HANDWRITTEN APPLICATIONS WILL NOT BE ACCEPTED

[FOR OFFICE USE]

(Application #)

(Date received)

CITY OF SARATOGA SPRINGS

PLANNING BOARD

City Hall - 474 Broadway
Saratoga Springs, New York 12866-2296
Tel: 518-587-3550 fax: 518-580-9480
http://www.saratoga-springs.org

APPLICATION FOR:

SITE PLAN REVIEW

(INCLUDING PUD)

(Rev: 12/2015)

*****Application Check List - All submissions must include completed application check list and all required items.**

Project Name: Slack Chemical Company Expansion

Property Address/Location: 3 Unlimited Dr

Tax Parcel #: 178.00-1-50 *(for example: 165.52-4-37)* Zoning District: IND-G

Proposed Use: Warehousing/Manufacturing

Date special use permit granted (if any): _____ Date zoning variance granted (if any): _____

Is property located within (check all that apply)?: ☐ Historic District ☐ Architectural Review District ☐ 500' of a State Park, city boundary, or county/state highway

	APPLICANT(S)*	OWNER(S) *(If not applicant)*	ATTORNEY/AGENT
Name	Slack Chemical Co.		Munter Enterprises, Inc.
Address	21 Grande Blvd Saratoga Springs, NY 12866		881 Murray Rd Middle Grove, NY 12850
Phone	[redacted]		[redacted]
Email			

Identify primary contact person: ☐ Applicant ☐ Owner ☑ Agent

* An applicant must be the property owner, lessee, or one with an option to lease or purchase the property in question.

Application Fee: A check for the total amount below payable to: "Commissioner of Finance" MUST accompany this application.

☐	Sketch Plan -	$250	$ _____
☑	Final Site Plan Approval		
	Residential -	$250 plus $150/unit	$ _____
	Non-Residential -	$500 plus $100/1,000 SQ. FT.	$ 3490.00
☐	Modification		
	Residential -	$250	$ _____
	Non-Residential -	$500	$ _____
			Total $ _____

Submission Deadline – Check City's website (www.saratoga-springs.org) for application deadlines and meeting dates.

Does any City officer, employee or family member thereof have a financial interest (as defined by General Municipal Law Section 809) in this application? YES ☐ NO ☑. If YES, a statement disclosing the name, residence, nature and extent of this interest must be filed with this application.

I, the undersigned owner, leasee or purchaser under contract for the property, hereby request Site Plan Review by the Planning Board for the identified property above. I agree to meet all requirements under Section 240-7.2 of the Zoning Ordinance of the City of Saratoga Springs.

Furthermore, I hereby authorize members of the Planning Board and designated City staff to enter the property associated with this application for purposes of conducting any necessary site inspections relating to this application.

Applicant Signature: Stuart Field Date: 10/19/2016

If applicant is not current owner, owner must also sign.

Owner Signature: Stuart Field/ POA for Bob Stortz Date: 10/19/2016

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Rev.12/2015

SITE PLAN REVIEW SUBMITTAL CHECKLIST

Project Name: Slack Chemical Co. Expansion

Listed below are the minimum submittal requirements for site plan review as set forth in The City of Saratoga Springs' Zoning Ordinance Appendix B. The Planning Board reserves the right to request additional information, as necessary, to support an application. The Board also reserves the right to reject the application if these minimum requirements are not met. Please complete the checklist below and provide with your submission.

REQUIRED ITEMS: *3 hard copies and 1 digital copy of ALL materials are required.

CHECK EACH ITEM	** HANDWRITTEN APPLICATIONS WILL NOT BE ACCEPTED**
☑	1. Completed Site Plan Application (3 hard copies - *1 w/original signature - and 1 digital) and Fee
☑	2. SEQR Environmental Assessment Form- short or long form as required by action.
☑	3. Set of plans including: (3) large scale plans (sheets must be 24" x 36", drawn to a scale of not more than 1"=50 feet). One digital version of all submittal items (pdf) shall be provided.
☑	4. Basic or Full Storm Water Pollution Prevention Plan as required per City Code Chapter 242.
☐	5. Copy of signed DPW water connection agreement for all projects involving new water connections to the City system N/A
☐	6. Engineering Report for Water and Sanitary N/A
☐	7. Complete Streets Checklist N/A
☑	8. Project Cost Estimate-Quantities of work items and estimate of costs

REQUIRED ITEMS ON SITE PLAN, AS APPLICABLE:

☑	1. Property line survey prepared by a licensed land surveyor. Site plan must reference such survey with all corners set and marked on plan. A copy of the original property survey must also be included.
☑	2. North arrow and map scale
☑	3. Parcel tax map number
☑	4. Site location map
☑	5. Site vicinity map (all features within 300 feet of property)
☑	6. Identification of zoning district with corresponding area requirements

☑	7. Building setback lines, either listed or shown on plans.
☑	8. Title block with project name; name and address of applicant; and name and address of property owner (if different)
☑	9. Topography data tied to NGVD 1929 datum
☑	10. Name of all adjacent property owners
☑	11. Parcel street address (existing and any proposed postal addresses)
Yes ☑ No ☐ N/A ☐	12. Identification of all existing or proposed easements, covenants or legal rights-of-way on this property
☐ ☐ ☑	13. References to all prior variances or special use permits
☑ ☐ ☐	14. Existing and proposed contours and spot grades (at 2 foot intervals)
☑ ☐ ☐	15. Identification of all spoil or borrow areas
☑ ☐ ☐	16. Identification of all watercourses, designated State wetlands, buffers, Federal wetlands, floodplains, rock outcroppings, etc.
☑ ☐ ☐	17. Location of proposed storage
☑ ☐ ☐	18. Identification of all existing or proposed sidewalks or pedestrian paths (show type, size and condition of existing sidewalks)
☑ ☐ ☐	19. Location, design specifications and construction material for all proposed site improvements (drains, culverts, retaining walls, berms, fences, etc.)
☑ ☐ ☐	20. Location and distance to fire hydrant
☑ ☐ ☐	21. Location, size, and material of all existing and proposed utility services
☑ ☐ ☐	22. Parking lot layout plan and identification of all loading areas (number all spaces)
☑ ☐ ☐	23. Parking demand calculations
☑ ☐ ☐	24. Identification of parking spaces and access points for physically impaired persons
☑ ☐ ☐	25. Location and screening plan for dumpster or recycling bins
☑ ☐ ☐	26. Location, design, type of construction and materials, proposed use and exterior dimensions of all buildings (existing and proposed) on site
☑ ☐ ☐	27. Identification of storage of any potentially hazardous materials All inside
☑ ☐ ☐	28. Planting plan identifying quantity, species and size of all proposed new plant materials. Label existing plant material to be retained or removed.
☑ ☐ ☐	29. Lighting plan showing type, location and intensity of all existing and proposed exterior lighting fixtures
☑ ☐ ☐	30. Erosion and sediment control plan – including designated concrete truck washout area

Checklist prepared by: _____ Date: 10/23/16

617.20
Appendix B
Short Environmental Assessment Form

Instructions for Completing

Part 1 - Project Information. The applicant or project sponsor is responsible for the completion of Part 1. Responses become part of the application for approval or funding, are subject to public review, and may be subject to further verification. Complete Part 1 based on information currently available. If additional research or investigation would be needed to fully respond to any item, please answer as thoroughly as possible based on current information.

Complete all items in Part 1. You may also provide any additional information which you believe will be needed by or useful to the lead agency; attach additional pages as necessary to supplement any item.

Part 1 - Project and Sponsor Information

Name of Action or Project:
SLACK CHEMICAL BUILIDING ADDITION

Project Location (describe, and attach a location map):
3 UNLIMITED DRIVE, GRANDE INDUSTRIAL PARK, SARATOGA SPRINGS, NY

Brief Description of Proposed Action:
29,900 SQUARE FOOT ADDITION TO EXISTING 26,100 SQUARE FOOT FACILITY. ADDITION INCLUDES ADDITIONAL TRUCK DOCKS AND SITEWORK TO PROVIDE TRUCK ACCESS TO THOSE DOCKS.

Name of Applicant or Sponsor:	Telephone: [redacted]
SLACK CHEMICAL COMPANY	E-Mail:

Address:
3 UNLIMITED DRIVE

City/PO:	State:	Zip Code:
SARATOGA SPRINGS	NY	12866

	NO	YES
1. Does the proposed action only involve the legislative adoption of a plan, local law, ordinance, administrative rule, or regulation? If Yes, attach a narrative description of the intent of the proposed action and the environmental resources that may be affected in the municipality and proceed to Part 2. If no, continue to question 2.	☑	☐
2. Does the proposed action require a permit, approval or funding from any other governmental Agency? If Yes, list agency(s) name and permit or approval: NYSDEC - STORMWATER NOTICE OF INTENT	☐	☑

3.a. Total acreage of the site of the proposed action? 6.2 acres
b. Total acreage to be physically disturbed? 2.8 acres
c. Total acreage (project site and any contiguous properties) owned or controlled by the applicant or project sponsor? 6.2 acres

4. Check all land uses that occur on, adjoining and near the proposed action.
☐ Urban ☐ Rural (non-agriculture) ☑ Industrial ☐ Commercial ☐ Residential (suburban)
☐ Forest ☐ Agriculture ☐ Aquatic ☐ Other (specify): _____
☐ Parkland

	NO	YES	N/A
5. Is the proposed action, a. A permitted use under the zoning regulations?	☐	☑	☐
b. Consistent with the adopted comprehensive plan?	☐	☑	☐
6. Is the proposed action consistent with the predominant character of the existing built or natural landscape?	☐	☑	
7. Is the site of the proposed action located in, or does it adjoin, a state listed Critical Environmental Area? If Yes, identify: _____	☑	☐	
8. a. Will the proposed action result in a substantial increase in traffic above present levels?	☑	☐	
b. Are public transportation service(s) available at or near the site of the proposed action?	☑	☐	
c. Are any pedestrian accommodations or bicycle routes available on or near site of the proposed action?	☑	☐	
9. Does the proposed action meet or exceed the state energy code requirements? If the proposed action will exceed requirements, describe design features and technologies: _____	☐	☑	
10. Will the proposed action connect to an existing public/private water supply? If No, describe method for providing potable water: _____	☐	☑	
11. Will the proposed action connect to existing wastewater utilities? If No, describe method for providing wastewater treatment: _____	☐	☑	
12. a. Does the site contain a structure that is listed on either the State or National Register of Historic Places?	☑	☐	
b. Is the proposed action located in an archeological sensitive area?	☑	☐	
13. a. Does any portion of the site of the proposed action, or lands adjoining the proposed action, contain wetlands or other waterbodies regulated by a federal, state or local agency?	☑	☐	
b. Would the proposed action physically alter, or encroach into, any existing wetland or waterbody? If Yes, identify the wetland or waterbody and extent of alterations in square feet or acres: _____	☑	☐	
14. Identify the typical habitat types that occur on, or are likely to be found on the project site. Check all that apply: ☐ Shoreline ☑ Forest ☐ Agricultural/grasslands ☐ Early mid-successional ☐ Wetland ☐ Urban ☐ Suburban			
15. Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?	☑	☐	
16. Is the project site located in the 100 year flood plain?	☑	☐	
17. Will the proposed action create storm water discharge, either from point or non-point sources? If Yes, a. Will storm water discharges flow to adjacent properties? ☑ NO ☐ YES	☑	☐	
b. Will storm water discharges be directed to established conveyance systems (runoff and storm drains)? If Yes, briefly describe: ☑ NO ☐ YES _____			

	NO	YES
18. Does the proposed action include construction or other activities that result in the impoundment of water or other liquids (e.g. retention pond, waste lagoon, dam)? If Yes, explain purpose and size: _____	☑	☐
19. Has the site of the proposed action or an adjoining property been the location of an active or closed solid waste management facility? If Yes, describe: _____	☑	☐
20. Has the site of the proposed action or an adjoining property been the subject of remediation (ongoing or completed) for hazardous waste? If Yes, describe: _____	☑	☐

I AFFIRM THAT THE INFORMATION PROVIDED ABOVE IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE

Applicant/sponsor name: Slack Chemical Date: 10/24/16

Signature: _____

Part 2 - Impact Assessment. The Lead Agency is responsible for the completion of Part 2. Answer all of the following questions in Part 2 using the information contained in Part 1 and other materials submitted by the project sponsor or otherwise available to the reviewer. When answering the questions the reviewer should be guided by the concept "Have my responses been reasonable considering the scale and context of the proposed action?"

	No, or small impact may occur	Moderate to large impact may occur
1. Will the proposed action create a material conflict with an adopted land use plan or zoning regulations?	☐	☐
2. Will the proposed action result in a change in the use or intensity of use of land?	☐	☐
3. Will the proposed action impair the character or quality of the existing community?	☐	☐
4. Will the proposed action have an impact on the environmental characteristics that caused the establishment of a Critical Environmental Area (CEA)?	☐	☐
5. Will the proposed action result in an adverse change in the existing level of traffic or affect existing infrastructure for mass transit, biking or walkway?	☐	☐
6. Will the proposed action cause an increase in the use of energy and it fails to incorporate reasonably available energy conservation or renewable energy opportunities?	☐	☐
7. Will the proposed action impact existing: a. public / private water supplies?	☐	☐
b. public / private wastewater treatment utilities?	☐	☐
8. Will the proposed action impair the character or quality of important historic, archaeological, architectural or aesthetic resources?	☐	☐
9. Will the proposed action result in an adverse change to natural resources (e.g., wetlands, waterbodies, groundwater, air quality, flora and fauna)?	☐	☐

	No, or small impact may occur	Moderate to large impact may occur
10. Will the proposed action result in an increase in the potential for erosion, flooding or drainage problems?	☐	☐
11. Will the proposed action create a hazard to environmental resources or human health?	☐	☐

Part 3 - Determination of significance. The Lead Agency is responsible for the completion of Part 3. For every question in Part 2 that was answered "moderate to large impact may occur", or if there is a need to explain why a particular element of the proposed action may or will not result in a significant adverse environmental impact, please complete Part 3. Part 3 should, in sufficient detail, identify the impact, including any measures or design elements that have been included by the project sponsor to avoid or reduce impacts. Part 3 should also explain how the lead agency determined that the impact may or will not be significant. Each potential impact should be assessed considering its setting, probability of occurring, duration, irreversibility, geographic scope and magnitude. Also consider the potential for short-term, long-term and cumulative impacts.

☐ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action may result in one or more potentially large or significant adverse impacts and an environmental impact statement is required.

☐ Check this box if you have determined, based on the information and analysis above, and any supporting documentation, that the proposed action will not result in any significant adverse environmental impacts.

Name of Lead Agency	Date
Print or Type Name of Responsible Officer in Lead Agency	Title of Responsible Officer
Signature of Responsible Officer in Lead Agency	Signature of Preparer (if different from Responsible Officer)

PRINT

Slack Expansion

Statement of Probable Construction Cost ***15-Oct-16***

Work within R.O.W.	**0.00**	@	25%	**0.00**
Work on the Site	**$ 161,687.00**	@	25%	**$ 40,422**

Total Letter of Credit $ 40,422

No Work is Required within the R.O.W. for this Project

Site Work

Item	*Unit*			*Unit Price*		*Cost*
Erosion Control						
Sediment Control Fence	1220	lf	@	$ 1.50	= $	1,830.00
Temporary Sediment Trap	2	ls	@	$ 900.00	= $	1,800.00
Demolition and Site Clearing						
Caution Flagging	500	lf	@	$ 0.50	= $	250.00
Clearing and Grubbing	1.5	ac	@	$ 2,000.00	= $	3,000.00
Strip Topsoil and Stockpile	1540	cy	@	$ 3.00	= $	4,620.00
Excavation and Site Grading						
Site Grading	13,370	sy	@	$ 1.50	= $	20,055.00
Pavement Subbase Course	75	cy	@	$ 12.00	= $	900.00
Spread Topsoil	960	cy	@	$ 3.00	= $	2,880.00
Storm Drainage						
Eave Trench	3960	sf	@	$ 4.50	= $	17,820.00
Catch Basin	2	ea	@	$ 600.00	= $	1,200.00
Drywell 8' x 8'	7	ea	@	$ 1,500.00	= $	10,500.00
12" HDPE	64	lf	@	$ 23.00	= $	1,472.00
8" Infiltration Pipe	148	lf	@	$ 28.00	= $	4,144.00
Paving and Curbs						
Segmental Retaining Wall	415	lf	@	$ 56.00	= $	23,240.00
Stone Surface	4200	sy	@	$ 13.00	= $	54,600.00
Asphalt Paving	225	sy	@	$ 18.00	= $	4,050.00
Planting						
Fine Grade and Seed	5160	sy	@	$ 1.10	= $	5,676.00
Transplant Tree	1	ea	@	$ 150.00	= $	150.00
Survey						
As-Built Survey	1	ls	@	$ 3,500.00	= $	3,500.00
				Total On-Site		***$ 161,687.00***

Slack Expansion

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				Total On-Site	***$***	***161,687.00***

STORMWATER MANAGEMENT REPORT
and
STORMWATER POLLUTION PREVENTION PLAN NARATIVE
for

SLACK CHEMICAL COMPANY, INC.

PROPOSED EXPANSION

City of Saratoga
Saratoga County, New York
Planning Board #16.--

Prepared by: NACE ENGINEERING, P.C.
169 HAVILAND ROAD
QUEENSBURY, NY 12804

Thomas W. Nace, P.E.

October 24, 2016
File: #47618

STORMWATER MANAGEMENT REPORT
MUNTER ENTERPRISES
SLACK CHEMICAL COMPANY – PROPOSED EXPANSION

Site Location

The project site is a currently developed lot in the eastern portion of W.J. Grande Industrial Park, on the northeast side of Unlimited Drive. The 6.9 acre lot is owned by Slack Chemical Company and was developed two years ago.

Existing Conditions

Current development of the site includes office space, manufacturing space and warehouse space totaling 26,120 sq. ft. The existing building was positioned on the site so that expansion of the building could occur on both the east and west sides of the existing building. The area of the proposed additions is currently wooded.

The USDA Soil Survey of Saratoga County shows the soils to be Windsor, loamy sands (hydrologic soils group A), with rapid percolation and groundwater deeper than 6 feet (see attached USDA soils map). Soil testing done for the adjacent Unlimited Potential and SCA Tissue sites showed medium sands to a depth of 5 to 7 feet underlain by coarse sand. No indication of seasonal high water table was evident to a depth of over 8 feet. Percolation rates were slightly less than one minute. Additionally, excavations for the existing Slack Chemical building verified the soils to be well drained coarse sand to a depth of 12+ feet.

The existing site and drainage patterns are shown on the Existing Conditions Plan.

Existing Conditions Summary:

Parcel Area:	6.92 acres		
Building & Pavement Coverage:	1.52 acres	–	21.9 %
Pervious Surface:	5.40 acres	=	78.1 %

Proposed Development

The proposed project consists of additions on the east and west sides of the existing building totaling 29,900 sq. ft. The project also includes truck docks on the north side of the additions and modification of the existing truck access drive to provide access to the docks.

The proposed project will result in the following lot coverage:

Proposed Conditions Summary

Parcel Area:	6.92 acres		
Building & Pavement Coverage:	2.76 acres	=	39.9 %
Pervious Surface:	5.45 acres	=	60.1 %

The proposed development will result in an increase of impervious surface of 18.0%

Construction Phasing
The project will be constructed in a single phase.

Green Infrastructure Practices and Requirements
As stated in the *New York State Stormwater Management Design Manual*, Section 3.2 – *Green Infrastructure for Stormwater Management* "The objective is to replicate pre-development hydrology by maintaining pre-construction infiltration, peak runoff flow, discharge volume, as well as minimizing concentrated flow by using runoff control techniques to provide treatment in a distributed manner before runoff reaches the collection system".

Due to the highly permeable nature of the existing site soil, there is the opportunity to use infiltration practices for runoff from all portions of the developed site.

Specific Green Infrastructure Practice goals are being addressed as follows:

Planning Practices for Preservation of Natural Features and Conservation

Preservation of undisturbed areas - This project is located in an industrial park which is substantially developed. However, a substantial natural buffer across the east and west sides of the site will remain undisturbed to preserve the natural woodland. Within the developed portion of the site a large area of existing trees will be maintained between the building and the truck assess road to the rear of the building.

Reduction of clearing and grading – parking and site circulation roads kept to a minimum.

Locating development in less sensitive areas – all planned development has been located in the center of the site, retaining natural buffers around the perimeter. There are no environmentally sensitive areas within or adjacent to the site.

Open space design – as previously stated, wide perimeter buffers are being maintained.

Soil restoration – Existing soil on the site is very permeable. Soil restoration will be required only on lawn areas which have been compacted as a result of construction activities.

Planning Practices for Reduction of Impervious Cover

Sidewalk reduction – Sidewalk length has been kept to a minimum required for access.

Driveway reduction – Driveway length has been dictated by the necessity for truck and emergency vehicle access to the building.

Building footprint reduction – nature of project is not conducive to multi-story building.

Parking reduction – parking dictated by code requirement.

Green Infrastructure Techniques

Rain Gardens – mainly used for residential development, rain gardens are generally not appropriate for larger commercial or industrial projects.

Green Roofs – Green roofs are very expensive to construct and maintain. Additionally, they are only marginally suitable for cold climates. They were not considered for this project because better alternatives were available.

Stormwater Planters – Generally used for small areas of pavement, stormwater planters were not considered for this project due to the size of the hard surfaces to be accommodated.

Rain Barrels – Like stormwater planters, rain barrels are generally used for small roof areas unless there is a great need for the collected water. Additionally, they are generally unsuitable for cold climates.

Porous Pavement – On this project, porous pavement would only be considered appropriate for the parking lot. However, it is not in general use in this area and the special asphalt mixes and placement requirements, as well as maintenance requirements have ruled it out for this project.

Proposed Stormwater Management

To the maximum extent possible drainage patterns and facilities established and constructed with the initial site development will be maintained.

All runoff from existing and proposed development will be handled by infiltration into the sandy, well drained soils on the site.

Runoff from the building roof will be handled by 6 foot wide by 4 foot deep, stone filled eave trenches along the front and sides of the building.

Runoff from the entrance drive and parking lot on the south side of the building will remain as is, handled by an infiltration swale which overflows into a drywell.

Runoff from the truck entrance drive, loading dock area and remainder of the developed site will be directed to two depressions located in the rear of the site. The depressions will provide pretreatment and sediment collection. The eastern most depression will include two drywells located so that their inlets are 6" above the bottom of the depression. The western most depression will include a catch basin located so that its inlet is located 6" above the bottom of the depression. The outfall of the catch basin will be piped to a series of four drywells which are interconnected with infiltration/equalization trenches.

Calculations

For analysis purposes the project is broken into three stormwater management areas:

- Building roof (subcatchments #1, 2 & 3)

- Western rear portion of lot (subcatchment #4)
- Eastern rear portion of lot (subcatchment #5).
- South portion of lot (subcatchment #6)

Stormwater Management Worksheets for each of these stormwater management areas (SMA) are included in the appendices. These provide the calculations for Water Quality Volume (WQv), minimum Runoff Reduction Volume (RRv) required, and RRv provided. These calculations are summarized as follows:

Water Quality Control

The Water Quality Volume (WQv) as defined by P x Rv x A / 12 represents the anticipated runoff from the developed site during a 90% rainfall event. In accordance with the *New York State Stormwater Management Design Manual*, the WQv must be treated either through green infrastructure practices or through standard WQv treatment practices such as ponds and wetlands. The following table summarizes the required WQv and the provided WQv for each stormwater management area as derived in the Stormwater Management Worksheets in the appendices. (note that the WQv required is equal to the WQv provided because all runoff from the 90% storm -1" rainfall – is being infiltrated in the proposed infiltration facilities)

Required WQv

Stormwater Management Area	WQv Required (cf)	WQv Provided (cf)
Building roof	4,966	4,966
Rear west	3,179	3,179
Rear east	1,231	1,231
South	935	935

Pretreatment is required prior to infiltration facilities. Since the native soils are in hydrologic soil group A, 100% of the WQv runoff must receive treatment. Pretreatment for the infiltration trenches and drywells is provided by a combination of grass filter strips adjacent to the paved surfaces and shallow grass swales conveying the runoff to the infiltration facilities.

Pretreatment

Stormwater Management Area	Contributing WQv (cf)	Required % Treatment	Required Treatment (cf)	Pretreatment Type	Pretreatment Provided (cf)
Rear west	3,180	100%	3,180	Filter Strip / Grass Swale	3,180
Rear east	1,231	100%	1,231	Filter Strip / Grass Swale	1,231
South	935	100%	935	Filter Strip / Grass Swale	935

Runoff Reduction

The *New York State Stormwater Management Design Manual* requires that Area Reduction, Impervious Disconnection and Source Control Practices be utilized to achieve a Runoff Reduction Volume RRv that, if possible, equals the Water Quality Volume WQv. At a minimum, RRv must

meet a minimum value which is a % of WQv dependent on the hydrologic soil group. The complete RRv calculations for each stormwater management areas are provided in the Stormwater Management Worksheets included in the appendices. A summary of the results are provided in the table below.

Runoff Reduction Volumes

Stormwater Management Area	WQv (cf)	Min. RRv (cf)	RRv Provided (cf)	RRv % WQv
Building roof	4,966	2,731	4,902	99%
Rear west	3,180	1,669	5,131	307%
Rear east	1,231	626	1,736	141%
south	935	474	1,272	136%

HydroCAD Analysis

HydroCAD stormwater modeling software has been used to analyze the pre and post development stormwater runoff from the site. The developed site has been modeled as a series of subcatchments (discrete drainage areas), reaches and ponds as shown on the attached HydroCAD drainage diagram. As in the WQv and RRv analysis, the site has been divided into three stormwater management areas. All calculations are based upon the following:

- All computations SCS TR-20, HydroCAD
- 1 year, 24 hour storm - Type II rainfall = 2.2"
- 10 year, 24 hour storm - Type II rainfall = 3.8"
- 100 year, 24 hour storm - Type II rainfall = 6.4"
- Soils – Winsor Sands – hydrologic soil group A, infiltration rate = 60 in/hr
- Design infiltration rate = 45 in/hr (inc. safety factor of 1.5) for the drywells, infiltration swale and eave trenches.

The attached HydroCAD calculations show the stormwater routing for the site and results for each of the subcatchments and ponds.

Channel Protection Volume

Channel protection is required by the DEC Stormwater Management Design Manual. This requires 24 hour extended detention of the 1 year 24 hour storm which is obviously meet since all of the 1-year storm is infiltrated. The HydroCAD analysis of the developed site shows that the Channel Protection Volume (CPv) is as presented in the table below:

Required Channel Protection Volume

Stormwater Management Area	CPv Required (cf)	Detention Volume Provided (cf)
Building roof	9,627	9,627
Rear west	1,699	1,699
Rear east	348	348
South	218	218

Overbank Flood Control

Overbank flood control is required by the DEC Stormwater Management Design Manual. The overbank flood control requires that the peak discharge rate from the 10 year 24 hour storm be

reduced to pre-development rates. This requirement is obviously met since all of the 10-year storm is infilterated. HydroCAD analysis shows the pre and post development discharges from each Stormwater Management Area to be as follows:

Overbank Flood Control

Stormwater Management Area	Predeveloped 10 yr storm (cfs)	Postdeveloped 10 yr storm (cfs)
Building roof	0	0
Rear west	0	0
Rear east	0	0
South	0	0

Extreme Storm Control

Extreme storm control is required by the DEC Stormwater Management Design Manual. The extreme storm control requires that the peak discharge from the 100 year storm be reduced to pre-development rates. HydroCAD analysis shows the pre and post development discharges from each Stormwater Management Area to be as follows:

Extreme Storm Control

Stormwater Management Area	Predeveloped 100 yr storm (cfs)	Postdeveloped 100 yr storm (cfs)
Building roof	0	0
Rear west	0	0
Rear east	0	0
South	0	0

Conclusions

The proposed stormwater management systems will contain and infiltrate all runoff, up through a 100-year storm. As shown in the calculations they meet all of the green infrastructure requirements as well as the water quality and peak discharge requirements.

Historical Places or Archaeological Resources

The proposed project will not adversely affect any properties listed or eligible to be listed on the National Register of Historic Places; nor will it affect any properties mapped as archaeologically sensitive by OPRHP. A copy of the OPRHP sensitivity map was submitted with the original project.

Temporary Erosion and Sediment Control Measures

Erosion and sediment control measures will be incorporated into the construction of the project. These practices will comply with the New York State Department of Environmental Conservation publication entitled "New York Guidelines for Urban Erosion and Sediment Control" (the blue book).

Separate erosion and sediment controls will be installed for each phase of construction. The following temporary erosion and sediment control devices will be utilized as shown on the Sediment and Erosion Control Plans.

Sediment Control Fence: Silt fence shall be used to control erosion from sheet flow on slopes not to exceed 3 on 1. Concentrated flows shall not be directed toward the silt fence. The silt fence must be installed parallel to the contour lines to eliminate drainage along the fence.

Temporary Seeding: Land that is stripped of vegetation will be seeded and planted as soon as possible. Any area that will remain cleared but not under construction for 10 days or longer will be seeded with a ryegrass mixture and mulched to stabilize soil until construction resumes.

Temporary Silt Basin: A Temporary Silt Basins shall be constructed at low points outside of the pavement area and discharge clean stormwater into the drainage swale which shall be protected from sedimentation.

Temporary Diversion Swales: Temporary diversion swales shall be constructed as required, either to divert clean stormwater runoff from newly graded areas or to direct sediment laden runoff to a sediment trapping device.

Stabilized Construction Entrance: Existing roads will be protected by installation of a crushed stone blanket for cleaning construction vehicle wheels. Blankets shall be placed at any intersection of a construction road with a paved or publicly owned road. Stabilized construction entrances shall be installed as shown on the plans.

Tree Protection: Trees to be preserved within areas of construction shall be protected by placing construction fencing around the drip lines. Construction workers will be directed to avoid storing equipment or soil under trees to be preserved. There shall be no parking of automobiles or construction vehicles under trees.

Dust Control: Measures for dust control during construction shall be implemented as needed (daily water sprays will be used during dry conditions. In addition to water sprays, temporary mulching, temporary seeding and covering stockpiles with tarps shall be implemented when necessary.

Rock Check Dam: Small stone check dams shall be constructed in any temporary drainage channels during construction. These dams shall be constructed in the locations shown on the plans and as

necessary to control any drainage from the construction site which concentrates in flow paths or channels. Dams shall be constructed as detailed on the Erosion and Sediment Control Plan. Dams shall be cleaned of any sediment after each rainfall as needed.

Control of Litter, Construction Debris and Construction Chemicals
During the course of infrastructure and home construction, the site shall be kept clear of debris and litter which could be transported by water or wind. This material shall be picked up daily and shall be stored in waste debris containers where it is securely held.

All petroleum products or other waste contaminants which are water soluble or could be dispersed and transported by stormwater shall be stored in covered containers and be regularly removed from the site and properly and legally disposed of. All petroleum or other hazardous materials shall be stored and handled in conformance with NYSDEC spill prevention and containment requirements.

Sequence of Construction
Construction sequencing is specified in detail on the Erosion and Sediment Control Plans.

Maintenance of Temporary Erosion and Sediment Control Devices
The sediment basins shall be inspected at least weekly and after every rain event by the Contractor. When 50% of the volume of the trap is full, The Contractor shall remove collected sediment and dispose of properly.

The Contractor shall inspect the sediment control fence weekly and after every rain event and remove trapped sediment and maintain the devices in good working order.

Permanent Erosion Control
All pervious areas shall be graded, topsoil installed and seeded or planted as soon as practical. Seed beds shall be mulched with straw or hydro-mulch with tackifier and plant beds shall be mulched with pine bark mulch. Seeded areas on slopes over 3:1 shall be stabilized with erosion control netting as specified on the plans.

Post-Construction Operation and Maintenance of Stormwater Control Devices
All portions of the stormwater control system shall be inspected on a periodic basis and shall be cleaned and/or repaired as appropriate.

- Roadside infiltration swales - Inspect and clean fall and spring; mow twice per year.
- Eave trenches - Inspect and clean surface fall and spring
- Infiltration basins / depressions - Inspect and remove leaves fall and spring.
- Drywells - Inspect and clean grates monthly; inspect and clean inside biannually.

Keep maintenance records showing dates and descriptions of all inspections and maintenance.

Appendix

- **Stormwater Management Worksheets**
- **Drainage Area Maps**
- **HydroCAD Drainage Diagram**
- **Post Developed Conditions – 1 Year Design Storm**
- **Post Developed Conditions – 10 Year Design Storm**
- **Post Developed Conditions – 100 Year Design Storm**

STORMWATER MANAGEMENT WORKSHEETS

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMOICAL - ROOF STORMWATER MANAGEMENT AREA

Project: 47618- Slack Addition roof management area Date: 10/21/2016

Watershed Drainage Area Soils:

DA: 1.44 (acres) HSG(s): A 90% Rain (P): 1 (inches)

WATER QUALITY VOLUME (before runoff reduction)

Rv = 0.05 + 0.009(I) where I is % Impervious Cover: Rv minimum = 0.2

I = Percent Impervious Cover

A = Area of Site In Acres (Contributing Area)

1. ***Water Quality Volume (WQv) = P•A•Rv/12***

DA= 1.44 AI*= 1.44 acres Rv= 0.9500

I = 100 Applied Rv = 0.9500

Original WQv=	**0.1140**	**ac-ft**
	4965.84	**cf**

**If soil restoration is not practiced, include construction compacted areas as impervious.*

2. ***Minimum RRv Requirements*** *(when 100% WQv reduction cannot be achieved):* ***RRv = P x 0.95 x S x AI / 12***

with S= 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

P= 1 inches S= 0.55 AI= 1.44 acres

Min. RRv required=	**0.0627**	**ac-ft**
	2731.21	**cf**

AREA REDUCTION PRACTICES

3. ***Area Reduction Practices (complete for all applicable practices): (area includes practice and contributing area)***

- Conservation of natural areas: (contributing AI = 0.00 ac.) Area = 0.00 ac.
- Riparian buffers/filter strips: (contributing AI = ____ ac.) Area = ____ ac.
- Tree planting/tree preservation: (contributing AI = ____ ac.) Area = ____ ac.
- Total area reduction: Total Area Reduced = 0.00 ac.
- Total impervious area within area reduction: AI in Reduced Area = 0.00 ac.

4. ***Subtract total area reduction from DA:***

Remaining Drainage Area = 1.44 ac.

Remaining AI = 1.44 ac.

5. ***Recalculate WQv for site area remaining after area reductions:***

Remaining DA = 1.44 Remaining AI = 1.44 ac. Rv = 0.9500

I = 100.00

Area Reduced WQv =	**0.1140**	**ac-ft**
	4965.84	**cf**
RRv =	**0.0000**	**ac-ft**
	0	**cf -**

6. ***Runoff reduction volume (RRv) = original WQv - area reduced WQv***

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMOICAL - ROOF STORMWATER MANAGEMENT AREA

IMPERVIOUS DISCONNECTION

7. ***Impervious Area Disconnection:***

   Total disconnected impervious area (now considered pervious for RV calculation(s))

Area =	0.00	ac.

8. ***Recalculate WQv with RV modified for impervious disconnection:***

   DA = 1.44 ac. Remaining AI 1.44 ac. Rv = 0.95

   I = 100.00

Imperv. Disc. Reduced WQv =	0.1140	ac-ft
	4965.84	cf

9. ***Runoff reduction volume = area reduced WQv - Rv reduced WQv***

RRv =	0.0000	ac-ft
	0	cf

SOURCE CONTROL WQv TREATMENT PRACTICES (from attached worksheet)

10a. Subtotal DA tributary to Source Control treatment practices = 1.440 acres

10b. Subtotal Source Control WQv Treatment Volume = 0.114 ac-ft

10c. Subtotal Runoff Reduction Volume (RRv):

10d. Subtotal AI = 1.4400

Subtotal (Rv) RRv =	0.103	**ac-ft**
	4469.26	**cf**

TOTAL RUNOFF REDUCTION VOLUME (RRv)

11. ***Total drainage area treated with runoff reduction/source control practices =*** 1.44 acres

    (Area reduction (#3) + total DA tributary to source control (#10a))

12. ***Total impervious area (AI) treated with area reduction or source control RRv =*** 1.44 ac-ft

    (AI #3 + AI #7 + AI # 10d)

13. ***Total RRv provided (#6 + #9 + #10c) = Total (RRv) =***

Total Provided RRv =	0.1026	**ac-ft**
	4469.256	**cf**

14. ***Is Total Provided RRv ≥ Original WQv?*** Yes ✓ No _____ If yes, skip to #19

15. ***Is Total Provided RRv ≥ Minimum RRv?*** Yes ✓ No _____ If no, provide additional RRv and recalculate

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMICAL- NORTHWEST MANAGEMENT AREA

Project: 47618- Slack Addition northrear west management area Date: 10/21/2016

Watershed Drainage Area: Soils:

DA: 1.68 (acres) HSG(s): A 90% Rain (P): 1 (inches)

WATER QUALITY VOLUME (before runoff reduction)

Rv = 0.05 + 0.009(I) where I is % Impervious Cover: Rv minimum = 0.2

I = Percent Impervious Cover

A = Area of Site In Acres (Contributing Area)

1. ***Water Quality Volume (WQv) = P•A•Rv/12***

DA= 1.68 AI*= 0.88 acres Rv= 0.5214

I = 52.381 Applied Rv = 0.5214

Original WQv=	**0.0730**	**ac-ft**
	3179.88	**cf**

**If soil restoration is not practiced, include construction compacted areas as impervious.*

2. ***Minimum RRv Requirements*** *(when 100% WQv reduction cannot be achieved).* ***RRv = P x 0.95 x S x AI / 12***

with S= 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

P= 1 inches S= 0.55 AI= 0.88 acres

Min. RRv required=	**0.0383**	**ac-ft**
	1669.07	**cf**

AREA REDUCTION PRACTICES

3. ***Area Reduction Practices (complete for all applicable practices): (area includes practice and contributing area)***

- Conservation of natural areas: (contributing AI = 0.00 ac.) Area = 0.00 ac.
- Riparian buffers/filter strips: (contributing AI = ____ ac.) Area = ____ ac.
- Tree planting/tree preservation: (contributing AI = ____ ac.) Area = ____ ac.
- Total area reduction: Total Area Reduced = 0.00 ac.
- Total impervious area within area reduction: AI in Reduced Area = 0.00 ac.

4. ***Subtract total area reduction from DA:***

Remaining Drainage Area = 1.68 ac.

Remaining AI = 0.88 ac.

5. ***Recalculate WQv for site area remaining after area reductions:***

Remaining DA = 1.68 Remaining AI = 0.88 ac. Rv = 0.5214

I = 52.38

Area Reduced WQv =	**0.0730**	**ac-ft**
	3179.88	**cf**

6. ***Runoff reduction volume (RRv) = original WQv - area reduced WQv***

RRv =	**0.0000**	**ac-ft**
	0	**cf**

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMICAL- NORTHWEST MANAGEMENT AREA

IMPERVIOUS DISCONNECTION

7. ***Impervious Area Disconnection:***

   Total disconnected impervious area (now considered pervious for RV calculation(s))

   Area = 0.00 ac.

8. ***Recalculate WQv with RV modified for impervious disconnection:***

   DA = 1.68 ac. Remaining AI 0.88 ac. Rv = 0.52143

   I = 52.38

   Imperv. Disc. Reduced WQv = 0.0730 ac-ft

   3179.88 cf

9. ***Runoff reduction volume = area reduced WQv - Rv reduced WQv***

   RRv = 0.0000 ac-ft

   0 cf

SOURCE CONTROL WQv TREATMENT PRACTICES (from attached worksheet)

10a. Subtotal DA tributary to Source Control treatment practices = 1.680 acres

10b. Subtotal Source Control WQv Treatment Volume = 0.073 ac-ft

10c. Subtotal Runoff Reduction Volume (RRv):

10d. Subtotal AI = 0.8800

Subtotal (Rv) RRv = 0.066 ac-ft

2861.89 cf

TOTAL RUNOFF REDUCTION VOLUME (RRv)

11. ***Total drainage area treated with runoff reduction/source control practices =*** 1.68 acres

    (Area reduction (#3) + total DA tributary to source control (#10a))

12. ***Total impervious area (AI) treated with area reduction or source control RRv =*** 0.88 ac-ft

    (AI #3 + AI #7 + AI # 10d)

13. ***Total RRv provided (#6 + #9 + #10c) = Total (RRv) =***

    Total Provided RRv = 0.0657 ac-ft

    2861.892 cf

14. ***Is Total Provided RRv ≥ Original WQv?*** Yes ✓ No _____ If yes, skip to #19

15. ***Is Total Provided RRv ≥ Minimum RRv?*** Yes ✓ No _____ If no, provide additional RRv and recalculate

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMICAL - NORTHEAST MANAGEMENT AREA

Project: 47618- Slack Addition northeast management area Date: 10/21/2016

Watershed Drainage Area: Soils:

DA: 0.84 (acres) HSG(s): A 90% Rain (P): 1 (inches)

WATER QUALITY VOLUME (before runoff reduction)

Rv = 0.05 + 0.009(I) where I is % Impervious Cover: Rv minimum = 0.2

I = Percent Impervious Cover

A = Area of Site In Acres (Contributing Area)

1. ***Water Quality Volume (WQv) = P•A•Rv/12***

DA= 0.84 AI*= 0.33 acres Rv= 0.4036

I = 39.2857 Applied Rv = 0.4036

Original WQv=	**0.0283**	**ac-ft**
	1230.57	**cf**

**If soil restoration is not practiced, include construction compacted areas as impervious.*

2. ***Minimum RRv Requirements*** *(when 100% WQv reduction cannot be achieved):* ***RRv = P x 0.95 x S x AI / 12***

with S= 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

P= 1 inches S= 0.55 AI= 0.33 acres

Min. RRv required=	**0.0144**	**ac-ft**
	625.90	**cf**

AREA REDUCTION PRACTICES

3. ***Area Reduction Practices (complete for all applicable practices): (area includes practice and contributing area)***

- Conservation of natural areas: (contributing AI = 0.00 ac.) Area = 0.00 ac.
- Riparian buffers/filter strips: (contributing AI = ____ ac.) Area = ____ ac.
- Tree planting/tree preservation: (contributing AI = ____ ac.) Area = ____ ac.
- Total area reduction: Total Area Reduced = 0.00 ac.
- Total impervious area within area reduction: AI in Reduced Area = 0.00 ac.

4. ***Subtract total area reduction from DA:***

Remaining Drainage Area = 0.84 ac.

Remaining AI = 0.33 ac.

5. ***Recalculate WQv for site area remaining after area reductions:***

Remaining DA = 0.84 Remaining AI = 0.33 ac. Rv = 0.4036

I = 39.29

Area Reduced WQv =	**0.0283**	**ac-ft**
	1230.57	**cf**

6. ***Runoff reduction volume (RRv) = original WQv - area reduced WQv***

RRv =	**0.0000**	**ac-ft**
	0	**cf**

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMICAL - NORTHEAST MANAGEMENT AREA

IMPERVIOUS DISCONNECTION

7. ***Impervious Area Disconnection:***

Total disconnected impervious area (now considered pervious for RV calculation(s)) — Area = 0.64 ac.

8. ***Recalculate WQv with RV modified for impervious disconnection:***

DA = 0.84 ac. Remaining AI -0.31 ac. Rv = -0.2821

I = -36.90

Imperv. Disc. Reduced WQv = -0.0198 ac-ft

-860.31 cf

9. ***Runoff reduction volume = area reduced WQv - Rv reduced WQv***

RRv = 0.0480 ac-ft

2090.88 cf

SOURCE CONTROL WQv TREATMENT PRACTICES (from attached worksheet)

10a. Subtotal DA tributary to Source Control treatment practices = 0.840 acres

10b. Subtotal Source Control WQv Treatment Volume = 0.028 ac-ft

10c. Subtotal Runoff Reduction Volume (RRv):

10d. Subtotal AI = 0.3300

Subtotal (Rv) RRv = 0.025 ac-ft

1107.51 cf

TOTAL RUNOFF REDUCTION VOLUME (RRv)

11. ***Total drainage area treated with runoff reduction/source control practices =*** 0.84 acres

(Area reduction (#3) + total DA tributary to source control (#10a))

12. ***Total impervious area (AI) treated with area reduction or source control RRv =*** 0.97 ac-ft

(AI #3 + AI #7 + AI # 10d)

13. ***Total RRv provided (#6 + #9 + #10c) = Total (RRv) =***

Total Provided RRv = 0.0734 ac-ft

3198.393 cf

14. ***Is Total Provided RRv ≥ Original WQv?*** Yes ✓ No _____ If yes, skip to #19

15. ***Is Total Provided RRv ≥ Minimum RRv?*** Yes ✓ No _____ If no, provide additional RRv and recalculate

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMICAL - SOUTH MANAGEMENT AREA

Project: 47618- Slack Addition south management area Date: 10/21/2016

Watershed Drainage Area: Soils:

DA: 0.65 (acres) HSG(s): A 90% Rain (P): 1 (inches)

WATER QUALITY VOLUME (before runoff reduction)

Rv = 0.05 + 0.009(I) where I is % Impervious Cover: Rv minimum = 0.2

I = Percent Impervious Cover

A = Area of Site In Acres (Contributing Area)

1. ***Water Quality Volume (WQv) = P•A•Rv/12***

DA= 0.65 AI*= 0.25 acres Rv= 0.3962

I = 38.4615 Applied Rv = 0.3962

Original WQv=	**0.0215**	**ac-ft**
	934.73	**cf**

**If soil restoration is not practiced, include construction compacted areas as impervious.*

2. ***Minimum RRv Requirements*** *(when 100% WQv reduction cannot be achieved):* ***RRv = P x 0.95 x S x AI / 12***

with S= 0.55 (A soils) 0.40 (B soils) 0.30 (C soils) 0.20 (D soils) OR weighted HSG average in DA

P= 1 inches S= 0.55 AI= 0.25 acres

Min. RRv required=	**0.0109**	**ac-ft**
	474.17	**cf**

AREA REDUCTION PRACTICES

3. ***Area Reduction Practices (complete for all applicable practices): (area includes practice and contributing area)***

- Conservation of natural areas: (contributing AI = 0.00 ac.) Area = 0.00 ac.
- Riparian buffers/filter strips: (contributing AI = ____ ac.) Area = ____ ac.
- Tree planting/tree preservation: (contributing AI = ____ ac.) Area = ____ ac.
- Total area reduction: Total Area Reduced = 0.00 ac.
- Total impervious area within area reduction: AI in Reduced Area = 0.00 ac.

4. ***Subtract total area reduction from DA:***

Remaining Drainage Area = 0.65 ac.

Remaining AI = 0.25 ac.

5. ***Recalculate WQv for site area remaining after area reductions:***

Remaining DA = 0.65 Remaining AI = 0.25 ac. Rv = 0.3962

I = 38.46

Area Reduced WQv =	**0.0215**	**ac-ft**
	934.725	**cf**

6. ***Runoff reduction volume (RRv) = original WQv - area reduced WQv***

RRv =	**0.0000**	**ac-ft**
	0	**cf**

STORMWATER MANAGEMENT WORKSHEET

SLACK CHEMICAL - SOUTH MANAGEMENT AREA

IMPERVIOUS DISCONNECTION

7. ***Impervious Area Disconnection:***

   Total disconnected impervious area (now considered pervious for RV calculation(s)) — Area = 0.00 ac.

8. ***Recalculate WQv with RV modified for impervious disconnection:***

   DA = 0.65 ac. Remaining AI 0.25 ac. Rv = 0.39615

   I = 38.46

   Imperv. Disc. Reduced WQv = 0.0215 ac-ft
   934.725 cf

9. ***Runoff reduction volume = area reduced WQv - Rv reduced WQv***

   RRv = 0.0000 **ac-ft**
   0 cf

SOURCE CONTROL WQv TREATMENT PRACTICES (from attached worksheet)

10a. Subtotal DA tributary to Source Control treatment practices = 0.650 acres

10b. Subtotal Source Control WQv Treatment Volume = 0.021 ac-ft

10c. Subtotal Runoff Reduction Volume (RRv):

10d. Subtotal AI = 0.2500

Subtotal (Rv) RRv = 0.019 **ac-ft**
841.25 cf

TOTAL RUNOFF REDUCTION VOLUME (RRv)

11. ***Total drainage area treated with runoff reduction/source control practices =*** 0.65 acres

    (Area reduction (#3) + total DA tributary to source control (#10a))

12. ***Total impervious area (AI) treated with area reduction or source control RRv =*** 0.25 ac-ft

    (AI #3 + AI #7 + AI # 10d)

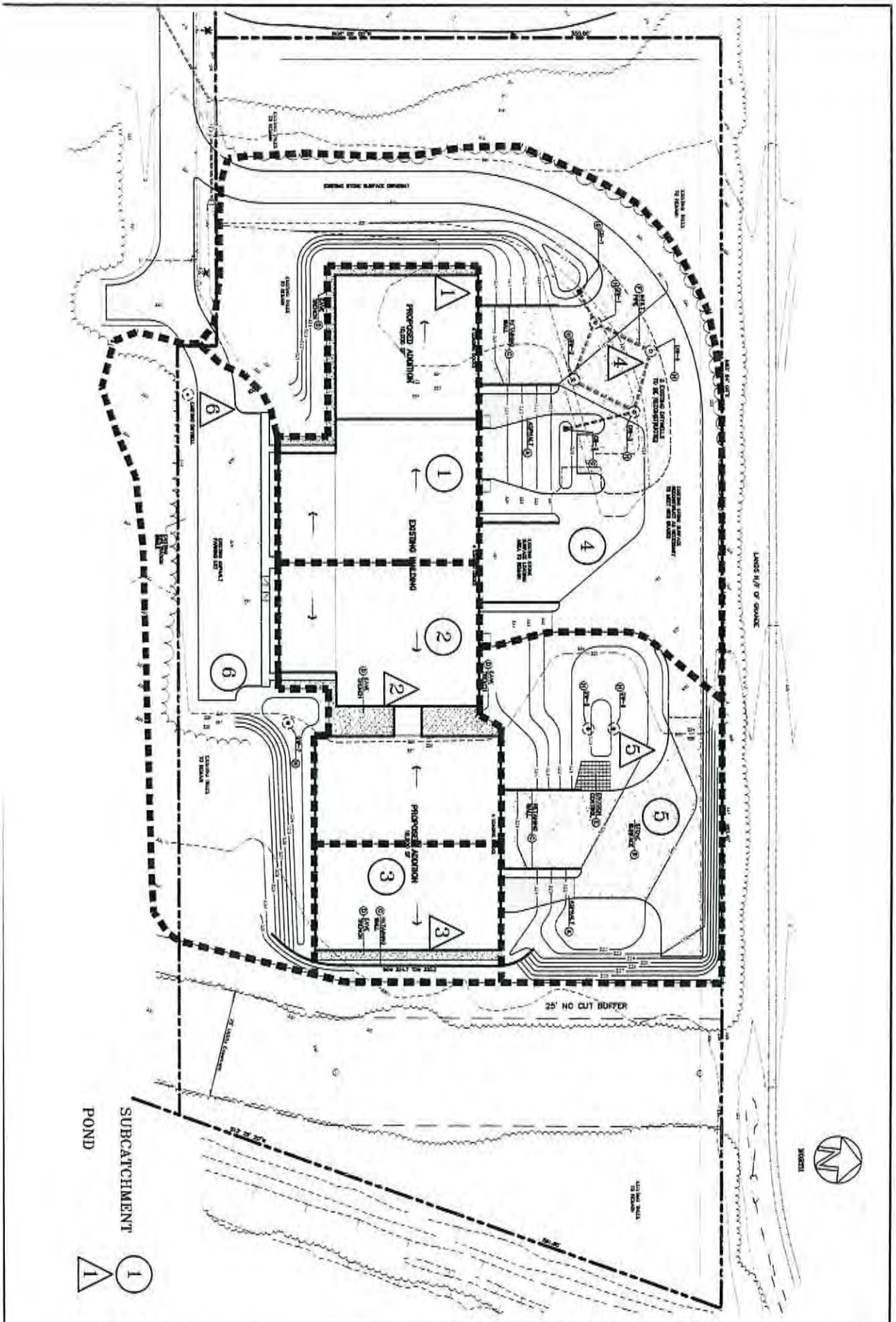
13. ***Total RRv provided (#6 + #9 + #10c) = Total (RRv) =***

    Total Provided RRv = 0.0193 **ac-ft**
    841.2525 cf

14. ***Is Total Provided RRv ≥ Original WQv?*** Yes ✓ No _____ If yes, skip to #19

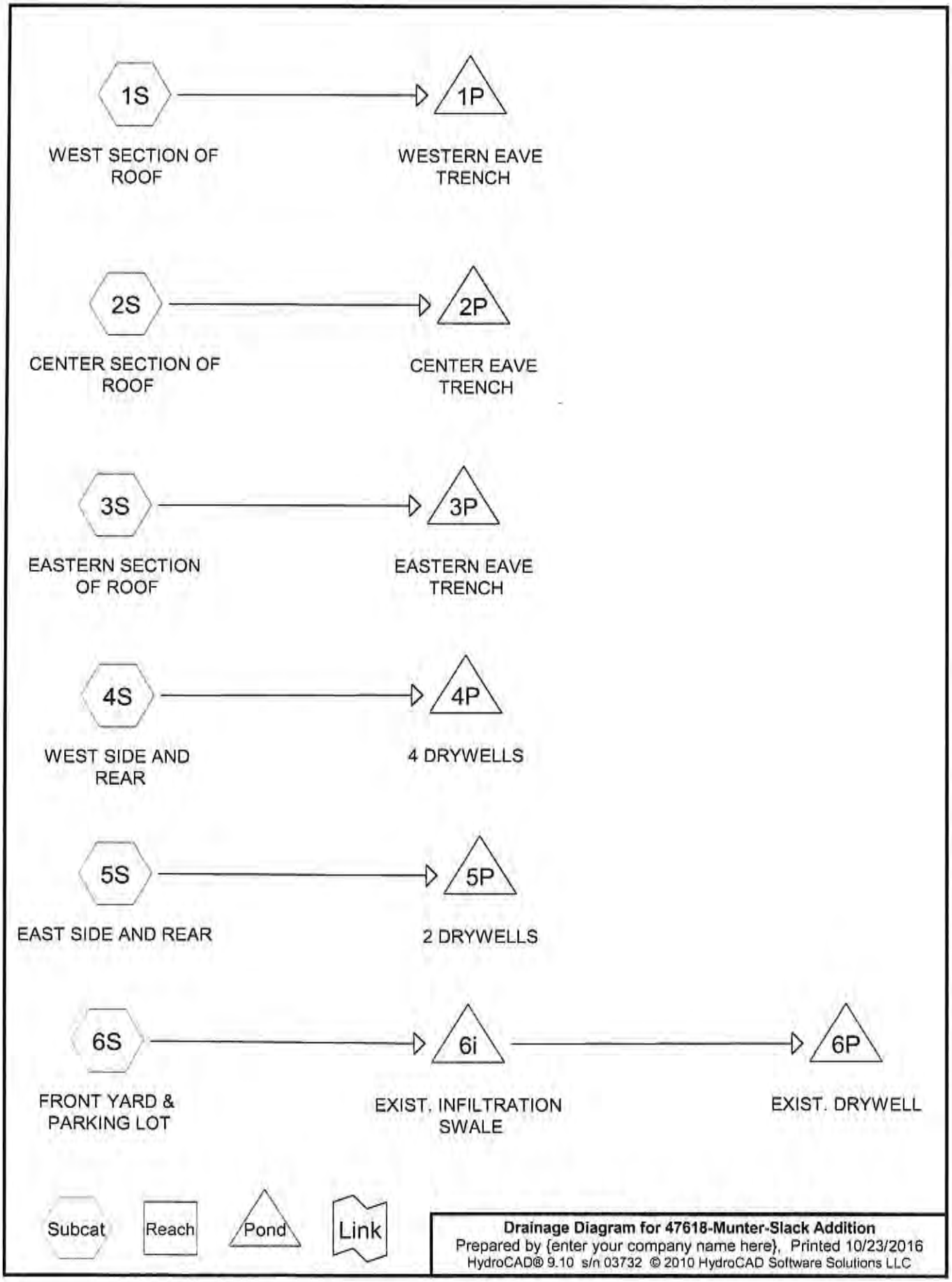
15. ***Is Total Provided RRv ≥ Minimum RRv?*** Yes ✓ No _____ If no, provide additional RRv and recalculate

DRAINAGE AREA MAP



NACE ENGINEERING,P.C. 169 HAVILAND ROAD QUEENSBURY, NY	SLACK CHEMICAL COMPANY ADDITION MUNTER ENTERPRISES 2 UNLIMITED DRIVE, SARATOGA SPRINGS, NY	DRAINAGE REPORT PROPOSED CONDITIONS JOB #47616 SCALE: 1" = 60' DATE: 10/18/2016

HydroCAD DRAINAGE DIAGRAM



Drainage Diagram for 47618-Munter-Slack Addition
Prepared by {enter your company name here}, Printed 10/23/2016

HydroCAD RESULTS

POST DEVELOPED CONDITIONS
1-YEAR DESIGN STORM

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WEST SECTION OF Runoff Area=24,693 sf 100.00% Impervious Runoff Depth>1.84"
Flow Length=190' Slope=0.0420 '/' Tc=1.7 min CN=98 Runoff=1.87 cfs 0.087 af

Subcatchment 2S: CENTER SECTION OF Runoff Area=25,563 sf 100.00% Impervious Runoff Depth>1.84"
Flow Length=100' Slope=0.0420 '/' Tc=1.0 min CN=98 Runoff=2.00 cfs 0.090 af

Subcatchment 3S: EASTERN SECTION Runoff Area=12,494 sf 100.00% Impervious Runoff Depth>1.84"
Flow Length=100' Slope=0.0420 '/' Tc=1.0 min CN=98 Runoff=0.98 cfs 0.044 af

Subcatchment 4S: WEST SIDE AND REAR Runoff Area=73,395 sf 52.52% Impervious Runoff Depth>0.28"
Flow Length=264' Tc=4.2 min CN=70 Runoff=0.82 cfs 0.039 af

Subcatchment 5S: EAST SIDE AND REAR Runoff Area=36,490 sf 39.44% Impervious Runoff Depth>0.11"
Flow Length=340' Tc=5.2 min CN=62 Runoff=0.06 cfs 0.008 af

Subcatchment 6S: FRONT YARD & Runoff Area=28,445 sf 37.78% Impervious Runoff Depth>0.09"
Flow Length=60' Slope=0.0300 '/' Tc=0.8 min CN=61 Runoff=0.04 cfs 0.005 af

Pond 1P: WESTERN EAVE TRENCH Peak Elev=0.17' Storage=100 cf Inflow=1.87 cfs 0.087 af
Discarded=1.52 cfs 0.087 af Primary=0.00 cfs 0.000 af Outflow=1.52 cfs 0.087 af

Pond 2P: CENTER EAVE TRENCH Peak Elev=0.03' Storage=30 cf Inflow=2.00 cfs 0.090 af
Discarded=1.97 cfs 0.090 af Primary=0.00 cfs 0.000 af Outflow=1.97 cfs 0.090 af

Pond 3P: EASTERN EAVE TRENCH Peak Elev=0.11' Storage=35 cf Inflow=0.98 cfs 0.044 af
Discarded=0.86 cfs 0.044 af Primary=0.00 cfs 0.000 af Outflow=0.86 cfs 0.044 af

Pond 4P: 4 DRYWELLS Peak Elev=0.87' Storage=129 cf Inflow=0.82 cfs 0.039 af
Outflow=0.50 cfs 0.039 af

Pond 5P: 2 DRYWELLS Peak Elev=0.04' Storage=2 cf Inflow=0.06 cfs 0.008 af
Outflow=0.06 cfs 0.007 af

Pond 6i: EXIST. INFILTRATION SWALE Peak Elev=0.00' Storage=1 cf Inflow=0.04 cfs 0.005 af
Discarded=0.04 cfs 0.005 af Primary=0.00 cfs 0.000 af Outflow=0.04 cfs 0.005 af

Pond 6P: EXIST. DRYWELL Peak Elev=0.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.616 ac Runoff Volume = 0.272 af Average Runoff Depth = 0.71"
37.12% Pervious = 1.714 ac 62.88% Impervious = 2.903 ac

Summary for Subcatchment 1S: WEST SECTION OF ROOF

Runoff = 1.87 cfs @ 11.91 hrs, Volume= 0.087 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YEAR Rainfall=2.20"

	Area (sf)	CN	Description
*	24,693	98	ROOF + EAVE TRENCH
	24,693		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	190	0.0420	1.82		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 2S: CENTER SECTION OF ROOF

Runoff = 2.00 cfs @ 11.90 hrs, Volume= 0.090 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YEAR Rainfall=2.20"

	Area (sf)	CN	Description
*	25,563	98	ROOF + EAVE TRENCH
	25,563		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0420	1.60		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 3S: EASTERN SECTION OF ROOF

Runoff = 0.98 cfs @ 11.90 hrs, Volume= 0.044 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YEAR Rainfall=2.20"

	Area (sf)	CN	Description
*	12,494	98	ROOF + EAVE TRENCH
	12,494		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0420	1.60		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 4S: WEST SIDE AND REAR

Runoff = 0.82 cfs @ 11.97 hrs, Volume= 0.039 af, Depth> 0.28"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YEAR Rainfall=2.20"

	Area (sf)	CN	Description
*	38,544	98	PAVEMENT
	34,851	39	>75% Grass cover, Good, HSG A
	73,395	70	Weighted Average
	34,851		47.48% Pervious Area
	38,544		52.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	24	0.0200	0.90		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"
3.8	240	0.0050	1.06		**Shallow Concentrated Flow, SHALLOW SWALE TO CB** Grassed Waterway Kv= 15.0 fps
4.2	264	Total			

Summary for Subcatchment 5S: EAST SIDE AND REAR

Runoff = 0.06 cfs @ 12.02 hrs, Volume= 0.008 af, Depth> 0.11"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YEAR Rainfall=2.20"

	Area (sf)	CN	Description
*	14,393	98	PAVEMENT
	22,097	39	>75% Grass cover, Good, HSG A
	36,490	62	Weighted Average
	22,097		60.56% Pervious Area
	14,393		39.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.19		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"
3.8	240	0.0050	1.06		**Shallow Concentrated Flow, SHALLOW SWALE TO CB** Grassed Waterway Kv= 15.0 fps
5.2	340	Total			

Summary for Subcatchment 6S: FRONT YARD & PARKING LOT

Runoff = 0.04 cfs @ 11.97 hrs, Volume= 0.005 af, Depth> 0.09"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 1-YEAR Rainfall=2.20"

	Area (sf)	CN	Description
*	10,746	98	PAVEMENT & SIDEWALK
	17,699	39	>75% Grass cover, Good, HSG A
	28,445	61	Weighted Average
	17,699		62.22% Pervious Area
	10,746		37.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	60	0.0300	1.26		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Pond 1P: WESTERN EAVE TRENCH

Inflow Area = 0.567 ac,100.00% Impervious, Inflow Depth > 1.84" for 1-YEAR event
Inflow = 1.87 cfs @ 11.91 hrs, Volume= 0.087 af
Outflow = 1.52 cfs @ 11.95 hrs, Volume= 0.087 af, Atten= 19%, Lag= 2.4 min
Discarded = 1.52 cfs @ 11.95 hrs, Volume= 0.087 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.17' @ 11.95 hrs Surf.Area= 1,433 sf Storage= 100 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (734.4 - 734.1)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,294 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 5,734 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	1,433	0	0	1,433
4.00	1,434	5,734	5,734	1,970

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=1.52 cfs @ 11.95 hrs HW=0.17' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.52 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: CENTER EAVE TRENCH

Inflow Area = 0.587 ac,100.00% Impervious, Inflow Depth > 1.84" for 1-YEAR event
Inflow = 2.00 cfs @ 11.90 hrs, Volume= 0.090 af
Outflow = 1.97 cfs @ 11.90 hrs, Volume= 0.090 af, Atten= 2%, Lag= 0.2 min
Discarded = 1.97 cfs @ 11.90 hrs, Volume= 0.090 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.03' @ 11.90 hrs Surf.Area= 2,153 sf Storage= 30 cf

Plug-Flow detention time= 0.3 min calculated for 0.090 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (733.8 - 733.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,446 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 8,614 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	2,153	0	0	2,153
4.00	2,154	8,614	8,614	2,811

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=2.25 cfs @ 11.90 hrs HW=0.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 2.25 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: EASTERN EAVE TRENCH

Inflow Area = 0.287 ac,100.00% Impervious, Inflow Depth > 1.84" for 1-YEAR event
Inflow = 0.98 cfs @ 11.90 hrs, Volume= 0.044 af
Outflow = 0.86 cfs @ 11.93 hrs, Volume= 0.044 af, Atten= 11%, Lag= 1.7 min
Discarded = 0.86 cfs @ 11.93 hrs, Volume= 0.044 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 0.11' @ 11.93 hrs Surf.Area= 780 sf Storage= 35 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.3 min (733.8 - 733.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 3,122 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	780	0	0	780
4.00	781	3,122	3,122	1,176

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.82 cfs @ 11.93 hrs HW=0.10' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.82 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: 4 DRYWELLS

Inflow Area = 1.685 ac, 52.52% Impervious, Inflow Depth > 0.28" for 1-YEAR event
Inflow = 0.82 cfs @ 11.97 hrs, Volume= 0.039 af
Outflow = 0.50 cfs @ 12.04 hrs, Volume= 0.039 af, Atten= 39%, Lag= 4.2 min
Discarded = 0.50 cfs @ 12.04 hrs, Volume= 0.039 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.87' @ 12.04 hrs Surf.Area= 432 sf Storage= 129 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.1 min (844.4 - 843.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	4,802 cf	**10.00'D x 10.00'H Vertical Cone/Cylinder Z=1.0** x 4 13,614 cf Overall - 1,608 cf Embedded = 12,005 cf x 40.0% Voids
#2	1.00'	1,608 cf	**8.00'D x 8.00'H Vertical Cone/Cylinder** x 4 Inside #1
		6,411 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.50 cfs @ 12.04 hrs HW=0.85' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.50 cfs)

Summary for Pond 5P: 2 DRYWELLS

Inflow Area = 0.838 ac, 39.44% Impervious, Inflow Depth > 0.11" for 1-YEAR event
Inflow = 0.06 cfs @ 12.02 hrs, Volume= 0.008 af
Outflow = 0.06 cfs @ 12.04 hrs, Volume= 0.007 af, Atten= 2%, Lag= 1.3 min
Discarded = 0.06 cfs @ 12.04 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.04' @ 12.04 hrs Surf.Area= 159 sf Storage= 2 cf

Plug-Flow detention time= 0.6 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 0.4 min (893.8 - 893.4)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,401 cf	**10.00'D x 10.00'H Vertical Cone/Cylinder Z=1.0** x 2 6,807 cf Overall - 804 cf Embedded = 6,003 cf x 40.0% Voids
#2	1.00'	804 cf	**8.00'D x 8.00'H Vertical Cone/Cylinder** x 2 Inside #1
		3,205 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.17 cfs @ 12.04 hrs HW=0.03' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.17 cfs)

Summary for Pond 6i: EXIST. INFILTRATION SWALE

Inflow Area = 0.653 ac, 37.78% Impervious, Inflow Depth > 0.09" for 1-YEAR event
Inflow = 0.04 cfs @ 11.97 hrs, Volume= 0.005 af
Outflow = 0.04 cfs @ 11.98 hrs, Volume= 0.005 af, Atten= 10%, Lag= 0.7 min
Discarded = 0.04 cfs @ 11.98 hrs, Volume= 0.005 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.00' @ 11.98 hrs Surf.Area= 390 sf Storage= 1 cf

Plug-Flow detention time= 0.2 min calculated for 0.005 af (100% of inflow)
Center-of-Mass det. time= 0.2 min (900.2 - 900.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	624 cf	**2.00'W x 195.00'L x 4.00'H Prismatoid** 1,560 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**1.5" x 4.5" Horiz. Orifice/Grate X 18.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.41 cfs @ 11.98 hrs HW=0.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.41 cfs)

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

Summary for Pond 6P: EXIST. DRYWELL

Inflow Area = 0.653 ac, 37.78% Impervious, Inflow Depth = 0.00" for 1-YEAR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.00' @ 5.00 hrs Surf.Area= 79 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	425 cf	**10.00'D x 6.00'H Vertical Cone/Cylinder Z=1.0** 1,263 cf Overall - 201 cf Embedded = 1,062 cf x 40.0% Voids
#2	1.00'	201 cf	**8.00'D x 4.00'H Vertical Cone/Cylinder** Inside #1
		626 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑—**1=Exfiltration** (Passes 0.00 cfs of 0.08 cfs potential flow)

HydroCAD RESULTS

POST DEVELOPED CONDITIONS
10-YEAR DESIGN STORM

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WEST SECTION OF Runoff Area=24,693 sf 100.00% Impervious Runoff Depth>3.29"
Flow Length=190' Slope=0.0420 '/' Tc=1.7 min CN=98 Runoff=3.28 cfs 0.155 af

Subcatchment 2S: CENTER SECTION OF Runoff Area=25,563 sf 100.00% Impervious Runoff Depth>3.29"
Flow Length=100' Slope=0.0420 '/' Tc=1.0 min CN=98 Runoff=3.50 cfs 0.161 af

Subcatchment 3S: EASTERN SECTION Runoff Area=12,494 sf 100.00% Impervious Runoff Depth>3.29"
Flow Length=100' Slope=0.0420 '/' Tc=1.0 min CN=98 Runoff=1.71 cfs 0.079 af

Subcatchment 4S: WEST SIDE AND REAR Runoff Area=73,395 sf 52.52% Impervious Runoff Depth>1.08"
Flow Length=264' Tc=4.2 min CN=70 Runoff=3.73 cfs 0.152 af

Subcatchment 5S: EAST SIDE AND REAR Runoff Area=36,490 sf 39.44% Impervious Runoff Depth>0.67"
Flow Length=340' Tc=5.2 min CN=62 Runoff=1.04 cfs 0.047 af

Subcatchment 6S: FRONT YARD & Runoff Area=28,445 sf 37.78% Impervious Runoff Depth>0.63"
Flow Length=60' Slope=0.0300 '/' Tc=0.8 min CN=61 Runoff=0.85 cfs 0.034 af

Pond 1P: WESTERN EAVE TRENCH Peak Elev=1.32' Storage=758 cf Inflow=3.28 cfs 0.155 af
Discarded=1.68 cfs 0.156 af Primary=0.00 cfs 0.000 af Outflow=1.68 cfs 0.156 af

Pond 2P: CENTER EAVE TRENCH Peak Elev=0.45' Storage=386 cf Inflow=3.50 cfs 0.161 af
Discarded=2.32 cfs 0.163 af Primary=0.00 cfs 0.000 af Outflow=2.32 cfs 0.163 af

Pond 3P: EASTERN EAVE TRENCH Peak Elev=1.08' Storage=337 cf Inflow=1.71 cfs 0.079 af
Discarded=0.92 cfs 0.079 af Primary=0.00 cfs 0.000 af Outflow=0.92 cfs 0.079 af

Pond 4P: 4 DRYWELLS Peak Elev=4.26' Storage=1,516 cf Inflow=3.73 cfs 0.152 af
Outflow=1.45 cfs 0.152 af

Pond 5P: 2 DRYWELLS Peak Elev=2.48' Storage=335 cf Inflow=1.04 cfs 0.047 af
Outflow=0.45 cfs 0.047 af

Pond 6i: EXIST. INFILTRATION SWALE Peak Elev=0.54' Storage=83 cf Inflow=0.85 cfs 0.034 af
Discarded=0.63 cfs 0.034 af Primary=0.00 cfs 0.000 af Outflow=0.63 cfs 0.034 af

Pond 6P: EXIST. DRYWELL Peak Elev=0.00' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Total Runoff Area = 4.616 ac Runoff Volume = 0.627 af Average Runoff Depth = 1.63"
37.12% Pervious = 1.714 ac 62.88% Impervious = 2.903 ac

Summary for Subcatchment 1S: WEST SECTION OF ROOF

Runoff = 3.28 cfs @ 11.91 hrs, Volume= 0.155 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YEAR Rainfall=3.80"

	Area (sf)	CN	Description
*	24,693	98	ROOF + EAVE TRENCH
	24,693		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	190	0.0420	1.82		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 2S: CENTER SECTION OF ROOF

Runoff = 3.50 cfs @ 11.90 hrs, Volume= 0.161 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YEAR Rainfall=3.80"

	Area (sf)	CN	Description
*	25,563	98	ROOF + EAVE TRENCH
	25,563		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0420	1.60		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 3S: EASTERN SECTION OF ROOF

Runoff = 1.71 cfs @ 11.90 hrs, Volume= 0.079 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YEAR Rainfall=3.80"

	Area (sf)	CN	Description
*	12,494	98	ROOF + EAVE TRENCH
	12,494		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0420	1.60		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 4S: WEST SIDE AND REAR

Runoff = 3.73 cfs @ 11.95 hrs, Volume= 0.152 af, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YEAR Rainfall=3.80"

	Area (sf)	CN	Description
*	38,544	98	PAVEMENT
	34,851	39	>75% Grass cover, Good, HSG A
	73,395	70	Weighted Average
	34,851		47.48% Pervious Area
	38,544		52.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	24	0.0200	0.90		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"
3.8	240	0.0050	1.06		**Shallow Concentrated Flow, SHALLOW SWALE TO CB** Grassed Waterway Kv= 15.0 fps
4.2	264	Total			

Summary for Subcatchment 5S: EAST SIDE AND REAR

Runoff = 1.04 cfs @ 11.98 hrs, Volume= 0.047 af, Depth> 0.67"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YEAR Rainfall=3.80"

	Area (sf)	CN	Description
*	14,393	98	PAVEMENT
	22,097	39	>75% Grass cover, Good, HSG A
	36,490	62	Weighted Average
	22,097		60.56% Pervious Area
	14,393		39.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.19		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"
3.8	240	0.0050	1.06		**Shallow Concentrated Flow, SHALLOW SWALE TO CB** Grassed Waterway Kv= 15.0 fps
5.2	340	Total			

Summary for Subcatchment 6S: FRONT YARD & PARKING LOT

Runoff = 0.85 cfs @ 11.92 hrs, Volume= 0.034 af, Depth> 0.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YEAR Rainfall=3.80"

	Area (sf)	CN	Description
*	10,746	98	PAVEMENT & SIDEWALK
	17,699	39	>75% Grass cover, Good, HSG A
	28,445	61	Weighted Average
	17,699		62.22% Pervious Area
	10,746		37.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	60	0.0300	1.26		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Pond 1P: WESTERN EAVE TRENCH

Inflow Area = 0.567 ac,100.00% Impervious, Inflow Depth > 3.29" for 10-YEAR event
Inflow = 3.28 cfs @ 11.91 hrs, Volume= 0.155 af
Outflow = 1.68 cfs @ 11.99 hrs, Volume= 0.156 af, Atten= 49%, Lag= 5.2 min
Discarded = 1.68 cfs @ 11.99 hrs, Volume= 0.156 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1.32' @ 11.99 hrs Surf.Area= 1,433 sf Storage= 758 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.6 min (730.3 - 728.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,294 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 5,734 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	1,433	0	0	1,433
4.00	1,434	5,734	5,734	1,970

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=1.67 cfs @ 11.99 hrs HW=1.30' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.67 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: CENTER EAVE TRENCH

Inflow Area =	0.587 ac,100.00% Impervious,	Inflow Depth >	3.29"	for 10-YEAR event
Inflow =	3.50 cfs @	11.90 hrs, Volume=	0.161 af	
Outflow =	2.32 cfs @	11.96 hrs, Volume=	0.163 af,	Atten= 34%, Lag= 3.5 min
Discarded =	2.32 cfs @	11.96 hrs, Volume=	0.163 af	
Primary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.45' @ 11.96 hrs Surf.Area= 2,153 sf Storage= 386 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (728.7 - 728.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,446 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 8,614 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	2,153	0	0	2,153
4.00	2,154	8,614	8,614	2,811

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=2.32 cfs @ 11.96 hrs HW=0.43' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 2.32 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: EASTERN EAVE TRENCH

Inflow Area =	0.287 ac,100.00% Impervious,	Inflow Depth >	3.29"	for 10-YEAR event
Inflow =	1.71 cfs @	11.90 hrs, Volume=	0.079 af	
Outflow =	0.92 cfs @	11.97 hrs, Volume=	0.079 af,	Atten= 46%, Lag= 4.5 min
Discarded =	0.92 cfs @	11.97 hrs, Volume=	0.079 af	
Primary =	0.00 cfs @	5.00 hrs, Volume=	0.000 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 1.08' @ 11.97 hrs Surf.Area= 780 sf Storage= 337 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.3 min (729.5 - 728.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 3,122 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	780	0	0	780
4.00	781	3,122	3,122	1,176

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=0.92 cfs @ 11.97 hrs HW=1.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.92 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: 4 DRYWELLS

Inflow Area = 1.685 ac, 52.52% Impervious, Inflow Depth > 1.08" for 10-YEAR event
Inflow = 3.73 cfs @ 11.95 hrs, Volume= 0.152 af
Outflow = 1.45 cfs @ 12.06 hrs, Volume= 0.152 af, Atten= 61%, Lag= 6.4 min
Discarded = 1.45 cfs @ 12.06 hrs, Volume= 0.152 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 4.26' @ 12.06 hrs Surf.Area= 1,078 sf Storage= 1,516 cf

Plug-Flow detention time= 7.4 min calculated for 0.151 af (100% of inflow)
Center-of-Mass det. time= 7.3 min (815.8 - 808.5)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	4,802 cf	**10.00'D x 10.00'H Vertical Cone/Cylinder Z=1.0** x 4 13,614 cf Overall - 1,608 cf Embedded = 12,005 cf x 40.0% Voids
#2	1.00'	1,608 cf	**8.00'D x 8.00'H Vertical Cone/Cylinder** x 4 Inside #1
		6,411 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=1.44 cfs @ 12.06 hrs HW=4.23' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.44 cfs)

Summary for Pond 5P: 2 DRYWELLS

Inflow Area = 0.838 ac, 39.44% Impervious, Inflow Depth > 0.67" for 10-YEAR event
Inflow = 1.04 cfs @ 11.98 hrs, Volume= 0.047 af
Outflow = 0.45 cfs @ 12.08 hrs, Volume= 0.047 af, Atten= 57%, Lag= 6.0 min
Discarded = 0.45 cfs @ 12.08 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 2.48' @ 12.08 hrs Surf.Area= 351 sf Storage= 335 cf

Plug-Flow detention time= 4.3 min calculated for 0.047 af (100% of inflow)
Center-of-Mass det. time= 4.2 min (833.1 - 829.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,401 cf	**10.00'D x 10.00'H Vertical Cone/Cylinder Z=1.0** x 2 6,807 cf Overall - 804 cf Embedded = 6,003 cf x 40.0% Voids
#2	1.00'	804 cf	**8.00'D x 8.00'H Vertical Cone/Cylinder** x 2 Inside #1
		3,205 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.45 cfs @ 12.08 hrs HW=2.46' (Free Discharge)
1=Exfiltration (Exfiltration Controls 0.45 cfs)

Summary for Pond 6i: EXIST. INFILTRATION SWALE

Inflow Area = 0.653 ac, 37.78% Impervious, Inflow Depth > 0.63" for 10-YEAR event
Inflow = 0.85 cfs @ 11.92 hrs, Volume= 0.034 af
Outflow = 0.63 cfs @ 11.96 hrs, Volume= 0.034 af, Atten= 27%, Lag= 2.8 min
Discarded = 0.63 cfs @ 11.96 hrs, Volume= 0.034 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.54' @ 11.96 hrs Surf.Area= 390 sf Storage= 83 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.5 min (829.4 - 828.8)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	624 cf	**2.00'W x 195.00'L x 4.00'H Prismatoid** 1,560 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**1.5" x 4.5" Horiz. Orifice/Grate X 18.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.61 cfs @ 11.96 hrs HW=0.50' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.61 cfs)

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

Summary for Pond 6P: EXIST. DRYWELL

Inflow Area = 0.653 ac, 37.78% Impervious, Inflow Depth = 0.00" for 10-YEAR event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.00' @ 5.00 hrs Surf.Area= 79 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	425 cf	**10.00'D x 6.00'H Vertical Cone/Cylinder Z=1.0** 1,263 cf Overall - 201 cf Embedded = 1,062 cf x 40.0% Voids
#2	1.00'	201 cf	**8.00'D x 4.00'H Vertical Cone/Cylinder** Inside #1
		626 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑—**1=Exfiltration** (Passes 0.00 cfs of 0.08 cfs potential flow)

HydroCAD RESULTS

POST DEVELOPED CONDITIONS
100-YEAR DESIGN STORM

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: WEST SECTION OF Runoff Area=24,693 sf 100.00% Impervious Runoff Depth>5.63"
Flow Length=190' Slope=0.0420 '/' Tc=1.7 min CN=98 Runoff=5.55 cfs 0.266 af

Subcatchment 2S: CENTER SECTION OF Runoff Area=25,563 sf 100.00% Impervious Runoff Depth>5.63"
Flow Length=100' Slope=0.0420 '/' Tc=1.0 min CN=98 Runoff=5.93 cfs 0.275 af

Subcatchment 3S: EASTERN SECTION Runoff Area=12,494 sf 100.00% Impervious Runoff Depth>5.63"
Flow Length=100' Slope=0.0420 '/' Tc=1.0 min CN=98 Runoff=2.90 cfs 0.134 af

Subcatchment 4S: WEST SIDE AND REAR Runoff Area=73,395 sf 52.52% Impervious Runoff Depth>2.88"
Flow Length=264' Tc=4.2 min CN=70 Runoff=9.82 cfs 0.404 af

Subcatchment 5S: EAST SIDE AND REAR Runoff Area=36,490 sf 39.44% Impervious Runoff Depth>2.15"
Flow Length=340' Tc=5.2 min CN=62 Runoff=3.53 cfs 0.150 af

Subcatchment 6S: FRONT YARD & Runoff Area=28,445 sf 37.78% Impervious Runoff Depth>2.07"
Flow Length=60' Slope=0.0300 '/' Tc=0.8 min CN=61 Runoff=3.00 cfs 0.113 af

Pond 1P: WESTERN EAVE TRENCH Peak Elev=3.88' Storage=2,225 cf Inflow=5.55 cfs 0.266 af
Discarded=2.04 cfs 0.266 af Primary=0.00 cfs 0.000 af Outflow=2.04 cfs 0.266 af

Pond 2P: CENTER EAVE TRENCH Peak Elev=1.92' Storage=1,654 cf Inflow=5.93 cfs 0.275 af
Discarded=2.57 cfs 0.275 af Primary=0.00 cfs 0.000 af Outflow=2.57 cfs 0.275 af

Pond 3P: EASTERN EAVE TRENCH Peak Elev=3.28' Storage=1,023 cf Inflow=2.90 cfs 0.134 af
Discarded=1.15 cfs 0.134 af Primary=0.00 cfs 0.000 af Outflow=1.15 cfs 0.134 af

Pond 4P: 4 DRYWELLS Peak Elev=8.80' Storage=5,131 cf Inflow=9.82 cfs 0.404 af
Outflow=3.39 cfs 0.404 af

Pond 5P: 2 DRYWELLS Peak Elev=7.07' Storage=1,736 cf Inflow=3.53 cfs 0.150 af
Outflow=1.28 cfs 0.150 af

Pond 6i: EXIST. INFILTRATION SWALE Peak Elev=3.94' Storage=615 cf Inflow=3.00 cfs 0.113 af
Discarded=2.02 cfs 0.112 af Primary=0.23 cfs 0.001 af Outflow=2.25 cfs 0.113 af

Pond 6P: EXIST. DRYWELL Peak Elev=0.45' Storage=16 cf Inflow=0.23 cfs 0.001 af
Outflow=0.11 cfs 0.001 af

Total Runoff Area = 4.616 ac Runoff Volume = 1.342 af Average Runoff Depth = 3.49"
37.12% Pervious = 1.714 ac 62.88% Impervious = 2.903 ac

Summary for Subcatchment 1S: WEST SECTION OF ROOF

Runoff = 5.55 cfs @ 11.91 hrs, Volume= 0.266 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YEAR Rainfall=6.40"

	Area (sf)	CN	Description
*	24,693	98	ROOF + EAVE TRENCH
	24,693		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	190	0.0420	1.82		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 2S: CENTER SECTION OF ROOF

Runoff = 5.93 cfs @ 11.90 hrs, Volume= 0.275 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YEAR Rainfall=6.40"

	Area (sf)	CN	Description
*	25,563	98	ROOF + EAVE TRENCH
	25,563		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0420	1.60		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 3S: EASTERN SECTION OF ROOF

Runoff = 2.90 cfs @ 11.90 hrs, Volume= 0.134 af, Depth> 5.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YEAR Rainfall=6.40"

	Area (sf)	CN	Description
*	12,494	98	ROOF + EAVE TRENCH
	12,494		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	100	0.0420	1.60		**Sheet Flow, ACROSS ROOF TO EAVE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Subcatchment 4S: WEST SIDE AND REAR

Runoff = 9.82 cfs @ 11.95 hrs, Volume= 0.404 af, Depth> 2.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YEAR Rainfall=6.40"

	Area (sf)	CN	Description
*	38,544	98	PAVEMENT
	34,851	39	>75% Grass cover, Good, HSG A
	73,395	70	Weighted Average
	34,851		47.48% Pervious Area
	38,544		52.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	24	0.0200	0.90		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"
3.8	240	0.0050	1.06		**Shallow Concentrated Flow, SHALLOW SWALE TO CB** Grassed Waterway Kv= 15.0 fps
4.2	264	Total			

Summary for Subcatchment 5S: EAST SIDE AND REAR

Runoff = 3.53 cfs @ 11.97 hrs, Volume= 0.150 af, Depth> 2.15"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YEAR Rainfall=6.40"

	Area (sf)	CN	Description
*	14,393	98	PAVEMENT
	22,097	39	>75% Grass cover, Good, HSG A
	36,490	62	Weighted Average
	22,097		60.56% Pervious Area
	14,393		39.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0200	1.19		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"
3.8	240	0.0050	1.06		**Shallow Concentrated Flow, SHALLOW SWALE TO CB** Grassed Waterway Kv= 15.0 fps
5.2	340	Total			

Summary for Subcatchment 6S: FRONT YARD & PARKING LOT

Runoff = 3.00 cfs @ 11.90 hrs, Volume= 0.113 af, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YEAR Rainfall=6.40"

	Area (sf)	CN	Description
*	10,746	98	PAVEMENT & SIDEWALK
	17,699	39	>75% Grass cover, Good, HSG A
	28,445	61	Weighted Average
	17,699		62.22% Pervious Area
	10,746		37.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	60	0.0300	1.26		**Sheet Flow, ACROSS PAVEMENT TO SWALE** Smooth surfaces n= 0.011 P2= 2.40"

Summary for Pond 1P: WESTERN EAVE TRENCH

Inflow Area = 0.567 ac,100.00% Impervious, Inflow Depth > 5.63" for 100-YEAR event
Inflow = 5.55 cfs @ 11.91 hrs, Volume= 0.266 af
Outflow = 2.04 cfs @ 12.01 hrs, Volume= 0.266 af, Atten= 63%, Lag= 6.4 min
Discarded = 2.04 cfs @ 12.01 hrs, Volume= 0.266 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.88' @ 12.01 hrs Surf.Area= 1,434 sf Storage= 2,225 cf

Plug-Flow detention time= 4.9 min calculated for 0.265 af (100% of inflow)
Center-of-Mass det. time= 4.8 min (730.6 - 725.9)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,294 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 5,734 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	1,433	0	0	1,433
4.00	1,434	5,734	5,734	1,970

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=2.03 cfs @ 12.01 hrs HW=3.82' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 2.03 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 2P: CENTER EAVE TRENCH

Inflow Area = 0.587 ac,100.00% Impervious, Inflow Depth > 5.63" for 100-YEAR event
Inflow = 5.93 cfs @ 11.90 hrs, Volume= 0.275 af
Outflow = 2.57 cfs @ 11.99 hrs, Volume= 0.275 af, Atten= 57%, Lag= 5.5 min
Discarded = 2.57 cfs @ 11.99 hrs, Volume= 0.275 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 1.92' @ 11.99 hrs Surf.Area= 2,153 sf Storage= 1,654 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.4 min (727.7 - 725.4)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	3,446 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 8,614 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	2,153	0	0	2,153
4.00	2,154	8,614	8,614	2,811

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=2.57 cfs @ 11.99 hrs HW=1.89' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 2.57 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 3P: EASTERN EAVE TRENCH

Inflow Area = 0.287 ac,100.00% Impervious, Inflow Depth > 5.63" for 100-YEAR event
Inflow = 2.90 cfs @ 11.90 hrs, Volume= 0.134 af
Outflow = 1.15 cfs @ 12.00 hrs, Volume= 0.134 af, Atten= 60%, Lag= 5.9 min
Discarded = 1.15 cfs @ 12.00 hrs, Volume= 0.134 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 3.28' @ 12.00 hrs Surf.Area= 781 sf Storage= 1,023 cf

Plug-Flow detention time= 3.9 min calculated for 0.134 af (100% of inflow)
Center-of-Mass det. time= 3.8 min (729.2 - 725.4)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1,249 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 3,122 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
0.00	780	0	0	780
4.00	781	3,122	3,122	1,176

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**170.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Discarded OutFlow Max=1.15 cfs @ 12.00 hrs HW=3.26' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 1.15 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=0.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: 4 DRYWELLS

Inflow Area = 1.685 ac, 52.52% Impervious, Inflow Depth > 2.88" for 100-YEAR event
Inflow = 9.82 cfs @ 11.95 hrs, Volume= 0.404 af
Outflow = 3.39 cfs @ 12.07 hrs, Volume= 0.404 af, Atten= 66%, Lag= 7.0 min
Discarded = 3.39 cfs @ 12.07 hrs, Volume= 0.404 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 8.80' @ 12.07 hrs Surf.Area= 2,392 sf Storage= 5,131 cf

Plug-Flow detention time= 13.4 min calculated for 0.402 af (100% of inflow)
Center-of-Mass det. time= 13.3 min (801.0 - 787.8)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	4,802 cf	**10.00'D x 10.00'H Vertical Cone/Cylinder Z=1.0** x 4 13,614 cf Overall - 1,608 cf Embedded = 12,005 cf x 40.0% Voids
#2	1.00'	1,608 cf	**8.00'D x 8.00'H Vertical Cone/Cylinder** x 4 Inside #1
		6,411 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=3.36 cfs @ 12.07 hrs HW=8.74' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 3.36 cfs)

Summary for Pond 5P: 2 DRYWELLS

Inflow Area = 0.838 ac, 39.44% Impervious, Inflow Depth > 2.15" for 100-YEAR event
Inflow = 3.53 cfs @ 11.97 hrs, Volume= 0.150 af
Outflow = 1.28 cfs @ 12.09 hrs, Volume= 0.150 af, Atten= 64%, Lag= 7.2 min
Discarded = 1.28 cfs @ 12.09 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 7.07' @ 12.09 hrs Surf.Area= 916 sf Storage= 1,736 cf

Plug-Flow detention time= 11.5 min calculated for 0.150 af (100% of inflow)
Center-of-Mass det. time= 11.4 min (813.5 - 802.1)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	2,401 cf	**10.00'D x 10.00'H Vertical Cone/Cylinder Z=1.0** x 2 6,807 cf Overall - 804 cf Embedded = 6,003 cf x 40.0% Voids
#2	1.00'	804 cf	**8.00'D x 8.00'H Vertical Cone/Cylinder** x 2 Inside #1
		3,205 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=1.28 cfs @ 12.09 hrs HW=7.05' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 1.28 cfs)

Summary for Pond 6i: EXIST. INFILTRATION SWALE

Inflow Area = 0.653 ac, 37.78% Impervious, Inflow Depth > 2.07" for 100-YEAR event
Inflow = 3.00 cfs @ 11.90 hrs, Volume= 0.113 af
Outflow = 2.25 cfs @ 11.95 hrs, Volume= 0.113 af, Atten= 25%, Lag= 3.0 min
Discarded = 2.02 cfs @ 11.96 hrs, Volume= 0.112 af
Primary = 0.23 cfs @ 11.95 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 3.94' @ 11.96 hrs Surf.Area= 390 sf Storage= 615 cf

Plug-Flow detention time= 2.0 min calculated for 0.113 af (100% of inflow)
Center-of-Mass det. time= 1.9 min (802.5 - 800.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	624 cf	**2.00'W x 195.00'L x 4.00'H Prismatoid** 1,560 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**
#2	Primary	3.90'	**1.5" x 4.5" Horiz. Orifice/Grate X 18.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=1.99 cfs @ 11.96 hrs HW=3.85' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 1.99 cfs)

Primary OutFlow Max=0.21 cfs @ 11.95 hrs HW=3.92' (Free Discharge)
↑—**2=Orifice/Grate** (Weir Controls 0.21 cfs @ 0.50 fps)

Summary for Pond 6P: EXIST. DRYWELL

Inflow Area = 0.653 ac, 37.78% Impervious, Inflow Depth = 0.02" for 100-YEAR event
Inflow = 0.23 cfs @ 11.95 hrs, Volume= 0.001 af
Outflow = 0.11 cfs @ 11.98 hrs, Volume= 0.001 af, Atten= 53%, Lag= 1.7 min
Discarded = 0.11 cfs @ 11.98 hrs, Volume= 0.001 af

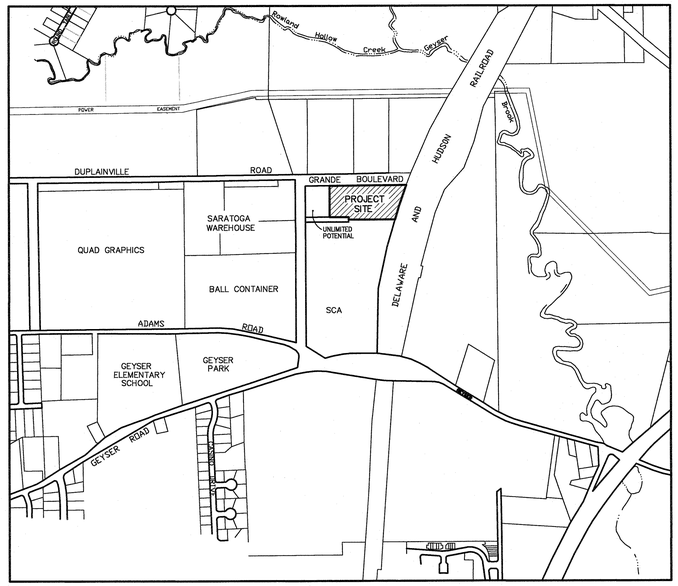
Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 0.45' @ 11.98 hrs Surf.Area= 93 sf Storage= 16 cf

Plug-Flow detention time= 2.0 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 2.4 min (719.4 - 717.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	425 cf	**10.00'D x 6.00'H Vertical Cone/Cylinder Z=1.0** 1,263 cf Overall - 201 cf Embedded = 1,062 cf x 40.0% Voids
#2	1.00'	201 cf	**8.00'D x 4.00'H Vertical Cone/Cylinder** Inside #1
		626 cf	Total Available Storage

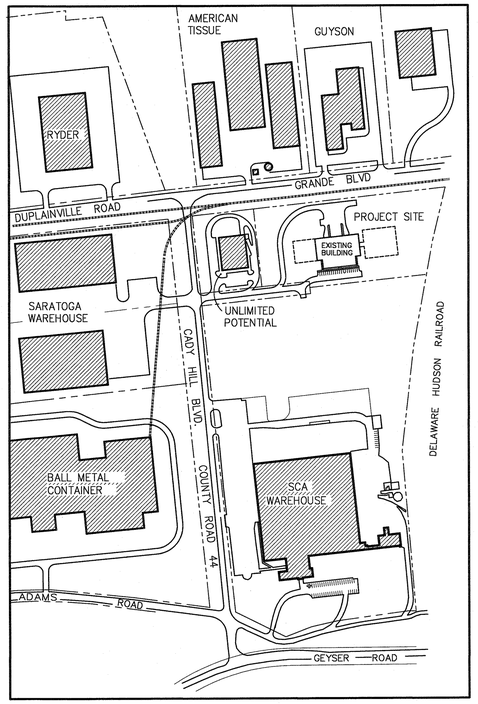
Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**45.000 in/hr Exfiltration over Wetted area**

Discarded OutFlow Max=0.10 cfs @ 11.98 hrs HW=0.39' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.10 cfs)



Location Plan

Scale: 1" = 800'



Vicinity Plan Not to Scale

AREA REQUIREMENTS

	DISTRICT	MINIMUM LOT SIZE	MINIMUM MEAN WIDTH (FEET)	MAXIMUM PERCENTAGE OF LOT TO BE OCCUPIED		MINIMUM YARD DEMENSION (FEET)				PRINCIPAL BUILDINGS		ACCESSORY BUILDINGS MINIMUM DISTANCE TO (FEET)				MINIMUM % OF LOT TO BE PERMEABLE
				PRINCIPAL BUILDING	ACCESSORY BUILDING	FRONT	SIDE	TOTAL SIDE	REAR	MIMIMUM 1st FLOOR AREA (SF)	MAXIMUM HEIGHT (FEET)	PRINCIPAL BUILDING	FRONT LOT LINE	FRONT LOT	SIDE LOT LINE	
REQUIRED	IND-G	40,000 SF	200'	40%	30%	40	15	30	15	–	50	10	40	40	10	30%
EXISTING		301,605 SF	819.1'	8.6%	0	70.1	304.5+263.5	569.6	167.4	26,120 SF	0	–	–	–	–	78.1%
PROPOSED		301,605 SF	819.1'	18.6%	0	70.1	163.5+139.2	302.7	152.4	56,020 sf	–	–	–	–	–	60.1%

SITE STATISTICS

TAX MAP PARCEL – 178.00-1-50.1
ZONING: IND-G – GENERAL INDUSTRIAL
PROPOSED USE: LIGHT INDUSTRIAL
SITE AREA: 6.9 ACRES (301,605 sf)

PROPOSED SITE UTILIZATION

BUILDING AREA: 56,020 sf = 18.6%
PAVEMENTS: 64,103 sf = 21.3%
PERMEABLE AREA: 181,482 sf = 60.1% (30% REQUIRED)

PROPOSED PARKING AND LOADING

–PROPOSED LOADING: 12 LOADING DOCKS AT REAR OF BUILDING PLUS 4 GRADE ACCESS VEHICLE DOORS AT REAR OF BUILDING

–REQUIRED PARKING: 1 per 2 EMPLOYEES (40) = 20
PLUS 1 per COMPANY VEHICLE (3) = 21 REQUIRED TOTAL

PROPOSED PARKING: 23 SPACES
1 ACCESSIBLE PARKING SPACE PROVIDED

NOTES

1. BASE INFORMATION FOR THIS PLAN WAS TAKEN FROM A BOUNDARY AND TOPOGRAPHIC SURVEY PREPARED BY AZIMUTH SURVEYING AND CARTOGRAPHY, JAMES WHITE LAND SURVEYOR, DATED MAY 2, 2005.
2. FOR PROPERTY LINE AND EXISTING CONDITIONS INFORMATION SEE "AS-BUILT 3 UNLIMITED DRIVE" MAP INCLUDED AT THE END OF THIS SET.
3. UTILITY LOCATIONS INDICATED ON THIS PLAN ARE APPROXIMATE. THE CONTRACTOR SHALL NOTIFY ALL UTILITY OWNERS PRIOR TO THE COMMENCEMENT OF WORK. THE CONTRACTOR SHALL VERIFY THE ACCURATE LOCATIONS IN THE FIELD AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
4. THE CONTRACTOR SHALL STAKEOUT ALL PROPOSED WORK, INCLUDING FINISHED GRADE ELEVATIONS, PRIOR TO THE START OF CONSTRUCTION AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES. THE CONTRACTOR SHALL NOT PROCEED WITH THE WORK UNTIL THE THE STAKEOUT HAS MET THE SATISFACTION OF THE ENGINEER AND THE OWNER,
5. THE CONTRACTOR SHALL PROTECT EXISTING PAVEMENTS AND IMPROVEMENTS TO REMAIN FROM DAMAGE DURING DEMOLITION AND CONSTRUCTION ACTIVITIES.

CITY OF SARATOGA SPRINGS STANDARD NOTES

1. ALL WORK MUST CONFORM TO ALL FEDERAL, STATE AND CITY CODES, SPECIFICATIONS, ORDINANCES, RULES AND REGULATIONS.
2. THE ELEVATION BASE FOR THE CONTOURS AND BENCHMARKS ARE BASED ON THE NATIONAL GEODETIC VERTICAL DATUM, 1929.
3. ALL REFUSE, DEBRIS AND MISCELLANEOUS ITEMS TO BE REMOVED SHALL BE LEGALLY DISPOSED OF OFF-SITE BY THE CONTRACTOR TO A LOCATION APPROVED BY THE CITY ENGINEER.
4. THE CONTRACTOR MUST SET UP A PRE-CONSTRUCTION MEETING WITH THE CITY ENGINEER PRIOR TO ANY CONSTRUCTION. CONSTRUCTION INSPECTIONS BY THE DESIGN PROFESSIONAL ARE REQUIRED. THE COST OF THE CONSTRUCTION INSPECTIONS IS THE RESPONSIBILITY OF THE APPLICANT/DEVELOPER.
5. THE CONTRACTOR MUST OBTAIN A BLASTING PERMIT FROM THE BUILDING INSPECTOR IF ANY BLASTING IS REQUIRED FOR THE PROJECT.
6. THE CONTRACTOR MUST OBTAIN A STREET OPENING PERMIT ISSUED BY THE DEPARTMENT OF PUBLIC WORKS FOR ANY WORK IN THE STREET OR RIGHT-OF-WAY OF ANY CITY STREET ROAD OR ALLEY.
7. ALL POINTS OF CONSTRUCTION INGRESS OR EGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT OR DEBRIS ONTO A PUBLIC ROAD.
8. A CERTIFICATE OF OCCUPANCY CANNOT BE ISSUED UNTIL ALL SITE WORK IS COMPLETED IN ACCORDANCE WITH THE APPROVED PLANS: AND AN AS-BUILT DRAWING HAS BEEN PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE CITY ENGINEER.

NOTICE
CALL BEFORE YOU DIG
DIG SAFELY NEW YORK
1-800-962-7962
48 HOURS NOTICE REQUIRED

LIST OF DRAWINGS

Planning Board No. 16.0

APPROVED UNDER AUTHORITY OF A RESOLUTION ADOPTED _____ BY THE PLANNING BOARD OF THE CITY OF SARATOGA SPRINGS

_____ CHAIRMAN

DATE SIGNED _____

General Contractors EST. 1972 Munter Enterprises, Inc.

Nace Engineering, PC
CIVIL ENGINEERS
169 Haviland Road
Queensbury, NY 12804
(518) 745-4400
FAX (518) 792-8511

SLACK CHEMICAL COMPANY EXPANSION

3 Unlimited Drive, City of Saratoga Springs, Saratoga County, New York

Owner/Applicant: Slack Chemical Company
3 Unlimited Drive, Saratoga Springs NY 12866

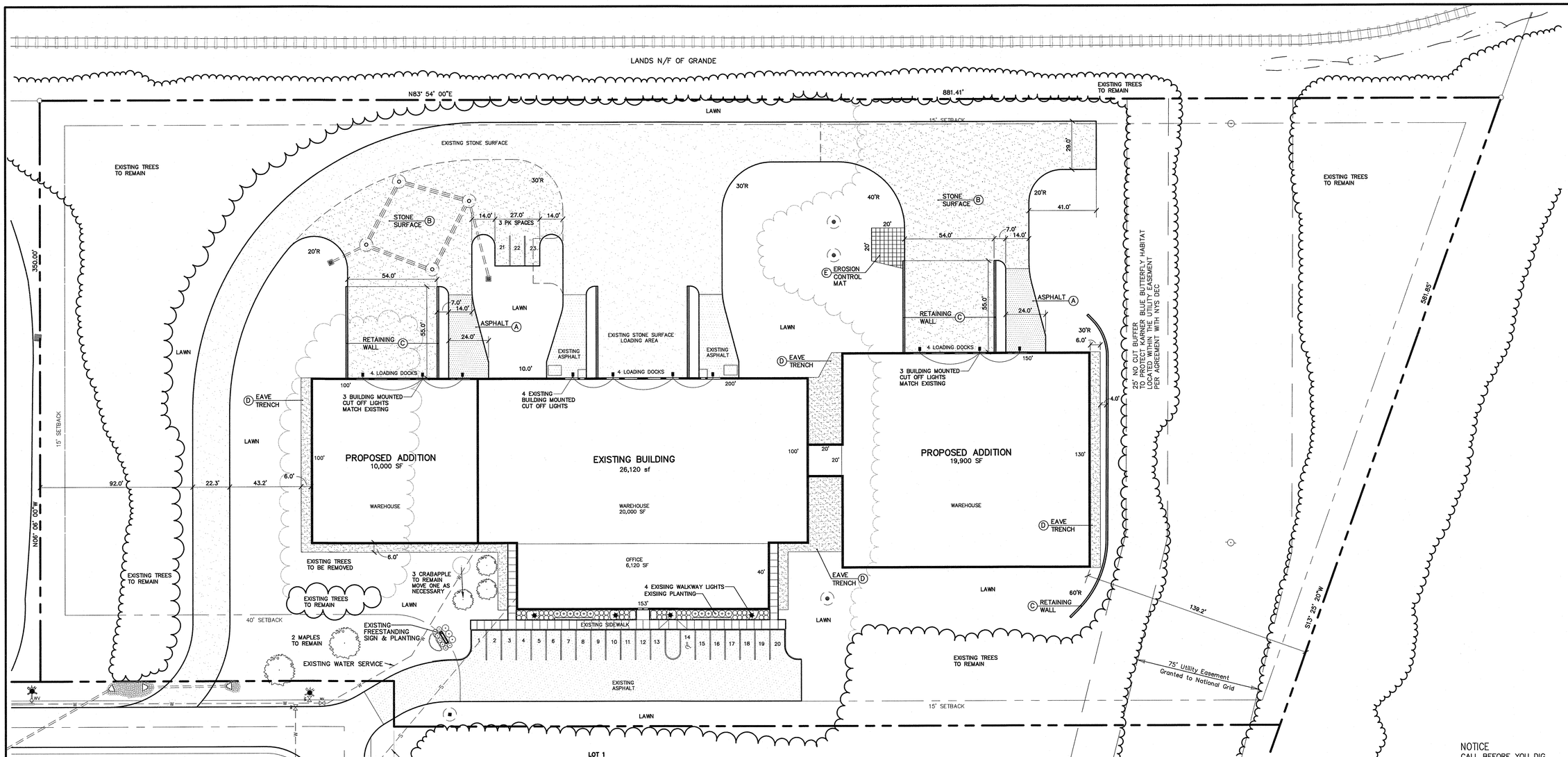
SITE LOCATION PLAN

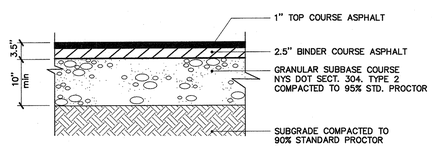
Date: October 24, 2016

Revisions

SP-1

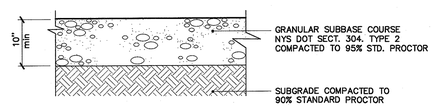
SHEET 1 OF 4





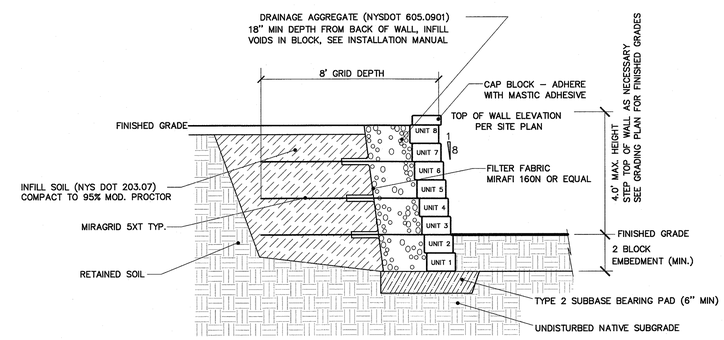
A ASPHALT PAVEMENT

NOT TO SCALE



B STONE SURFACE

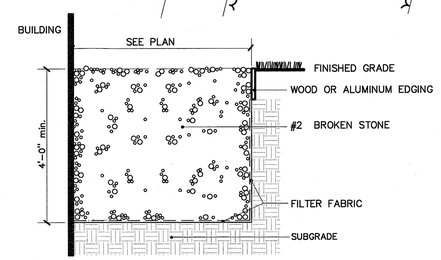
NOT TO SCALE



NOTE: WALL IS DETAILED AS ROCKWOOD WALL – CLASSIC 8 SYSTEM BY ROCKWOOD SYSTEMS OR APPROVED EQUAL COMPLY WITH MANUFACTURER'S DESIGN AND INSTALLATION RECOMMENDATIONS

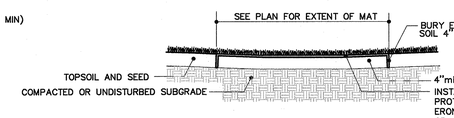
C SEGMENTAL RETAINING WALL

NOT TO SCALE



D EAVE TRENCH DETAIL

NOT TO SCALE



E EROSION CONTROL MAT

NOT TO SCALE

NOTICE
CALL BEFORE YOU DIG
DIG SAFELY NEW YORK
1-800-962-7962
48 HOURS NOTICE REQUIRED

Legend

- EXISTING TREELINE
- TREES TO BE CLEARED
- EXISTING TREES
- (S) EXISTING SEWER MANHOLE
- —S— EXISTING SEWER MAIN
- PROPERTY LINE
- EXISTING HYDRANT
- WV EXISTING WATER VALVE
- —W— EXISTING WATER MAIN
- (A) DETAIL SYMBOL
- GRADING LIMIT LINE / LIMITS OF CONSTRUCTION

Planning Board No. 16.0

APPROVED UNDER AUTHORITY OF A RESOLUTION ADOPTED _____ BY THE PLANNING BOARD OF THE CITY OF SARATOGA SPRINGS

_____ CHAIRMAN

DATE SIGNED _____

GENERAL CONTRACTORS EST. 1972 Munter ENTERPRISES, INC.

Nace Engineering, PC
CIVIL ENGINEERS
169 Haviland Road
Queensbury, NY 12804
(518) 745-4400
FAX (518) 792-8511

SLACK CHEMICAL COMPANY EXPANSION

3 Unlimited Drive, City of Saratoga Springs, Saratoga County, New York

Owner/Applicant: Slack Chemical Company
3 Unlimited Drive, Saratoga Springs NY 12866

SITE LALYOUT PLAN

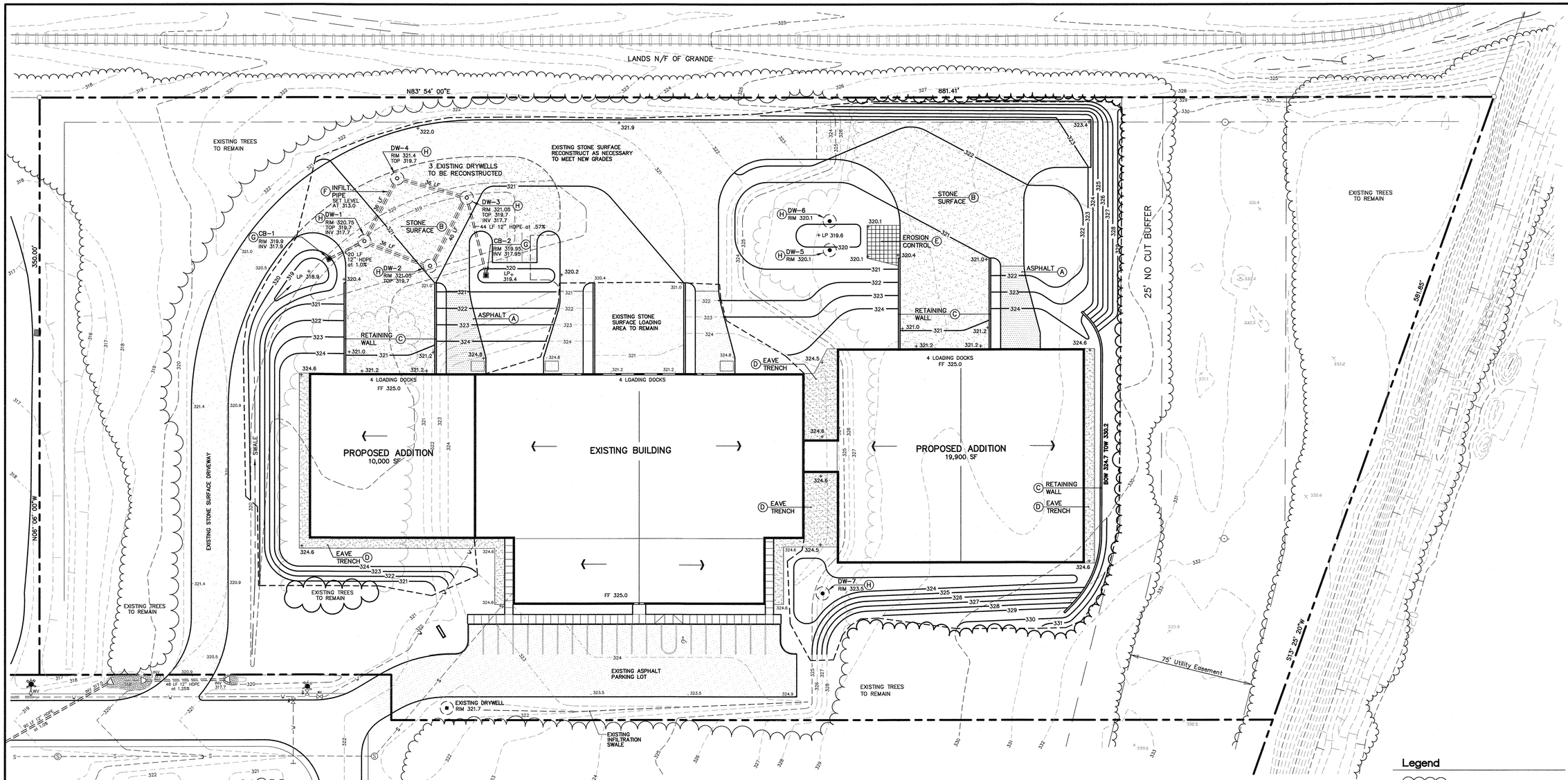
NORTH
SCALE 1" = 30'

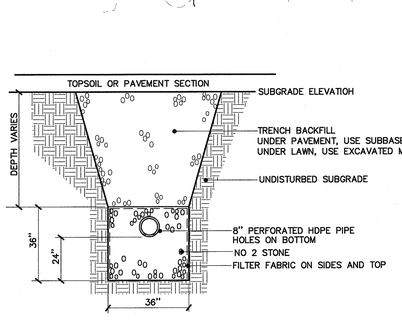
Date: October 24, 2016

Revisions

SP-2

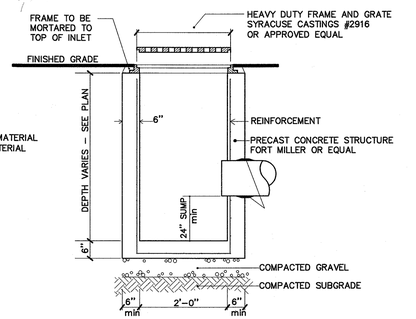
SHEET 2 OF 4





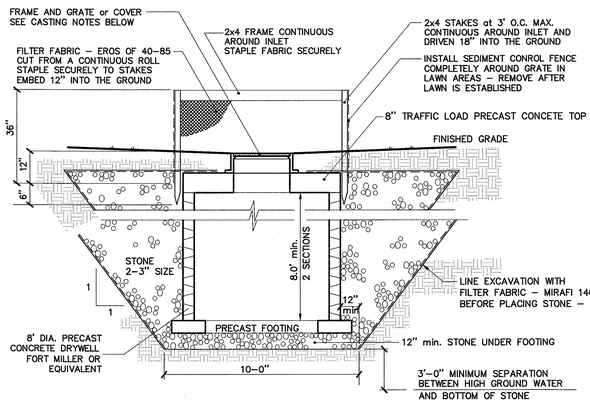
F INFILTRATION PIPE DETAIL

NOT TO SCALE



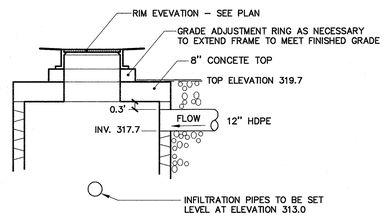
G CATCH BASIN – SQUARE

NOT TO SCALE



H 8' X 8' DEEP DRYWELL

NOT TO SCALE



DRYWELL IN PAVEMENT WITH PIPE DETAIL

CASTING NOTES

DRYWELLS NO. 1-4 TO RECEIVE A FRAME AND COVER NEENAH FOUNDRY MODEL R-1795-F OR APPROVED EQUAL

DRYWELLS NO. 5-7 TO RECEIVE A FRAME AND GRATE NEENAH FOUNDRY MODEL R-2554 OR APPROVED EQUAL

Legend

- EXISTING TREELINE
- TREES TO BE CLEARED
- EXISTING TREES
- (S) EXISTING SEWER MANHOLE
- S EXISTING SEWER MAIN
- PROPERTY LINE
- EXISTING HYDRANT
- WV EXISTING WATER VALVE
- W EXISTING WATER MAIN
- (A) DETAIL SYMBOL
- 326 EXISTING CONTOUR LINE
- 326 NEW FINISHED GRADE CONTOUR LINE
- 321.4 · EXISTING SPOT ELEVATION
- 324.9+ NEW FINISHED SPOT ELEVATION
- GRADING LIMIT LINE LIMITS OF CONSTRUCTION

Planning Board No. 16.0

APPROVED UNDER AUTHORITY OF A RESOLUTION ADOPTED _____ BY THE PLANNING BOARD OF THE CITY OF SARATOGA SPRINGS

_____ CHAIRMAN

DATE SIGNED _____

General Contractors Est. 1972 Munter Enterprises, Inc.

Miller Associates
LANDSCAPE ARCHITECTS

Nace Engineering, PC
CIVIL ENGINEERS

169 Haviland Road
Queensbury, NY 12804
(518) 745-4400
FAX (518) 792-8511

SLACK CHEMICAL COMPANY EXPANSION

3 Unlimited Drive, City of Saratoga Springs, Saratoga County, New York

Owner/Applicant: Slack Chemical Company
3 Unlimited Drive, Saratoga Springs NY 12866

GRADING AND DRAINAGE PLAN

NORTH
SCALE 1" = 30'

Date: October 24, 2016

Revisions

SP-3

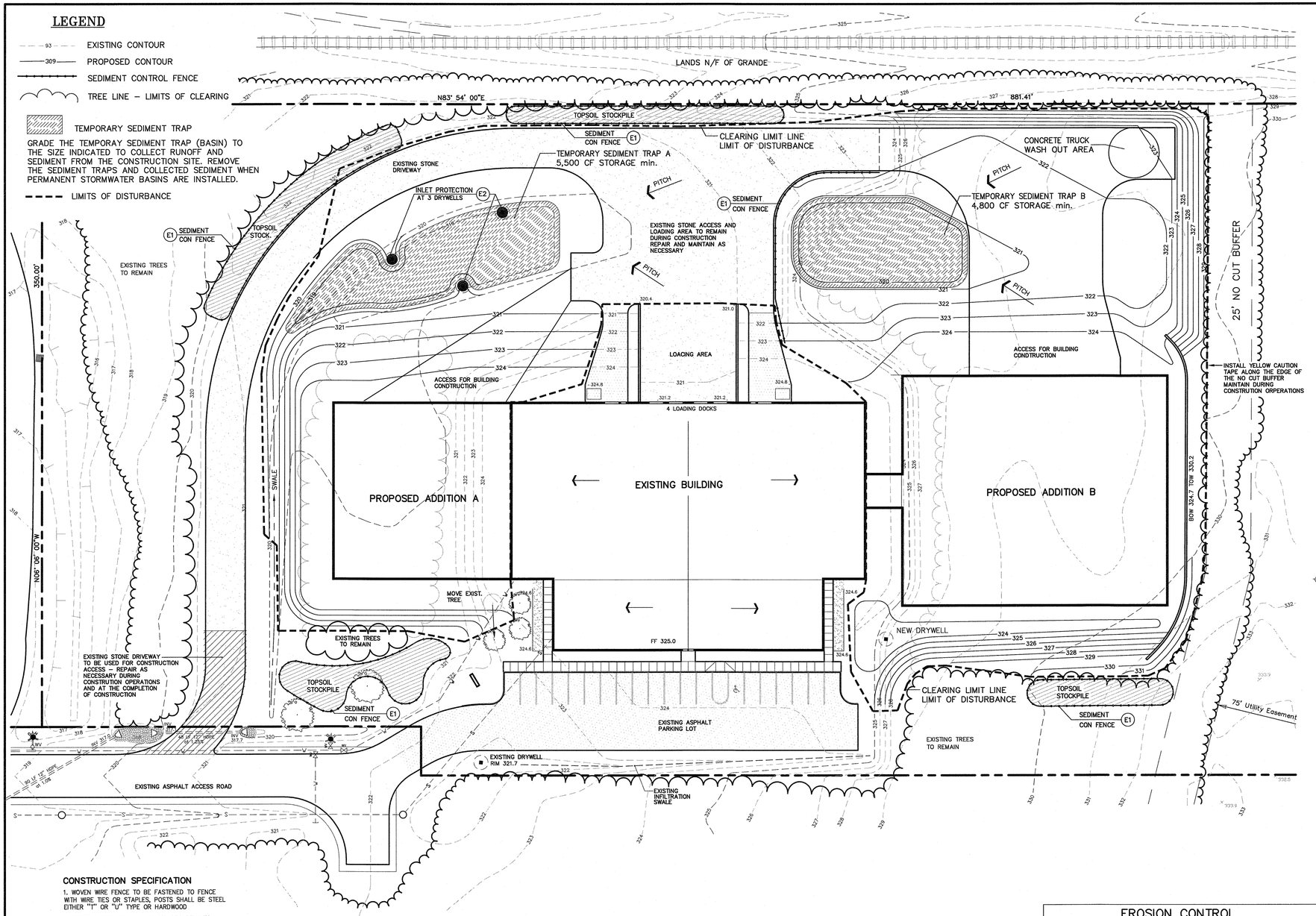
SHEET 3 OF 4

LEGEND

- 93 — EXISTING CONTOUR
- 309 — PROPOSED CONTOUR
- SEDIMENT CONTROL FENCE
- TREE LINE – LIMITS OF CLEARING
- TEMPORARY SEDIMENT TRAP

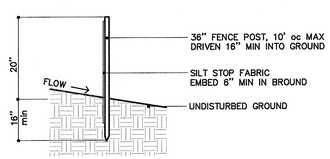
GRADE THE TEMPORARY SEDIMENT TRAP (BASIN) TO THE SIZE INDICATED TO COLLECT RUNOFF AND SEDIMENT FROM THE CONSTRUCTION SITE. REMOVE THE SEDIMENT TRAPS AND COLLECTED SEDIMENT WHEN PERMANENT STORMWATER BASINS ARE INSTALLED.

- LIMITS OF DISTURBANCE



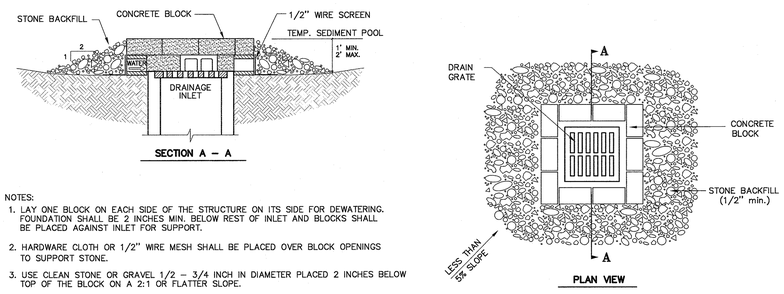
CONSTRUCTION SPECIFICATION

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



E1 SEDIMENT CONTROL FENCE

NOT TO SCALE



NOTES:

1. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING. FOUNDATION SHALL BE 2 INCHES MIN. BELOW REST OF INLET AND BLOCKS SHALL BE PLACED AGAINST INLET FOR SUPPORT.
2. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.
3. USE CLEAN STONE OR GRAVEL 1/2 – 3/4 INCH IN DIAMETER PLACED 2 INCHES BELOW TOP OF THE BLOCK ON A 2:1 OR FLATTER SLOPE.

E2 STONE & BLOCK INLET PROTECTION

NOT TO SCALE

EROSION CONTROL IMPLEMENTATION SCHEDULE

PRACTICE	IMPLEMENTATION TIME	DURATION OF PRACTICE
SEDIMENT CONTROL FENCE	PRIOR TO CLEARING AND SOIL DISTURBANCE	ENTIRE PROJECT (REMOVE AFTER FINAL SITE STABILIZATION AND VEGETATION ESTABLISHMENT)
INLET PROTECTION	PRIOR TO INITIAL SOIL DISTURBANCE	ENTIRE PROJECT (REMOVE PRIOR TO FINAL DRIVEWAY FINISHING)
SEDIMENT TRAP	DURING INITIAL SITE GRADING & EXCAVATION	UNTIL FINAL SITE GRADING AND CONSTRUCTION OF STORMWATER BASINS
TEMPORARY SEEDING & MULCHING	AFTER INITIAL SITE GRADING	UNTIL FINAL GRADING AND VEGETATION ESTABLISHMENT
DRYWELLS AND INFILTRATION SWALES	AFTER FINAL SITE GRADING	PERMANENT
SEEDING & OTHER VEGETATION STABILIZATION	AFTER FINAL SITE GRADING	PERMANENT

NOTE: EROSION AND SEDIMENT CONTROLS DEPICTED HEREON ARE INTENDED TO PROVIDE A GENERAL UNDERSTANDING OF THE REQUIRED WORK. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED DURING CONSTRUCTION AND WILL BE EMPLOYED AS NECESSARY TO PREVENT EROSION AND SEDIMENTATION FROM DISCHARGING OFF SITE.

S.W.P.P.P. REQUIREMENTS

1. THE CONTRACTOR UNDERTAKING SITE CONSTRUCTION OF THIS PROJECT MUST SIGN THE CERTIFICATION IN THE SWPPP AND BE FAMILIAR WITH ALL REQUIREMENTS OF THE SWPPP AND REQUIREMENTS OF THE NYS DEC SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITY – PERMIT No. GP-0-10-001.
2. THE CONTRACTOR IS SOLEY RESPONSIBLE TO COMPLY WITH THE TERMS OF THE NYS DEC SPDES GENERAL PERMIT FOR STORMWATER DISCHARGES FROM CONSTRUCTION ACTIVITY – PERMIT No. GP-0-10-001. COPIES OF THE GENERAL PERMIT ARE AVAILABLE BY CALLING DEC (518) 402-8109 AND ON LINE.
3. A NOTICE OF INTENT (NOI) MUST BE SUBMITTED TO DEC PRIOR TO INITIATING WORK.
4. THE SWPPP INCLUDES INFORMATION ON ALL DRAWINGS SP-1 TO SP-4 AND THE STORMWATER MANAGEMENT REPORT.
5. PRIOR TO COMMENCEMENT OF CONSTRUCTION, THE CONTRACTOR SHALL HAVE THE ENGINEER CONDUCT AN ASSESSMENT OF THE SITE AND CERTIFY IN AN INSPECTION REPORT THAT THE APPROPRIATE EROSION AND SEDIMENT CONTROLS HAVE BEEN ADEQUATELY INSTALLED. FOLLOWING COMMENCEMENT OF CONSTRUCTION, THE ENGINEER SHALL MAKE WEEKLY SITE INSPECTIONS AND INSPECTIONS AND PREPARE A REPORT AS REQUIRED BY THE GP-0-10-001. THE CONTRACTOR SHALL IMMEDIATELY REVIEW THE ENGINEER'S REPORT AND ADDRESS ALL ITEMS REQUIRING ATTENTION.
6. THE CONTRACTOR SHALL MAINTAIN A RECORD OF ALL INSPECTION REPORTS IN A SITE LOG BOOK, MAINTAINED ON SITE AND AVAILABLE TO THE PERMITTING AUTHORITY UPON REQUEST.
5. AT COMPLETION OF CONSTRUCTION, THE CONTRACTOR SHALL PERFORM A FINAL INSPECTION TO CERTIFY THAT THE SITE HAS UNDERGONE FINAL STABILIZATION AND THAT ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS HAVE BEEN REMOVED. UPON CERTIFICATION OF COMPLETION A NOTICE OF TERMINATION (NOT) SHALL BE SUBMITTED TO NYS DEC.

MAINTENANCE

1. SEDIMENT SHALL BE REMOVED FROM SEDIMENT TRAPS WHENEVER THEIR CAPACITY HAS BEEN REDUCED BY 50%.
2. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL BE INSPECTED WITHIN 24 HOURS OF A STORM EVENT AND REPAIRED AND/OR MODIFIED AS REQUIRED TO BE GOOD WORKABLE CONDITION.
3. THE CONTRACTOR SHALL CONDUCT AN INSPECTION OF THE SITE ON A DAILY BASIS TO COLLECT LITTER AND CONSTRUCTION DEBRIS AND DISPOSE OF LEGALLY.
4. ANY STOCKPILES OF FILL, TOPSOIL, EXCAVATED MATERIAL SHALL BE COVERED OR CONTAINED BY SEDIMENT CONTROL FENCE TO PREVENT EROSION.

STABILIZATION

1. THE CONTRACTOR SHALL INITIATE STABILIZATION MEASURES AS SOON AS PRACTICABLE IN PORTIONS OF THE SITE WHERE ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED, BUT IN NO CASE MORE THAN 14 DAYS.
2. STABILIZATION OF GRASS AREAS INCLUDES HYROSEEDING USING TACKIFIER ON SLOPES OVER 5:1 OR SEEDING AND INSTALLING A CONTINUOUS COVER OF STRAW MULCH WATERED INTO PLACE.
3. AREAS TO BE STABILIZED BY SEEDING SHALL BE SEEDED WITH AN ANNUAL RYEGRASS MIX OR OTHER APPROVED MIX, AT A RATE OF 5lbs PER 1000 sf, STARTER FERTILIZER (5-10-5) AT 40LBS PER 1,000 sf AND MULCHED WITH 3" min. STRAW OR HYDROSEEDED.

CONSTRUCTION SEQUENCING

1. THE PROJECT SITE IS TO BE DEVELOPED IN ONE PHASE.
2. THE LIMITS OF CLEARING AND GRADING SHALL BE STAKED BY A LAND SURVEYOR.
3. THE CONTRACTOR SHALL USE THE EXISTING STONE DRIVEWAY FOR THE CONSTRUCTION ROAD ENTRANCE. THE STONE DRIVEWAY MUST BE MAINTAINED AND REPAIRED AS NECESSARY DURING CONSTRUCTION AND AT THE END OF CONSTRUCTION.
4. THE CONTRACTOR SHALL CLEAR THE SITE AND REMOVE TIMBER AND DEBRIS.
5. PRIOR TO THE START OF GRADING OPERATIONS, THE CONTRACTOR SHALL INSTALL SEDIMENT CONTROL FENCING AND TEMPORARY INLET PROTECTION AS INDICATED.
6. THE CONTRACTOR SHALL COMPLETE GRUBBING OPERATIONS AND REMOVE STUMPS FROM THE SITE. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REUSE. EXCESS TOPSOIL IS TO BE REMOVED FROM THE SITE ASAP.
7. TEMPORARY SEDIMENT TRAP "A" SHALL BE GRADED AND COMPLETED TO ACCEPT RUNOFF FROM PROPOSED BUILDING AND PAVEMENT AREAS.
8. THE SITE SHALL BE ROUGH GRADED. CUT AND FILL OPERATIONS SHALL BE COMPLETED TO ESTABLISH ROUGH SUBGRADE ELEVATIONS. FILL SHALL BE PLACED IN LOW AREA AS INDICATED ON THE GRADING PLAN AND COMPACTED. THE SUBGRADE FOR BUILDING ADDITION "A" SHALL BE ESTABLISHED AND SURROUNDING SITE AREA GRADED TO ESTABLISH FINAL SUBGRADE ELEVATIONS.
9. INSTALL YELLOW CAUTION TAPE ALONG THE CLEARING/GRADING LIMITS ON THE EAST SIDE OF THE SITE ALONG THE NO CUT BUFFER AREA.
10. TEMPORARY SEDIMENT TRAP "B" IS TO BE GRADED TO ACCEPT STORMWATER RUNOFF FROM PROPOSED BUILDING AND PAVEMENT AREAS. THE TEMPORARY SEDIMENT TRAPS SHALL BE SEEDED WITH PERENNIAL RYEGRASS AT 5 lbs. PER 1,000 SF.
11. THE EAST SIDE OF THE SITE SHALL BE ROUGH GRADED. CUT OPERATIONS SHALL BE COMPLETED TO ESTABLISH ROUGH SUBGRADE ELEVATIONS. THE SUBGRADE FOR BUILDING ADDITION "B" SHALL BE ESTABLISHED AND SURROUNDING SITE AREA GRADED TO ESTABLISH FINAL SUBGRADE ELEVATIONS. INSTALL THE RETAINING WALL ON THE EAST SIDE. EXCESS OR UNACCEPTABLE SOIL SHALL BE REMOVED FROM THE SITE ASAP.
12. WHEN SUBGRADE FOR PAVED AREAS ARE COMPLETE AND THE BUILDING ROOFS AND SIDING ARE COMPLETE, THE CONTRACTOR SHALL INSTALL EAVE TRENCHES CATCH BASINS AND DRYWELLS. INSTALL PROTECTION AT INLETS.
13. ALL LAWN AREAS SHALL BE TOPSOILED AND SEEDED. ALL DISTURBED AREAS SHALL BE SEEDED OR PLANTED.
14. FOLLOWING COMPLETION ALL PLANTING AND THE ESTABLISHMENT OF ALL GRASS AREAS, REMOVE ANY COLLECTED SEDIMENT AND REMOVE THE SEDIMENT CONTROL REMOVE ANY DEBRIS FROM THE PERIMETER OF THE SITE AND DISPOSE OF ALL WASTE MATERIAL IN A LEGAL MANNER.

AREA OF DISTURBANCE

SITE AREA: 301,605 SF = 6.9 ACRES
TOTAL DISTURBANCE: 120,310 sf = 2.8 ACRES
– NEW BUILDING AREA: 29,900 sf = 0.7 ACRES
– NEW PAVEMENT AREA: 24,214 sf = 0.6 ACRES

Planning Board No. 16.0

APPROVED UNDER AUTHORITY OF A RESOLUTION ADOPTED BY THE PLANNING BOARD OF THE CITY OF SARATOGA SPRINGS

_____ CHAIRMAN

DATE SIGNED _____

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SLACK CHEMICAL COMPANY EXPANSION
3 Unlimited Drive, City of Saratoga Springs, Saratoga County, New York
Owner/Applicant: Slack Chemical Company
3 Unlimited Drive, Saratoga Springs NY 12866

EROSION AND SEDIMENT CONTROL PLAN

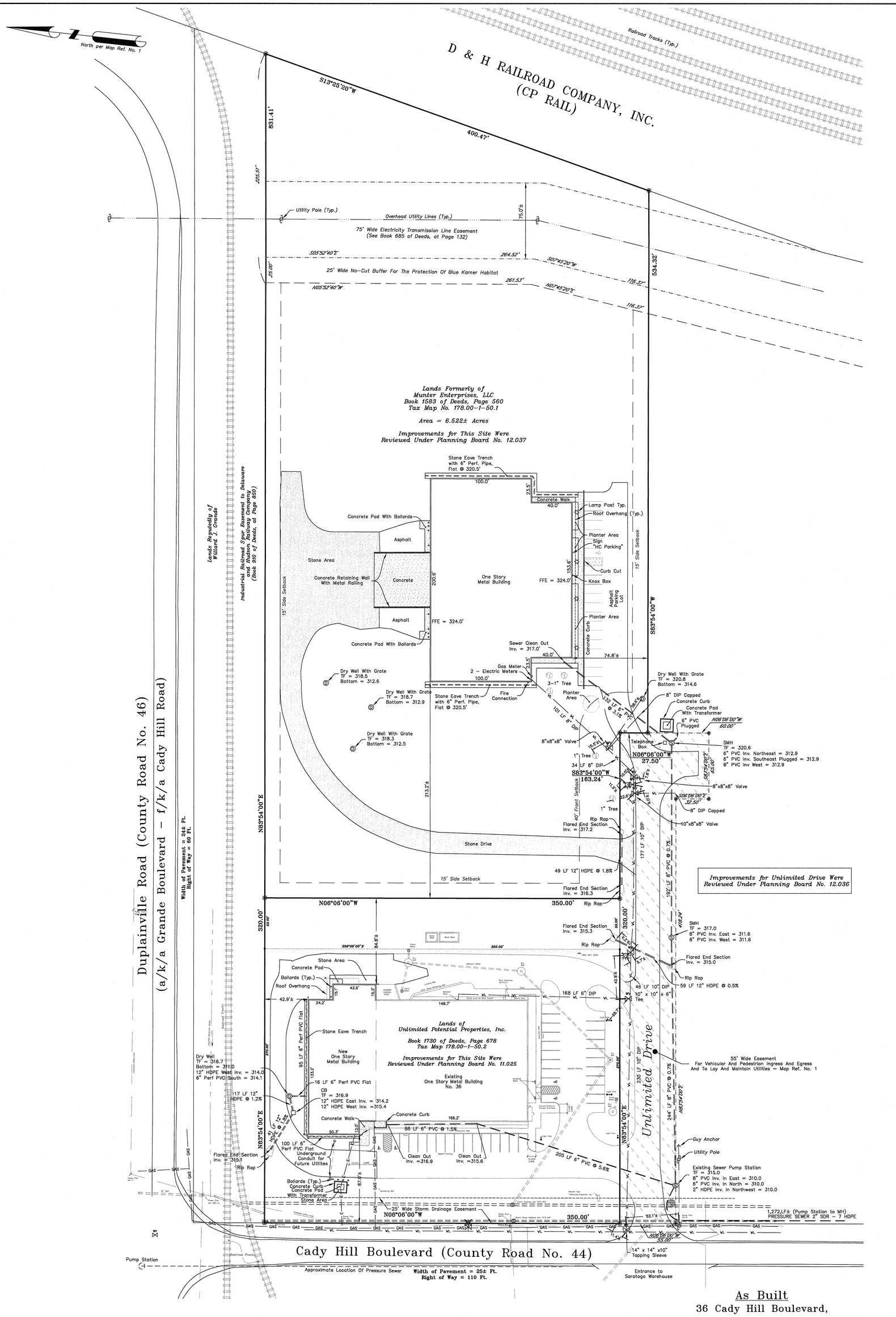
NORTH
SCALE 1" = 30'

Date: October 24, 2016

Revisions

SP-4

SHEET 4 OF 4



As Built

36 Cady Hill Boulevard, 3 Unlimited Drive, and Unlimited Drive

PLANTING CERTIFICATION:

THE EXISTING PLANTING MEETS OR EXCEEDS THE PLANTING PLAN SHOWN ON THE APPROVED PLANS ASSOCIATED WITH PLANNING BOARD PROJECTS 11.025, 12.036, AND 12.037.

THOMAS W. NACE P.E. NYS LIC. NO. 055150

CERTIFICATION:

I, THOMAS W. NACE, REGISTERED PROFESSIONAL ENGINEER NO. 055150, IN THE STATE OF NEW YORK, WAS RETAINED BY MUNTER ENTERPRISES, LLC, TO UNDERTAKE PERIODIC INSPECTIONS AND HEREBY CERTIFY THAT THE IMPROVEMENTS SHOWN ON THIS DRAWING ARE IN CONFORMANCE WITH THE APPROVED DRAWINGS AND SPECIFICATIONS OR ANY AUTHORIZED CHANGES, AND SHOW THE ACTUAL FACILITIES AND INFRASTRUCTURE AS THEY WERE INSTALLED IN THE FIELD.

THOMAS W. NACE P.E. NYS LIC. NO. 055150

STATE OF NEW YORK — JASON M. TOMMELL — 50605 — LICENSED LAND SURVEYOR

JASON M. TOMMELL
P.L.S. LIC. NO. 50,605

TOMMELL & ASSOCIATES
28 CLINTON STREET, SUITE 1
SARATOGA SPRINGS, NY 12866
PH: (518) 587-3149 FAX: (518) 587-7251

PB Nos.: 11.025, 12.036, 12.037
SCALE: 1" = 40'

CITY OF SARATOGA SPRINGS (OD)
SARATOGA COUNTY, NEW YORK
SEPTEMBER 30, 2014

MAP NO: 140048.04