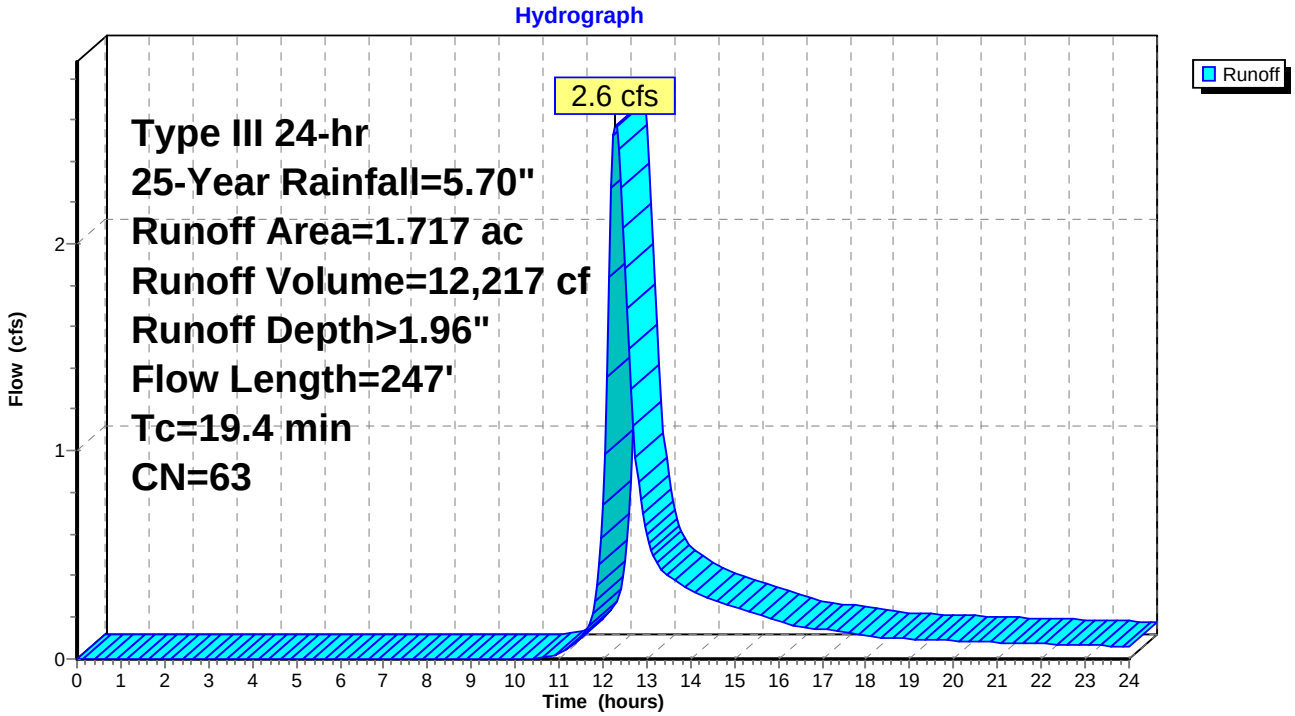
Runoff = 2.6 cfs @ 12.29 hrs, Volume= 12,217 cf, Depth> 1.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 25-Year Rainfall=5.70"

	Area (ac)	CN	Description
	0.091	77	Woods, Good, HSG D
	0.151	55	Woods, Good, HSG B
	1.283	61	>75% Grass cover, Good, HSG B
	0.187	80	>75% Grass cover, Good, HSG D
*	0.000	98	Solar Array Posts, HSG B
	0.005	98	Paved parking, HSG B
	1.717	63	Weighted Average
	1.712		99.71% Pervious Area
	0.005		0.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 3.02" for 25-Year event
Inflow = 5.2 cfs @ 12.21 hrs, Volume= 21,482 cf
Outflow = 5.1 cfs @ 12.25 hrs, Volume= 21,420 cf, Atten= 3%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.55 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 8.6 min

Peak Storage= 934 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



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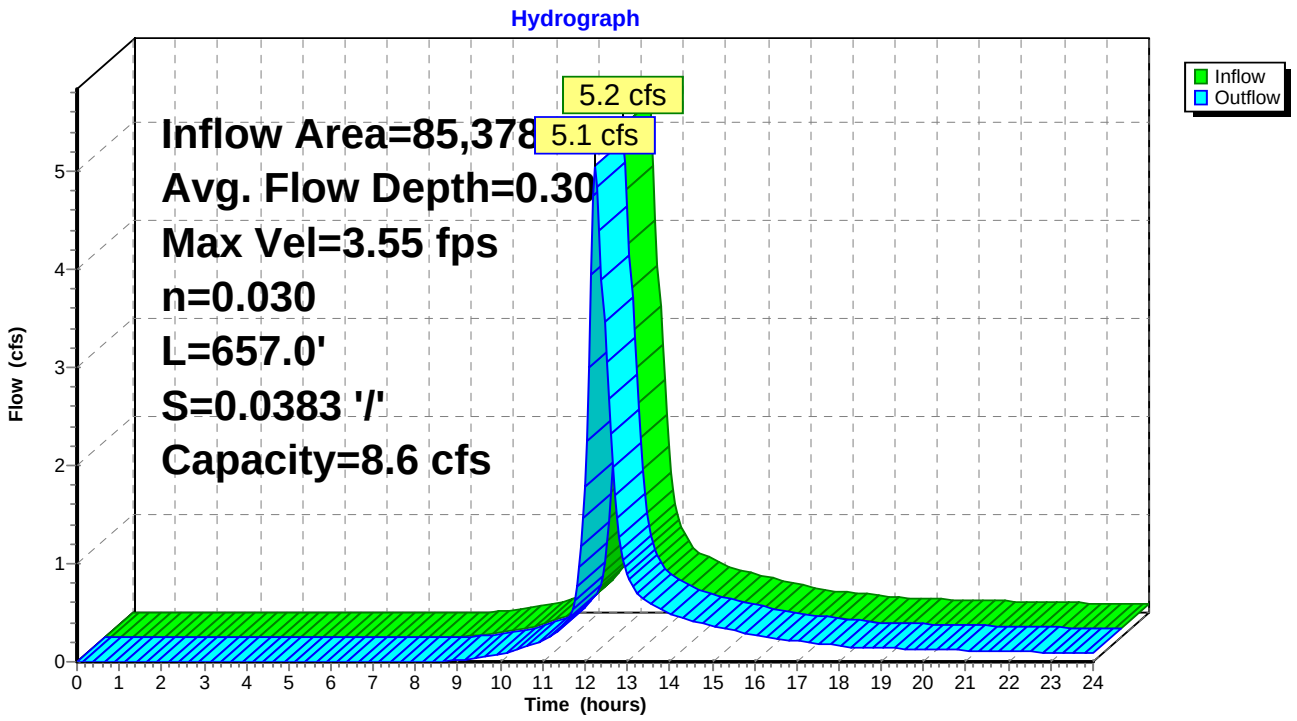

Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 3.12" for 25-Year event
Inflow = 3.9 cfs @ 12.14 hrs, Volume= 13,851 cf
Outflow = 3.7 cfs @ 12.17 hrs, Volume= 13,814 cf, Atten= 3%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.50 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 7.9 min

Peak Storage= 560 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.28'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



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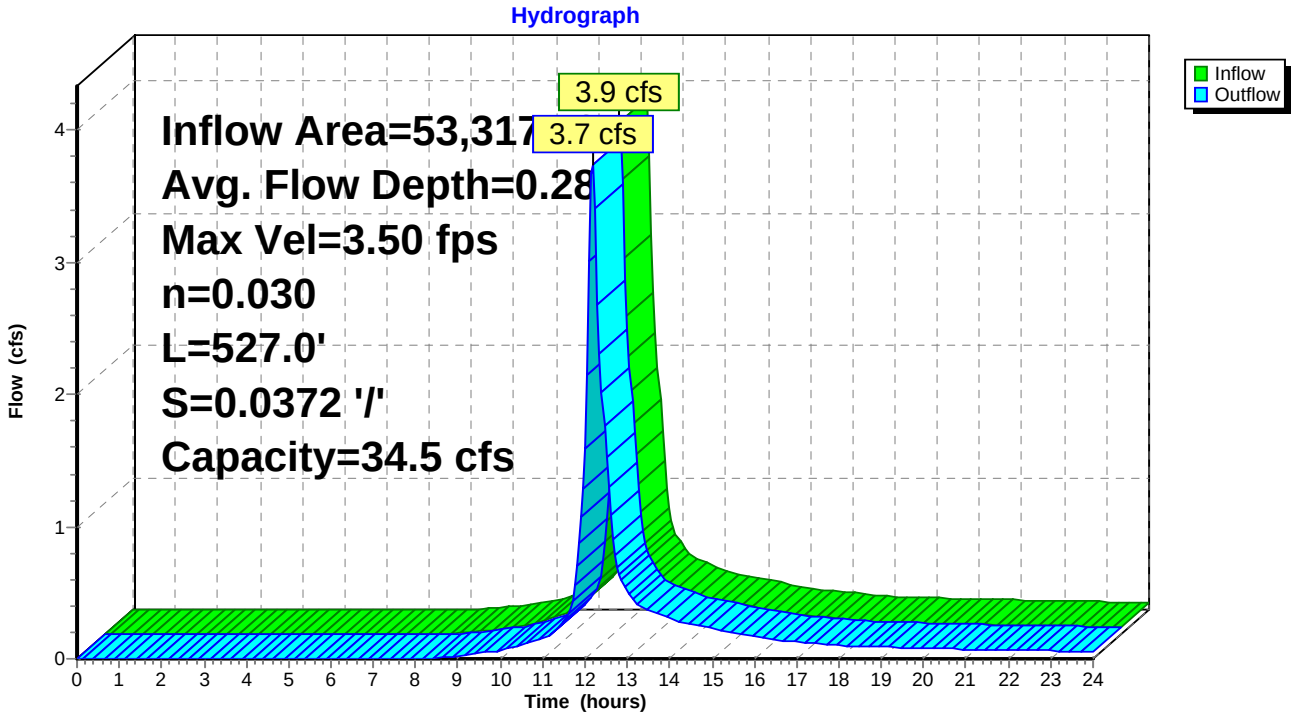
Reach 21R: Riprap Swale

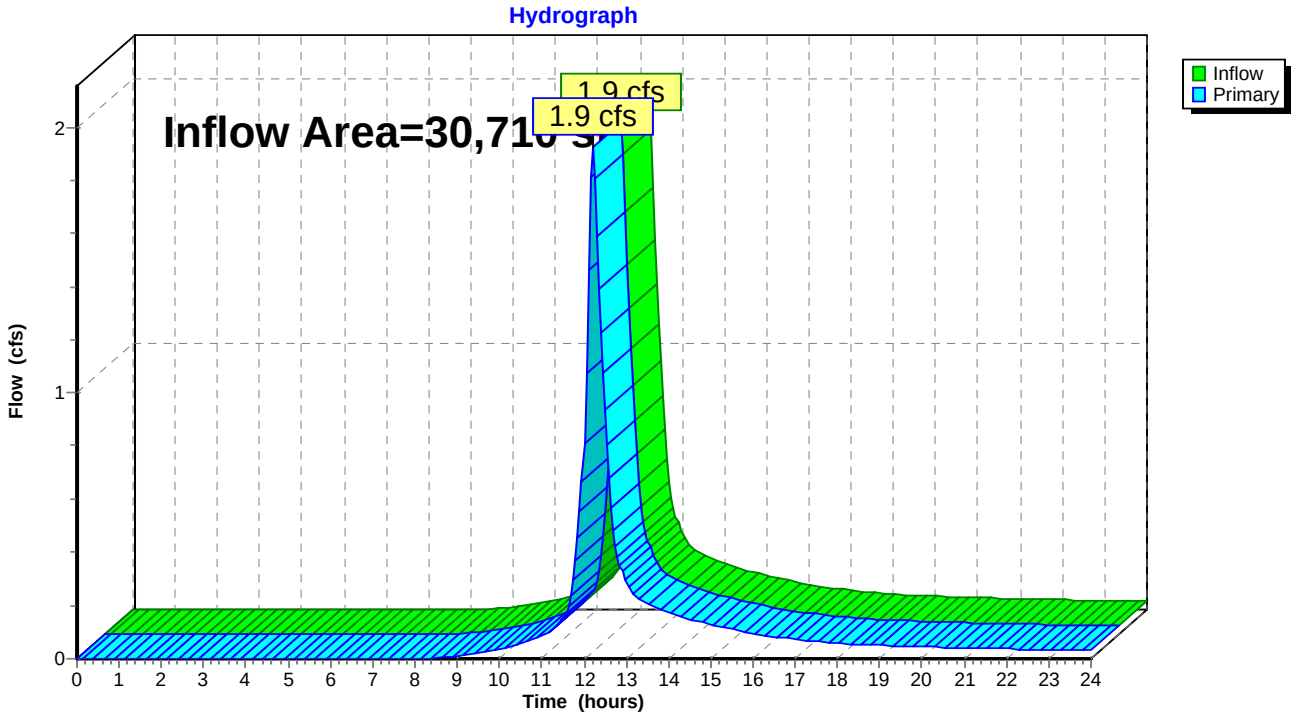


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 4.54% Impervious, Inflow Depth > 3.02" for 25-Year event
Inflow = 1.9 cfs @ 12.20 hrs, Volume= 7,729 cf
Primary = 1.9 cfs @ 12.20 hrs, Volume= 7,729 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

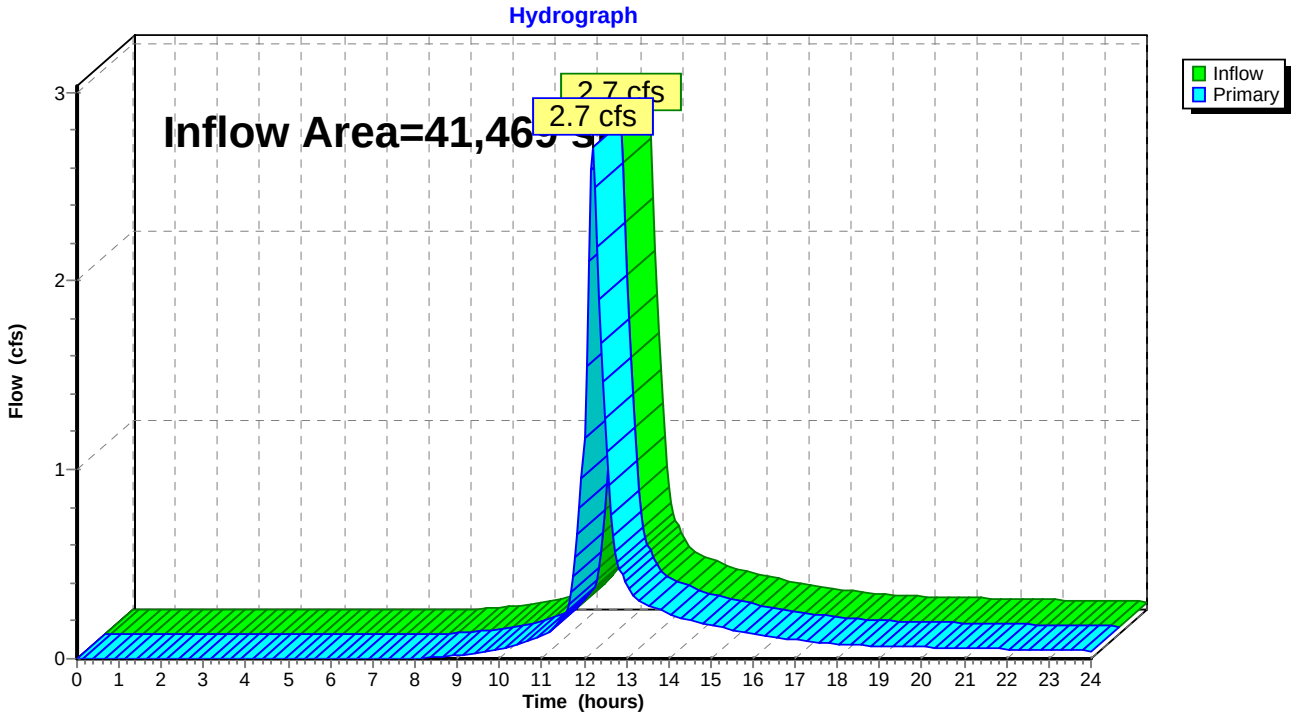


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 4.52% Impervious, Inflow Depth > 3.11" for 25-Year event
Inflow = 2.7 cfs @ 12.19 hrs, Volume= 10,764 cf
Primary = 2.7 cfs @ 12.19 hrs, Volume= 10,764 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

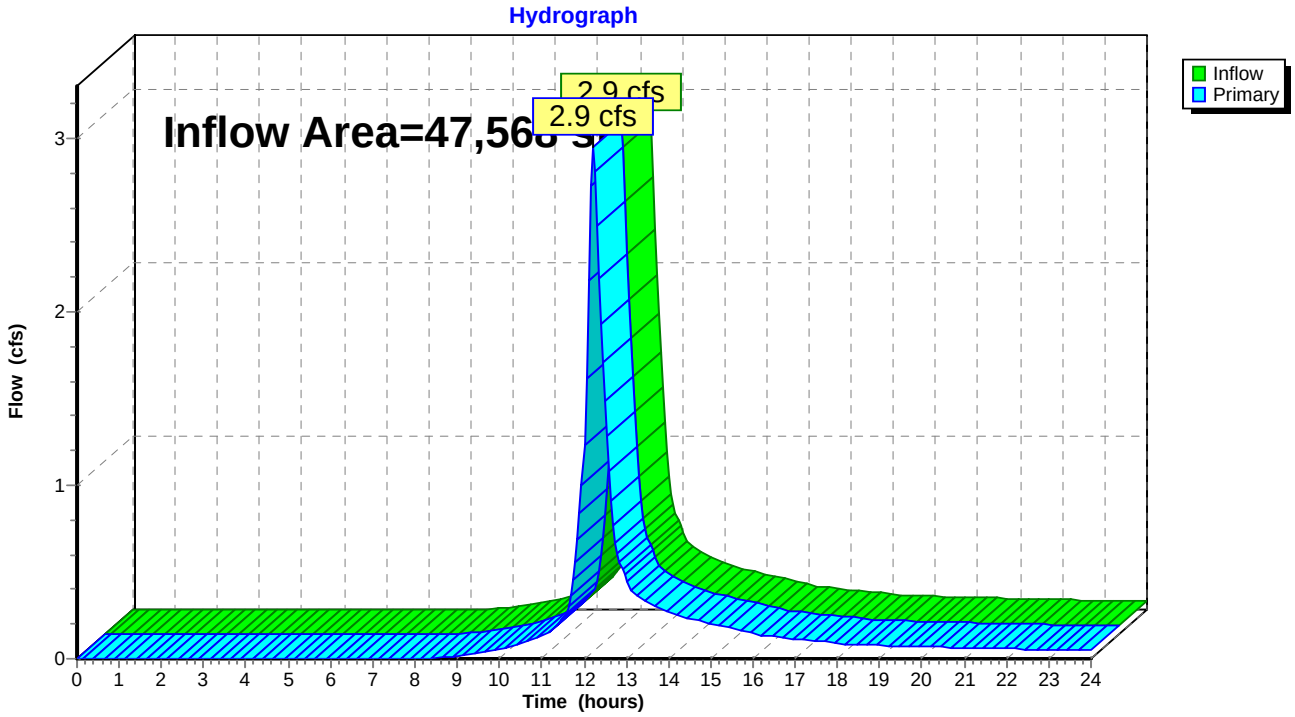


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 5.31% Impervious, Inflow Depth > 3.02" for 25-Year event
Inflow = 2.9 cfs @ 12.21 hrs, Volume= 11,970 cf
Primary = 2.9 cfs @ 12.21 hrs, Volume= 11,970 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

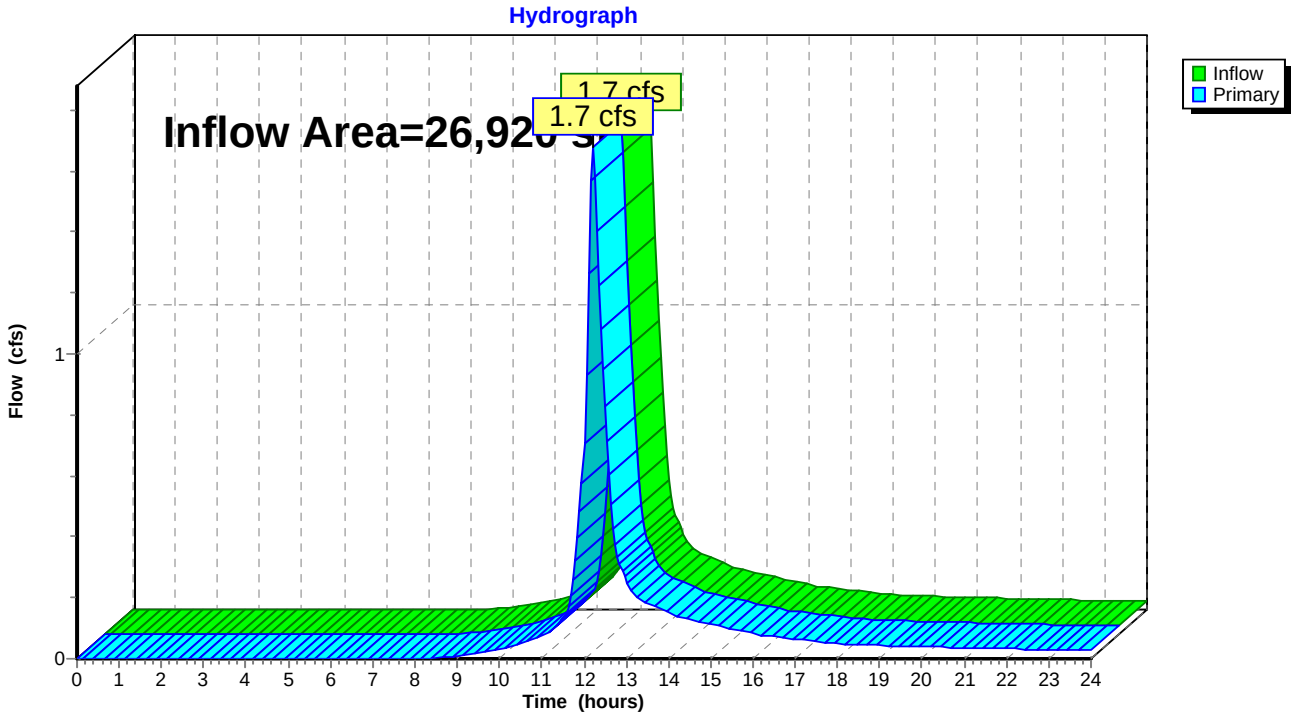


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 4.53% Impervious, Inflow Depth > 3.02" for 25-Year event
Inflow = 1.7 cfs @ 12.20 hrs, Volume= 6,775 cf
Primary = 1.7 cfs @ 12.20 hrs, Volume= 6,775 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

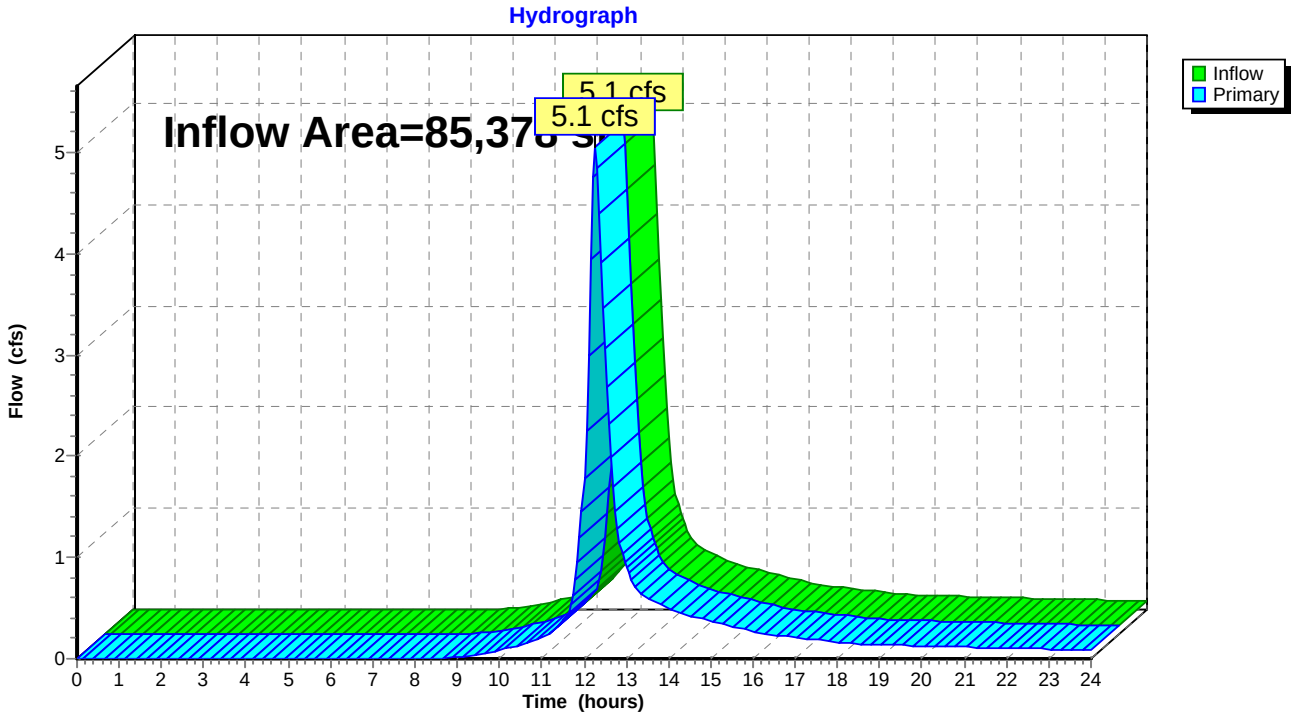


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 3.01" for 25-Year event
Inflow = 5.1 cfs @ 12.25 hrs, Volume= 21,420 cf
Primary = 5.1 cfs @ 12.25 hrs, Volume= 21,420 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

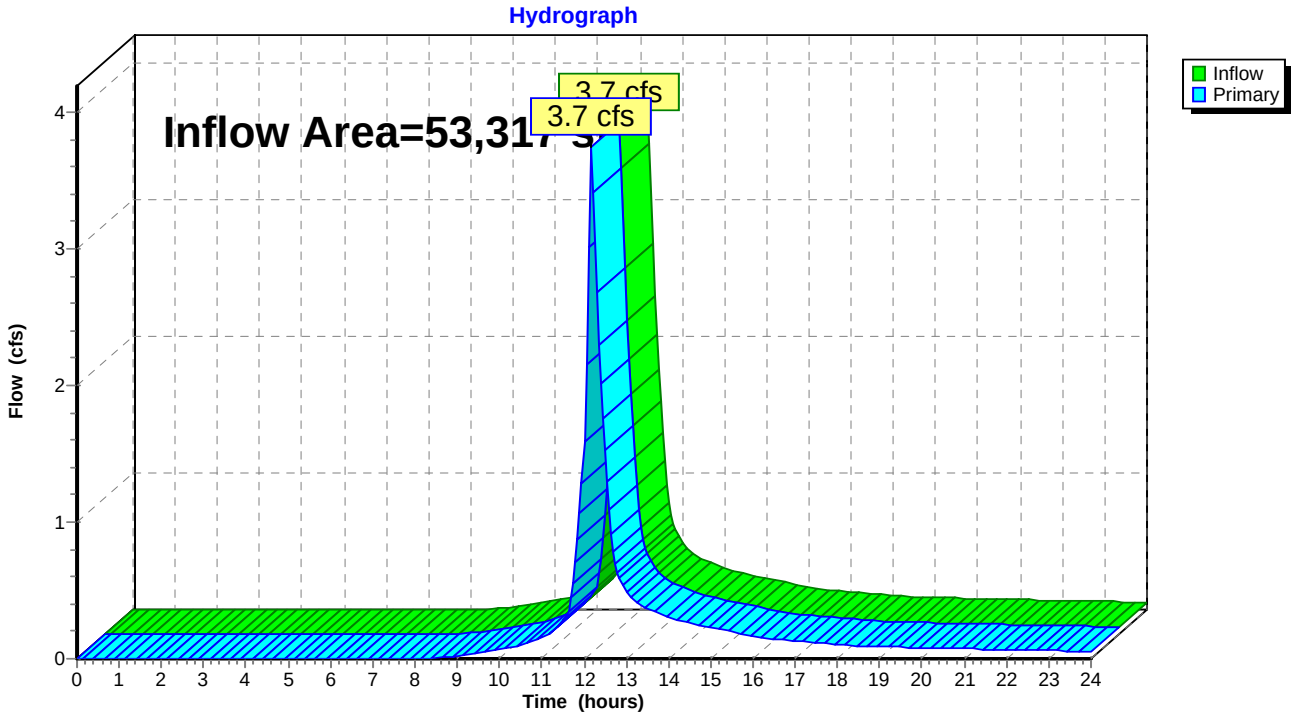


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 3.11" for 25-Year event
Inflow = 3.7 cfs @ 12.17 hrs, Volume= 13,814 cf
Primary = 3.7 cfs @ 12.17 hrs, Volume= 13,814 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

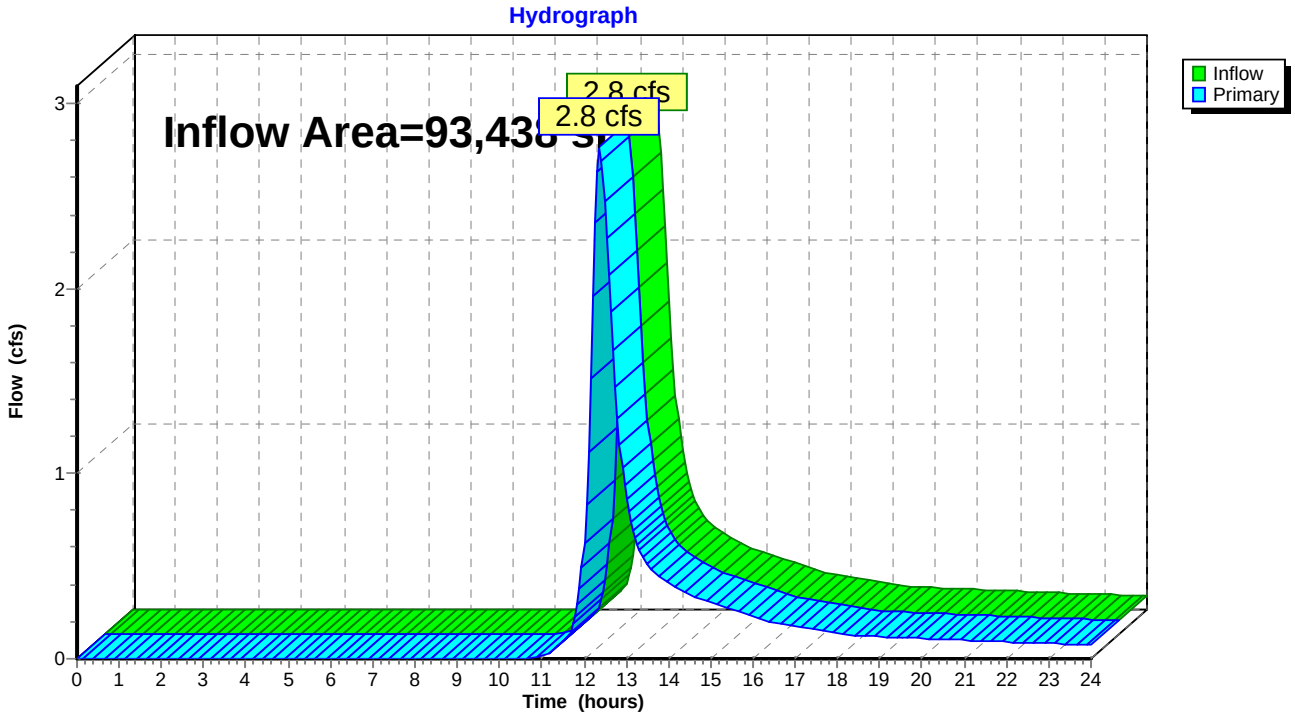


Summary for Link 15L: Wetland W

Inflow Area = 93,438 sf, 0.61% Impervious, Inflow Depth > 1.88" for 25-Year event
Inflow = 2.8 cfs @ 12.37 hrs, Volume= 14,608 cf
Primary = 2.8 cfs @ 12.37 hrs, Volume= 14,608 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

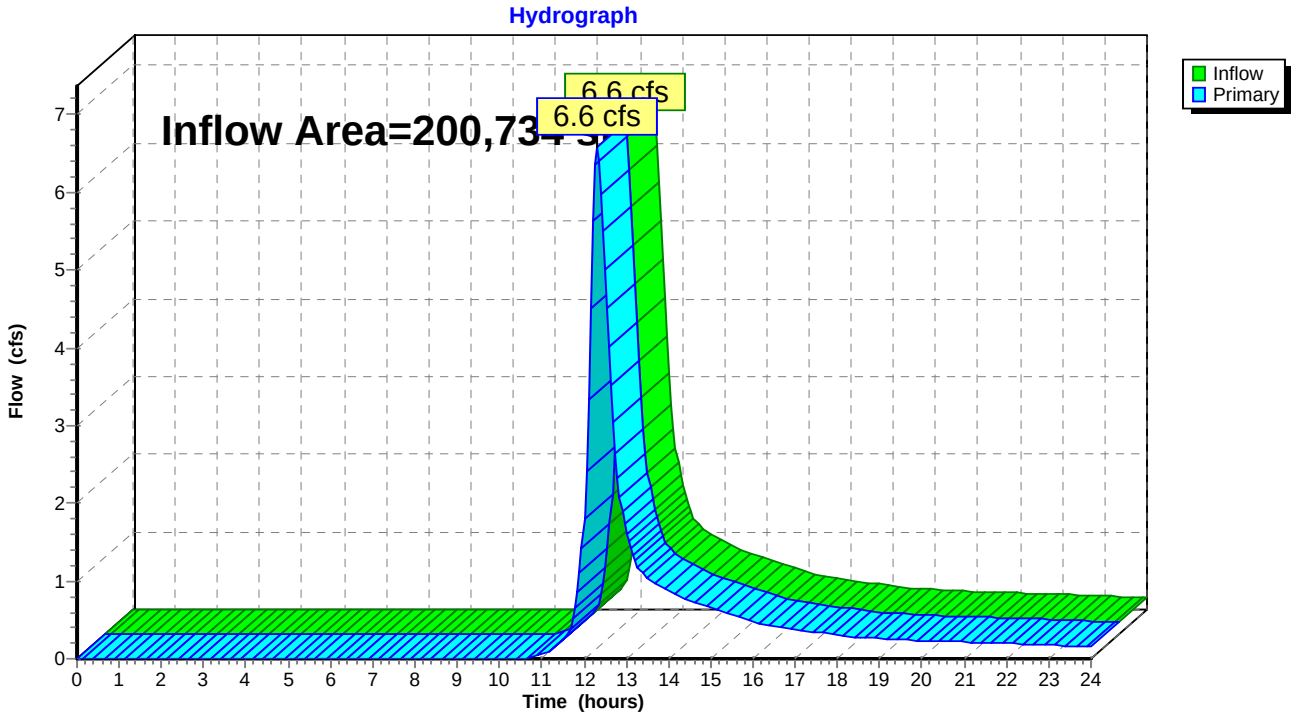


Summary for Link 16L: Wetland E

Inflow Area = 200,734 sf, 0.11% Impervious, Inflow Depth > 1.91" for 25-Year event
Inflow = 6.6 cfs @ 12.30 hrs, Volume= 31,930 cf
Primary = 6.6 cfs @ 12.30 hrs, Volume= 31,930 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 4.52% Impervious Runoff Depth>3.63"
Flow Length=239' Tc=13.7 min CN=76 Runoff=3.2 cfs 12,550 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 4.54% Impervious Runoff Depth>3.53"
Flow Length=179' Tc=14.1 min CN=75 Runoff=2.3 cfs 9,034 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 5.31% Impervious Runoff Depth>3.53"
Flow Length=204' Tc=14.6 min CN=75 Runoff=3.4 cfs 13,992 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 4.53% Impervious Runoff Depth>3.53"
Flow Length=222' Tc=14.3 min CN=75 Runoff=2.0 cfs 7,919 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 3.27% Impervious Runoff Depth>3.53"
Flow Length=752' Tc=15.2 min CN=75 Runoff=6.1 cfs 25,110 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 4.00% Impervious Runoff Depth>3.63"
Flow Length=459' Tc=10.0 min CN=76 Runoff=4.5 cfs 16,147 cf

Subcatchment 7S: Green Field W Runoff Area=93,438 sf 0.61% Impervious Runoff Depth>2.28"
Flow Length=472' Tc=24.7 min CN=62 Runoff=3.4 cfs 17,788 cf

Subcatchment 8S: Green Field E Runoff Area=125,941 sf 0.00% Impervious Runoff Depth>2.29"
Flow Length=305' Tc=20.6 min CN=62 Runoff=5.0 cfs 24,002 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.29% Impervious Runoff Depth>2.38"
Flow Length=247' Tc=19.4 min CN=63 Runoff=3.2 cfs 14,820 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.33' Max Vel=3.72 fps Inflow=6.1 cfs 25,110 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=5.9 cfs 25,044 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.30' Max Vel=3.68 fps Inflow=4.5 cfs 16,147 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=4.4 cfs 16,108 cf

Link 7L: Wetlands NW Inflow=2.3 cfs 9,034 cf
Primary=2.3 cfs 9,034 cf

Link 8L: Depression S Inflow=3.2 cfs 12,550 cf
Primary=3.2 cfs 12,550 cf

Link 9L: Wetlands NE Inflow=3.4 cfs 13,992 cf
Primary=3.4 cfs 13,992 cf

Link 10L: Wetlands N Inflow=2.0 cfs 7,919 cf
Primary=2.0 cfs 7,919 cf

Link 11L: Collection Swale W Inflow=5.9 cfs 25,044 cf
Primary=5.9 cfs 25,044 cf

Link 12L: Collection Swale W Inflow=4.4 cfs 16,108 cf
Primary=4.4 cfs 16,108 cf

Link 15L: Wetland W Inflow=3.4 cfs 17,788 cf
Primary=3.4 cfs 17,788 cf

Link 16L: Wetland E Inflow=8.1 cfs 38,821 cf
Primary=8.1 cfs 38,821 cf

Total Runoff Area = 579,533 sf Runoff Volume = 141,361 cf Average Runoff Depth = 2.93"
97.80% Pervious = 566,801 sf 2.20% Impervious = 12,732 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

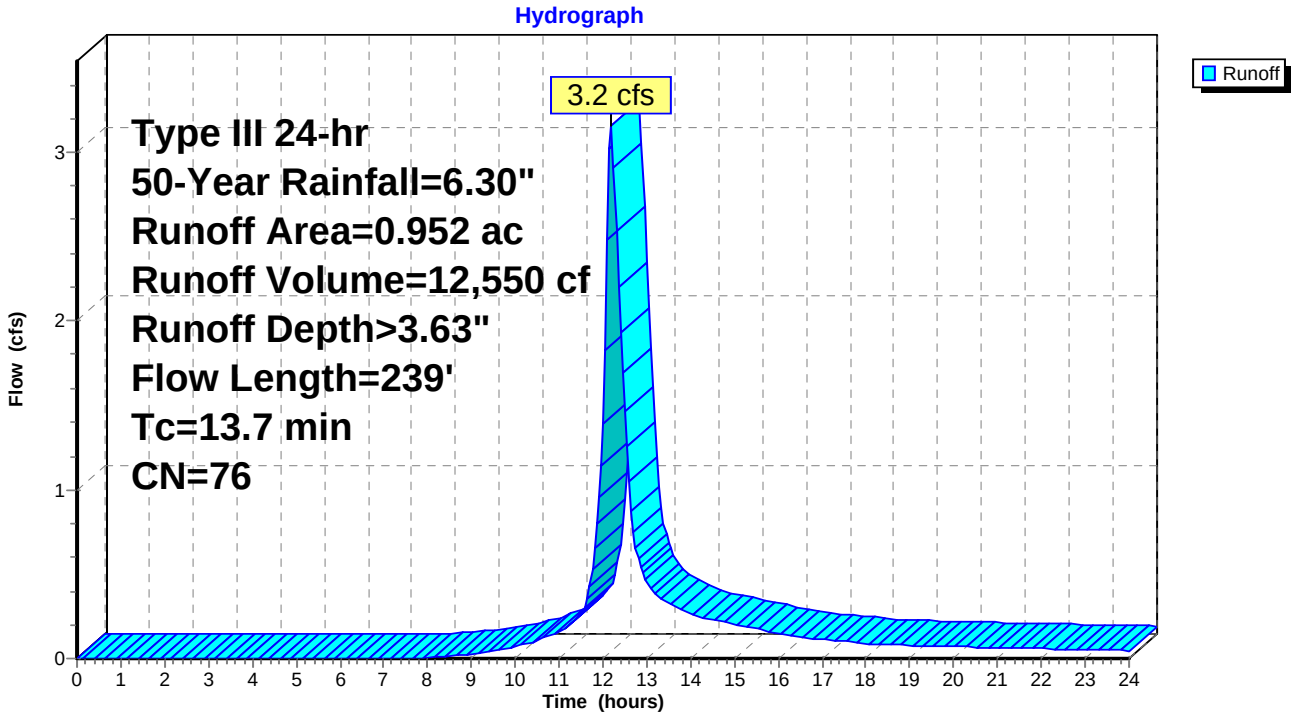
Runoff = 3.2 cfs @ 12.19 hrs, Volume= 12,550 cf, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (ac)	CN	Description
	0.829	74	>75% Grass cover, Good, HSG C
	0.080	89	Gravel roads, HSG C
*	0.003	98	Equipment Pad, HSG C
*	0.040	98	Solar array Ballasts, HSG C
	0.952	76	Weighted Average
	0.909		95.48% Pervious Area
	0.043		4.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

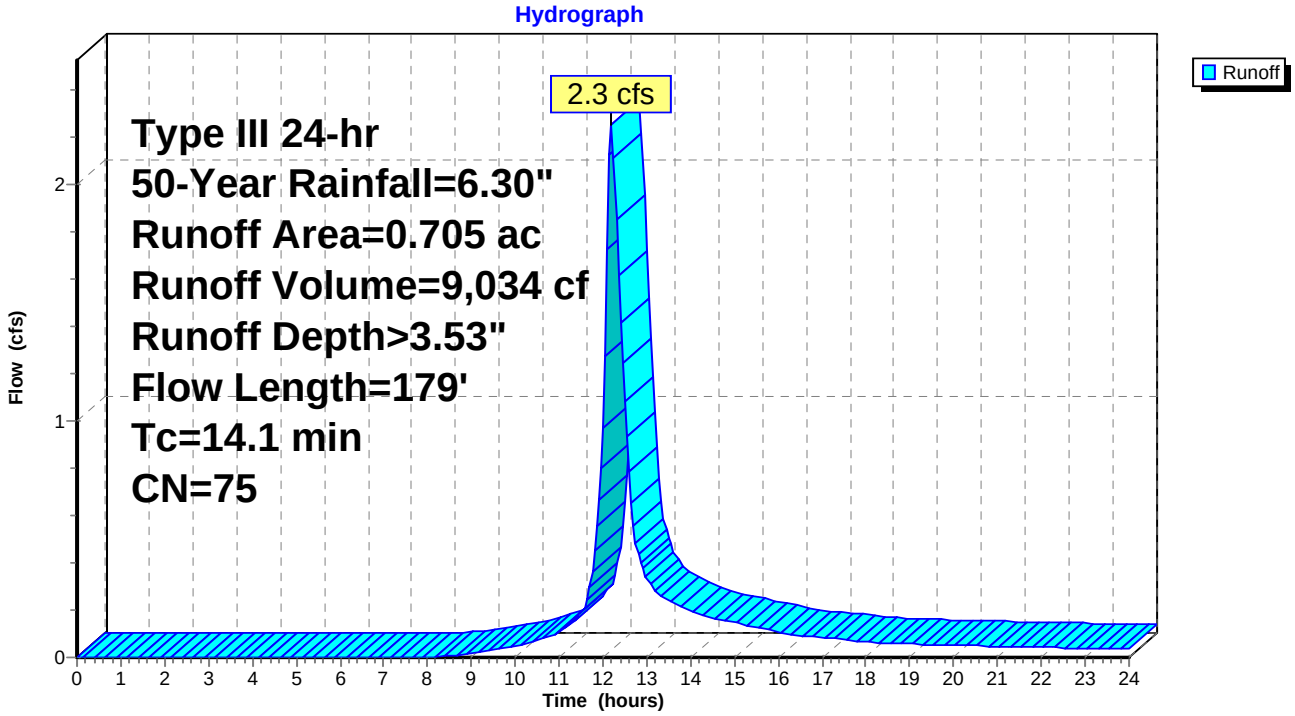
Runoff = 2.3 cfs @ 12.20 hrs, Volume= 9,034 cf, Depth> 3.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (ac)	CN	Description
	0.659	74	>75% Grass cover, Good, HSG C
*	0.032	98	Solar array ballasts, HSG C
	0.014	89	Gravel roads, HSG C
	0.705	75	Weighted Average
	0.673		95.46% Pervious Area
	0.032		4.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

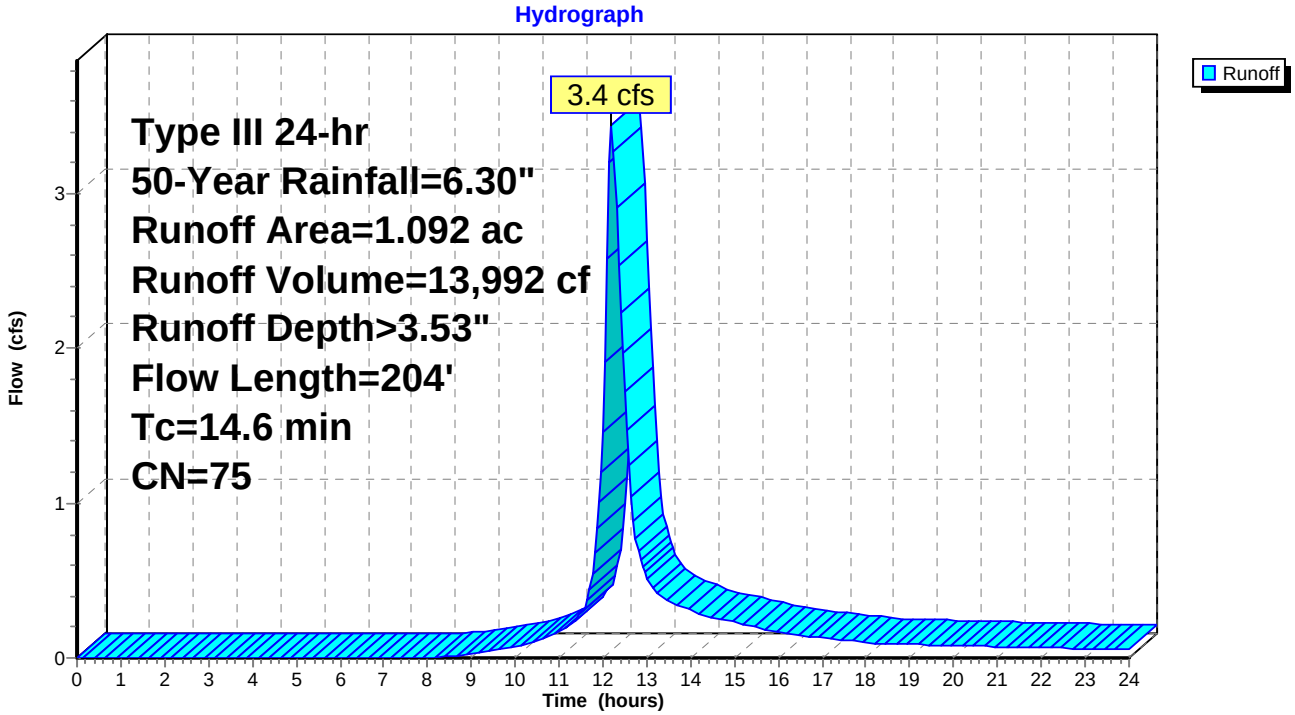
Runoff = 3.4 cfs @ 12.20 hrs, Volume= 13,992 cf, Depth> 3.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (ac)	CN	Description
	1.034	74	>75% Grass cover, Good, HSG C
*	0.058	98	Solar array ballasts, HSG C
	1.092	75	Weighted Average
	1.034		94.69% Pervious Area
	0.058		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

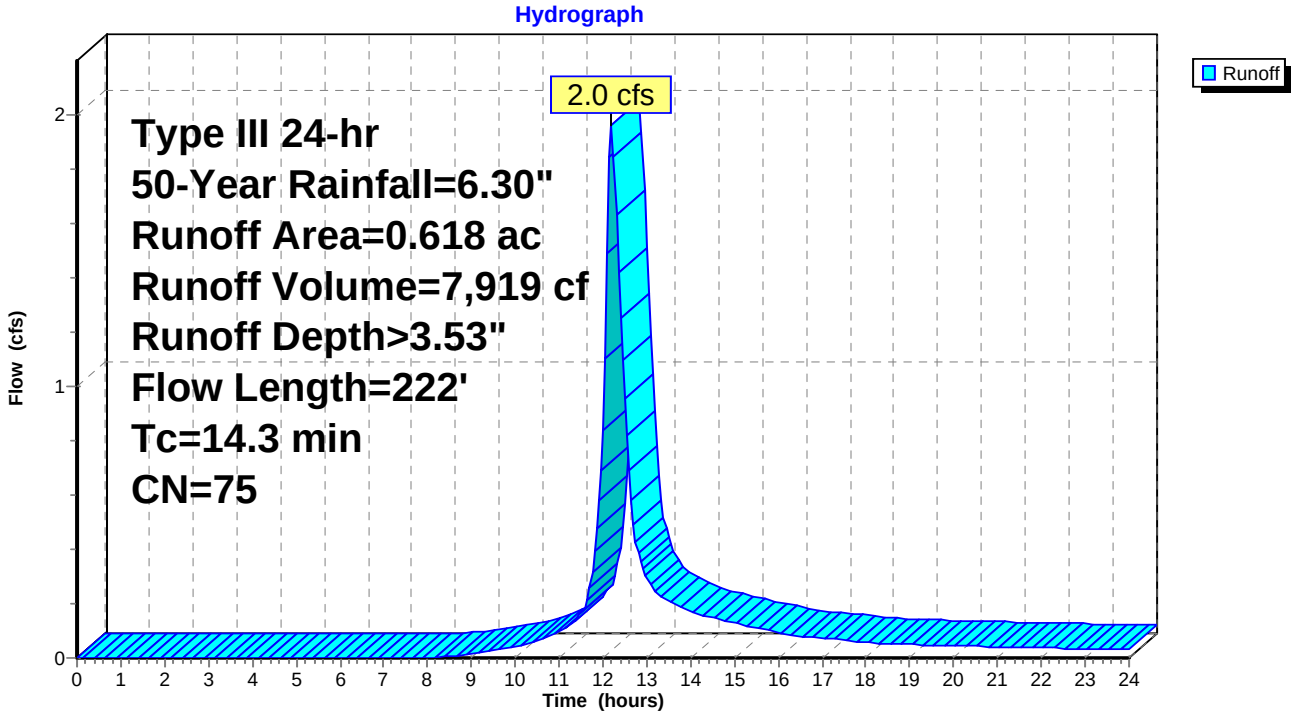
Runoff = 2.0 cfs @ 12.20 hrs, Volume= 7,919 cf, Depth> 3.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (ac)	CN	Description
	0.590	74	>75% Grass cover, Good, HSG C
*	0.028	98	Solar array ballasts, HSG C
	0.618	75	Weighted Average
	0.590		95.47% Pervious Area
	0.028		4.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

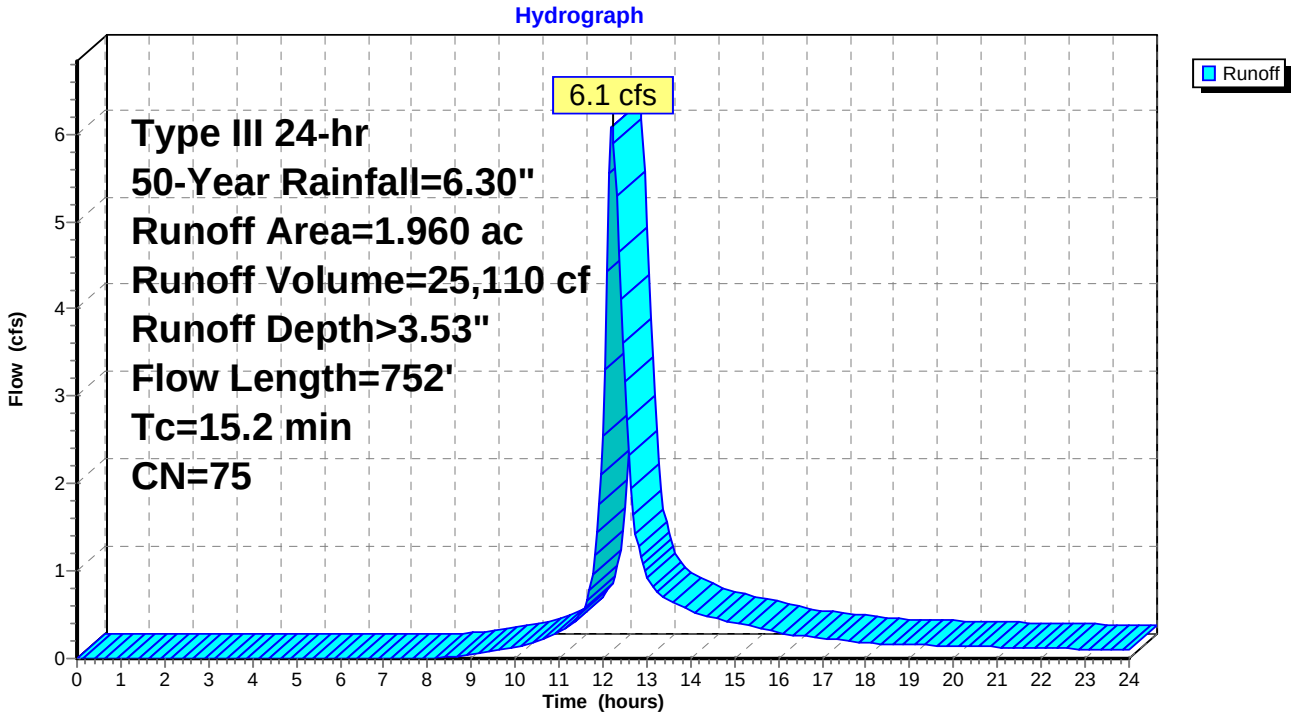
Runoff = 6.1 cfs @ 12.21 hrs, Volume= 25,110 cf, Depth> 3.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (ac)	CN	Description
	1.896	74	>75% Grass cover, Good, HSG C
*	0.064	98	Solar array ballasts, HSG C
	1.960	75	Weighted Average
	1.896		96.73% Pervious Area
	0.064		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

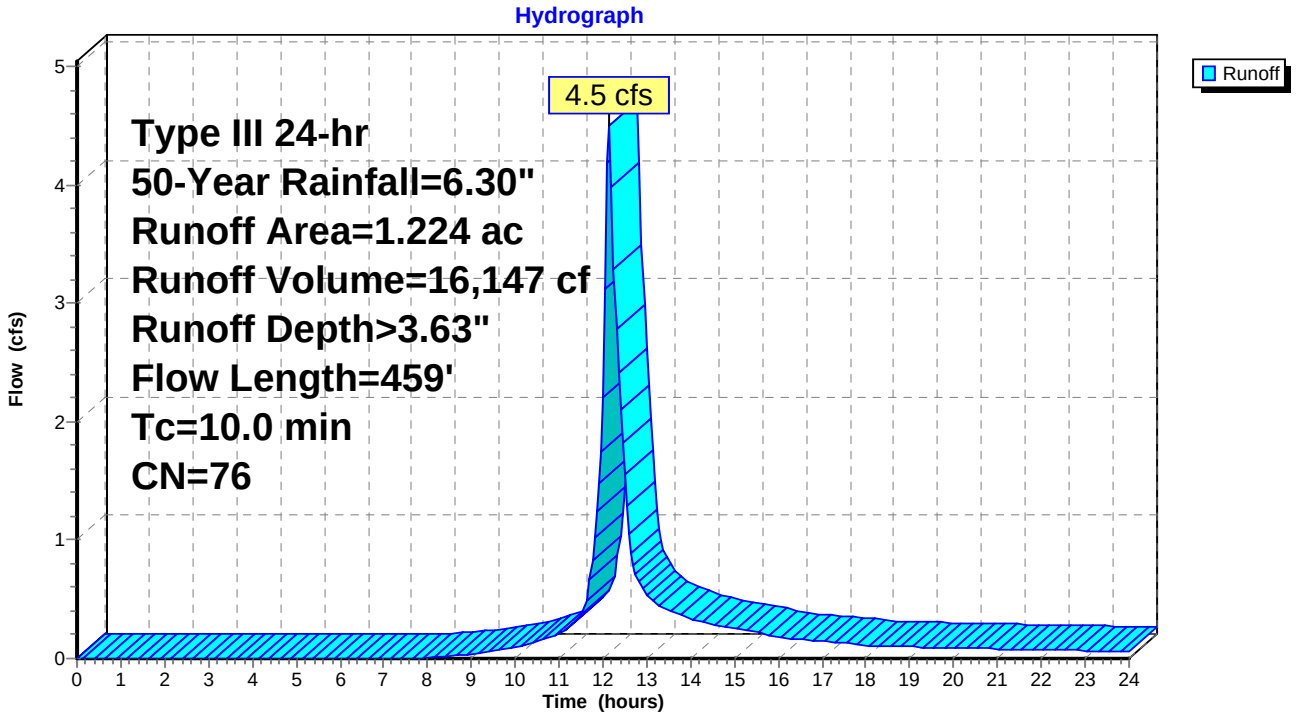
Runoff = 4.5 cfs @ 12.14 hrs, Volume= 16,147 cf, Depth> 3.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (ac)	CN	Description
	1.085	74	>75% Grass cover, Good, HSG C
	0.090	89	Gravel roads, HSG C
*	0.046	98	Solar array ballasts, HSG C
*	0.003	98	Concrete Equipment Pad, HSG C
	1.224	76	Weighted Average
	1.175		96.00% Pervious Area
	0.049		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

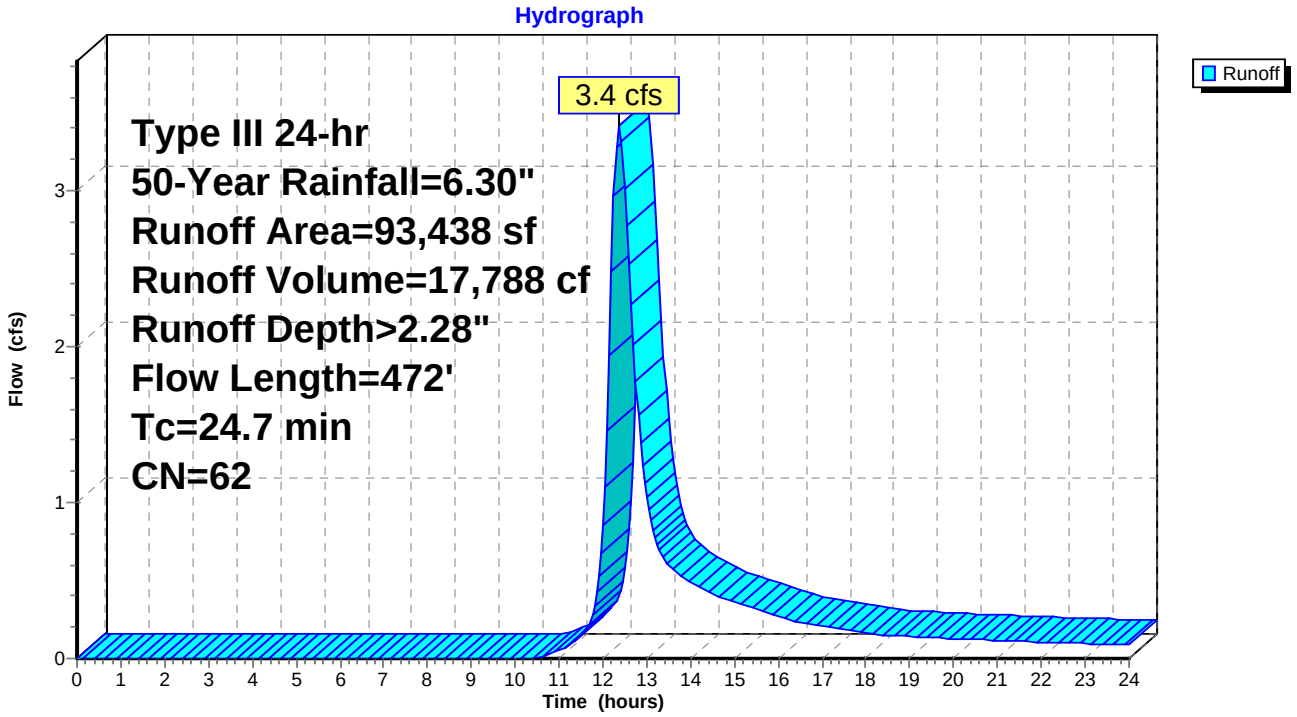
Runoff = 3.4 cfs @ 12.37 hrs, Volume= 17,788 cf, Depth> 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (sf)	CN	Description
	832	74	>75% Grass cover, Good, HSG C
	3,861	80	>75% Grass cover, Good, HSG D
	21,955	61	>75% Grass cover, Good, HSG B
	66,216	61	>75% Grass cover, Good, HSG B
	340	98	Paved parking, HSG C
*	4	98	Solar Array Posts, HSG B
*	230	98	Equipment Pad, HSG B
	93,438	62	Weighted Average
	92,864		99.39% Pervious Area
	574		0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field** Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

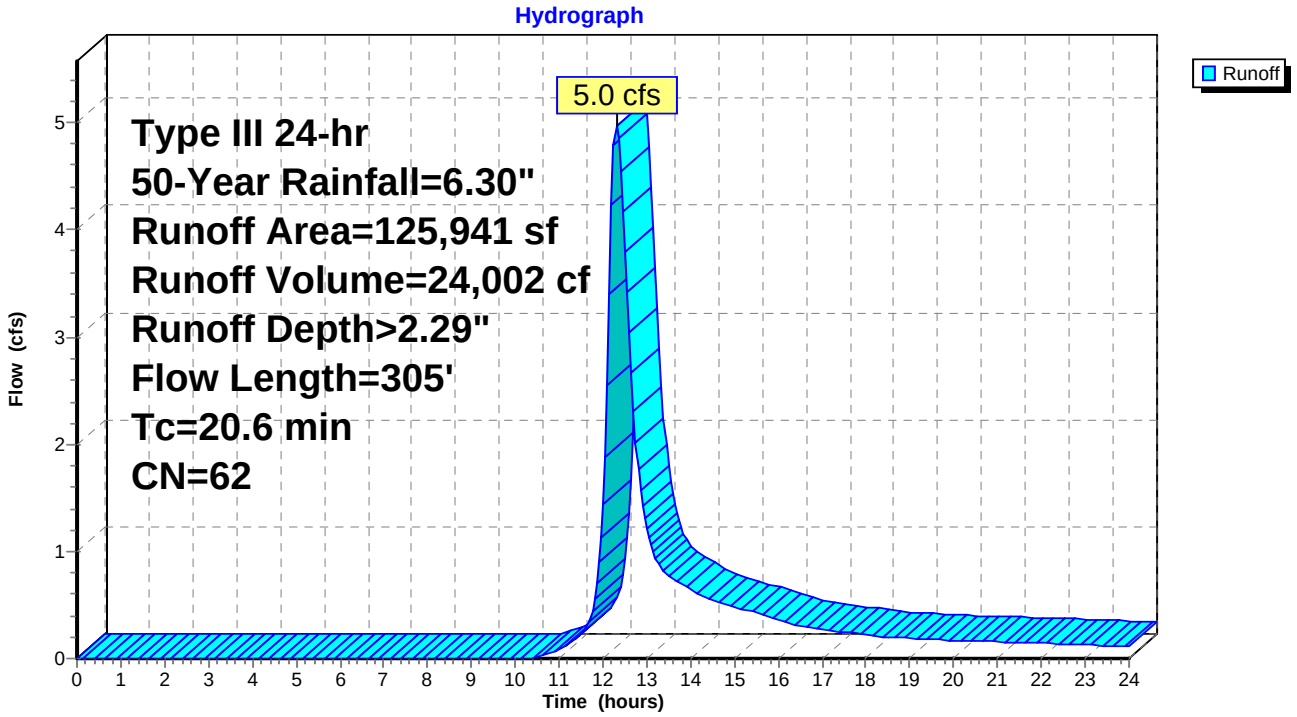
Runoff = 5.0 cfs @ 12.31 hrs, Volume= 24,002 cf, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (sf)	CN	Description
	116,936	61	>75% Grass cover, Good, HSG B
	3,129	80	>75% Grass cover, Good, HSG D
	1,452	80	>75% Grass cover, Good, HSG D
	4,419	61	>75% Grass cover, Good, HSG B
*	5	98	Solar Array Posts, HSG B
	125,941	62	Weighted Average
	125,936		100.00% Pervious Area
	5		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

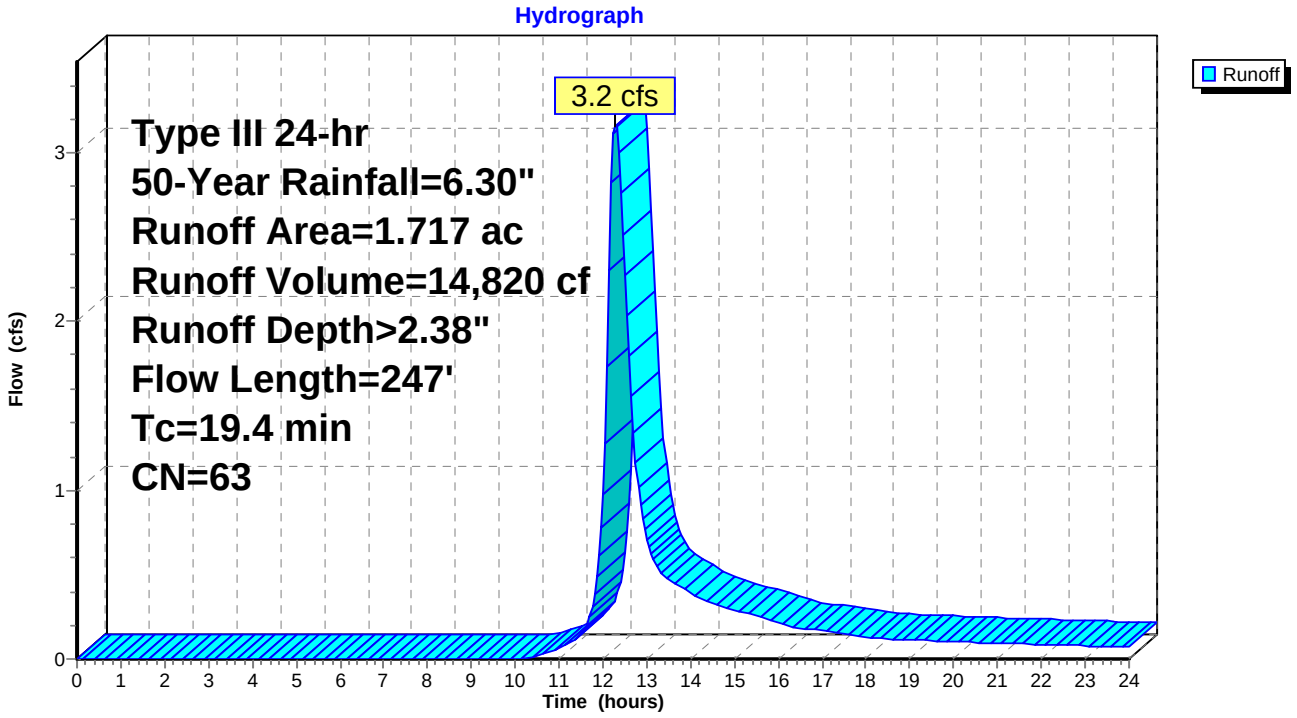
Runoff = 3.2 cfs @ 12.28 hrs, Volume= 14,820 cf, Depth> 2.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 50-Year Rainfall=6.30"

	Area (ac)	CN	Description
	0.091	77	Woods, Good, HSG D
	0.151	55	Woods, Good, HSG B
	1.283	61	>75% Grass cover, Good, HSG B
	0.187	80	>75% Grass cover, Good, HSG D
*	0.000	98	Solar Array Posts, HSG B
	0.005	98	Paved parking, HSG B
	1.717	63	Weighted Average
	1.712		99.71% Pervious Area
	0.005		0.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 3.53" for 50-Year event
Inflow = 6.1 cfs @ 12.21 hrs, Volume= 25,110 cf
Outflow = 5.9 cfs @ 12.25 hrs, Volume= 25,044 cf, Atten= 3%, Lag= 2.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.72 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 1.33 fps, Avg. Travel Time= 8.3 min

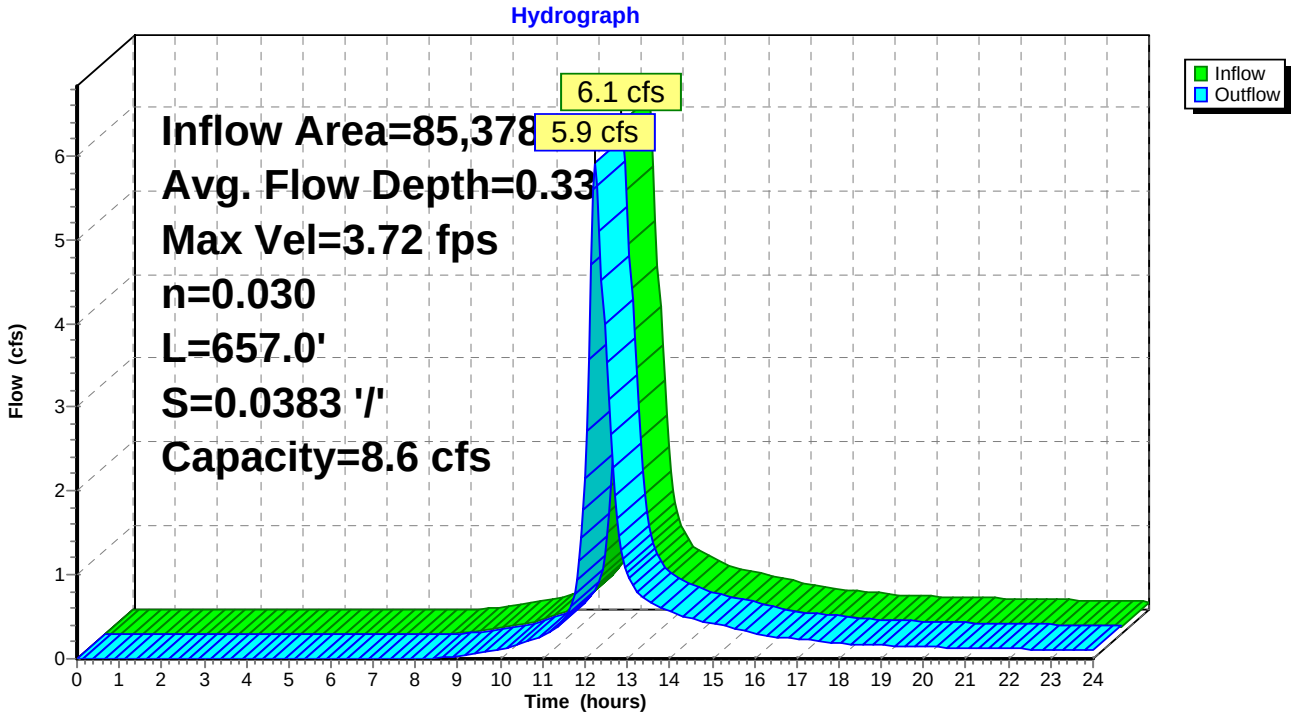
Peak Storage= 1,046 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡

Reach 19R: Riprap Swale



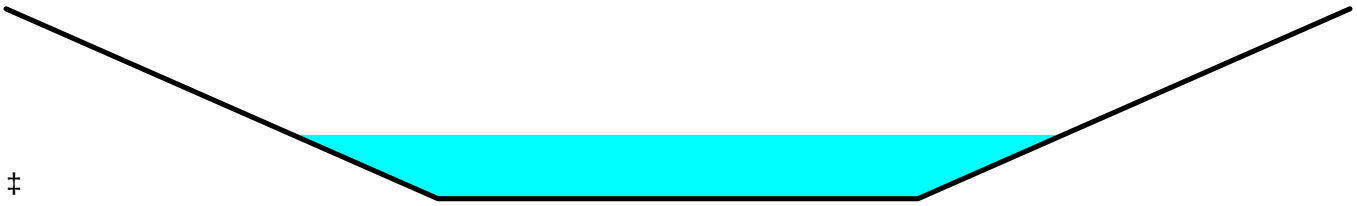
Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 3.63" for 50-Year event
Inflow = 4.5 cfs @ 12.14 hrs, Volume= 16,147 cf
Outflow = 4.4 cfs @ 12.17 hrs, Volume= 16,108 cf, Atten= 3%, Lag= 1.7 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.68 fps, Min. Travel Time= 2.4 min
Avg. Velocity = 1.16 fps, Avg. Travel Time= 7.6 min

Peak Storage= 624 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.30'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



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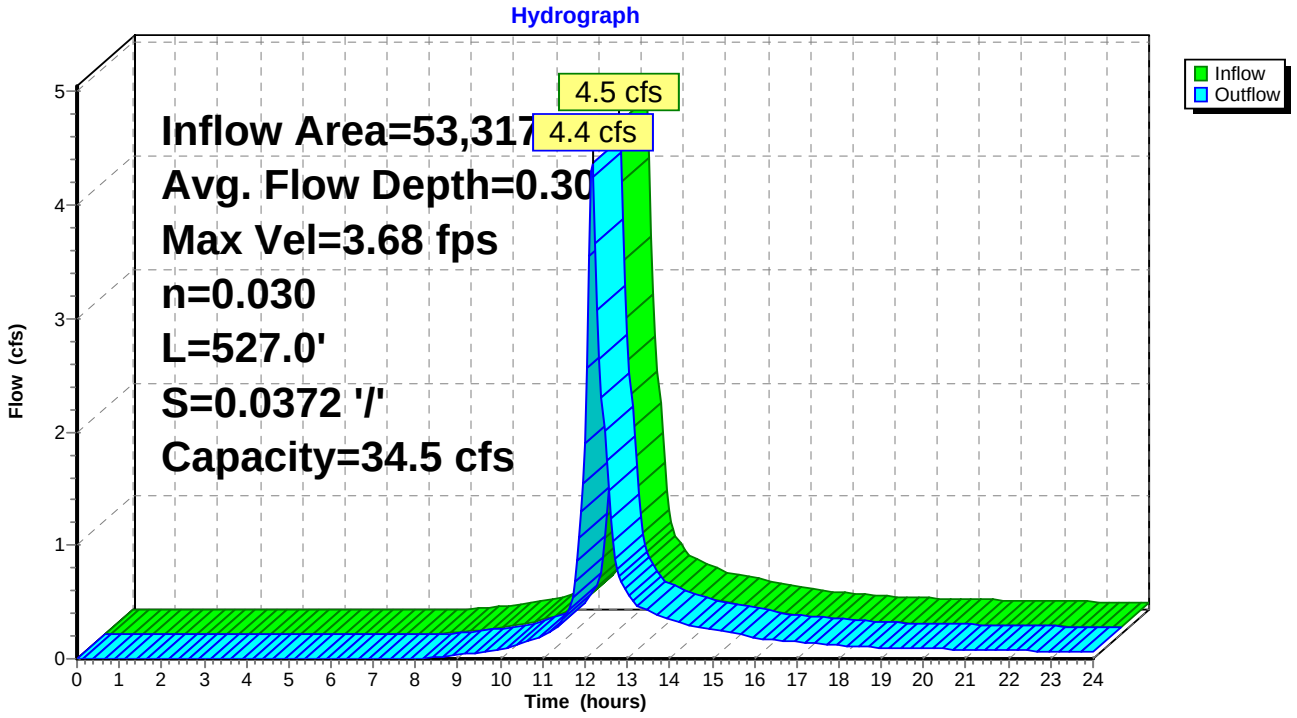
Reach 21R: Riprap Swale

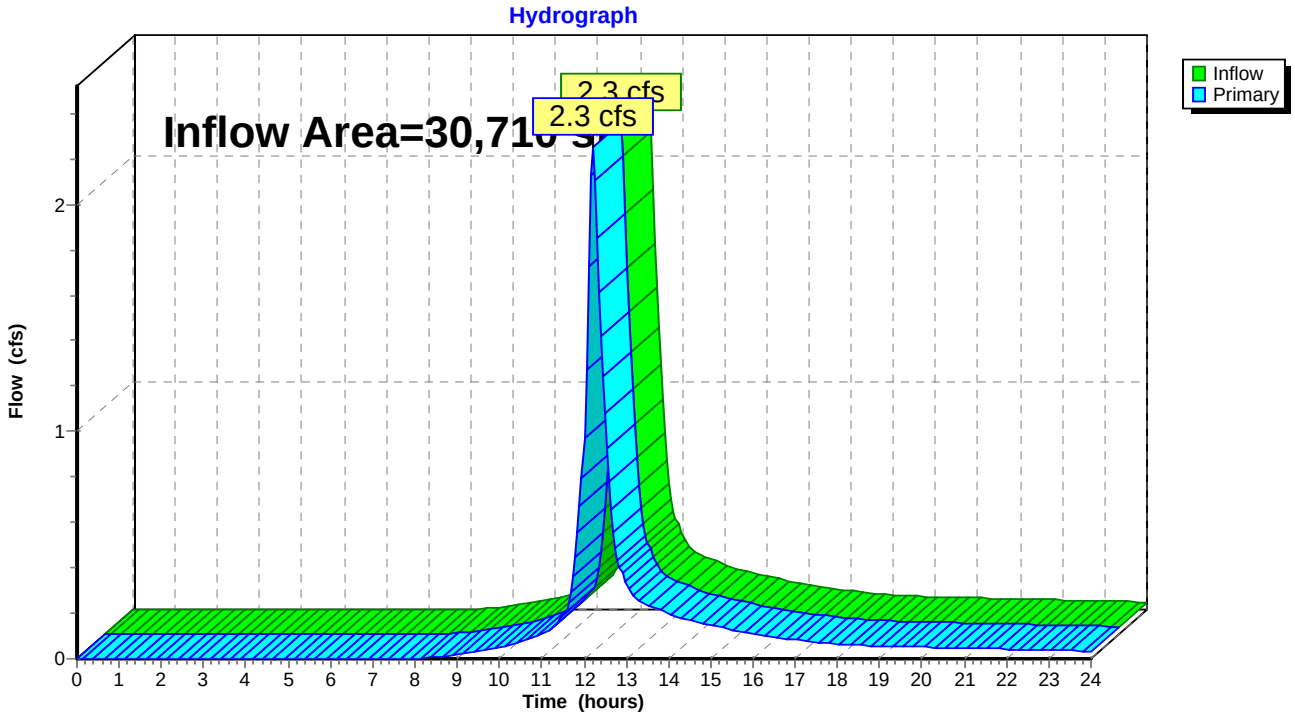


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 4.54% Impervious, Inflow Depth > 3.53" for 50-Year event
Inflow = 2.3 cfs @ 12.20 hrs, Volume= 9,034 cf
Primary = 2.3 cfs @ 12.20 hrs, Volume= 9,034 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

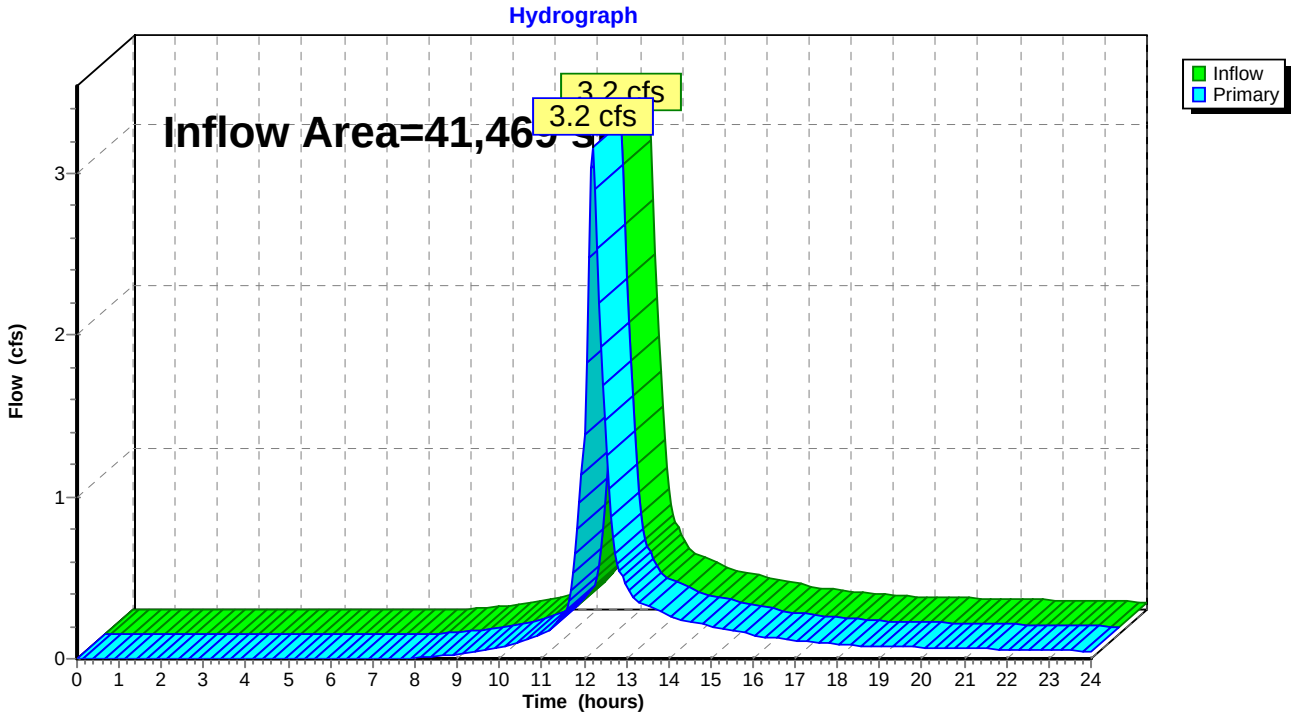


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 4.52% Impervious, Inflow Depth > 3.63" for 50-Year event
Inflow = 3.2 cfs @ 12.19 hrs, Volume= 12,550 cf
Primary = 3.2 cfs @ 12.19 hrs, Volume= 12,550 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

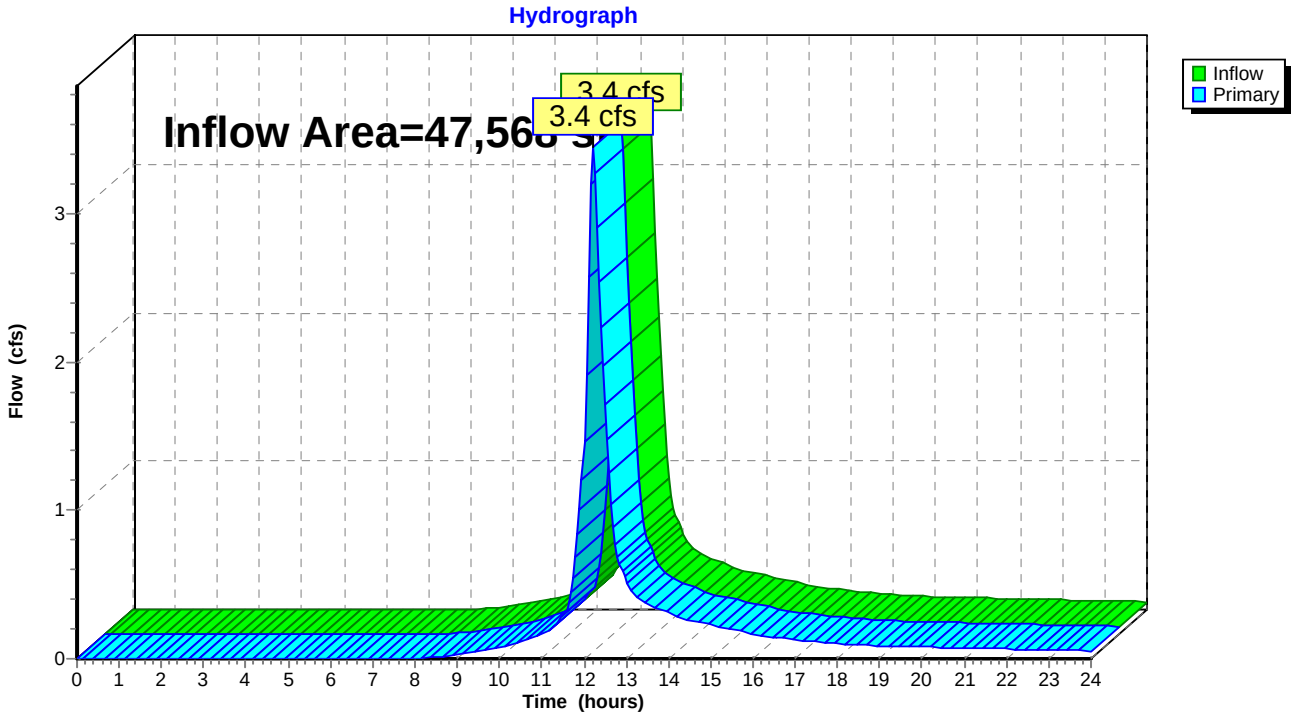


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 5.31% Impervious, Inflow Depth > 3.53" for 50-Year event
Inflow = 3.4 cfs @ 12.20 hrs, Volume= 13,992 cf
Primary = 3.4 cfs @ 12.20 hrs, Volume= 13,992 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

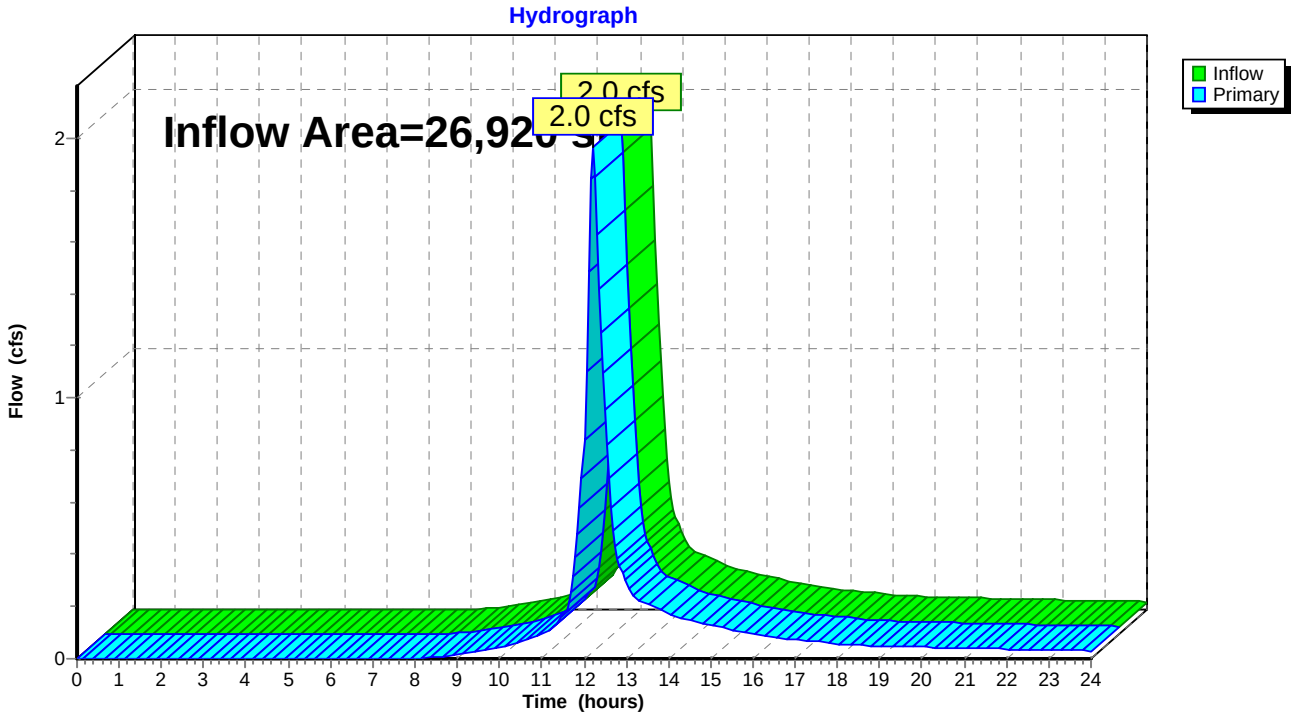


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 4.53% Impervious, Inflow Depth > 3.53" for 50-Year event
Inflow = 2.0 cfs @ 12.20 hrs, Volume= 7,919 cf
Primary = 2.0 cfs @ 12.20 hrs, Volume= 7,919 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

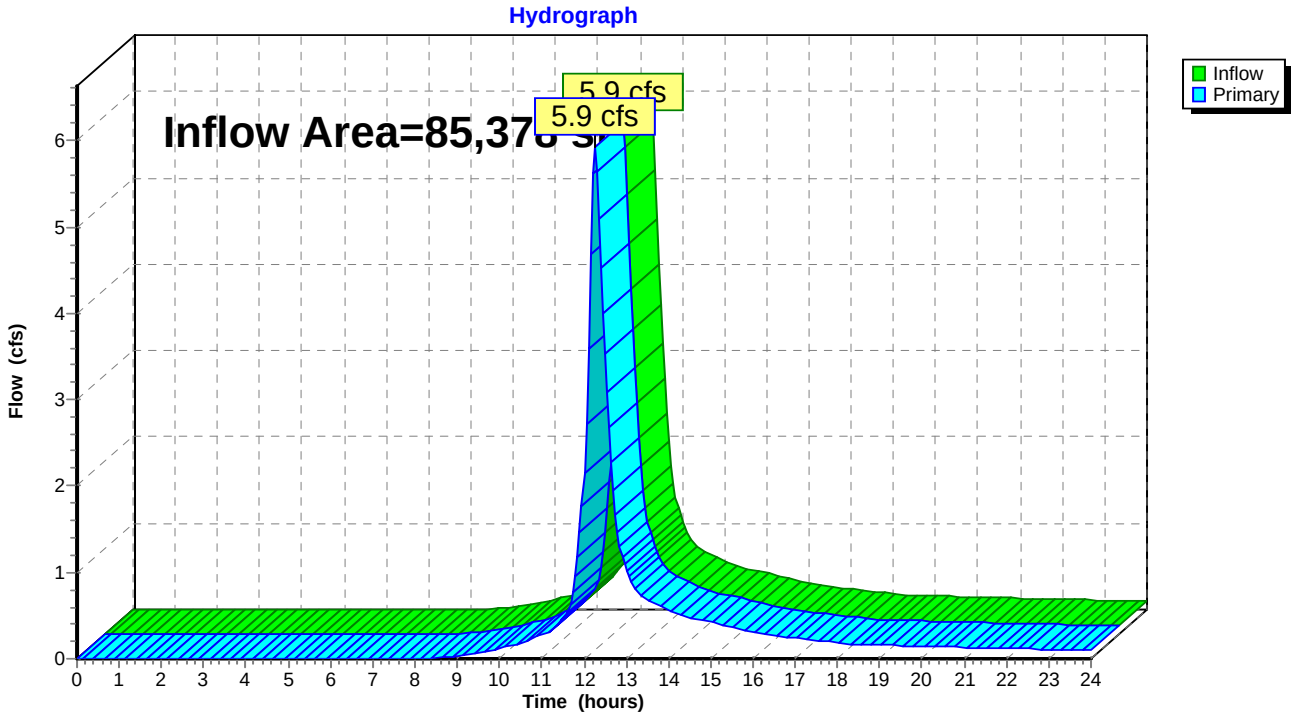


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 3.52" for 50-Year event
Inflow = 5.9 cfs @ 12.25 hrs, Volume= 25,044 cf
Primary = 5.9 cfs @ 12.25 hrs, Volume= 25,044 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

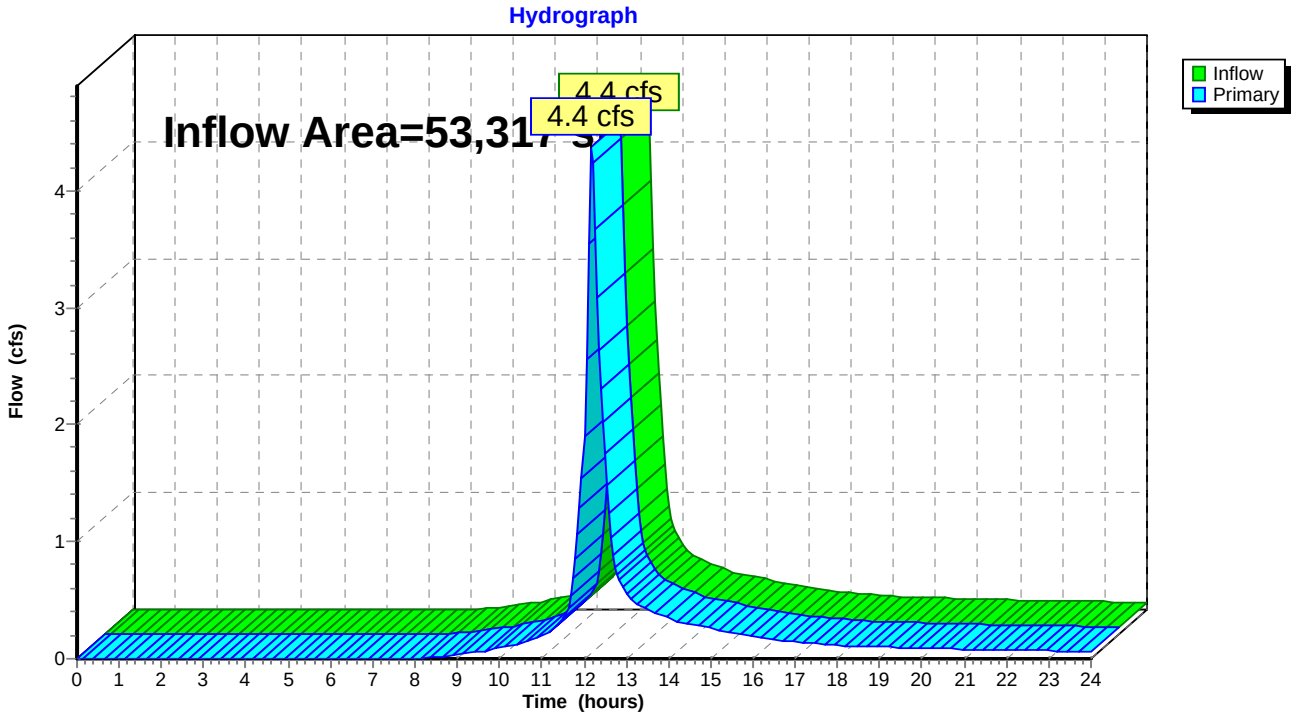


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 3.63" for 50-Year event
Inflow = 4.4 cfs @ 12.17 hrs, Volume= 16,108 cf
Primary = 4.4 cfs @ 12.17 hrs, Volume= 16,108 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

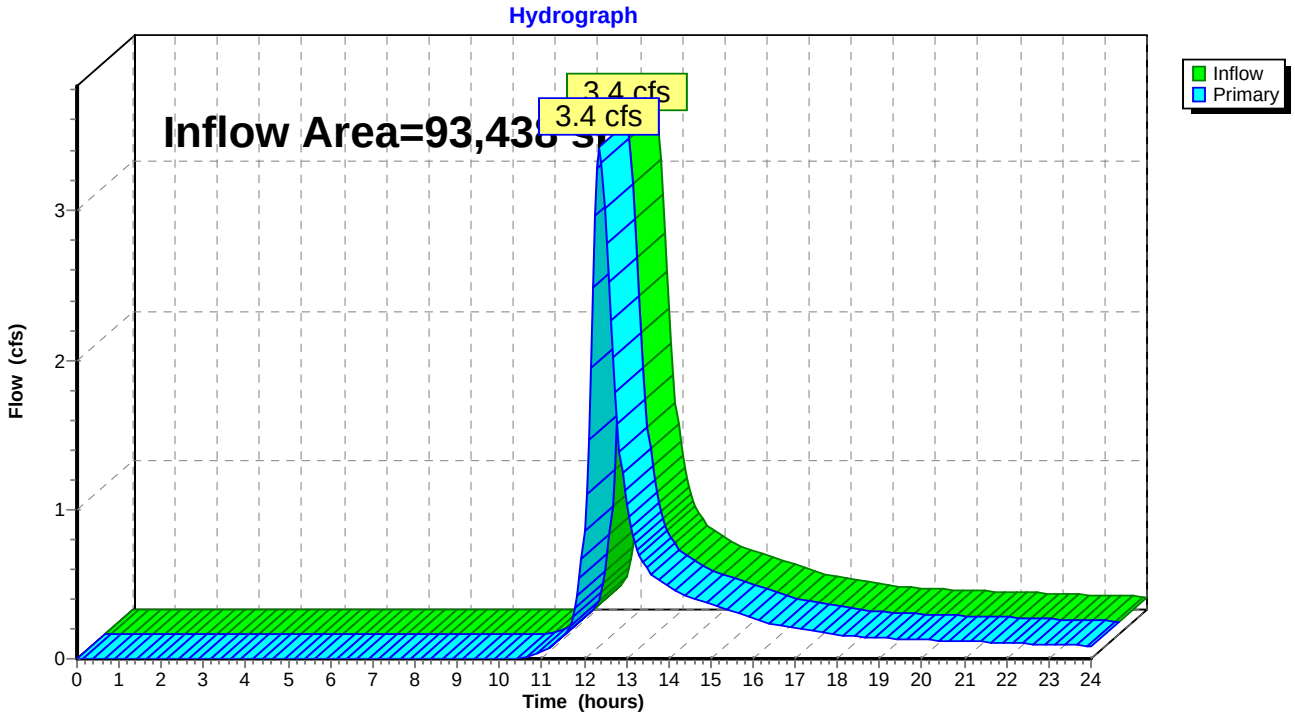


Summary for Link 15L: Wetland W

Inflow Area = 93,438 sf, 0.61% Impervious, Inflow Depth > 2.28" for 50-Year event
Inflow = 3.4 cfs @ 12.37 hrs, Volume= 17,788 cf
Primary = 3.4 cfs @ 12.37 hrs, Volume= 17,788 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

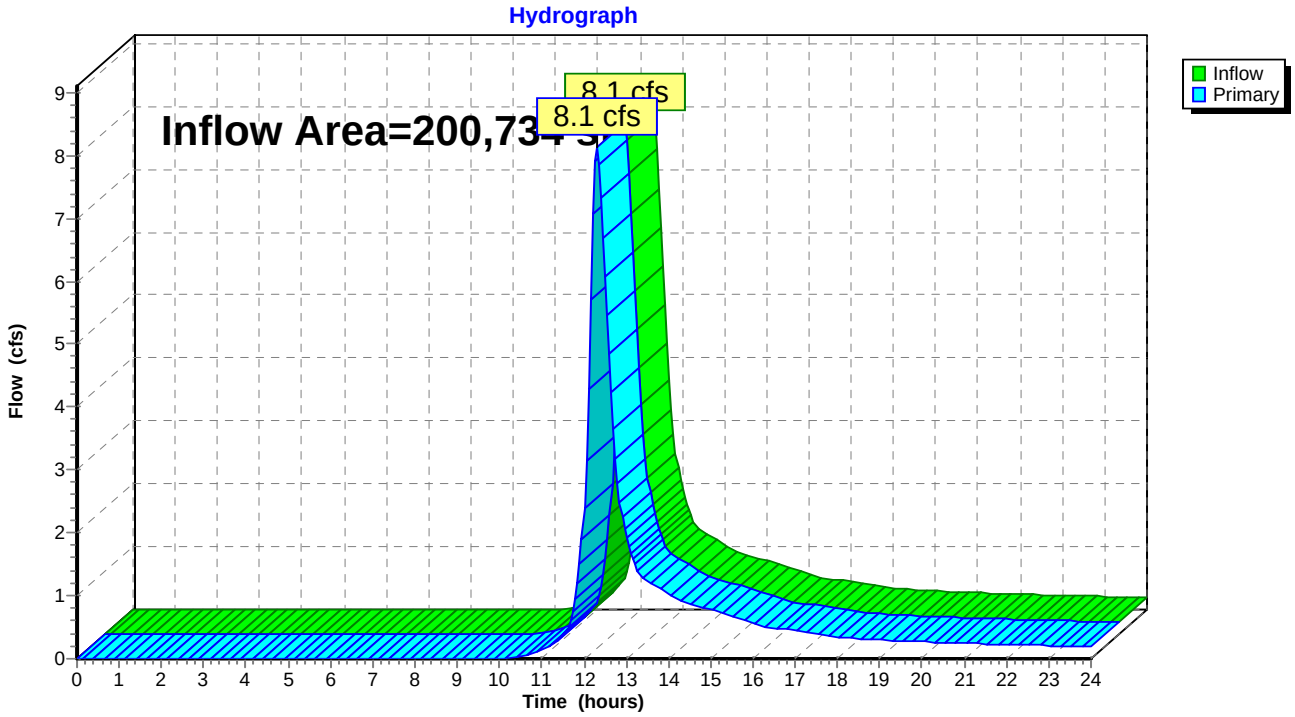


Summary for Link 16L: Wetland E

Inflow Area = 200,734 sf, 0.11% Impervious, Inflow Depth > 2.32" for 50-Year event
Inflow = 8.1 cfs @ 12.30 hrs, Volume= 38,821 cf
Primary = 8.1 cfs @ 12.30 hrs, Volume= 38,821 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E



Time span=0.00-24.00 hrs, dt=0.050 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Bulky Waste Landfill SW Runoff Area=0.952 ac 4.52% Impervious Runoff Depth>4.34"
Flow Length=239' Tc=13.7 min CN=76 Runoff=3.8 cfs 14,985 cf

Subcatchment 2S: Bulky Waste Landfill NW Runoff Area=0.705 ac 4.54% Impervious Runoff Depth>4.23"
Flow Length=179' Tc=14.1 min CN=75 Runoff=2.7 cfs 10,818 cf

Subcatchment 3S: Bulky Waste Landfill E Runoff Area=1.092 ac 5.31% Impervious Runoff Depth>4.23"
Flow Length=204' Tc=14.6 min CN=75 Runoff=4.1 cfs 16,755 cf

Subcatchment 4S: Landfill N Runoff Area=0.618 ac 4.53% Impervious Runoff Depth>4.23"
Flow Length=222' Tc=14.3 min CN=75 Runoff=2.4 cfs 9,483 cf

Subcatchment 5S: Landfill W Runoff Area=1.960 ac 3.27% Impervious Runoff Depth>4.23"
Flow Length=752' Tc=15.2 min CN=75 Runoff=7.3 cfs 30,069 cf

Subcatchment 6S: Landfill E Runoff Area=1.224 ac 4.00% Impervious Runoff Depth>4.34"
Flow Length=459' Tc=10.0 min CN=76 Runoff=5.4 cfs 19,281 cf

Subcatchment 7S: Green Field W Runoff Area=93,438 sf 0.61% Impervious Runoff Depth>2.86"
Flow Length=472' Tc=24.7 min CN=62 Runoff=4.3 cfs 22,257 cf

Subcatchment 8S: Green Field E Runoff Area=125,941 sf 0.00% Impervious Runoff Depth>2.86"
Flow Length=305' Tc=20.6 min CN=62 Runoff=6.3 cfs 30,030 cf

Subcatchment 9S: Greenfield 2 Runoff Area=1.717 ac 0.29% Impervious Runoff Depth>2.96"
Flow Length=247' Tc=19.4 min CN=63 Runoff=4.0 cfs 18,468 cf

Reach 19R: Riprap Swale Avg. Flow Depth=0.36' Max Vel=3.92 fps Inflow=7.3 cfs 30,069 cf
n=0.030 L=657.0' S=0.0383 '/' Capacity=8.6 cfs Outflow=7.1 cfs 29,996 cf

Reach 21R: Riprap Swale Avg. Flow Depth=0.33' Max Vel=3.89 fps Inflow=5.4 cfs 19,281 cf
n=0.030 L=527.0' S=0.0372 '/' Capacity=34.5 cfs Outflow=5.2 cfs 19,237 cf

Link 7L: Wetlands NW Inflow=2.7 cfs 10,818 cf
Primary=2.7 cfs 10,818 cf

Link 8L: Depression S Inflow=3.8 cfs 14,985 cf
Primary=3.8 cfs 14,985 cf

Link 9L: Wetlands NE Inflow=4.1 cfs 16,755 cf
Primary=4.1 cfs 16,755 cf

Link 10L: Wetlands N Inflow=2.4 cfs 9,483 cf
Primary=2.4 cfs 9,483 cf

Link 11L: Collection Swale W Inflow=7.1 cfs 29,996 cf
Primary=7.1 cfs 29,996 cf

Link 12L: Collection Swale W Inflow=5.2 cfs 19,237 cf
Primary=5.2 cfs 19,237 cf

Link 15L: Wetland W Inflow=4.3 cfs 22,257 cf
Primary=4.3 cfs 22,257 cf

Link 16L: Wetland E Inflow=10.3 cfs 48,498 cf
Primary=10.3 cfs 48,498 cf

Total Runoff Area = 579,533 sf Runoff Volume = 172,145 cf Average Runoff Depth = 3.56"
97.80% Pervious = 566,801 sf 2.20% Impervious = 12,732 sf

Summary for Subcatchment 1S: Bulky Waste Landfill SW

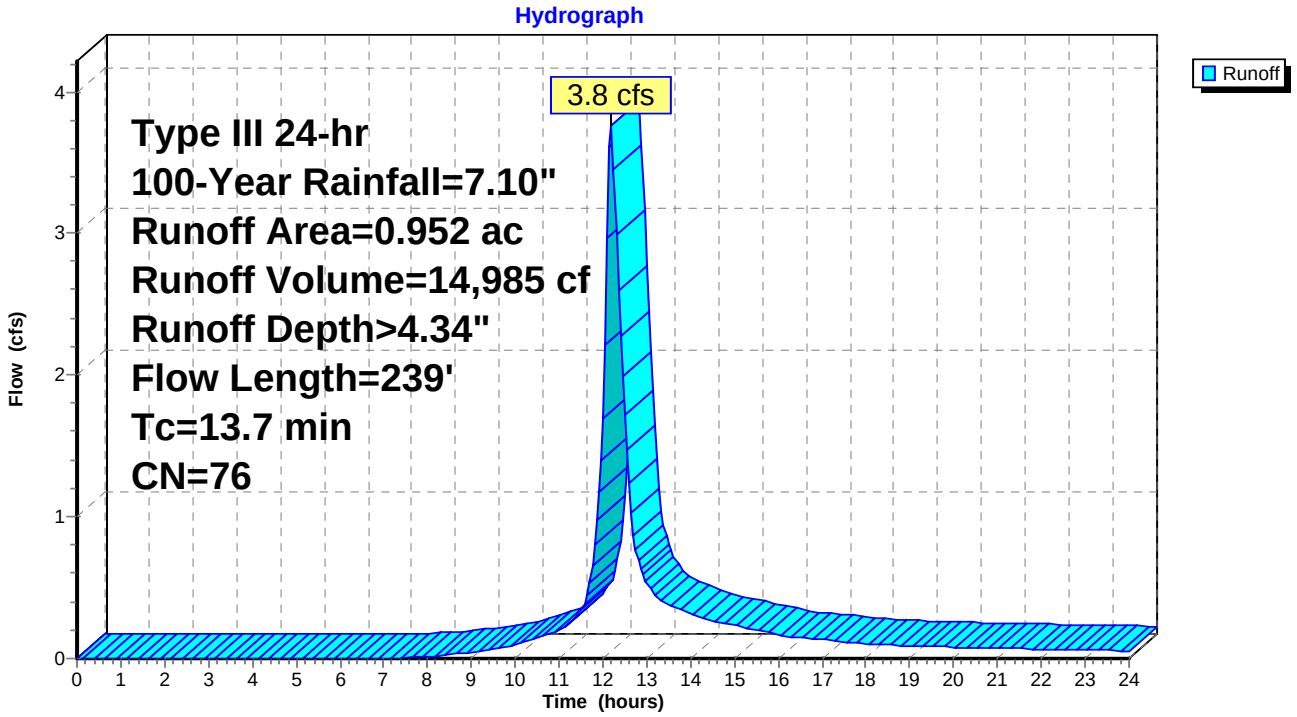
Runoff = 3.8 cfs @ 12.19 hrs, Volume= 14,985 cf, Depth> 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (ac)	CN	Description
	0.829	74	>75% Grass cover, Good, HSG C
	0.080	89	Gravel roads, HSG C
*	0.003	98	Equipment Pad, HSG C
*	0.040	98	Solar array Ballasts, HSG C
	0.952	76	Weighted Average
	0.909		95.48% Pervious Area
	0.043		4.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	100	0.0251	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.5	66	0.1137	2.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	46	0.1957	3.10		**Shallow Concentrated Flow, Lanfill Cap** Short Grass Pasture Kv= 7.0 fps
0.4	27	0.0050	1.14		**Shallow Concentrated Flow, Access Drive** Unpaved Kv= 16.1 fps
13.7	239	Total			

Subcatchment 1S: Bulky Waste Landfill SW



Summary for Subcatchment 2S: Bulky Waste Landfill NW

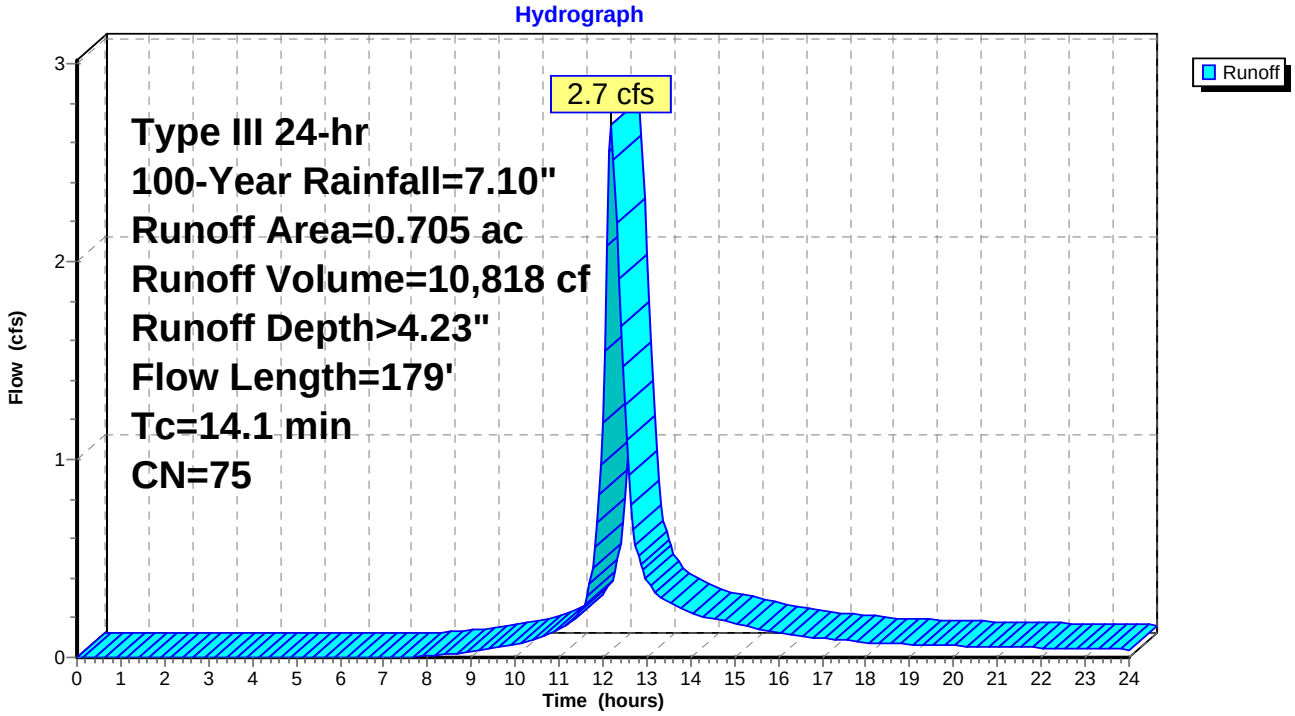
Runoff = 2.7 cfs @ 12.20 hrs, Volume= 10,818 cf, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (ac)	CN	Description
	0.659	74	>75% Grass cover, Good, HSG C
*	0.032	98	Solar array ballasts, HSG C
	0.014	89	Gravel roads, HSG C
	0.705	75	Weighted Average
	0.673		95.46% Pervious Area
	0.032		4.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.6	79	0.0886	2.08		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.1	179	Total			

Subcatchment 2S: Bulky Waste Landfill NW



Summary for Subcatchment 3S: Bulky Waste Landfill E

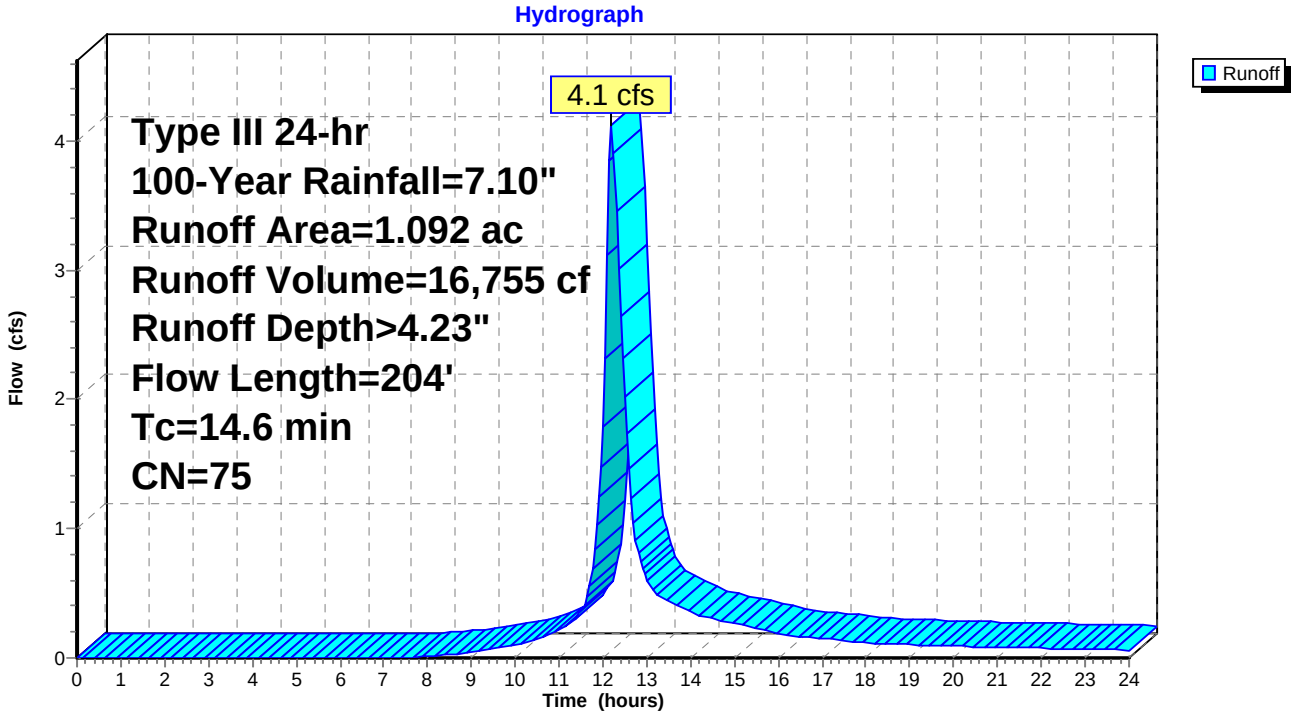
Runoff = 4.1 cfs @ 12.20 hrs, Volume= 16,755 cf, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (ac)	CN	Description
	1.034	74	>75% Grass cover, Good, HSG C
*	0.058	98	Solar array ballasts, HSG C
	1.092	75	Weighted Average
	1.034		94.69% Pervious Area
	0.058		5.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0212	0.12		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	80	0.0375	1.36		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.1	24	0.1667	2.86		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.6	204	Total			

Subcatchment 3S: Bulky Waste Landfill E



Summary for Subcatchment 4S: Landfill N

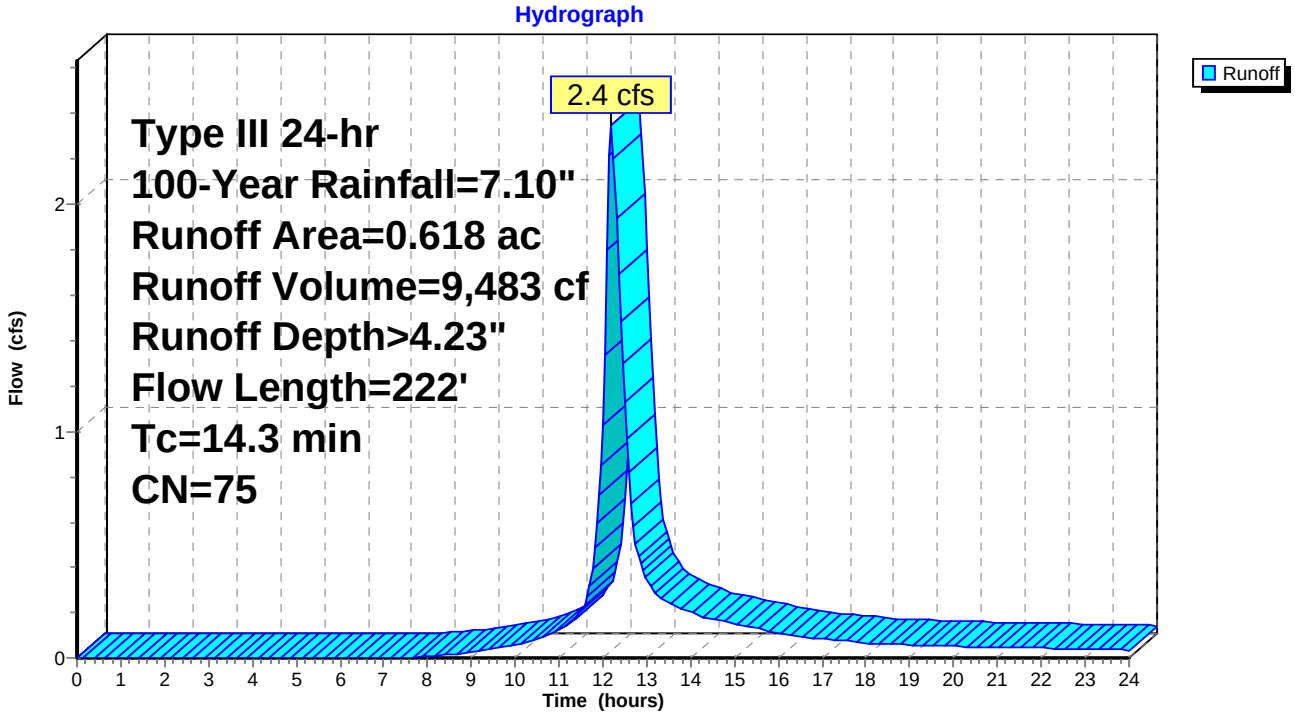
Runoff = 2.4 cfs @ 12.20 hrs, Volume= 9,483 cf, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (ac)	CN	Description
	0.590	74	>75% Grass cover, Good, HSG C
*	0.028	98	Solar array ballasts, HSG C
	0.618	75	Weighted Average
	0.590		95.47% Pervious Area
	0.028		4.53% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.1	100	0.0230	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	81	0.0371	1.35		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	41	0.1707	2.89		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
14.3	222	Total			

Subcatchment 4S: Landfill N



Summary for Subcatchment 5S: Landfill W

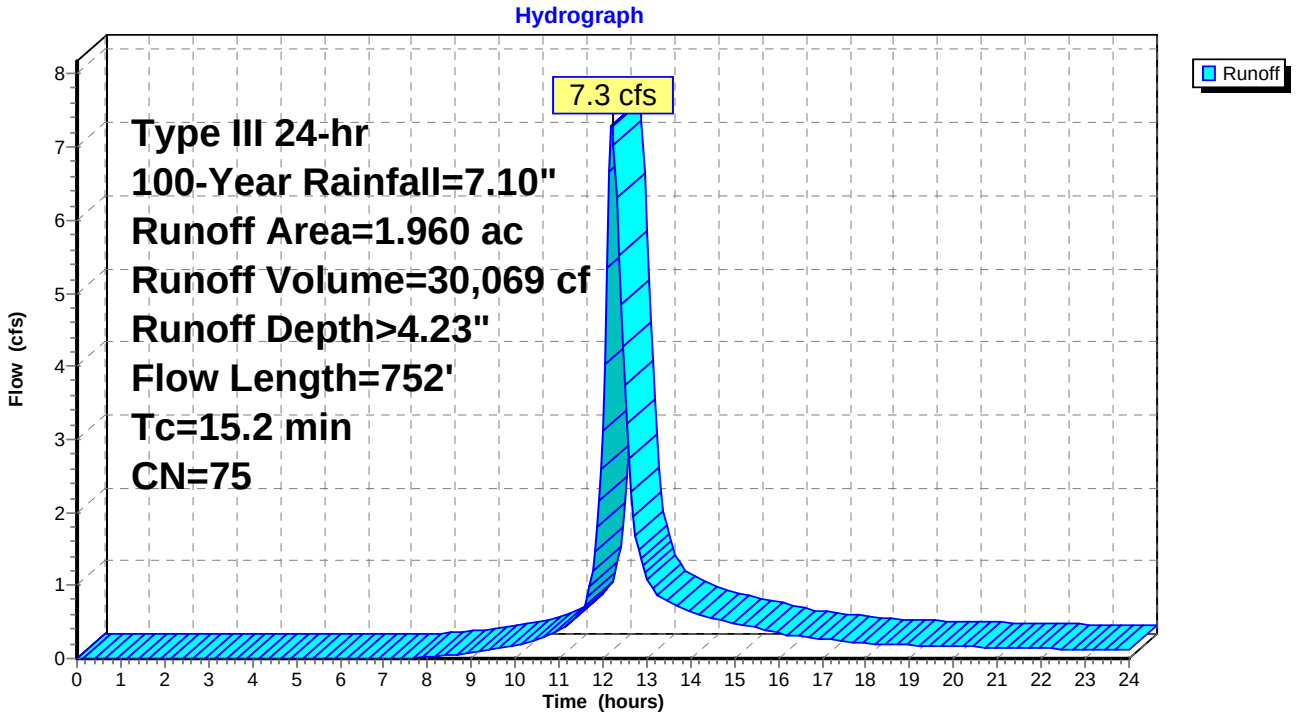
Runoff = 7.3 cfs @ 12.21 hrs, Volume= 30,069 cf, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (ac)	CN	Description
	1.896	74	>75% Grass cover, Good, HSG C
*	0.064	98	Solar array ballasts, HSG C
	1.960	75	Weighted Average
	1.896		96.73% Pervious Area
	0.064		3.27% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.3	100	0.0220	0.13		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
0.3	37	0.0811	1.99		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.3	58	0.1897	3.05		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
1.3	520	0.0200	6.71	50.33	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
0.0	37	0.2160	22.05	165.39	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
15.2	752	Total			

Subcatchment 5S: Landfill W



Summary for Subcatchment 6S: Landfill E

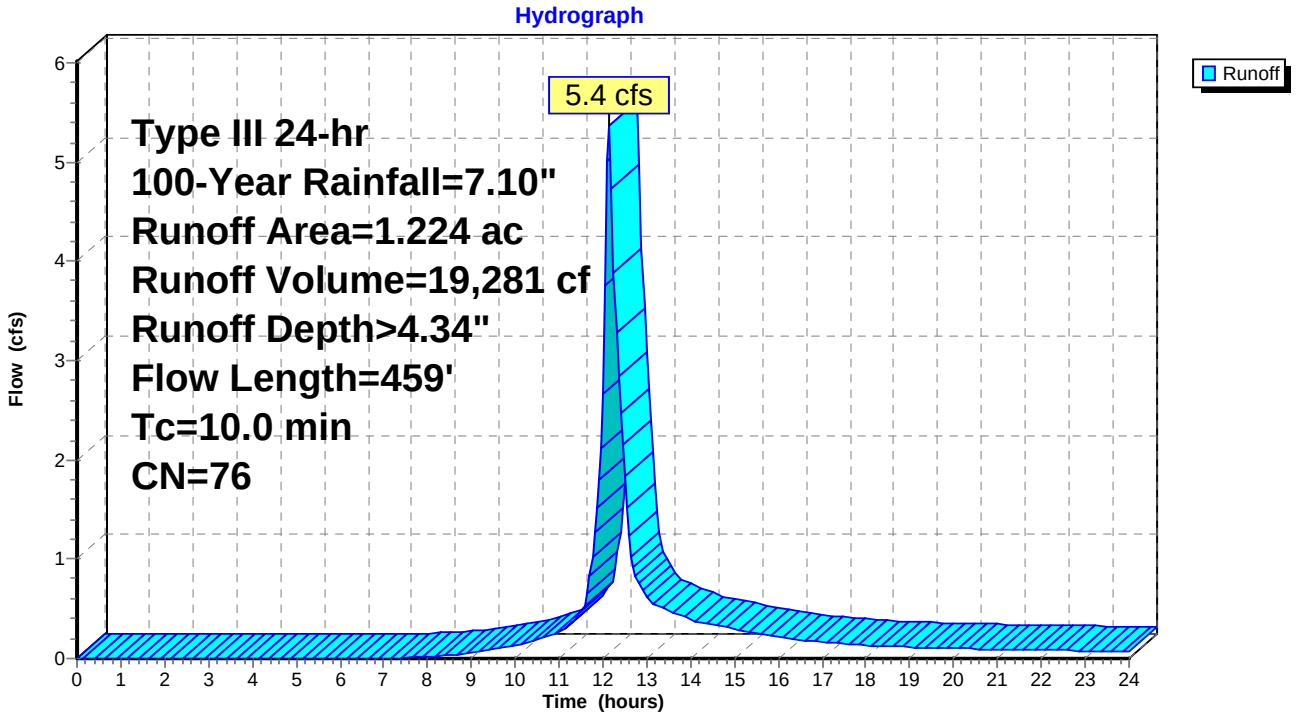
Runoff = 5.4 cfs @ 12.14 hrs, Volume= 19,281 cf, Depth> 4.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (ac)	CN	Description
	1.085	74	>75% Grass cover, Good, HSG C
	0.090	89	Gravel roads, HSG C
*	0.046	98	Solar array ballasts, HSG C
*	0.003	98	Concrete Equipment Pad, HSG C
	1.224	76	Weighted Average
	1.175		96.00% Pervious Area
	0.049		4.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.5	40	0.0543	0.15		**Sheet Flow, Landfill Cap** Grass: Dense n= 0.240 P2= 3.40"
1.0	60	0.0117	1.03		**Sheet Flow, Gravel** Smooth surfaces n= 0.011 P2= 3.40"
0.5	86	0.0384	3.15		**Shallow Concentrated Flow, Gravel** Unpaved Kv= 16.1 fps
0.7	76	0.0658	1.80		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	49	0.2245	3.32		**Shallow Concentrated Flow, Landfill Cap** Short Grass Pasture Kv= 7.0 fps
0.2	148	0.1081	15.60	117.00	**Channel Flow, Riprap Swale** Area= 7.5 sf Perim= 8.0' r= 0.94' n= 0.030 Rubble masonry, cemented
7.1	459	Total, Increased to minimum Tc = 10.0 min			

Subcatchment 6S: Landfill E



Summary for Subcatchment 7S: Green Field W

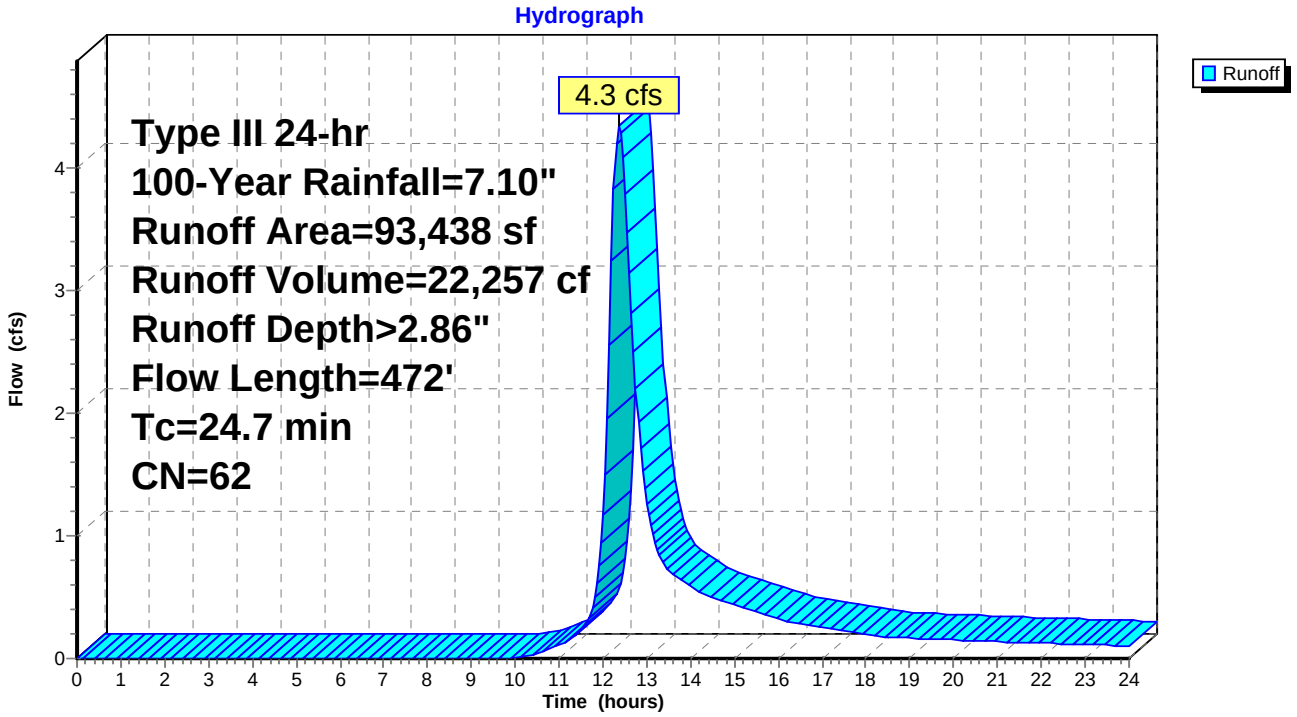
Runoff = 4.3 cfs @ 12.36 hrs, Volume= 22,257 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
	832	74	>75% Grass cover, Good, HSG C
	3,861	80	>75% Grass cover, Good, HSG D
	21,955	61	>75% Grass cover, Good, HSG B
	66,216	61	>75% Grass cover, Good, HSG B
	340	98	Paved parking, HSG C
*	4	98	Solar Array Posts, HSG B
*	230	98	Equipment Pad, HSG B
	93,438	62	Weighted Average
	92,864		99.39% Pervious Area
	574		0.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field**
					Grass: Dense n= 0.240 P2= 3.40"
0.4	23	0.0217	1.03		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
4.8	160	0.0063	0.56		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
0.6	51	0.0392	1.39		**Shallow Concentrated Flow, field**
					Short Grass Pasture Kv= 7.0 fps
1.4	88	0.0227	1.05		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
0.7	50	0.0300	1.21		**Shallow Concentrated Flow, Field**
					Short Grass Pasture Kv= 7.0 fps
24.7	472	Total			

Subcatchment 7S: Green Field W



Summary for Subcatchment 8S: Green Field E

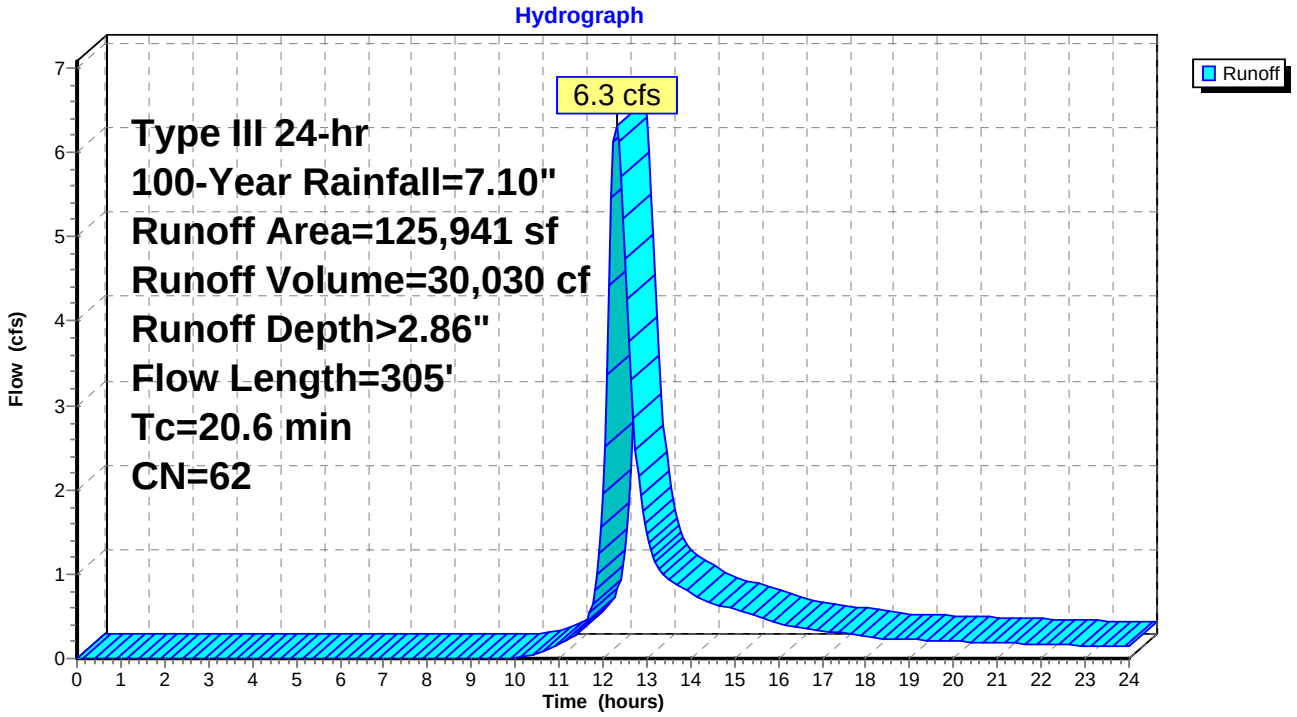
Runoff = 6.3 cfs @ 12.30 hrs, Volume= 30,030 cf, Depth> 2.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (sf)	CN	Description
	116,936	61	>75% Grass cover, Good, HSG B
	3,129	80	>75% Grass cover, Good, HSG D
	1,452	80	>75% Grass cover, Good, HSG D
	4,419	61	>75% Grass cover, Good, HSG B
*	5	98	Solar Array Posts, HSG B
	125,941	62	Weighted Average
	125,936		100.00% Pervious Area
	5		0.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.8	100	0.0123	0.10		**Sheet Flow, Field** Grass: Dense n= 0.240 P2= 3.40"
0.4	24	0.0208	1.01		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
2.6	106	0.0094	0.68		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
0.8	75	0.0467	1.51		**Shallow Concentrated Flow, Field** Short Grass Pasture Kv= 7.0 fps
20.6	305	Total			

Subcatchment 8S: Green Field E



Summary for Subcatchment 9S: Greenfield 2

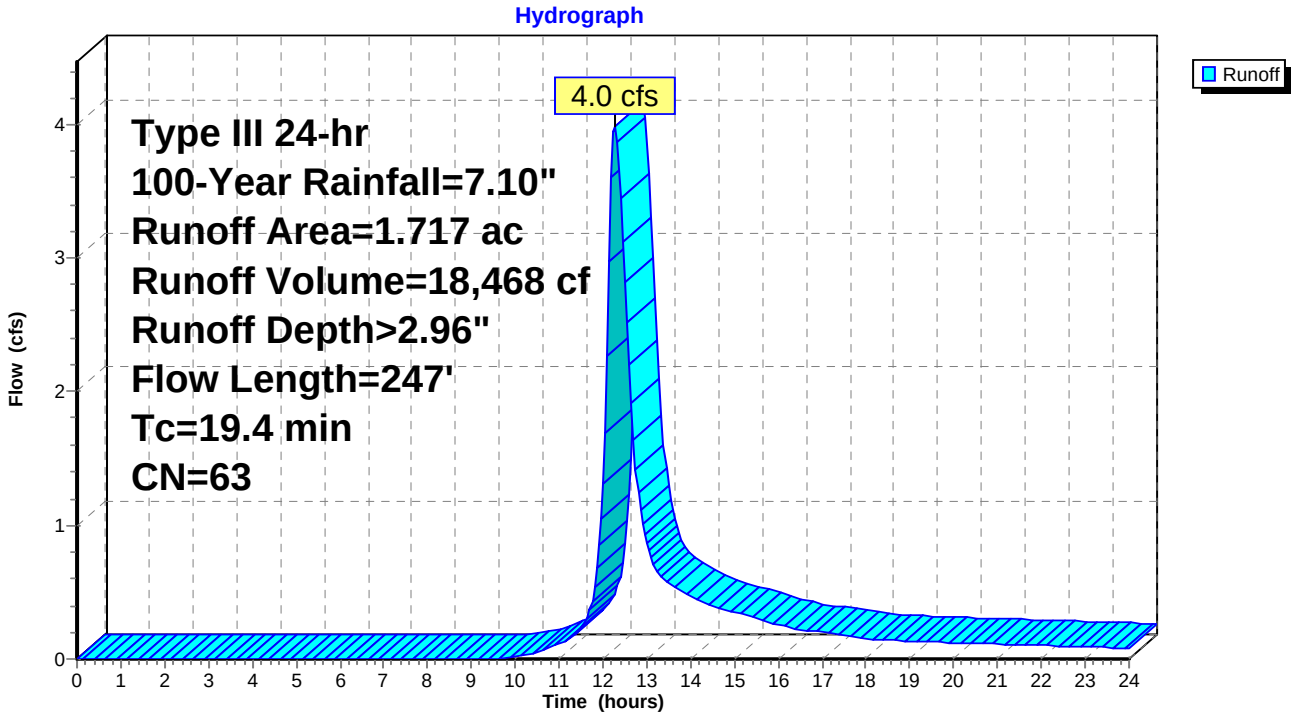
Runoff = 4.0 cfs @ 12.28 hrs, Volume= 18,468 cf, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Type III 24-hr 100-Year Rainfall=7.10"

	Area (ac)	CN	Description
	0.091	77	Woods, Good, HSG D
	0.151	55	Woods, Good, HSG B
	1.283	61	>75% Grass cover, Good, HSG B
	0.187	80	>75% Grass cover, Good, HSG D
*	0.000	98	Solar Array Posts, HSG B
	0.005	98	Paved parking, HSG B
	1.717	63	Weighted Average
	1.712		99.71% Pervious Area
	0.005		0.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0128	0.10		**Sheet Flow, Grass** Grass: Dense n= 0.240 P2= 3.40"
2.9	147	0.0148	0.85		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
19.4	247	Total			

Subcatchment 9S: Greenfield 2



Summary for Reach 19R: Riprap Swale

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 4.23" for 100-Year event
Inflow = 7.3 cfs @ 12.21 hrs, Volume= 30,069 cf
Outflow = 7.1 cfs @ 12.25 hrs, Volume= 29,996 cf, Atten= 3%, Lag= 2.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.92 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 1.39 fps, Avg. Travel Time= 7.9 min

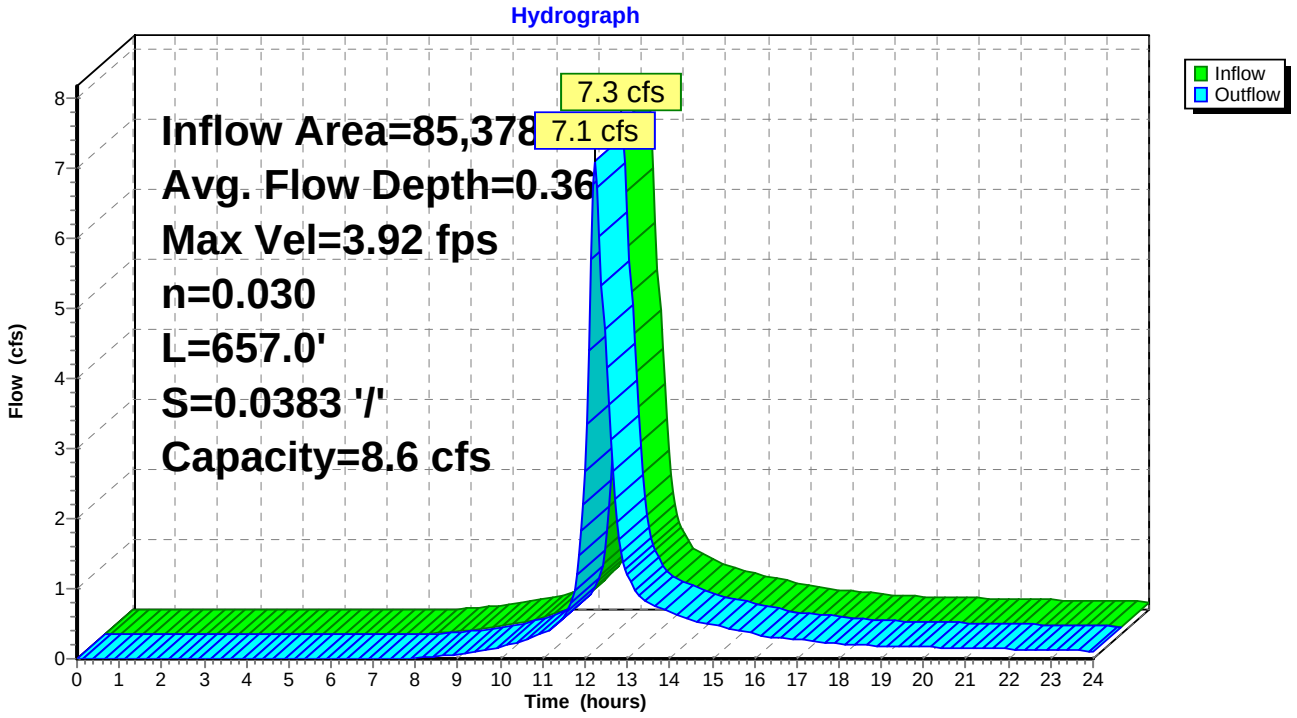
Peak Storage= 1,191 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.36'
Bank-Full Depth= 0.40' Flow Area= 2.1 sf, Capacity= 8.6 cfs

3.00' x 0.40' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 5.5 '/' Top Width= 7.40'
Length= 657.0' Slope= 0.0383 '/'
Inlet Invert= 274.52', Outlet Invert= 249.36'



‡

Reach 19R: Riprap Swale



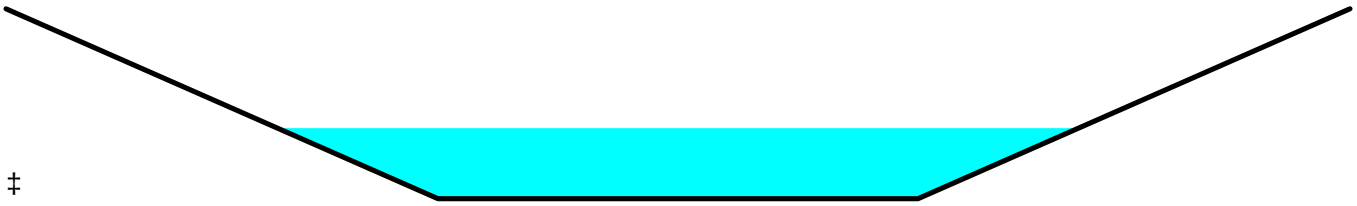
Summary for Reach 21R: Riprap Swale

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 4.34" for 100-Year event
Inflow = 5.4 cfs @ 12.14 hrs, Volume= 19,281 cf
Outflow = 5.2 cfs @ 12.17 hrs, Volume= 19,237 cf, Atten= 3%, Lag= 1.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs
Max. Velocity= 3.89 fps, Min. Travel Time= 2.3 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 7.2 min

Peak Storage= 705 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.33'
Bank-Full Depth= 0.90' Flow Area= 5.1 sf, Capacity= 34.5 cfs

3.00' x 0.90' deep channel, n= 0.030 Rubble masonry, cemented
Side Slope Z-value= 3.0 '/' Top Width= 8.40'
Length= 527.0' Slope= 0.0372 '/'
Inlet Invert= 276.70', Outlet Invert= 257.10'



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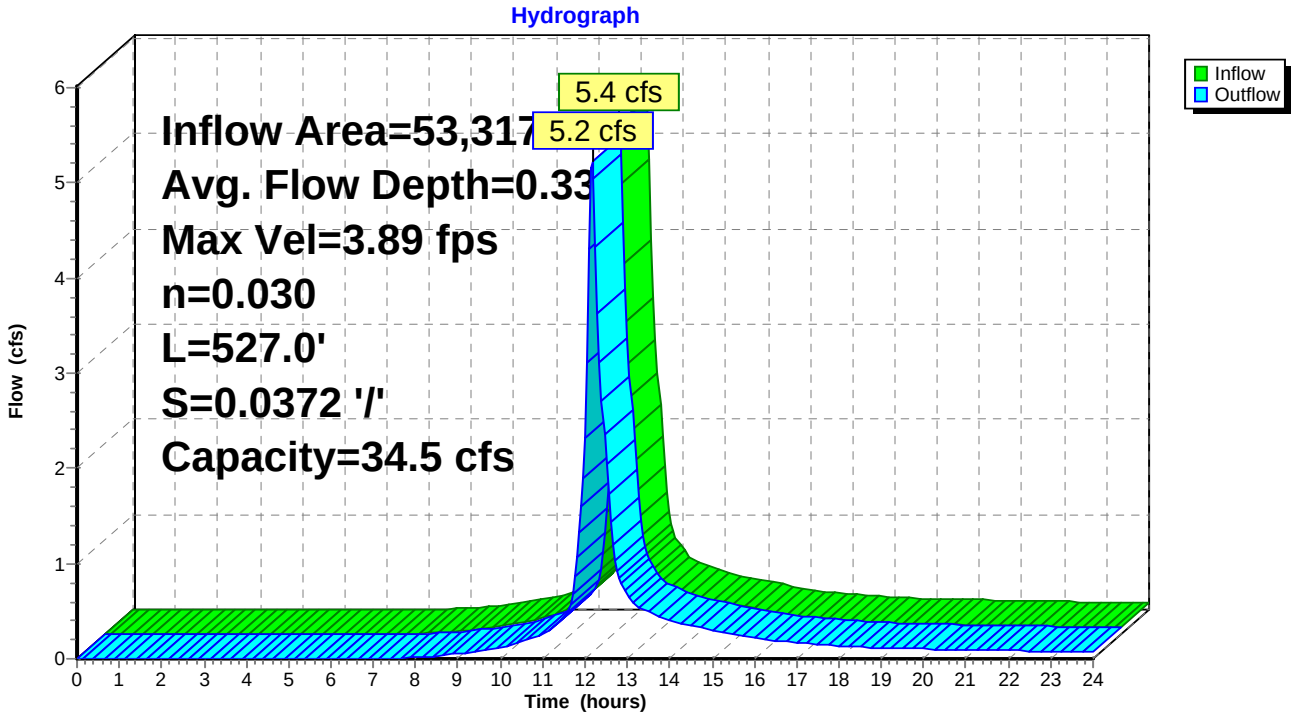
Reach 21R: Riprap Swale

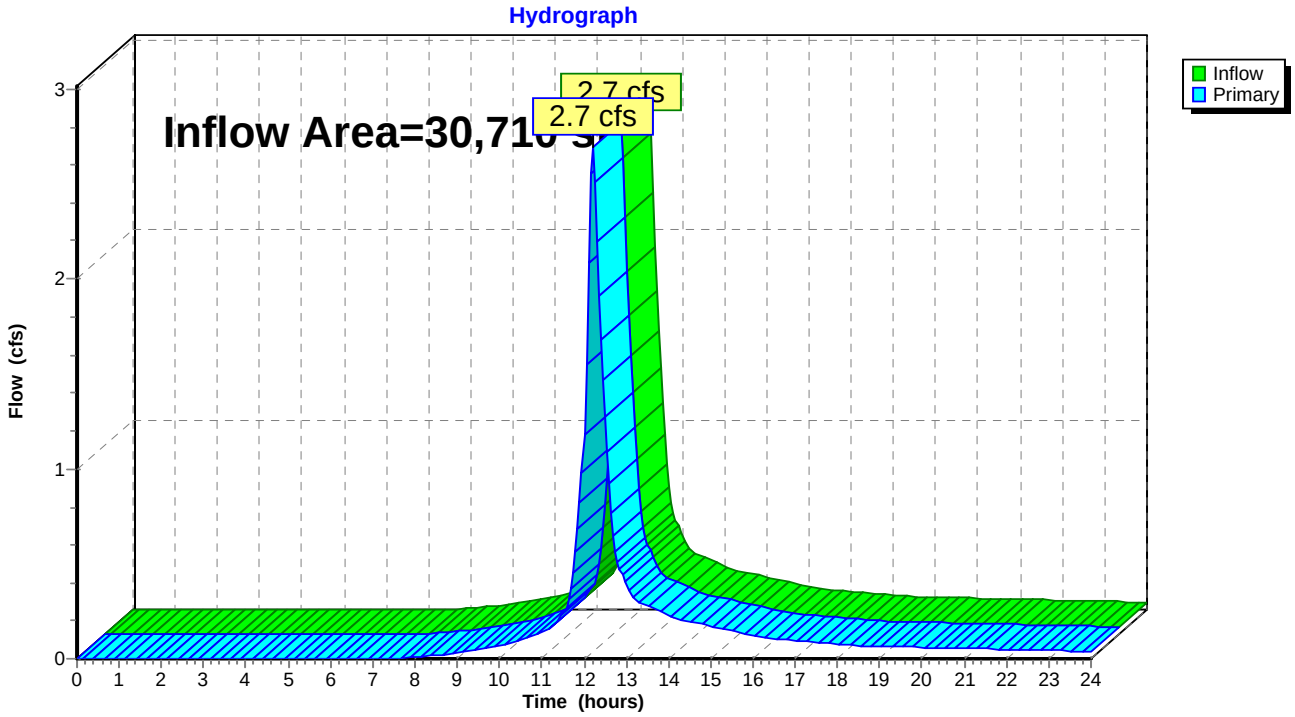


Summary for Link 7L: Wetlands NW

Inflow Area = 30,710 sf, 4.54% Impervious, Inflow Depth > 4.23" for 100-Year event
Inflow = 2.7 cfs @ 12.20 hrs, Volume= 10,818 cf
Primary = 2.7 cfs @ 12.20 hrs, Volume= 10,818 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 7L: Wetlands NW

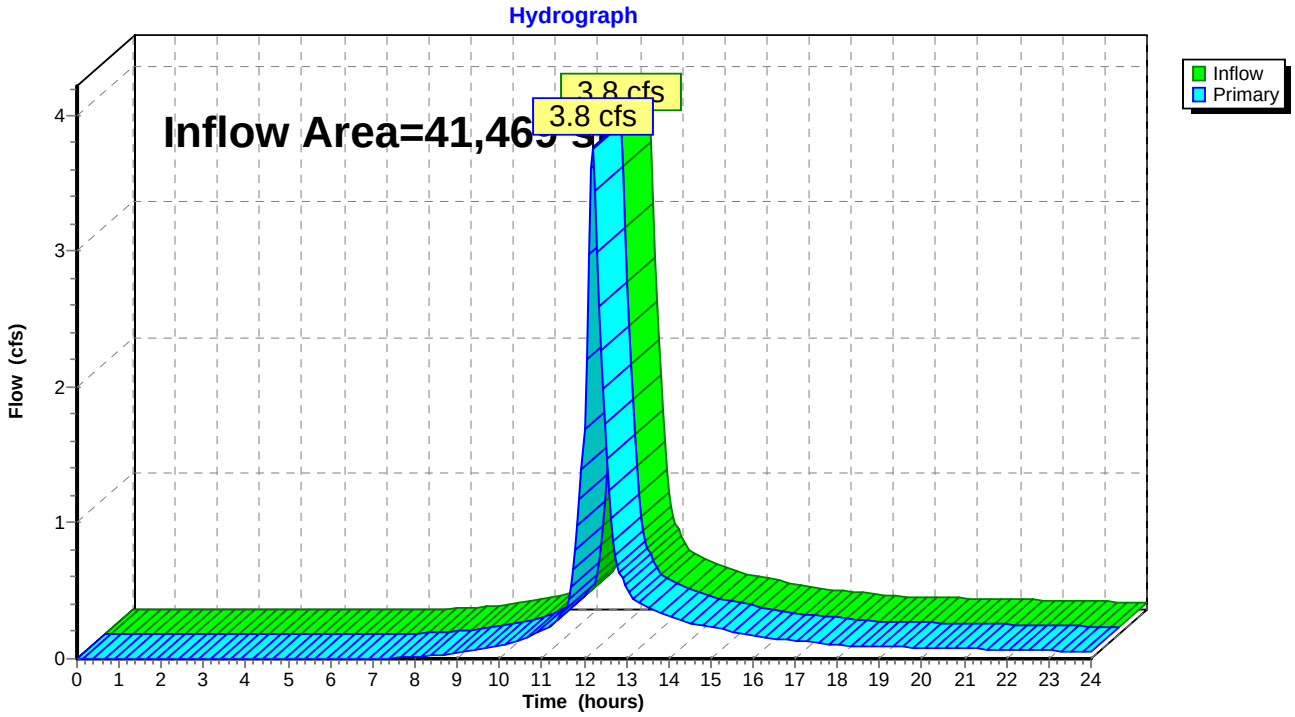


Summary for Link 8L: Depression S

Inflow Area = 41,469 sf, 4.52% Impervious, Inflow Depth > 4.34" for 100-Year event
Inflow = 3.8 cfs @ 12.19 hrs, Volume= 14,985 cf
Primary = 3.8 cfs @ 12.19 hrs, Volume= 14,985 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 8L: Depression S

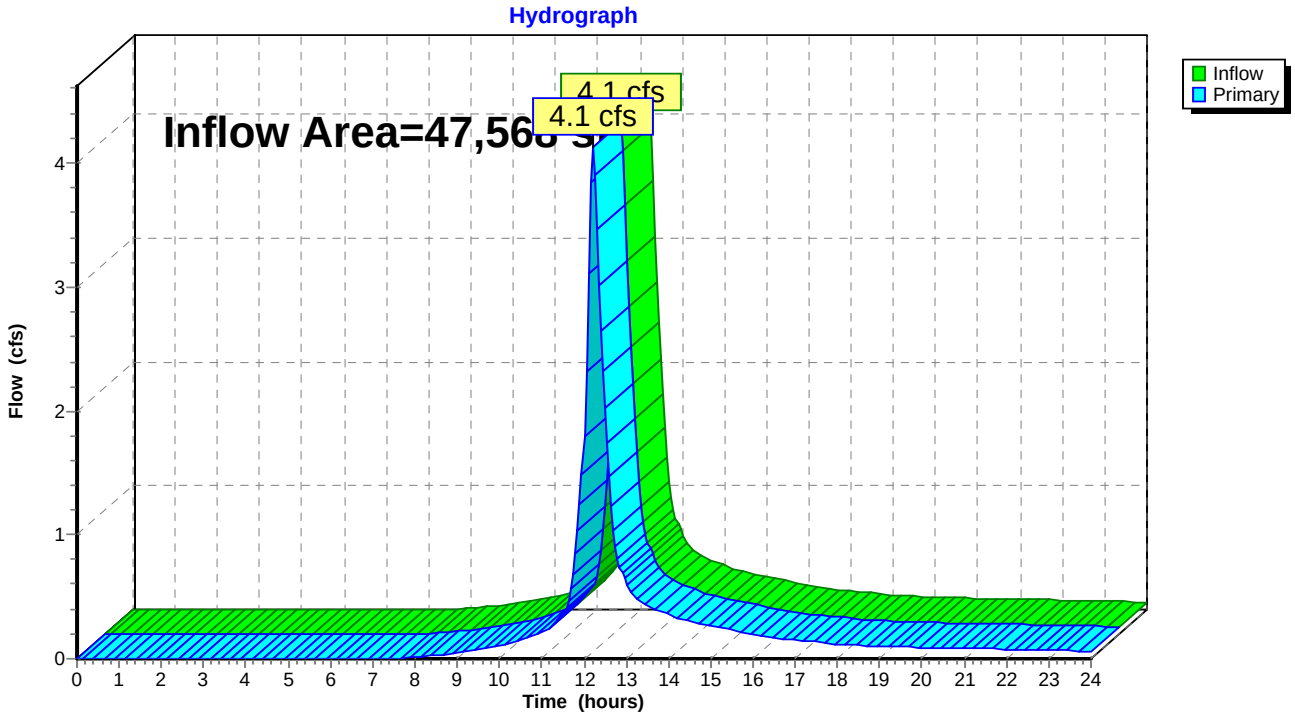


Summary for Link 9L: Wetlands NE

Inflow Area = 47,568 sf, 5.31% Impervious, Inflow Depth > 4.23" for 100-Year event
Inflow = 4.1 cfs @ 12.20 hrs, Volume= 16,755 cf
Primary = 4.1 cfs @ 12.20 hrs, Volume= 16,755 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 9L: Wetlands NE

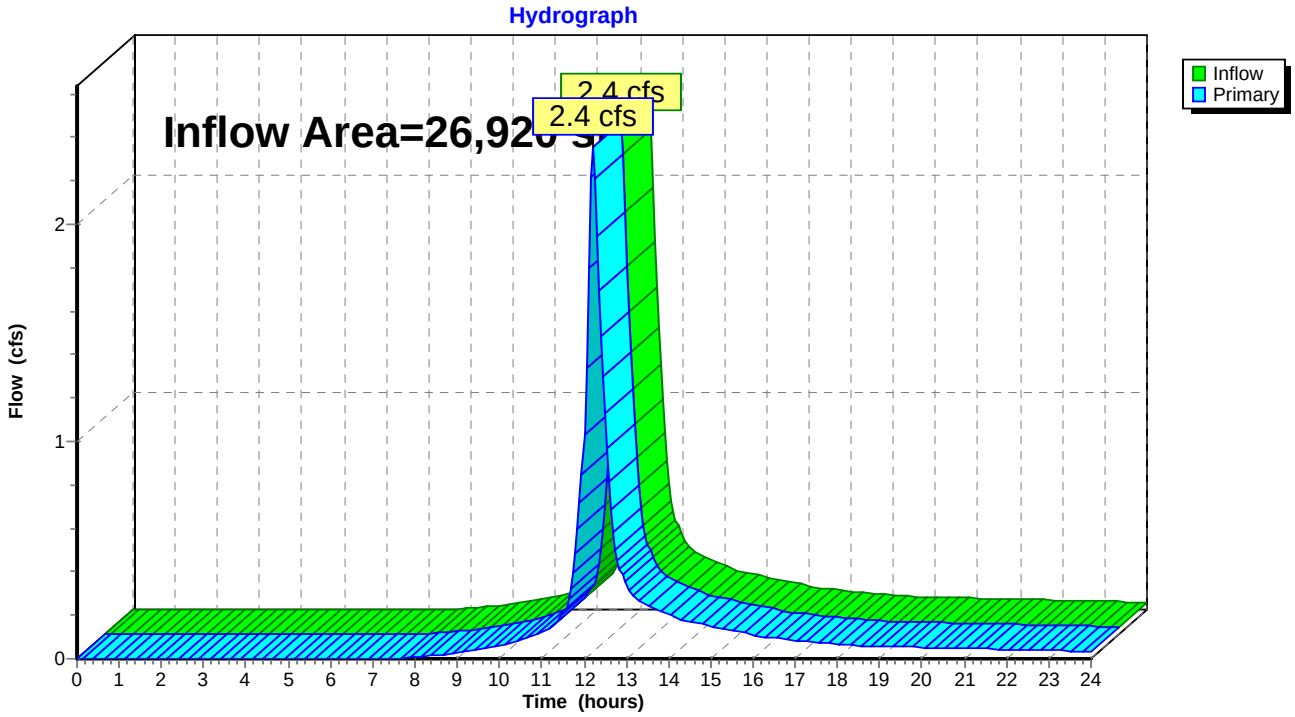


Summary for Link 10L: Wetlands N

Inflow Area = 26,920 sf, 4.53% Impervious, Inflow Depth > 4.23" for 100-Year event
Inflow = 2.4 cfs @ 12.20 hrs, Volume= 9,483 cf
Primary = 2.4 cfs @ 12.20 hrs, Volume= 9,483 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 10L: Wetlands N

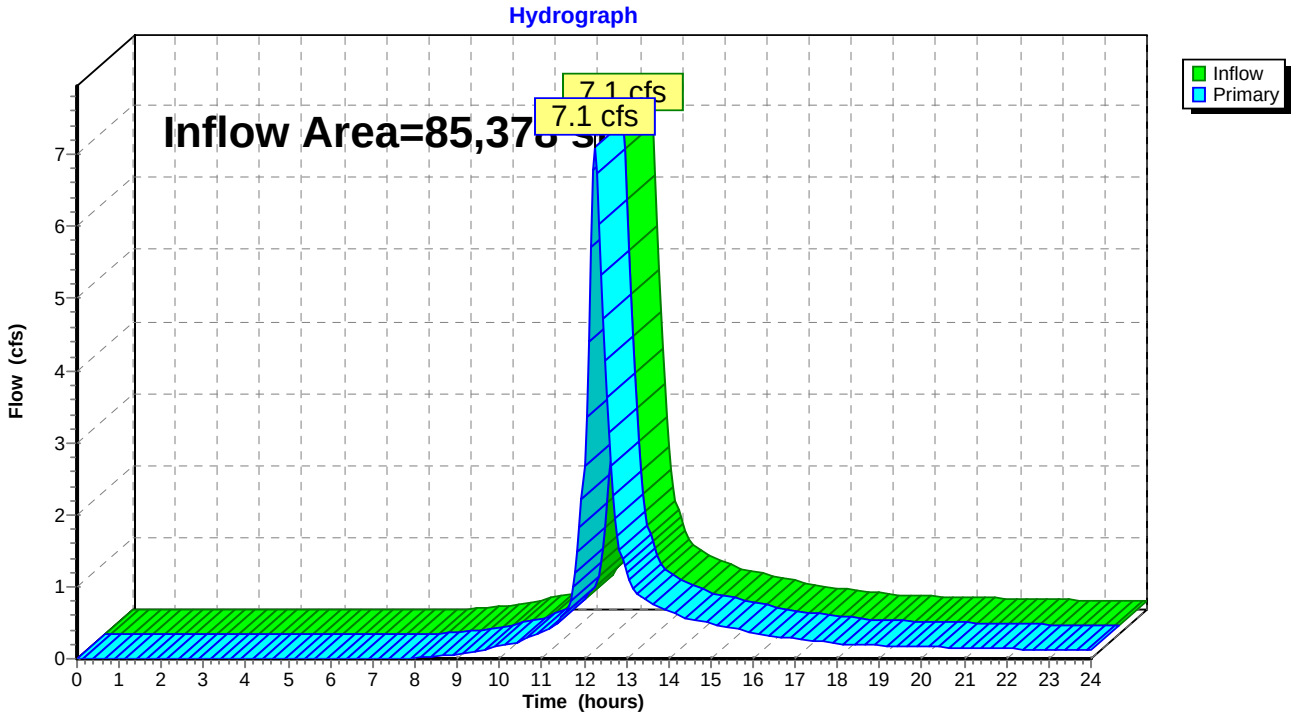


Summary for Link 11L: Collection Swale W

Inflow Area = 85,378 sf, 3.27% Impervious, Inflow Depth > 4.22" for 100-Year event
Inflow = 7.1 cfs @ 12.25 hrs, Volume= 29,996 cf
Primary = 7.1 cfs @ 12.25 hrs, Volume= 29,996 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 11L: Collection Swale W

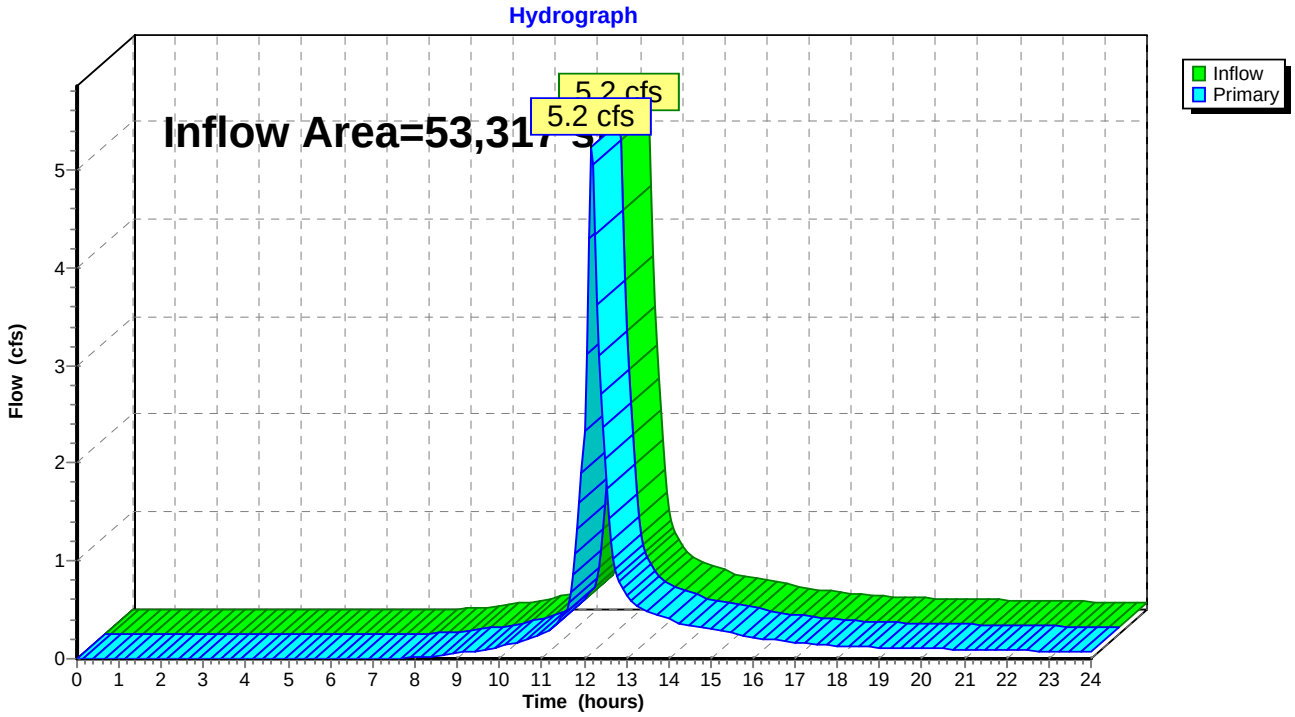


Summary for Link 12L: Collection Swale W

Inflow Area = 53,317 sf, 4.00% Impervious, Inflow Depth > 4.33" for 100-Year event
Inflow = 5.2 cfs @ 12.17 hrs, Volume= 19,237 cf
Primary = 5.2 cfs @ 12.17 hrs, Volume= 19,237 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 12L: Collection Swale W

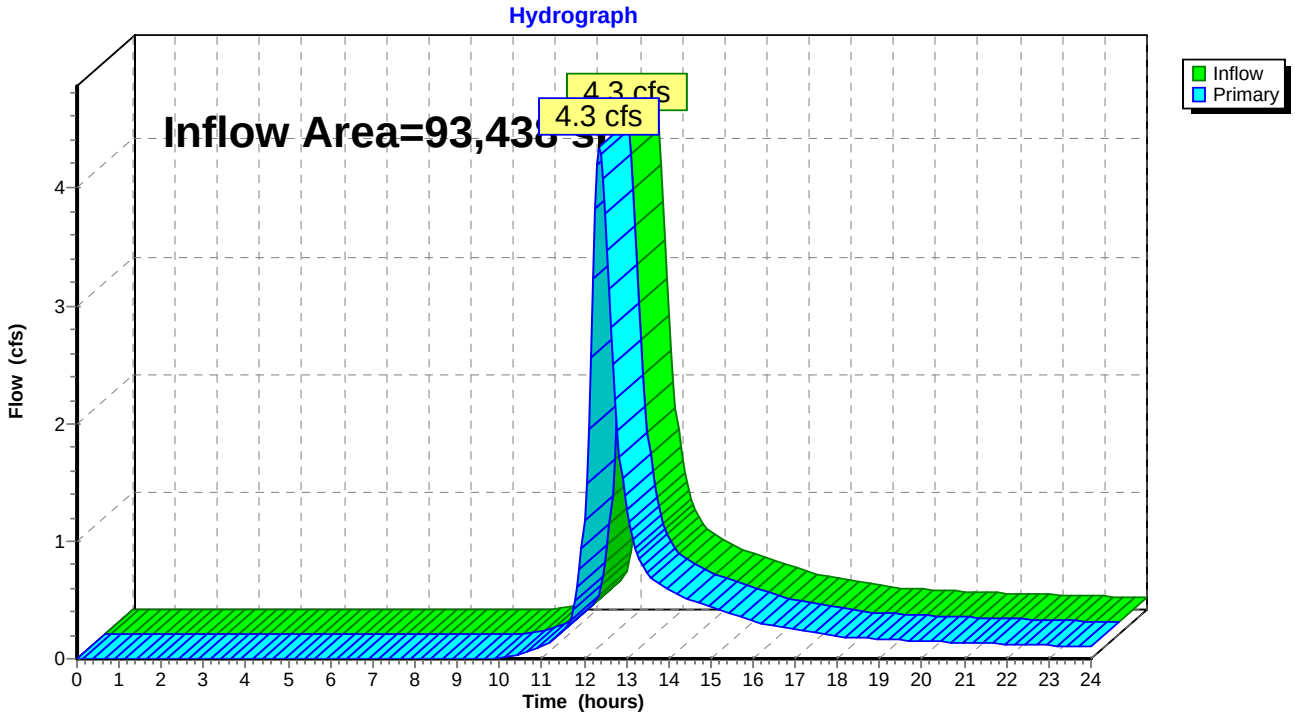


Summary for Link 15L: Wetland W

Inflow Area = 93,438 sf, 0.61% Impervious, Inflow Depth > 2.86" for 100-Year event
Inflow = 4.3 cfs @ 12.36 hrs, Volume= 22,257 cf
Primary = 4.3 cfs @ 12.36 hrs, Volume= 22,257 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 15L: Wetland W

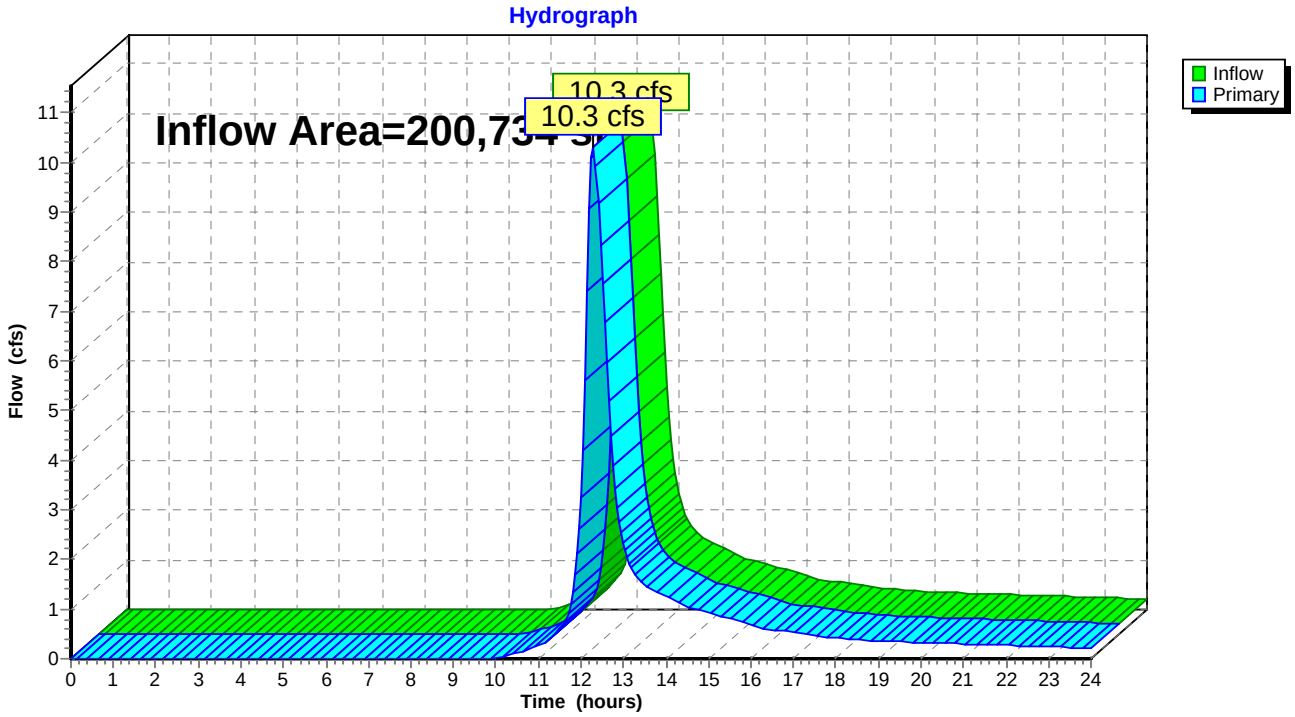


Summary for Link 16L: Wetland E

Inflow Area = 200,734 sf, 0.11% Impervious, Inflow Depth > 2.90" for 100-Year event
Inflow = 10.3 cfs @ 12.29 hrs, Volume= 48,498 cf
Primary = 10.3 cfs @ 12.29 hrs, Volume= 48,498 cf, Atten= 0%, Lag= 0.0 min

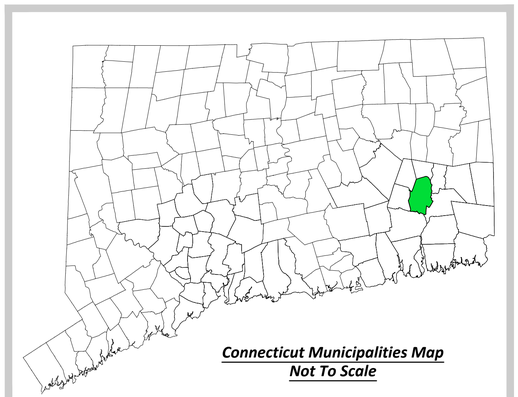
Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.050 hrs

Link 16L: Wetland E

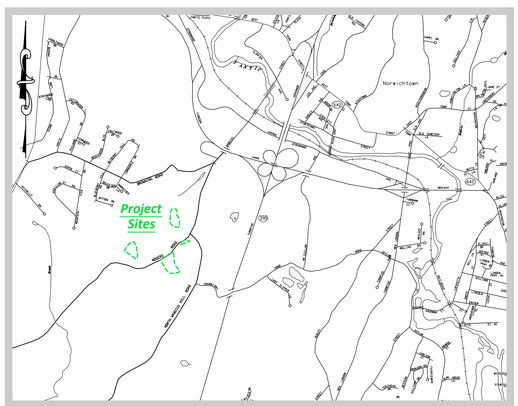


Appendix C
Site Development Plans

ROGERS ROAD LANDFILL SOLAR PROJECT
SOLAR PHOTOVOLTAIC (PV) SYSTEM
Prepared For
SolarCity Corporation
82 Rogers Road - Norwich, Connecticut
August 2015



Connecticut Municipalities Map
Not To Scale



Site Location Map
Scale: 1"=2000'



Site Location Aerial View
Not To Scale

Project Information	
Developed By: *Brightfields Development, LLC* *41 Walnut Street, Suite 301* *Wellesley, MA 02481* *SolarCity Corporation* *714 Brook Street* *Rocky Hill, CT 06067* *Civil Engineer:* *Boundaries LLC* *179 Pachaug River Drive* *Griswold, CT 06351*	*Electrical Engineer:* *SolarCity Corporation* *714 Brook Street* *Rocky Hill, CT 06067* *Host:* *City of Norwich* *100 Broadway* *Norwich, CT 06360* *Utility:* *Connecticut Municipal Electric Energy Cooperative* *30 Stott Avenue* *Norwich, CT 06360*

Index To Drawings	
Sheet	*Sheet Title*
1	*Cover Sheet*
	Mounting Plane #1 and Mounting Plane #4
2	*Topographic Survey-Existing Conditions*
3	*Site Development Plan*
	Mounting Plane #2
4	*Topographic Survey-Existing Conditions*
5	*Site Development Plan*
	Mounting Plane #3
6	*Topographic Survey-Existing Conditions*
7	*Site Development Plan*
8	*Overall Site Utility Plan*
9	*Erosion & Sediment Control Narrative and Details*
10	*Site Details*
11	*Site Details*

PROGRESS PRINT
AUGUST 26, 2015

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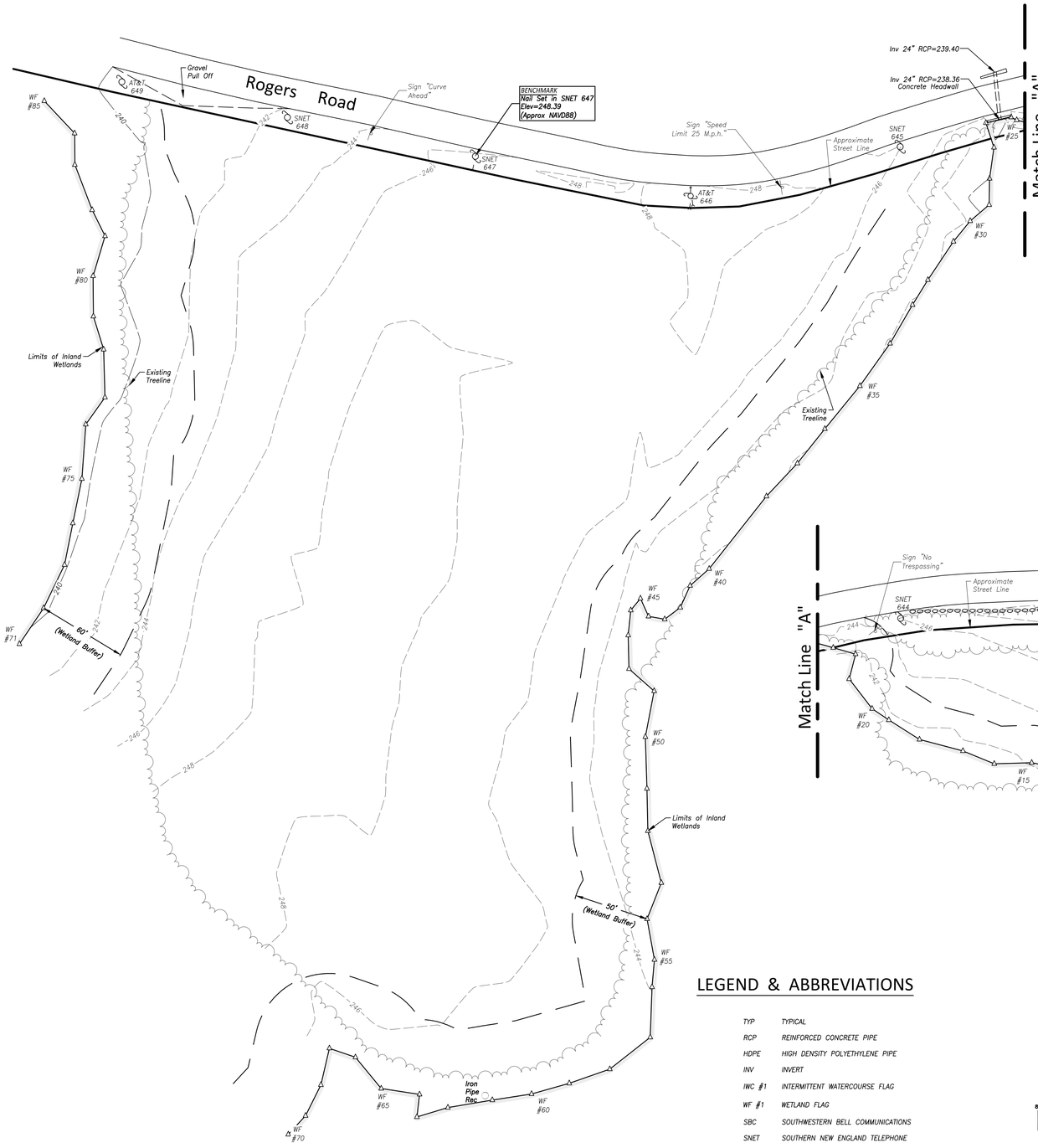

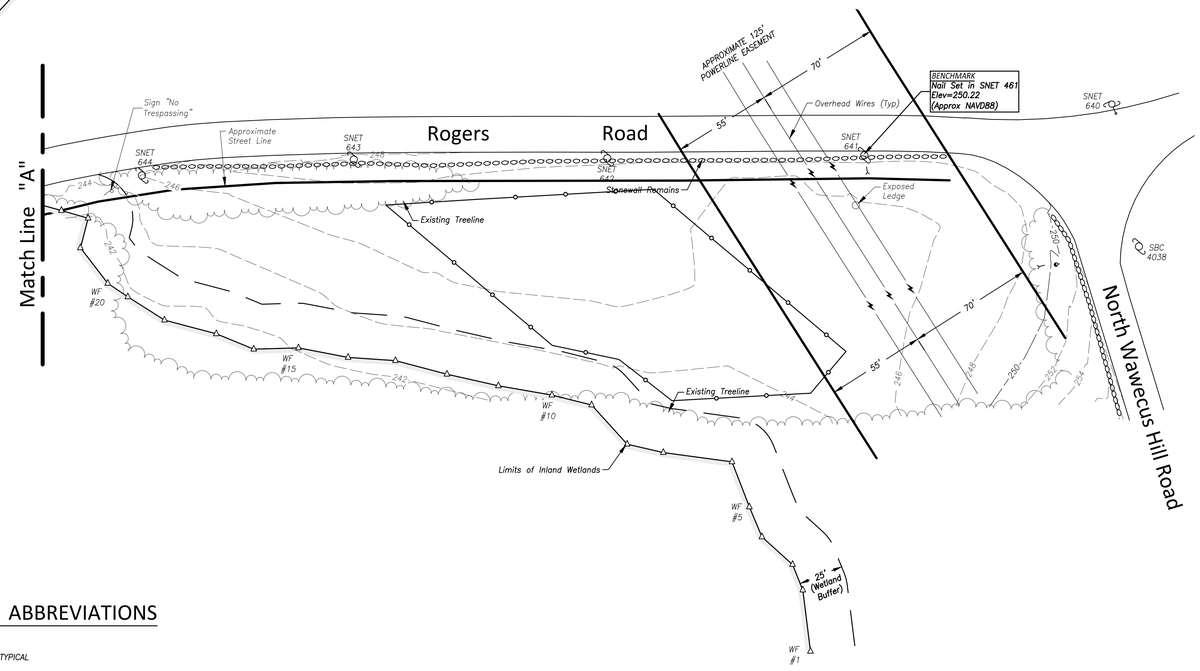

SURVEY NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300B-1 THROUGH 20-300B-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED FOR USE BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996. IT IS A TOPOGRAPHIC SURVEY AND CONFORMS TOPOGRAPHIC CLASS T-2 ACCURACY STANDARDS. IT IS INTENDED TO BE USED FOR SITE PLANNING.
2. NORTH ORIENTATION DEPICTED HEREON IS APPROXIMATE NORTH AMERICAN DATUM 1983 (NAD83) BASED UPON GLOBAL POSITIONING SYSTEM OBSERVATIONS, OBSERVED ON OCTOBER 03, 2014 THRU OCTOBER 07, 2014.
3. VERTICAL DATUM DEPICTED HERE ON IS APPROXIMATE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD83) BASED GLOBAL POSITIONING SYSTEM OBSERVATIONS USING GEOIDE12A ON OCTOBER 03, 2014 THRU OCTOBER 07, 2014.
3. ALL SUBTERRANEAN FEATURES AND IMPROVEMENTS MAY NOT BE DEPICTED OR NOTED HEREON.
4. THE FIELD SURVEY WAS COMPLETED ON OCTOBER 07, 2014
5. LIMITS OF INLAND WETLANDS DEPICTED HEREON WERE DELINEATED BY DEMIAN A. SORRENTINO, C.S.S., BOUNDARIES LLC. BUFFER AREAS DEPICTED HEREON ARE PREDICATED ON RECOMMENDED SETBACKS PROVIDED BY ALL POINTS TECHNOLOGY CORPORATION BASED EVALUATION OF SAID INLAND WETLANDS. THE CITY OF NORWICH INLAND WETLAND REGULATIONS REQUIRES AN UPLAND REGULATED AREA OF 100'.
6. THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE BASED ON THE LOCATION OF ABOVEGROUND STRUCTURES AND RECORD DRAWINGS PROVIDED TO THE SURVEYOR. LOCATIONS OF UNDERGROUND UTILITIES MAY VARY FROM LOCATIONS SHOWN HEREON. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL UTILITY LOCATIONS AND ELEVATIONS AND CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EARTHWORK OPERATIONS.

REFERENCE MAPS

1. AS-BUILT CONDITIONS, PREPARED FOR NUTMEG SAND AND GRAVEL COMPANY, NORWICH BULKY WASTE SITE, ROGERS ROAD, NORWICH, CONNECTICUT, SCALE: 1"=40', DATED: 10/26/99 SHEET No. 1 OF 1, PREPARED BY: ANCHOR ENGINEERING SERVICES, INC.
2. CONSTRUCTION PLANS FOR NORWICH LANDFILL CLOSURE, TOWN OF NORWICH, ROGERS ROAD, NORWICH, CONNECTICUT DATED: APRIL 1996, SHEETS 1 – 7, PREPARED BY: FUSS & O'NEILL

LEGEND & ABBREVIATIONS

TYP	TYPICAL
RCP	REINFORCED CONCRETE PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
INV	INVERT
IWC #1	INTERMITTENT WATERCOURSE FLAG
WF #1	WETLAND FLAG
SBC	SOUTHWESTERN BELL COMMUNICATIONS
SNET	SOUTHERN NEW ENGLAND TELEPHONE
CL&P	CONNECTICUT LIGHT AND POWER
AT&T	AMERICAN TELEPHONE AND TELEGRAPH
248	EXISTING CONTOUR
	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG

GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
1 inch = 40 ft.

PROGRESS PRINT
AUGUST 26, 2015

I HAVE CONDUCTED AN ON-SITE SOIL INVESTIGATION OF THE PARCEL OF LAND DEPICTED HEREON. THE INTERMITTENT WATERCOURSES AND INLAND WETLAND BOUNDARIES AS PORTRAYED ARE AN ACCURATE REPRESENTATION OF THE DELINEATION PERFORMED IN THE FIELD.

DEMIAN A. SORRENTINO, C.S.S. DATE

"TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON."

70016
JOHN U. FAULISE JR. L.S. LICENSE NO. DATE

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CIVIL ENGINEERING LAND SURVEYING LAND DEVELOPMENT PLANNING
BOUNDARIES
Boundaries LLC
179 Pachaug River Drive Griswold, CT 06351
T 860.376.2006 | www.boundariesllc.net

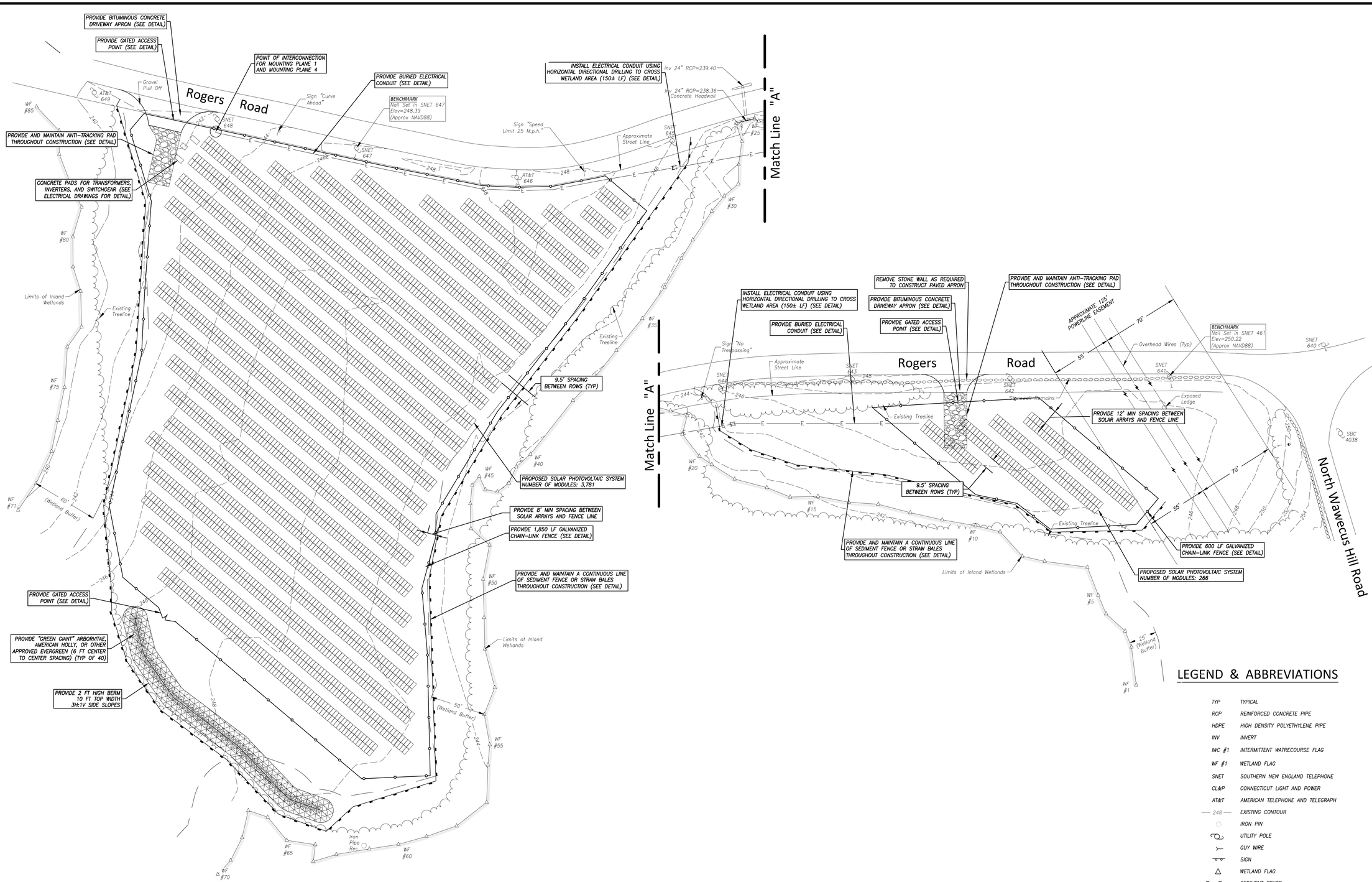
BRIGHTFIELDS DEVELOPMENT LLC
40 Walnut Street Suite 301
Wellesley, MA 02481
www.solarbrownfields.com

SolarCity
714 Brook Street
Rocky Hill, CT 06067
www.solarcity.com

SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Plane 1 and Mounting Plane 4
Topographic Survey - Existing Conditions

SCALE:
DATE: August 2015
JOB I.D. NO. 14-2302
Revisions

SHEET NO.
2
11



GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
1 inch = 40 ft.

LEGEND & ABBREVIATIONS

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RCP	REINFORCED CONCRETE PIPE
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INV	INVERT
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WF #1	WETLAND FLAG
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CL&P	CONNECTICUT LIGHT AND POWER
AT&T	AMERICAN TELEPHONE AND TELEGRAPH
248	EXISTING CONTOUR
	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG
	SEDIMENT FENCE
	STRAW WATTLE
	CHAIN LINK FENCE
E	ELECTRICAL CONDUIT

PROGRESS PRINT
AUGUST 26, 2015

29102
DAVID C. McKAY P.E., LICENSE NO. DATE

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www.solarbrownfields.com

SolarCity
714 Brook Street
Rocky Hill, CT 06067
www.solarcity.com

SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Plane 1 and Mounting Plane 4
Site Development Plan

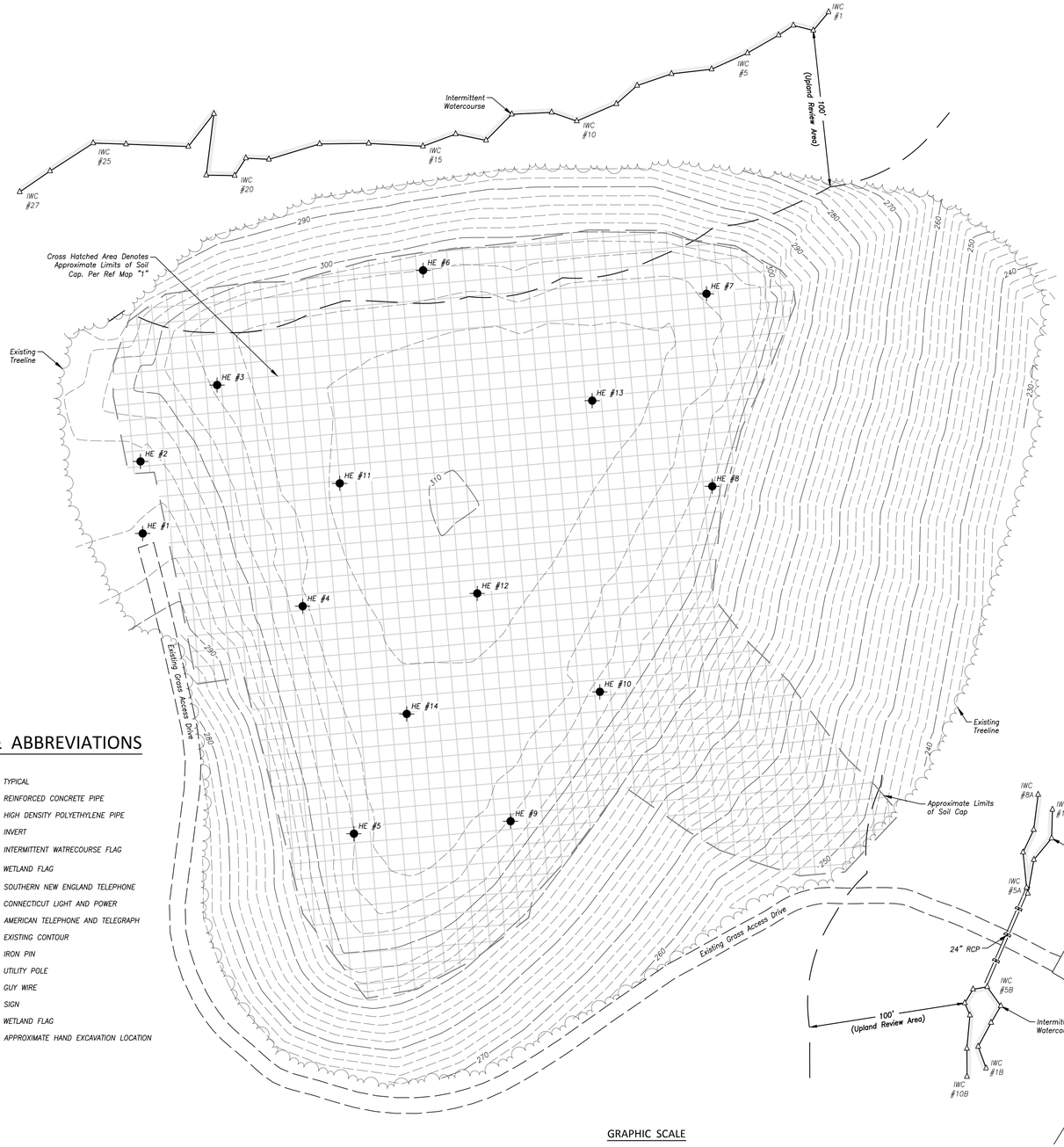
SCALE:

DATE: August 2015

JOB I.D. NO. 14-2302

Revisions

SHEET NO.
3
11



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WF #1	WETLAND FLAG
SNET	SOUTHERN NEW ENGLAND TELEPHONE
CL&P	CONNECTICUT LIGHT AND POWER
AT&T	AMERICAN TELEPHONE AND TELEGRAPH
248	EXISTING CONTOUR
	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG
HE #1	APPROXIMATE HAND EXCAVATION LOCATION

GRAPHIC SCALE

80 40 20 0 40

(IN FEET)

1 inch = 40 ft.

SURVEY NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300B-1 THROUGH 20-300B-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED FOR USE BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996. IT IS A TOPOGRAPHIC SURVEY AND CONFORMS TOPOGRAPHIC CLASS T-2 ACCURACY STANDARDS. IT IS INTENDED TO BE USED FOR SITE PLANNING.
2. NORTH ORIENTATION DEPICTED HEREON IS APPROXIMATE NORTH AMERICAN DATUM 1983 (NAD83) BASED UPON GLOBAL POSITIONING SYSTEM OBSERVATIONS, OBSERVED ON OCTOBER 03, 2014 THRU OCTOBER 07, 2014.
3. VERTICAL DATUM DEPICTED HERE ON IS APPROXIMATE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD83) BASED GLOBAL POSITIONING SYSTEM OBSERVATIONS USING GEOIDE12A ON OCTOBER 03, 2014 THRU OCTOBER 07, 2014.
3. ALL SUBTERRANEAN FEATURES AND IMPROVEMENTS MAY NOT BE DEPICTED OR NOTED HEREON.
4. THE FIELD SURVEY WAS COMPLETED ON OCTOBER 07, 2014
5. THE LOCATIONS OF UNDERGROUND UTILITIES AS SHOWN HEREON ARE BASED ON THE LOCATION OF ABOVEGROUND STRUCTURES AND RECORD DRAWINGS PROVIDED TO THE SURVEYOR. LOCATIONS OF UNDERGROUND UTILITIES MAY VARY FROM LOCATIONS SHOWN HEREON. ADDITIONAL BURIED UTILITIES/STRUCTURES MAY BE ENCOUNTERED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL UTILITY LOCATIONS AND ELEVATIONS AND CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EARTHWORK OPERATIONS.

REFERENCE MAPS

1. AS-BUILT CONDITIONS, PREPARED FOR NUTMEG SAND AND GRAVEL COMPANY, NORWICH BULKY WASTE SITE, ROGERS ROAD, NORWICH, CONNECTICUT, SCALE: 1"=40', DATED: 10/26/99 SHEET No. 1 OF 1, PREPARED BY: ANCHOR ENGINEERING SERVICES, INC.
2. CONSTRUCTION PLANS FOR NORWICH LANDFILL CLOSURE, TOWN OF NORWICH, ROGERS ROAD, NORWICH, CONNECTICUT DATED: APRIL 1996, SHEETS 1 – 7, PREPARED BY: FUSS & O'NEILL

HAND EXCAVATION RESULTS

HAND EXCAVATION LOCATIONS ARE APPROXIMATE ONLY. HAND EXCAVATIONS WERE PERFORMED BY WESTON & SAMPSON ENGINEERS, INC. ON JULY 9, 2015.

HAND EXCAVATION #1

SURFACE	COMPACTED SAND/GRAVEL AT BEGINNING OF PROPOSED GRAVEL ACCESS DRIVE
0" – 11"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, SOME SMALL TO LARGE GRAVEL; MOIST. APPEARED TO BE DENSE TO VERY DENSE BASED ON HAND EXCAVATION EFFORT. COULD NOT EXCAVATE BEYOND 11" BELOW GROUND SURFACE.

END OF EXCAVATION AT 11" BELOW GROUND SURFACE.

HAND EXCAVATION #2

SURFACE	TALL FIELD GRASS ALONG PROPOSED GRAVEL ACCESS DRIVE AT BASE OF LANDFILL SLOPE
0" – 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" – 12"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, SOME MEDIUM TO LARGE GRAVELS. APPEARED TO BE MEDIUM DENSE TO DENSE BASED ON HAND EXCAVATION EFFORT.
12" – 19"	GRAY, GRAVEL FILL (UP TO 4 IN. DIAMETER) WITH FINE TO MEDIUM SILTY SAND; MOIST. APPEARED TO BE VERY DENSE BASED ON HAND EXCAVATION EFFORT. COULD NOT EXCAVATE BEYOND 19" BELOW GROUND SURFACE.

END OF EXCAVATION AT 19" BELOW GROUND SURFACE.

HAND EXCAVATION #3

SURFACE	TALL FIELD GRASS ALONG PROPOSED GRAVEL ACCESS DRIVE AT TOP OF LANDFILL
0" – 2"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS.
2" – 18"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 18" BELOW GROUND SURFACE, END OF EXCAVATION AT 18" BELOW GROUND SURFACE.

HAND EXCAVATION #4

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 3"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
3" – 23"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE BRICK DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 23" BELOW GROUND SURFACE, END OF EXCAVATION AT 23" BELOW GROUND SURFACE.

HAND EXCAVATION #5

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" – 15"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE BRICK DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 15" BELOW GROUND SURFACE, END OF EXCAVATION AT 15" BELOW GROUND SURFACE.

HAND EXCAVATION #6

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 3"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
3" – 17"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 17" BELOW GROUND SURFACE, END OF EXCAVATION AT 17" BELOW GROUND SURFACE.

HAND EXCAVATION #7

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" – 9"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 9" BELOW GROUND SURFACE, END OF EXCAVATION AT 9" BELOW GROUND SURFACE.

HAND EXCAVATION #8

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" – 15"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE PLASTIC DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 15" BELOW GROUND SURFACE, END OF EXCAVATION AT 15" BELOW GROUND SURFACE.

HAND EXCAVATION #9

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 6"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
6" – 15"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE PLASTIC DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 15" BELOW GROUND SURFACE, END OF EXCAVATION AT 15" BELOW GROUND SURFACE.

HAND EXCAVATION #10

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 5"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
5" – 14"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 14" BELOW GROUND SURFACE, END OF EXCAVATION AT 14" BELOW GROUND SURFACE.

HAND EXCAVATION #11

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 2"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
2" – 27"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. SMALL COBBLES AT APPROXIMATELY 15" BELOW GROUND SURFACE. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 27" BELOW GROUND SURFACE, END OF EXCAVATION AT 27" BELOW GROUND SURFACE.

HAND EXCAVATION #12

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 4"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
4" – 17"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 17" BELOW GROUND SURFACE, END OF EXCAVATION AT 17" BELOW GROUND SURFACE.

HAND EXCAVATION #13

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 6"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
6" – 21"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS); MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 21" BELOW GROUND SURFACE, END OF EXCAVATION AT 21" BELOW GROUND SURFACE.

HAND EXCAVATION #14

SURFACE	TALL FIELD GRASS ON TOP OF LANDFILL
0" – 3"	DARK BROWN SILTY TOPSOIL WITH THICK GRASS ROOT SYSTEMS; MOIST.
3" – 25"	BROWN, FINE TO MEDIUM, SILTY SAND FILL, TRACE TO LITTLE GRAVEL, TRACE TO LITTLE ORGANICS (ROOTS, WOOD CHIPS, SMALL TWIGS), TRACE PLASTIC DEBRIS; MOIST. APPEARED TO BE LOOSE BASED ON HAND EXCAVATION EFFORT.

SILTY SAND COVER LAYER OBSERVED AT 25" BELOW GROUND SURFACE, END OF EXCAVATION AT 25" BELOW GROUND SURFACE.

PROGRESS PRINT
AUGUST 26, 2015

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DEMIAN A. SORRENTINO, C.S.S. DATE

"TO MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON."

70016

JOHN U. FAULISE JR. L.S. LICENSE NO. DATE

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SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Plane 2 - Bulky Waste Area
Topographic Survey - Existing Conditions

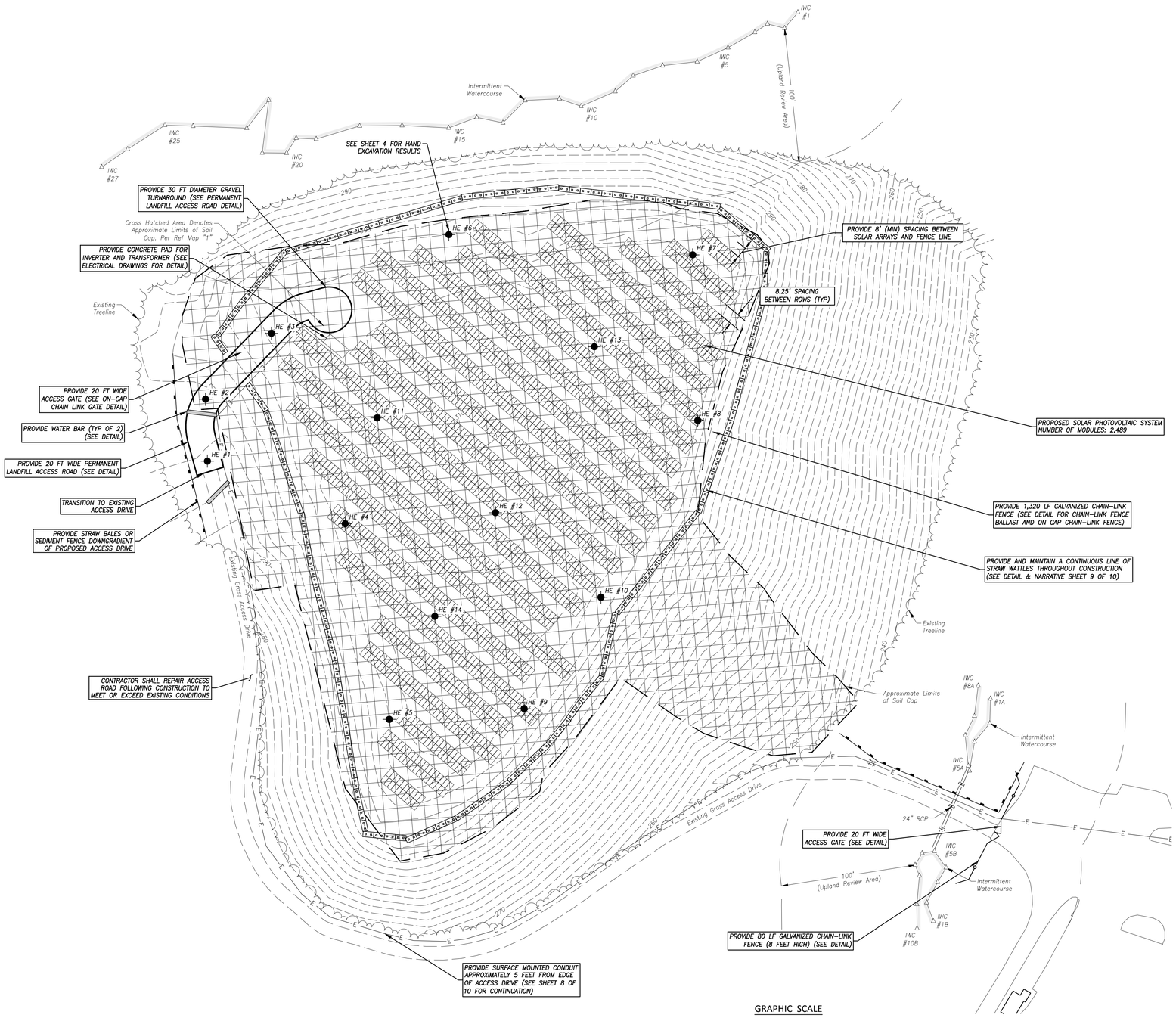
SCALE:

DATE: August 2015

JOB I.D. NO. 14-2302

Revisions

SHEET NO. 4 / 11



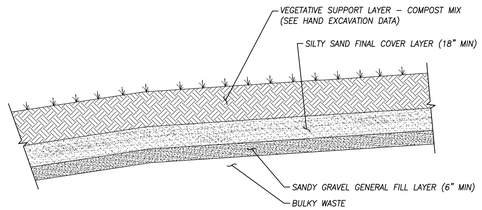
LEGEND & ABBREVIATIONS

TYP	TYPICAL
RCP	REINFORCED CONCRETE PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
INV	INVERT
IWC #1	INTERMITTENT WATRECOURSE FLAG
WF #1	WETLAND FLAG
SNET	SOUTHERN NEW ENGLAND TELEPHONE
CL&P	CONNECTICUT LIGHT AND POWER
AT&T	AMERICAN TELEPHONE AND TELEGRAPH
248	EXISTING CONTOUR
	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG
	SEDIMENT FENCE
	STRAW WATTLE
	CHAIN LINK FENCE
E	ELECTRICAL CONDUIT
HE #1	APPROXIMATE HAND EXCAVATION LOCATION

GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
1 inch = 40 ft.



NOTE:
1. NO EXCAVATION WITHIN THE 18" SILTY SAND COVER LAYER.
2. CROSS SECTION DEVELOPED FROM LANDFILL CLOSURE REPORT PREPARED BY OTHERS AND MAY NOT REFLECT ACTUAL CONDITIONS.

BULKY WASTE LANDFILL SOIL CAP
CROSS SECTION

NOT TO SCALE

PROGRESS PRINT
AUGUST 26, 2015

29102

DAVID C. McKAY P.E., LICENSE NO. DATE

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SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Plane 2 - Bulky Waste Area
Site Development Plan

SCALE:

DATE: August 2015

JOB I.D. NO. 14-2302

Revisions

SHEET NO.
5
11

LEGEND & ABBREVIATIONS

TYP	TYPICAL
RCP	REINFORCED CONCRETE PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
INV	INVERT
IWC #1	INTERMITTENT WATRECOURSE FLAG
WF #1	WETLAND FLAG
SNET	SOUTHERN NEW ENGLAND TELEPHONE
CL&P	CONNECTICUT LIGHT AND POWER
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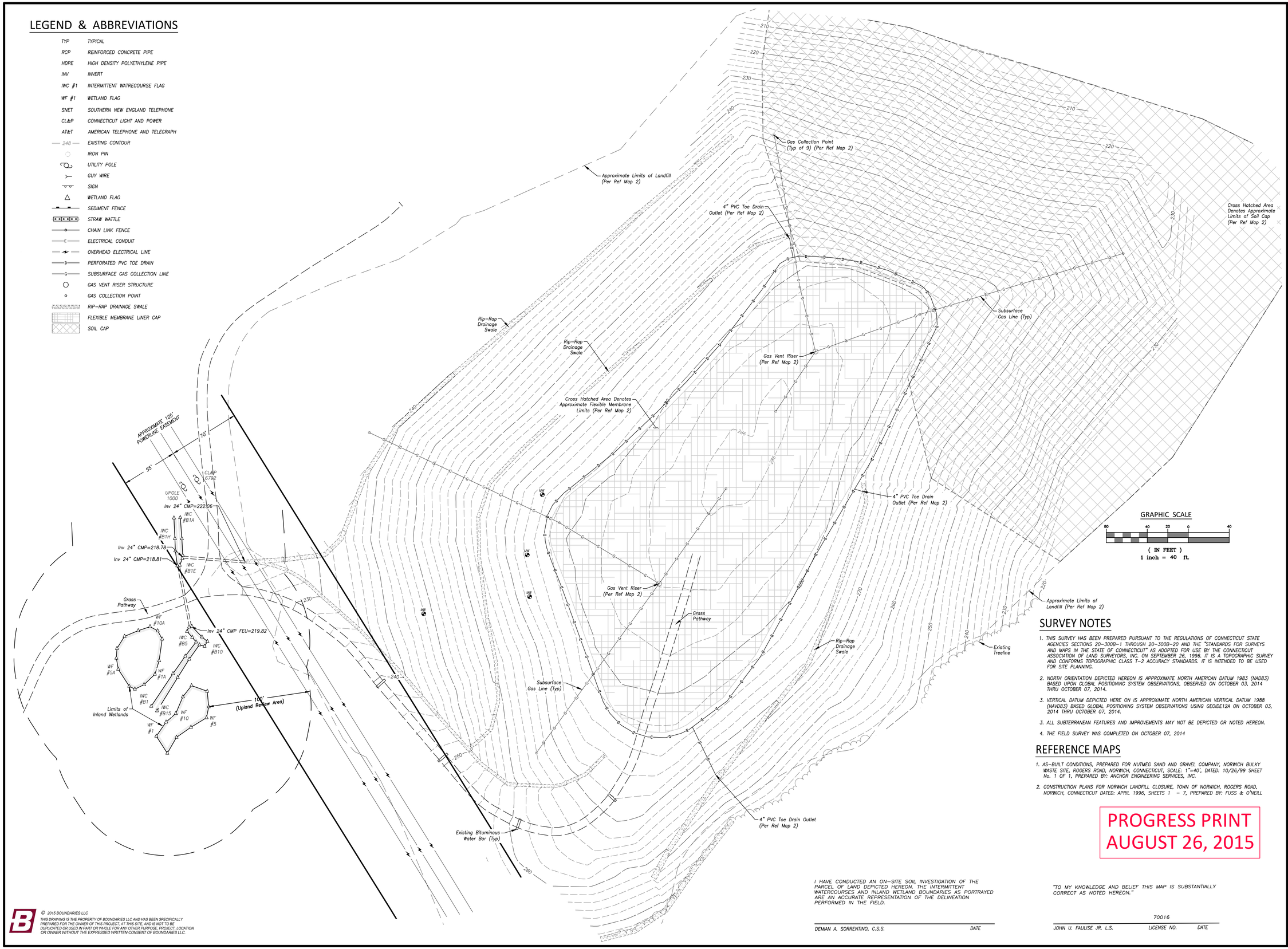
	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG
	SEDIMENT FENCE
	STRAW WATTLE
	CHAIN LINK FENCE
E	ELECTRICAL CONDUIT
	OVERHEAD ELECTRICAL LINE
D	PERFORATED PVC TOE DRAIN
G	SUBSURFACE GAS COLLECTION LINE
	GAS VENT RISER STRUCTURE
	GAS COLLECTION POINT
	RIP-RAP DRAINAGE SWALE
	FLEXIBLE MEMBRANE LINER CAP
	SOIL CAP



GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
1 inch = 40 ft.

SURVEY NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20-300B-1 THROUGH 20-300B-20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED FOR USE BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996. IT IS A TOPOGRAPHIC SURVEY AND CONFORMS TOPOGRAPHIC CLASS T-2 ACCURACY STANDARDS. IT IS INTENDED TO BE USED FOR SITE PLANNING.
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3. VERTICAL DATUM DEPICTED HERE ON IS APPROXIMATE NORTH AMERICAN VERTICAL DATUM 1988 (NAVDB3) BASED GLOBAL POSITIONING SYSTEM OBSERVATIONS USING GEOIDE12A ON OCTOBER 03, 2014 THRU OCTOBER 07, 2014.
3. ALL SUBTERRANEAN FEATURES AND IMPROVEMENTS MAY NOT BE DEPICTED OR NOTED HEREON.
4. THE FIELD SURVEY WAS COMPLETED ON OCTOBER 07, 2014

REFERENCE MAPS

1. AS-BUILT CONDITIONS, PREPARED FOR NUTMEG SAND AND GRAVEL COMPANY, NORWICH BULKY WASTE SITE, ROGERS ROAD, NORWICH, CONNECTICUT, SCALE: 1"=40', DATED: 10/26/99 SHEET No. 1 OF 1, PREPARED BY: ANCHOR ENGINEERING SERVICES, INC.
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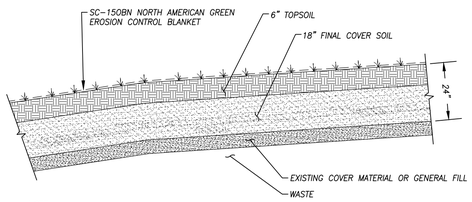
SCALE:
DATE: August 2015
JOB I.D. NO. 14-2302
Revisions

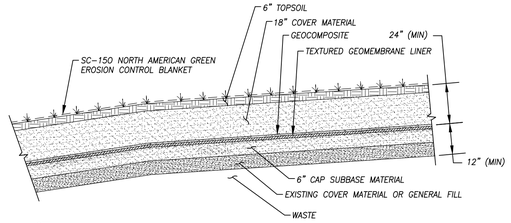
SHEET NO.
6
11



NOTE:
1. NO EXCAVATION WITHIN THE ORIGINAL COVER MATERIAL/GENERAL FILL LAYER.
2. CROSS SECTION DEVELOPED FROM LANDFILL CLOSURE PLANS PREPARED BY OTHERS AND MAY NOT REFLECT ACTUAL CONDITIONS.

NORWICH LANDFILL SOIL CAP CROSS SECTION

NOT TO SCALE



NOTE:
1. NO EXCAVATION WITHIN THE COVER MATERIAL LAYER.
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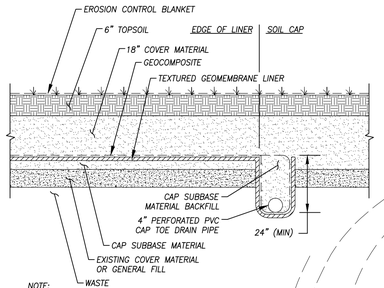
NORWICH LANDFILL FLEXIBLE MEMBRANE LINER CAP CROSS SECTION

NOT TO SCALE



NOTE:
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2. CROSS SECTION DEVELOPED FROM LANDFILL CLOSURE PLANS PREPARED BY OTHERS AND MAY NOT REFLECT ACTUAL CONDITIONS.

FML CAP AND SOIL CAP INTERFACE CROSS SECTION

NOT TO SCALE

LEGEND & ABBREVIATIONS

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	SEDIMENT FENCE
	STRAW WATTLE
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E	ELECTRICAL CONDUIT
	OVERHEAD ELECTRICAL LINE
D	PERFORATED PVC TOE DRAIN
G	SUBSURFACE GAS COLLECTION LINE
	GAS VENT RISER STRUCTURE
	GAS COLLECTION POINT
	RIP-RAP DRAINAGE SWALE
	FLEXIBLE MEMBRANE LINER CAP
	SOIL CAP

GRAPHIC SCALE

80 40 20 0 40

(IN FEET)
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PROGRESS PRINT
AUGUST 26, 2015

29102
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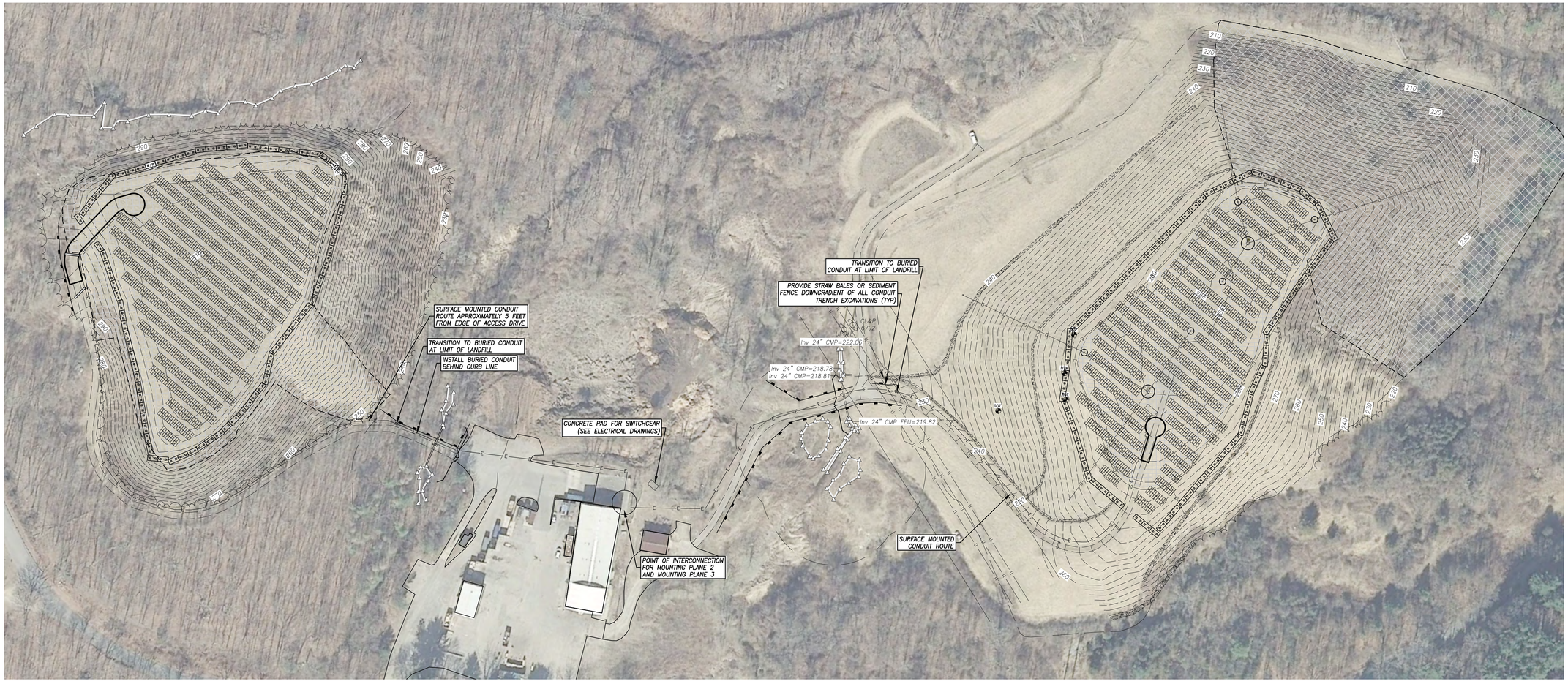

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	IRON PIN
	UTILITY POLE
	GUY WIRE
	SIGN
	WETLAND FLAG
	SEDIMENT FENCE
	STRAW WATTLE
	CHAIN LINK FENCE
E	ELECTRICAL CONDUIT
H	OVERHEAD ELECTRICAL LINE

GRAPHIC SCALE

160 80 40 0 80

(IN FEET)
1 inch = 80 ft.

PROGRESS PRINT
AUGUST 26, 2015

29102
DAVID C. McKAY P.E., LICENSE NO. DATE

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SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Planes 2 & 3
Overall Site Utility Plan

SCALE: 1" = 80'
DATE: August 2015
JOB I.D. NO.: 14-2302
Revisions

SHEET NO.
8
11

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL CALL BEFORE YOU DIG AT 811 OR 1-800-922-4455 AT LEAST 72 HOURS, SATURDAY, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATION AT ANY LOCATION. A COPY OF THE CALL BEFORE YOU DIG PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
2. LOCATIONS OF EXISTING PIPES, CONDUITS, UTILITIES, FOUNDATIONS AND OTHER UNDERGROUND OBJECTS ARE NOT WARRANTED TO BE CORRECT AND THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT SHOULD THEY BE OTHER THAN THAT SHOWN.
3. STONE WALLS, FENCES, CURBS, ETC. SHALL BE REMOVED AND REPLACED AS NECESSARY TO PERFORM THE WORK. UNLESS OTHERWISE INDICATED, ALL SUCH WORK SHALL BE INCIDENTAL TO CONSTRUCTION OF THE PROJECT.
4. ALL OTHER DISTURBED BY THE CONTRACTOR BEYOND PAYMENT LIMITS SHALL BE RESTORED AT NO ADDITIONAL COST TO THE OWNER.
5. IF SURVEY CONTROL STAKING AND EROSION CONTROL MEASURES ARE REQUIRED, HAND DUG TEST HOLES WILL BE PERFORMED TO CONFIRM THE DEPTH TO THE LINER OR SOIL CAP, PRIOR TO INSTALLATION. ALL TEST HOLES SHALL BE VERIFIED BY THE ON-SITE ENGINEER.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH OSHA REQUIREMENTS AND THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH THESE REQUIREMENTS. IN ADDITION, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ANY EXCAVATION SAFEGUARDS, NECESSARY BARRICADES, FLAGMEN, ETC. FOR TRAFFIC CONTROL AND SITE SAFETY.
7. ALL EROSION & SEDIMENTATION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF CONSTRUCTION.
8. ALL FUEL, OIL, PAINT OR OTHER HAZARDOUS MATERIALS USED DURING CONSTRUCTION SHOULD BE STORED IN A SECONDARY CONTAINER AND REMOVED TO A LOCKED INDOOR AREA WITH AN IMPERVIOUS FLOOR DURING NON-WORK HOURS.
9. NO WASTE MATERIALS (SUCH AS STUMPS) ARE ALLOWED TO BE BURIED ON SITE. ALL WASTE MATERIALS SHALL BE DISPOSED OF OFF-SITE AT AN APPROPRIATE LOCATION IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS.

SPECIFICATIONS FOR WORK ON LANDFILL:

GENERAL:

1. THE CONTRACTOR SHALL BE AWARE THAT WORK IS LOCATED ON A LANDFILL AND IS SUBJECT TO THE CONNECTICUT SOLID WASTE REGULATIONS AND ANY REQUIREMENTS OUTLINED IN THE CT DEEP LANDFILL DISRUPTION AUTHORIZATION.
2. THE CONTRACTOR SHALL BE AWARE THAT THE WORK IS TO TAKE PLACE ABOVE A LANDFILL COVER SYSTEM, GENERALLY COMPRISED OF A VEGETATIVE SUPPORT LAYER, A SAND DRAINAGE LAYER, AND A LOW PERMEABILITY FLEXIBLE MEMBRANE LINER OR SOIL CAP. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO NOT DISRUPT THE LANDFILL CAP PROFILE OR TO DAMAGE THE LOW PERMEABILITY FLEXIBLE MEMBRANE LINER OR SOIL CAP.
3. WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION'S PERMIT APPROVAL.
4. THE CONTRACTOR SHALL HAVE A HEALTH AND SAFETY PLAN WHILE WORKING ON THE LANDFILL.

EQUIPMENT:

1. THE CONTRACTOR SHALL PROVIDE A LIST OF ALL EQUIPMENT PROPOSED TO BE WORKING ON THE LANDFILL. THE LIST SHALL INCLUDE THE EQUIPMENT WEIGHT, GROUND PRESSURE, AND ANY RESTRICTIONS THAT WILL BE IMPOSED ON THE VEHICLE (I.E. LIMITED TO EXISTING ACCESS ROADS, LIMITED TO CARRYING ½ LOADS, ETC.)
2. ALL EQUIPMENT IS SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. AS A GENERAL RULE, EQUIPMENT SHALL ADHERE TO THE FOLLOWING REQUIREMENTS:

Equipment Ground Pressure		Minimum Lift Thickness	
KPa	psi	meter	inches
<70	<10	0.30	12
70-140	10-20	0.60	24
>140	>20	0.90	36

SOURCE: GEOMEMBRANE PROTECTION DESIGN MANUAL, GSE; DHANI MAREJO, PH.D. AND GREG CORCORAN, P.E., FIRST EDITION.

EXCAVATIONS:

1. THE CONTRACTOR SHALL PROVIDE AN EXCAVATION PLAN DETAILING HOW THE CONTRACTOR WILL COMPLY WITH ALL PERTINENT PROVISIONS OF THE CONTRACT DOCUMENTS INCLUDING SITE RESTRICTIONS, WORK PROTOCOLS, TEMPORARY ROADS, ON-SITE PARKING AND STORAGE AREAS.
2. EXCAVATIONS ON THE LANDFILL AREA SHALL BE PERFORMED WITH THE GUIDANCE OF A LABORER OR "SPOTTER" AT ALL TIMES. THE LABORER SHALL IDENTIFY THE DEPTH OF THE LINER AND ENSURE THAT THE OPERATOR MAINTAINS A SAFE SEPARATING DISTANCE.
3. IT IS REQUIRED TO USE A SMOOTH BUCKET EXCAVATOR IN LIEU OF BUCKET WITH TEETH FOR EXCAVATIONS IN THE VICINITY OF THE LANDFILLS.

TEMPORARY EROSION CONTROL MEASURES:

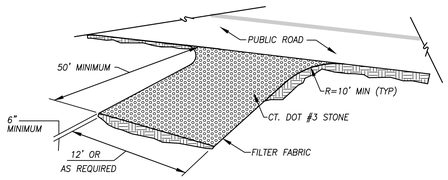
1. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AS DETERMINED BY THE ON-SITE ENGINEER.
2. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME.
3. SEDIMENT/EROSION CONTROL MEASURES SHALL BE INSTALLED AS SHOWN ON PLANS. EROSION CONTROL BARRIERS ARE TO BE MAINTAINED AND CLEANED UNTIL ALL SLOPES HAVE BEEN ADEQUATELY STABILIZED.
4. FILL MATERIAL SHALL BE FREE FROM STUMPS, WOOD, ROOTS, ETC.
5. THE TEMPORARY AND PERMANENT STORMWATER CONTROLS SHALL BE PERIODICALLY CLEANED OF SEDIMENT, AS REQUIRED BY THE ENGINEER. THE SEDIMENT WILL BE REMOVED TO A SECURE LOCATION SO AS TO PREVENT SILTATION OF NATURAL WATER WAYS.
6. STRAW WATTLES MUST BE A MINIMUM TUBE DIAMETER OF 12 INCHES (300MM) FOR SLOPES UP TO 50 FEET (15.24M) IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPS OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
7. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
8. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.
9. EROSION CONTROL MEASURES SHALL BE REMOVED WHEN DISTURBED AREA IS STABILIZED. DISTURBED AREA RESULTING FROM THE SILT FENCE REMOVAL OPERATION SHALL BE SEEDED IN ACCORDANCE WITH THE SPECIFICATIONS.
10. EROSION CONTROLS OTHER THAT AS SHOWN (I.E. HAY BALES) MUST BE APPROVED BY THE ENGINEER.

EROSION CONTROL NOTES:

1. THE RESPONSIBLE PARTY FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES IS ROBERT MILLER AT SOLARCITY AT 914-584-6894.
2. THE "2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL" BY THE CONNECTICUT COUNCIL ON SOIL AND WATER CONSERVATION IN COOPERATION WITH THE CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION, DEP BULLETIN 34, SHALL BE USED FOR INSTALLING AND MAINTAINING ALL EROSION CONTROL MEASURES. THE CONTRACTOR SHALL INSTALL ADDITIONAL MEASURES AS NECESSARY IF DIRECTED BY THE ENGINEER.
3. SEEDING FOR PERMANENT STABILIZATION SHALL BE DONE BETWEEN APRIL 15 THROUGH JUNE 15 OR BETWEEN AUGUST 15 THROUGH SEPTEMBER 15. IF SEEDING CANNOT BE DONE WITHIN THESE TIMES, APPLY TEMPORARY MULCH UNTIL NEXT SEEDING TIME. SEED MIXTURE SHALL BE AS FOLLOWS:

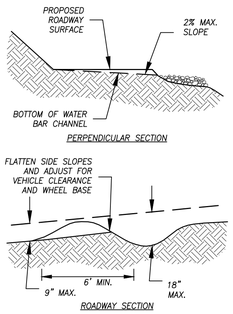
ALL 2:1 SLOPE AREAS			
CROWN VETCH	15 LBS/ACRE	OR	0.35 LBS/1,000 SF
PERENNIAL RYEGRASS	10 LBS/ACRE	OR	0.25 LBS/1,000 SF
ALL OTHER GRASSED AREAS			
CREEPING RED FESCUE	20 LBS/ACRE	OR	0.45 LBS/1,000 SF
REDTOP	2 LBS/ACRE	OR	0.05 LBS/1,000 SF
CROWN VETCH	15 LBS/ACRE	OR	0.35 LBS/1,000 SF

4. MULCH SHALL BE A GOOD QUALITY HAY OR STRAW AND SHALL BE APPLIED AT A RATE OF 2 BALES/100 SF.
5. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED WITHIN 24 HOURS AFTER RAIN EVENTS AND REPAIRED OR REPLACED AS NECESSARY TO INSURE COMPLIANCE WITH THE APPROVED SOIL EROSION AND SEDIMENT CONTROL PLAN.
6. DUST CONTROL MEASURES WILL BE IMPLEMENTED DURING DRY CONDITIONS AND INCLUDE WATERING WITH A TANK TRUCK ON AN AS-NEEDED BASIS IN ORDER TO INSURE THAT NO AMBIENT DUST CONDITIONS ARE GENERATED FROM THE PROJECT.
7. THE ANTI-TRACKING PAD SHALL BE INSPECTED ON A WEEKLY BASIS AND MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION FOR THIS PROJECT. WHEN THE ANTI-TRACKING PAD IS NO LONGER FUNCTIONING EFFICIENTLY OR ACCUMULATED SEDIMENT IS TO A DEPTH OF 2" BELOW THE STONE SURFACE, THE ANTI-TRACKING PAD SHALL BE REMOVED AND REPLACED AS PER THE DETAIL INDICATED ON THESE PLANS.



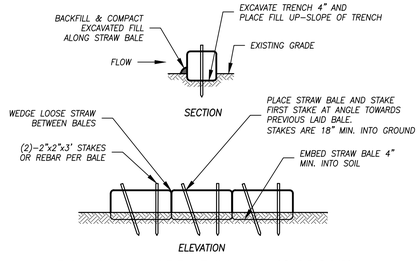
ANTI-TRACKING PAD

NOT TO SCALE



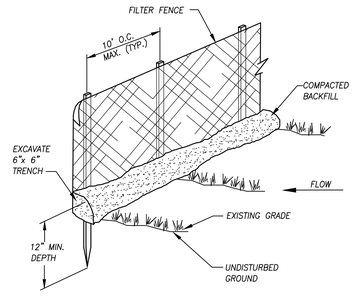
WATER BAR DETAIL

NOT TO SCALE



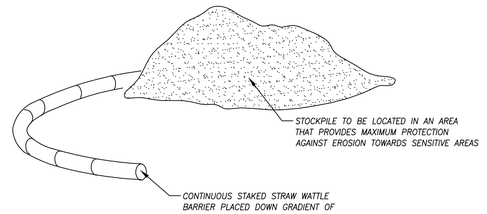
STRAW BALE BARRIER DETAIL (OFF CAP)

NOT TO SCALE



SEDIMENT FENCE DETAIL (OFF CAP)

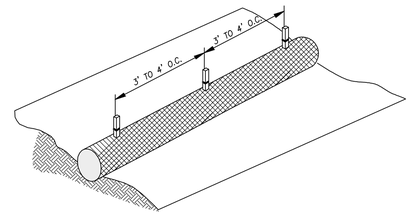
NOT TO SCALE



NOTE: LONG AXIS OF STOCKPILE TO BE PERPENDICULAR TO CONTOUR.

TEMPORARY STOCKPILE BARRIER DETAIL

NOT TO SCALE

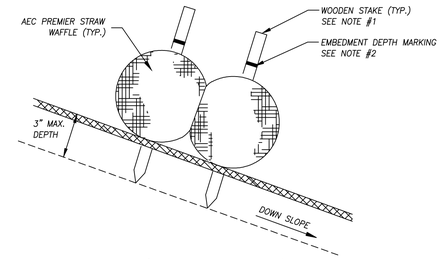


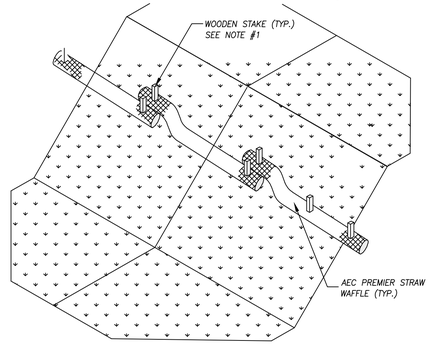
STRAW WATTLE INSTALLATION DETAIL (ON CAP)

NOT TO SCALE

NOTES:

1. PRIOR TO INSTALLATION OF WATTLES OR OTHER APPROVED EROSION CONTROL MEASURES, THE CONTRACTOR MUST PERFORM HAND DUG TEST HOLES UNDER THE SUPERVISION OF THE ON-SITE ENGINEER. IF SUFFICIENT CLEARANCE IS NOT FOUND, CONCRETE BLOCKS WILL BE USED AS A SUBSTITUTE FOR STAKES.
2. WATTLES CAN BE STAKED ON THE LANDFILL PROVIDED THE STAKES DO NOT EXCEED 3 INCHES INTO THE VEGETATIVE SUPPORT LAYER. STAKES SHALL BE CLEARLY MARKED 16 INCHES FROM THE TIP OF THE STAKE (3" MAX. EMBEDMENT DEPTH + 12" WATTLE) AND SHALL BE CLEARLY VISIBLE.





STRAW WATTLE SLOPE INSTALLATION DETAIL (ON CAP)

NOT TO SCALE

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AUGUST 26, 2015

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P:\CIVIL 3D PROJECTS\2014\14-2302 - BRIGHTFIELDS-NORWICH\DWG\DESIGN\(9) EROSION & SEDIMENT CTRL NARRATIVE & DETAILS.DWG

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Erosion & Sediment Control Narrative and Details

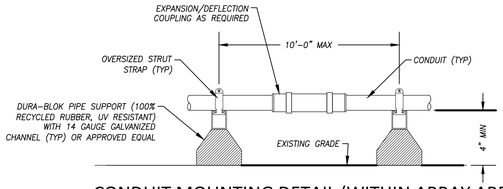
SCALE:

DATE: August 2015

JOB I.D. NO. 14-2302

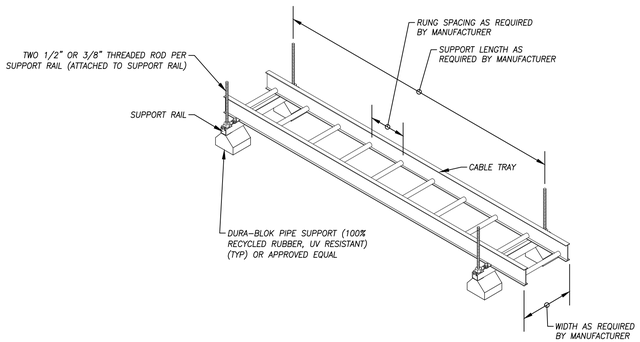
Revisions

SHEET NO. 9 / 11



CONDUIT MOUNTING DETAIL (WITHIN ARRAY AREA)

NOT TO SCALE



CABLE TRAY DETAIL (WITHIN ARRAY AREA)

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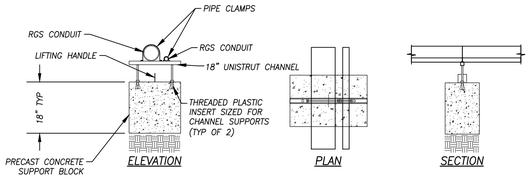
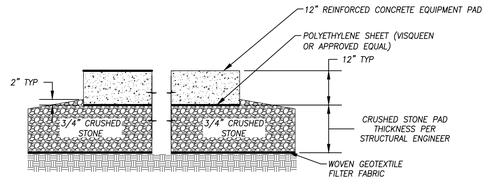


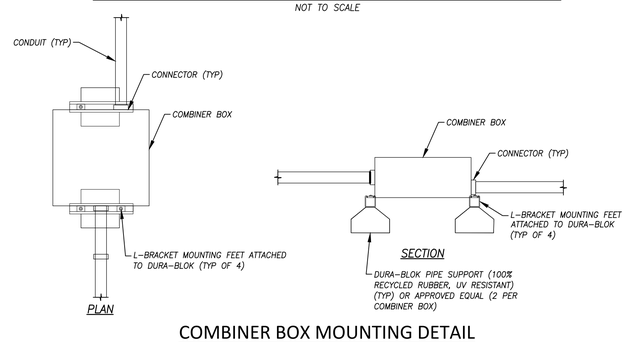
CONCRETE BLOCK RACEWAY DETAIL (ON LANDFILL CAP)

NOT TO SCALE



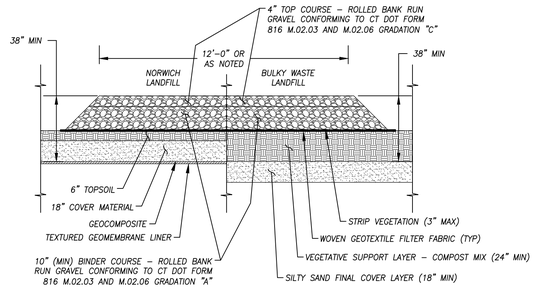
ELECTRICAL EQUIPMENT PAD DETAIL (ON LANDFILL CAP)

NOT TO SCALE



COMBINER BOX MOUNTING DETAIL

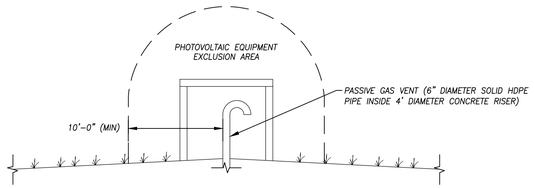
NOT TO SCALE



NOTE:
1. TEST PITS TO DETERMINE EXISTING ACCESS ROAD THICKNESS SHALL BE COMPLETED PRIOR TO UTILIZATION FOR CONSTRUCTION EQUIPMENT. IMPROVE AS REQUIRED FOR CONSTRUCTION EQUIPMENT USE.
2. ACCESS ROAD TO COMPLY WITH H-20 WHEEL LOADING.
3. TEST PITS TO DETERMINE CAPPING SYSTEM AND CONFIRM LAYER THICKNESS SHALL BE PERFORMED PRIOR TO INSTALLATION OF THE ACCESS ROAD.
4. ROADWAY DESIGN TO COMPLY WITH LOCAL EMERGENCY SERVICE REQUIREMENTS.
5. COMPACT PERMANENT ACCESS ROAD TO 95% MAXIMUM DENSITY IN LIFTS NOT TO EXCEED 12".

PERMANENT/TEMPORARY LANDFILL ACCESS ROAD

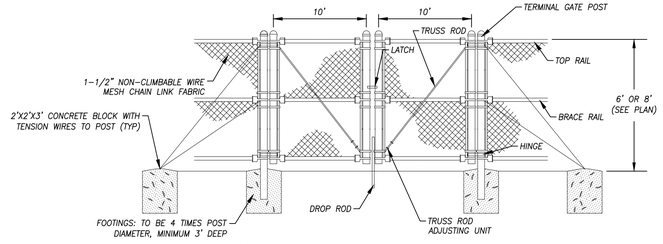
NOT TO SCALE



NOTE:
1. NO EQUIPMENT ASSOCIATED WITH THE PHOTOVOLTAIC SYSTEM SHALL BE LOCATED WITHIN A 10' EXCLUSION AREA OF PASSIVE GAS VENTS.
2. THE CONTRACTOR IS RESPONSIBLE FOR PROTECTING THE EXISTING GAS VENTS FROM DAMAGE FROM CONSTRUCTION EQUIPMENT/VEHICLES. ANY DAMAGE TO EXISTING GAS VENTS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER AND REPAIRED AT NO COST TO THE OWNER/DEVELOPER.

PASSIVE GAS VENT (EQUIPMENT FREE AREA) DETAIL

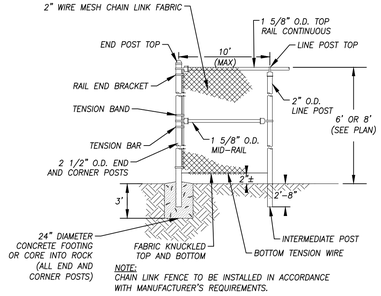
NOT TO SCALE



NOTE:
SWING GATES TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

OFF CAP GALVANIZED SWING GATE DETAIL MOUNTING PLANE #1

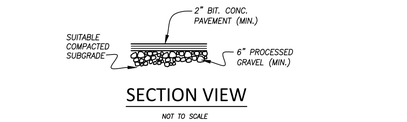
NOT TO SCALE



NOTE:
CHAIN LINK FENCE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

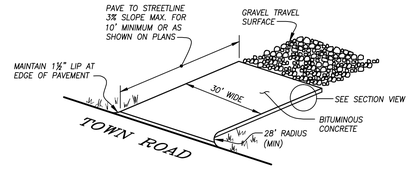
OFF CAP GALVANIZED CHAIN LINK FENCE DETAIL

NOT TO SCALE



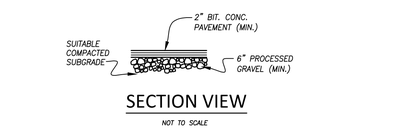
SECTION VIEW

NOT TO SCALE



TYPICAL DRIVEWAY APRON MOUNTING PLANE #1

NOT TO SCALE



SECTION VIEW

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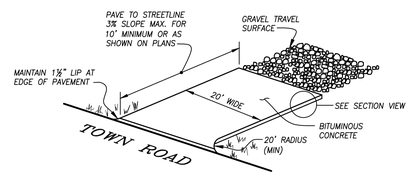

TYPICAL DRIVEWAY APRON MOUNTING PLANE #4

NOT TO SCALE



NOTE:
1. SIGNS MOUNTED ON GATES AT ALL ENTRANCES.
2. SIGNS TO BE RATED FOR OUTDOOR ENVIRONMENTS.

IDENTIFICATION SIGNAGE

NOT TO SCALE

29102

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AUGUST 26, 2015

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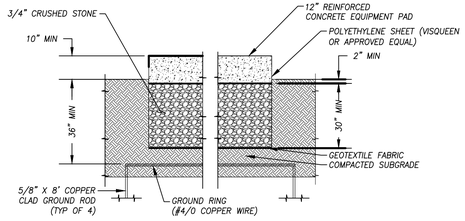
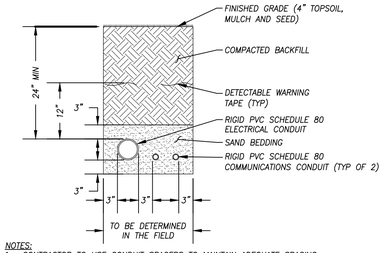
SHEET NO. 10 / 11



OFF CAP ELECTRICAL EQUIPMENT PAD DETAIL

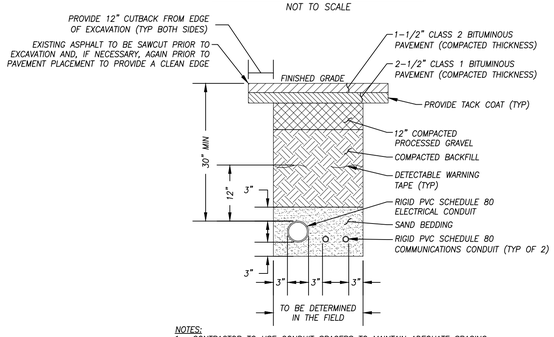
NOT TO SCALE



NOTES:
1. CONTRACTOR TO USE CONDUIT SPACERS TO MAINTAIN ADEQUATE SPACING.
2. MAINTAIN 3" SPACING BETWEEN OUTER WALLS OF CONDUITS.

OFF CAP TYPICAL MEDIUM VOLTAGE CONDUIT TRENCH DETAIL

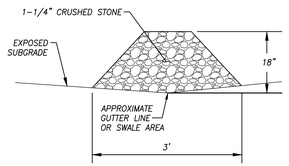
NOT TO SCALE



NOTES:
1. CONTRACTOR TO USE CONDUIT SPACERS TO MAINTAIN ADEQUATE SPACING.
2. MAINTAIN 3" SPACING BETWEEN OUTER WALLS OF CONDUITS.

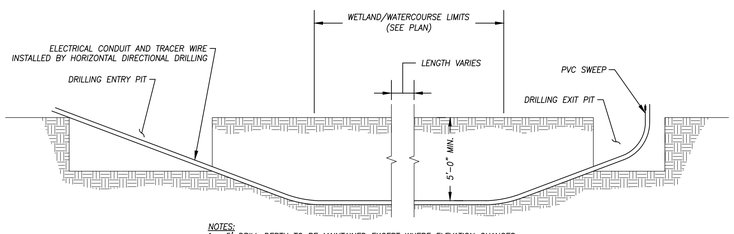
TYPICAL MEDIUM VOLTAGE CONDUIT TRENCH (IN PAVED AREAS) DETAIL

NOT TO SCALE



STONE CHECK DAM

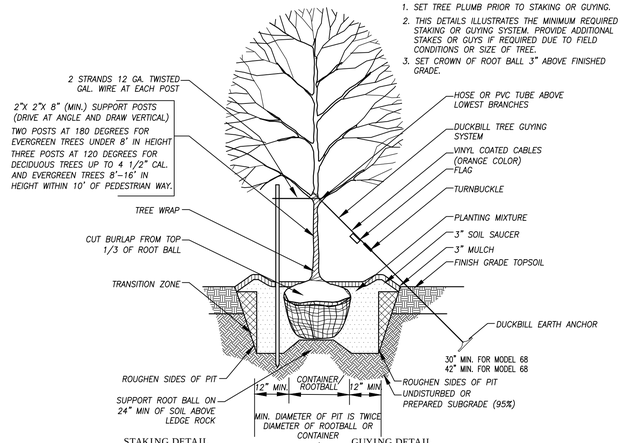
NOT TO SCALE



NOTES:
1. 5' DRILL DEPTH TO BE MAINTAINED EXCEPT WHERE ELEVATION CHANGES ARE REQUIRED TO AVOID OBSTACLES.
2. REFER TO ELECTRICAL PLANS AND WIRE SCHEDULE FOR ACTUAL NUMBER AND LOCATION OF CONDUITS.

TYPICAL HORIZONTAL DIRECTIONAL DRILLING DETAIL

NOT TO SCALE



NOTES:
1. SET TREE PLUMB PRIOR TO STAKING OR GUYING.
2. THIS DETAILS ILLUSTRATES THE MINIMUM REQUIRED STAKING OR GUYING SYSTEM. PROVIDE ADDITIONAL STAKES OR GUYS IF REQUIRED DUE TO FIELD CONDITIONS OR SIZE OF TREE.
3. SET CROWN OF ROOT BALL 3" ABOVE FINISHED GRADE.

STAKING DETAIL

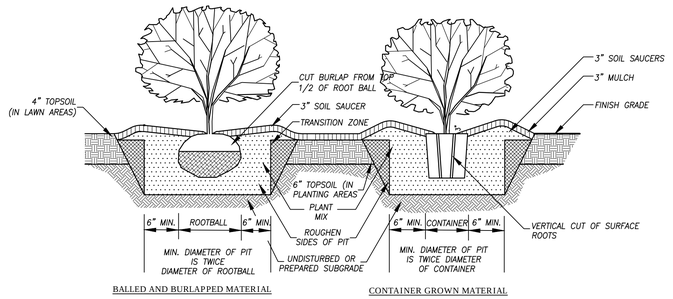
FOR USE WITH:
A. DECIDUOUS TREES UNDER 3" CALIPER.
B. DECIDUOUS TREES 3"-4 1/2" CALIPER WHEN PLANTED WITHIN 10' OF PEDESTRIAN WAYS.
C. EVERGREEN TREES UNDER 8' IN HEIGHT.
D. EVERGREEN TREES 8'-16' IN HEIGHT WHEN PLANTED WITHIN 10' OF PEDESTRIAN WAYS.

GUYING DETAIL

FOR USE WITH:
A. DECIDUOUS TREES 3"-4 1/2" CALIPER WHEN PLANTED GREATER THAN 10' OUTSIDE OF PEDESTRIAN WAYS.
B. DECIDUOUS TREE OVER 4 1/2" CALIPER.
C. EVERGREEN TREES 8'-16' IN HEIGHT WHEN PLANTED GREATER THAN 10' OUTSIDE OF PEDESTRIAN WAYS.
D. EVERGREEN TREES OVER 16' IN HEIGHT.

TREE PLANTING DETAIL

NOT TO SCALE



BALLED AND BURLAPPED MATERIAL

CONTAINER GROWN MATERIAL

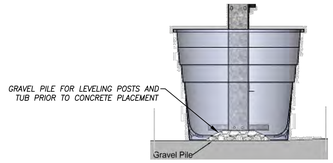
NOTES:
1. SET CROWN OF ROOTBALL 2" ABOVE FINISH GRADE.
2. FOR CONTAINER GROWN STOCK USE FINGERS OR A SHARP KNIFE TO LOOSEN ROOTS OUT OF THE OUTER LAYER OF POTTING SOIL; THEN CUT OR PULL APART ANY ROOTS CIRCLING THE PERIMETER OF THE CONTAINER.
3. AT PLANTING THOROUGHLY SOAK THE ROOT MASS AND ADJACENT SOIL. REPEAT SEVERAL TIMES DURING THE FIRST MONTH AND THROUGHOUT THE FOLLOWING TWO SUMMERS.

SHRUB PLANTING DETAIL

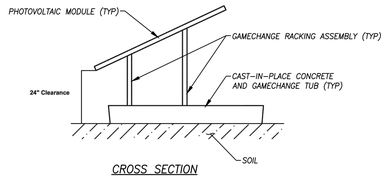
NOT TO SCALE

PLANTING SPECIFICATIONS:

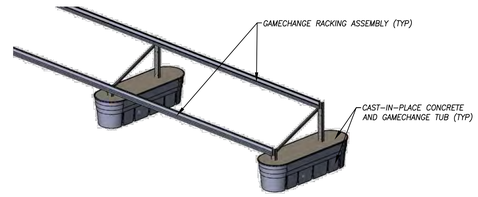
1. All materials and construction methods shall conform to the requirements of the Connecticut Association of Landscape Contractors Specification. All plants shall be nursery grown and conform to the latest edition of ANSI 260.1, AMERICAN STANDARD FOR NURSERY STOCK and also the minimum guidelines established for nursery stock published by the American Association of Nurserymen, Inc.
2. No substitution of plant materials will be allowed without the prior written consent of the Project Owner. Where a plant size range is provided at least 50% of the plants shall be of the larger size.
3. All lawn and planting area soil preparation shall be fertilized and amended according to recommendations of a soil analysis provided by an approved soil testing laboratory.
4. All exterior ground areas disturbed by construction and not covered by buildings, structures, paving, continuous planting beds or other site improvements shall be graded, topsoiled to a minimum depth of 4" and grass seeded. Provide lawn development in all areas of selective clearing as directed.
5. All plant pits must be free draining. Break up the bottom of the hole by fork if necessary to ensure plant has proper drainage.
6. Set all plants in center of plant pits, plumb and straight and as detailed on the drawing. All plant material shall bear the same relationship to finished grade as to original planting grade prior to digging. Trees shall be planted with the junction of roots and stem level with finished grade.
7. Handle balled and burlapped plants from the ball only. Once positioned in the hole, remove the top 1/3 of the burlap from the root ball without disturbing the roots.
8. Face each plant to give the best appearance. Final location of plant material should be approved by the Project Owner in the field.
9. Fill plant pits 2/3 their depth with prepared planting mixture, water thoroughly and allow to settle. Complete back-filling, water thoroughly to eliminate any voids and air pockets. Provide additional back-fill as necessary to conform to required elevation and as detailed.
10. Form saucer and install mulch over entire plant pit and saucer area as detailed.
11. All tree staking or guying shall be completed immediately after planting, but in no instance more than 24 hours after planting. See staking/guying detail. At the completion of the maintenance period remove all stakes, flags, guys, tree wrap, and anchors.
12. Mulch all new shrub beds and plant pits to achieve a 3" depth after settlement. Mulch all ground cover beds to achieve a 2" depth after settlement. Mulch for saucers and planting areas to be a double shredded bark mulch.
13. All plants shall be guaranteed for a period of one full year after inspection and acceptance by the Owner's representative, and shall have at least 80% healthy growth at the end of the guarantee period.
14. Landscape planting materials as proposed by this plan are Connecticut native and/or non-invasive species. This landscape plan has been designed to incorporate species which are prolific in USDA plant hardiness zone 6b and which require minimal energy input for upkeep and maintenance. References utilized for Connecticut native and non-invasive species selection include the Connecticut Botanical Society, the Connecticut agricultural experiment station, the U.S. Department of Transportation Federal Highway Administration, 2004 Connecticut Stormwater Quality Manual, New England Wetland Plants, Inc., and other sources.



GAMECHANGE TUB CROSS SECTION



CROSS SECTION

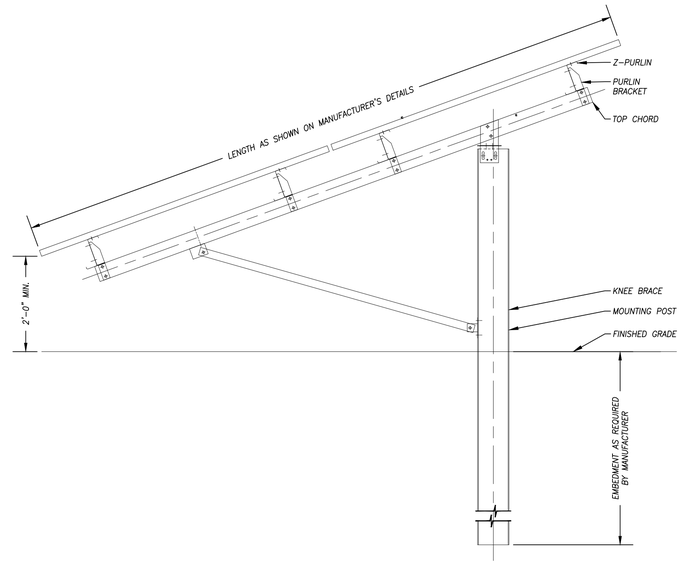


ISOMETRIC

NOTES:
1. GAMECHANGE RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.
2. SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION AND INSTALLATION SEQUENCE.

ON-CAP SOLAR ARRAY AND RACKING SYSTEM

NOT TO SCALE



NOTES:
SEE MANUFACTURER'S DETAIL SHEETS FOR ADDITIONAL INFORMATION REGARDING RACKING SYSTEM REQUIREMENTS AND INSTALLATION PROCEDURES. RACKING SYSTEM TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

TYPICAL POST MOUNTED RACKING SYSTEM DETAIL (OFF-CAP)

NOT TO SCALE

29102

DAVID C. McKAY, P.E. — LICENSE NO. — DATE

PROGRESS PRINT
AUGUST 26, 2015

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P:\CIVIL 3D PROJECTS\2014\14-2302 - BRIGHTFIELDS-NORWICH\DWG\DESIGN\(10-11) SITE DETAILS.DWG

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SolarCity Corporation
Proposed Solar Photovoltaic System
82 Rogers Road - Norwich, Connecticut
Mounting Planes 1-3
Site Details

SCALE:

DATE: August 2015

JOB I.D. NO. 14-2302

Revisions

SHEET NO. 11 / 11

Decommissioning Plan

82 Rogers Road Solar Project
Norwich, CT

This Decommissioning Plan establishes the approach to conduct decommissioning activities for the permanent closure of the solar panels and appurtenant equipment (Project or Facility) at the end of the Facility's useful life or the permanent cessation of the Facility's' operation, whichever comes first. This Plan also describes the approach for removal and/or abandonment of equipment associated with the Facility and describes anticipated land-restoration activities.

As background, the Site License Agreement (SLA) for the Site requires that no later than 90 days after its expiration all tangible personal property comprising the Facility must be removed from the site. The SLA also requires that the site be returned to its original condition, excepting ordinary wear and tear, including the removal of mounting pads or other support structures for the solar modules.

DECOMMISSIONING ACTIVITIES

In accordance with the SLA, decommissioning will involve removal and disposal or recycling of all Project components. All recyclable materials will be transported to the appropriate nearby recycling facilities. Any non-recyclable materials will be properly disposed of at a nearby landfill. 95% or greater of the Facility's components will be recyclable.

Decommissioning Preparation

The first step in the decommissioning process will be to prepare the site for decommissioning. Site decommissioning and equipment removal can take up to eight months to complete for a project of this size. Therefore, access roads, temporary fencing, and electrical power will temporarily remain in place for use by the decommissioning and site restoration workers until no longer needed. Demolition debris will be placed in temporary on-site storage areas pending final transportation and disposal/recycling according to the procedures listed below.

PV Equipment Removal and Recycling

During decommissioning, all Facility components that will not be used by the site owner will be removed from the site. Equipment removal will include all pad-mounted cabinets, wiring, solar modules, solar module racking, inverters, and panel boards. Steel posts and concrete pads that supported the module racking will be removed and any resulting holes will be backfilled with locally imported soil to match existing site soil conditions. The concrete transformer and interconnection equipment pads will be broken up and removed.

The demolition debris and removed equipment may be cut or dismantled into pieces that can be safely lifted or carried with the on-site equipment being used. The majority of glass, steel and aluminum will be processed for transportation and delivery to a licensed off-site recycling center. The solar modules will be transported to and recycled at the nearest facility that will accept them. Minimal non-recyclable materials are anticipated; these will be properly disposed of at the nearest qualified disposal facility.

Internal Power Collection System

The DC and AC power collection system will be dismantled and removed. All conduit and cabling that is removed will be recycled.

Access Roads

The onsite access driveway will remain in place to accomplish decommissioning at the end of the Facility's life. At the time of decommissioning, if the landowner determines that this road will be beneficial for the future use of the site, the access road may remain after decommissioning.. Roads that will not be used will be restored to pre-construction conditions by removal of the aggregate base material, fill of the compacted base section with locally imported soil to match existing onsite soils, and hydroseeding with a seed mix to match existing onsite groundcover.

Interconnection Line

The overhead interconnection cabling that connects the Project to the Norwich Public Utilities distribution network will remain in place during decommissioning activities to provide electric service onsite during decommissioning. At the time of decommissioning, if the landowner determines that this electric service line will be beneficial for the future use of the site, the line may remain after decommissioning. If the line is not used, it will be removed per Norwich Public Utilities guidelines and transported offsite to the nearest recycling facility.

SITE RECLAMATION

After the Project is completely decommissioned, and all Project equipment has been removed from the Site, additional activities will be performed to return the property back to its pre-construction conditions, excepting ordinary wear and tear.

Any site restoration or monitoring activities completed on the two closed landfill parcels will comply with applicable CTDEEP requirements.

Restoration Process

The decommissioning process will remove Project-related structures and infrastructure as described in the previous sections. Following decommissioning, site reclamation activities will occur. Reclamation will restore landform features, vegetative cover, and hydrologic function after the closure of the facility. The process will involve (where needed) the replacement of topsoil and vegetation, as well as modification of site topography where necessary to bring the Site back to substantially pre-construction conditions compatible with the adjacent surroundings.

Any excavated areas remain after removal of equipment pads or access road base material, will be backfilled and compacted with locally imported soil to match existing onsite soils, and hydroseeded with a seed mix to match existing onsite groundcover. Any other areas of lower than average ground surface level will receive similar treatment.

If any soils are compacted at levels that would affect successful re-vegetation, they will be de-compacted. The method of de-compaction will depend on how compacted the soil has become

over the life of the Project. Following de-compaction, re-contouring of the site will be conducted, if necessary, to return the Site to approximately match the pre-construction surface conditions and the surrounding area conditions. Original site drainage characteristics will be restored if they have not been maintained. It is unlikely that a significant amount of earthwork will be required, because the Project construction plan calls for minimal disturbance of the Site during Project construction. Grading activities will be limited to areas as shown on the design plans that require re-contouring. Efforts will be made to disturb as little of the natural drainages and existing natural vegetation that remain post-decommissioning as possible.

Any remaining bare earth areas will be hydroseeded with a seed mix to match existing onsite groundcover. Site restoration activities are anticipated to be limited, because the pre-construction conditions of the site are not planned to be significantly altered during Project construction. Also, any other activities that become necessary, will be performed to return the Site to a pre-construction condition.

Monitoring Activities

The Site will be monitored by SolarCity after site restoration activities are complete to confirm that any earthwork and re-vegetation were performed correctly. The Site will be periodically inspected (at least quarterly) to check for any eroded earthwork or failed vegetation. Any deficiencies will be promptly corrected. This monitoring will continue for a period of one year, or until the Site is re-developed for another future purpose, whichever comes first.

Financial Assurance

In accordance with the SLA, SolarCity shall provide, on or before the Commercial Operation Date of the System, financial assurance in the form of an annually renewing irrevocable Letter of Credit from a financial institution acceptable to the City of Norwich, in the form of financial assurance agreeable to the City to be in place prior to the start issuance of building permit naming the City as the beneficiary and to be drawn upon by City in the event that SolarCity fails to timely perform all of its obligations concerning removal of the System as required by the SLA. Such Letter of Credit shall remain effective and in force until such time as the System is fully removed and the Premises restored in accordance with the SLA or until such time that Licensor exercises its purchase option. The City shall provide up to fifty thousand (50,000) sq. ft. of space for the temporary storage and staging of tools, materials and equipment and for the parking of up to twenty (20) construction crew vehicles and one (1) temporary construction trailer and facilities reasonably necessary during System removal.