

**STORM WATER PRACTICE FEASIBILITY
STUDY REPORT**

**Pine Bush Senior Living Center
145 Karner Road**

TOWN OF GUILDERLAND

COUNTY OF ALBANY

STATE OF NEW YORK

PREPARED BY:

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INTRODUCTION:

Hershberg & Hershberg were retained by Pine Bush Senior Living LLC, the applicant for approval of this project. The contact person is Timothy Cassidy, Pine Bush Senior Living LLC, 823 West Park Avenue #256, Ocean, NJ 07712. He may be reached at (732)233-4625

DESCRIPTION OF EXISTING SITE:

PARCEL AREA

The existing site is Tax Map Parcel No.40.0-2-18 The existing site is currently vacant..



Fig. No. 1 - Aerial Photo of Existing Site

WATERCOURSES

The Kaikout Kill crosses the portion of the parcel to be preserved and will not be impacted by this project.

EXISTING WETLANDS

There is a small Federal wetlands (Waters of the United States) along the southerly line which will be retained with the exception of 0.098 acre to be impacted or New York State Freshwater Wetlands within the site.

FLOOD PLAIN

The site to be developed lies entirely within Zone X (Area of Minimal Flooding) as shown on Flood Insurance Rate Maps issued March 16, 2015.

EXISTING SOILS

Information obtained from the Web Soil Survey site indicates that the developed area will be:

Colonie loamy fine sand (CoC) rolling – Hydrologic Class A

Elnora loamy fine sand (EnA) 0 to 3% slopes - Hydrologic Class A

Udipsamments – Urban Land complex - Hydrologic Class A

Udipsamments, which are areas that have been excavated or filled for construction projects, have been the subject of test pits which confirm these soil profiles. Only Test Pit #7 encountered any significant fill which appears to have been placed in a ravine. Borings and test pits were conducted on this site by Dente Engineering. The results are contained in Appendix 1.



USDA Natural Resources Conservation Service

Web Soil Survey National Cooperative Soil Survey

6/15/2015 Page 1 of 3

Fig. No. 2 – Soil Map

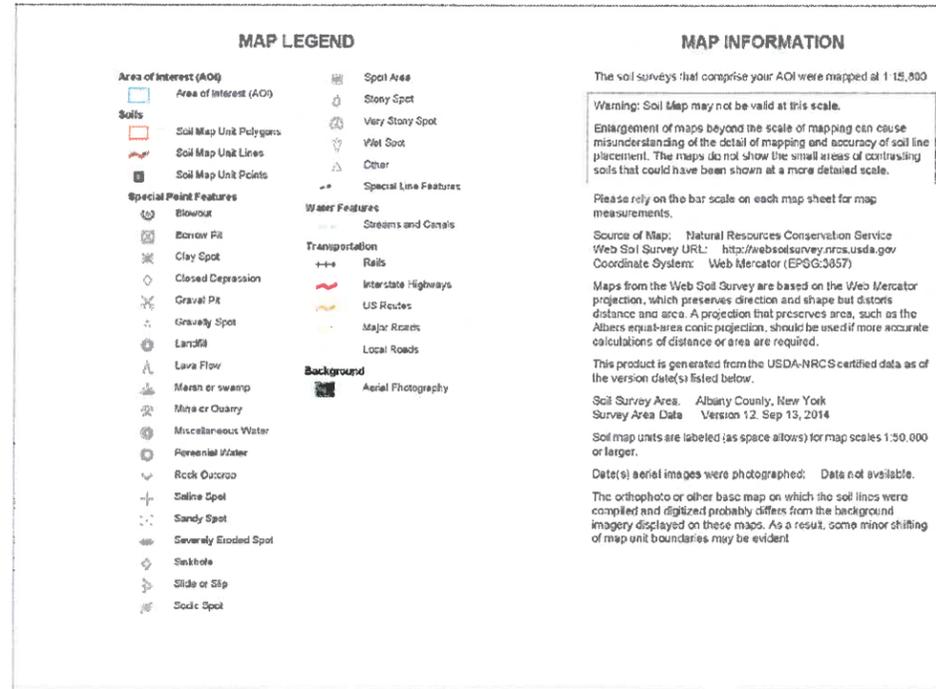


Fig. 3 – Soil Map Legend

Map Unit Legend

Albany County, New York (NY001)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CoC	Colonia loamy fine sand, rolling	5.1	43.8%
EnA	Enora loamy fine sand, 0 to 3 percent slopes	1.5	12.7%
HuE	Hudson silt loam, 25 to 45 percent slopes	3.5	30.2%
Uf	Udipsamments-Urban land complex	1.5	13.3%
Totals for Area of Interest		11.6	100.0%

Fig. 4 – Soil Map Unit Legend

DESCRIPTION OF INTENDED SITE DEVELOPMENT AND USE

The Applicant requests to rezone an 11+/- acre portion of the site to Multiple Residence Zone (MR) to accommodate a senior living complex which consists of the following elements:

- 56 unit/72 bed Assisted Living Facility
- 40 unit/48 bed Memory Care Facility
- 96 unit Independent Living Facility
- Senior Educational and Resource Facility

The development includes a private access roadway, 168 +/- parking spaces, a service entrance, outdoor courtyard areas, a stormwater collection system and other utility connections as required. The applicant proposes to dedicate a 39.9 +/- acre portion of the site to become a portion of the Albany Pine Bush Preserve.

DRAINAGE SYSTEM

The existing drainage pattern indicate that drainage is mainly discharged to the groundwater or to a small Federal wetland noted near the southwest corner of the 11 acre parcel to be developed. Significant portions of the storm drainage will be recharged to the groundwater. Attention will be paid to sedimentation, erosion control and the quality of storm water. A Storm Water Pollution Protection Plan (SWPPP) will be required under SPDES Permit #GP0-15-002. Storm water management will be implemented by using the following methods:

- Porous pavement with underdrain collection system
- Dry Swale
- Sedimentation Basin

Infiltration Basin

Overflow (Detention) Basin

The standards in *Erosion and Sediment Control Guidelines for New Development* promulgated by New York State Department of Environmental Conservation will be met. A full SWPPP will be required since the site disturbance will be greater than 1 acre.

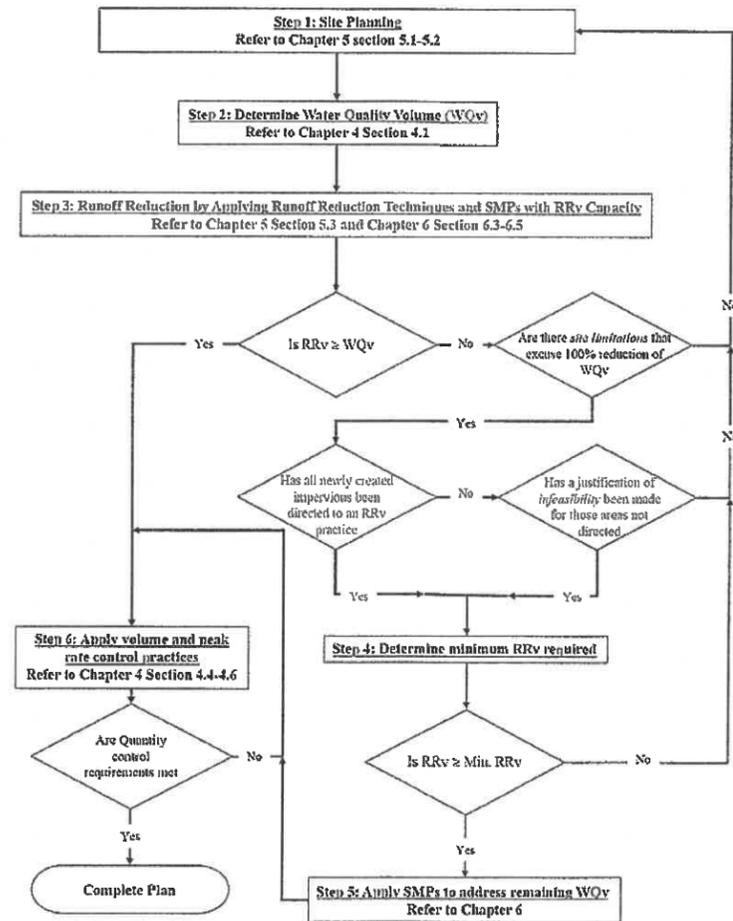
There will be no increase in drainage from this site for any storms up to and including a 100 year storm. Flows will be controlled utilizing recharge at the source, collection in an underdrain system from the porous asphalt pavement together with treatment of roof drainage and a portion of the pavement surface in a dry swale and an infiltration basin will be employed.. The preliminary storm water treatment system is shown on the Concept Plan.

COMPLIANCE WITH GREEN INFRASTRUCTURE REQUIREMENTS UNDER SPDES GP#0-15-002

Under SPDES GP#0-15-002, the SWPPP must comply with the latest revision of the New York State Stormwater Design Manual (hereinafter NYSSWDM), last revised January, 2015. This includes consideration of the “The Six Step Process for Stormwater Site Planning and Practice Selection”¹ which is shown below. During preparation of the SWPPP more details will be provided on compliance with the Six Step Process. :

¹Page 3-1, *New York State Stormwater Management Design Manual, January 2015, Updated By New York State Department of Environmental Conservation.*

Figure 3.1: Stormwater Site Planning and Practice Selection Flow Chart



3-1

Fig. No. 5 – Six Step Process

COMPLIANCE WITH SIX STEP PROCESS
STEP 1 – SITE PLANNING

The following steps will be considered and implemented where reasonable:

A. CONSERVE NATURAL AREAS

1. Preservation of Undisturbed Areas
Undisturbed areas will be preserved.
2. Preservation of Buffers
This plan proposes to preserve 39.9 +/- acres of land and dedicate this to the Pine Bush Preserve. .
3. Reduction of Clearing and Grading
The clearing and grading is limited to the minimum area necessary for the development.
4. Locating Development in Less Sensitive Area
The sensitive areas of the lands for dedication to the Pine Bush Preserve are avoided by this design. The only sensitive area impacted is 0.098 acre of Federal wetlands.
5. Open Space Design
This greenspace on the developed parcel is 59.4% of the 11 acre site limits. The green space on the entire site of 50.9 acres is 87.8%.
6. Soil Restoration
Soil will be restored by using de-compaction techniques prior to installation of porous pavement, infiltration trenches, infiltration basin, dry swales or planting and installation of topsoil throughout the site.

B. REDUCE IMPERVIOUS COVER

1. Roadway Reduction

This development reduces impervious pavement by utilizing porous pavement wherever practical.

2. Sidewalk Reduction

This development limits sidewalks to those required to provide safe access to the building from parking areas and to Route 155.

3. Driveways Reduction

The driveways are the minimum width and length to permit access to the site.

4. Parking Reduction

This development includes the minimum parking required by the usage.

5. Building Footprint Reduction

The total building footprint has been reduced through the use of multi-story design for the independent living facility.

STEP 2 – WATER QUALITY VOLUME

Water Quality Volume (WQ_v) is computed based upon the following formula:²

$$WQ_v = \frac{(P)(R_v)(A)}{12}$$

Where WQ_v = water quality volume (acre-feet)

P = 90% rainfall event³ (1.20 inches)

R_v = 0.05 + 0.009 I, where I is percent impervious cover

² Ibid. Table 4-1, Page 4-3

³ Ibid., Page 4-2, Figure 4.1

A = site area in acres

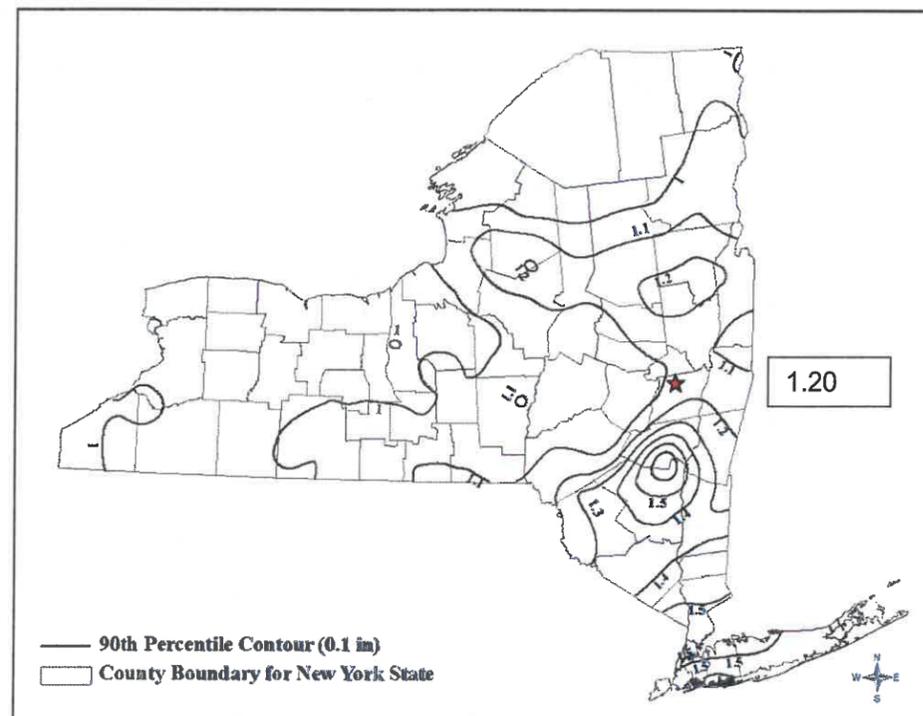


Fig. No. 5 – 90% Rainfall Event Map

The Water Quality Volume (WQ_v) is 0.457 acre feet or 19,906 cubic feet.
See Computation in Appendix 2.

STEP 3 – APPLY RUNOFF REDUCTION VOLUME

Basic Runoff Reduction Volume (RR_v) can be computed based upon the following formula:⁴

$$RR_v = \frac{(P)(R_v)(A_i)}{12}$$

⁴ Ibid., Page 4-6

Where RR_v = runoff reduction volume (acre-feet)
 P = 90% rainfall event⁵ (1.20 inches for Town of Guilderland)
 R_v = $0.05 + 0.009 I$, where I is percent impervious cover
 AiC = site impervious area in acres
 S = Hydrologic Soil Group Specific Reduction Factor
 Ai = $(AiC) (S)$

The Basic Runoff Reduction Volume (RR_v) is 0.200 acre feet or 8,6954 cubic feet. See Computation in Appendix 2.

STEP 4 – DETERMINE MINIMUM RUNOFF REDUCTION

The Basic Runoff Reduction Volume (RR_v) will be computed on the NYSDEC Green Infrastructure Worksheet when the SWPPP is completed. Since RR_v will in all likelihood be less than WQ_v , justification and assessment will be provided when the final design and the SWPPP are completed. The justification and assessment will consider the uses of the following methods:

Porous Pavement

Standard SMP with RR_v Capacity

- Infiltration practices
- Dry Swale (Open Channel Practice)

STEP 5 – APPLY SMP'S TO ADDRESS REMAINING WQ_v

SELECTED TREATMENT SYSTEMS

POROUS ASPHALT PAVEMENT

From Table 5-4 in Section 5.3.11 –Porous Pavement the following treatment results are noted

⁵ Ibid., Page 4-6

<u>Pollutant Parameter</u>	<u>% Removal</u>
Total Phosphorus	65
Total Nitrogen	80 – 85
Total Suspended Solids	82 – 95

Other items noted in the same section are proposed to be employed.

SOILS

The underlying parent soils should have a minimum infiltration rate of 0.5 inches per hour. Soil testing is required as set forth in Appendix D of this Design Manual. To maintain effective pollutant removal in the underlying soils, organic matter content in the subsoils is important.

SLOPES

Runoff should sheet flow across permeable pavement. Slopes across the surface and bottom of the stone reservoir should not exceed 5 percent to prevent ponding of water on the surface and within the subbase. Ideally it should be completely flat so that the infiltrated runoff will be able to infiltrate through the entire surface. A terraced system may be used on slopes. Perforated pipes may be used to distribute runoff through the reservoir evenly.

DRY SWALE DESIGN

A dry swale design was selected for a portion of the site as contained in the Chapter 6 of the New York State Stormwater Management Design Manual and as detailed in Fig. 6-20⁶.

⁶ Ibid., pg 6-60

In compliance with Chapter 5 of New York State Stormwater Management Design Manual (NYSSWDM) potential systems were evaluated. Porous asphalt, a permeable pavement method has been chosen to provide treatment for the area where new pavement will be placed. Portions will also utilize underdrain to collect water not absorbed into the groundwater and divert it to an overflow basin to provide for overbank and extreme flood criteria. In addition a Standard SMP's with RRV capabilities were selected to treat roof drainage. A dry swale and an infiltration basin. In making this selection consideration was given to five selection matrices contained in the NYSSWDM. The first matrix considered was the "Land Use Selection Matrix" (See Matrix 7.1 reproduced below)⁷. The Infiltration Basin was rated "Good" and the Dry Swale was rated "Depends" under "Commercial/High Density."

⁷ Ibid., Page 7-3

Table 7.1 Land Use Selection Matrix

SMP Group	SMP Design	Rural	Residential	Roads and Highways	Commercial/High Density	Hotspots	Ultra Urban
Pond	Micropool ED	○	○	○	▶	⊕	●
	Wet Pond	○	○	○	▶	⊕	●
	Wet ED Pond	○	○	○	▶	⊕	●
	Multiple Pond	○	○	▶	▶	⊕	●
	Pocket Pond	○	▶	○	▶	●	●
Wetland	Shallow Wetland	○	○	▶	▶	⊕	●
	ED Wetland	○	○	▶	▶	⊕	●
	Pond/Wetland	○	○	●	▶	⊕	●
	Pocket Wetland	○	▶	○	▶	●	●
Infiltration	Infiltration Trench	▶	▶	○	○	●	▶
	Shallow I-Basin	▶	▶	▶	▶	●	▶
	Dry Well ¹	▶	○	●	▶	●	▶
Filters	Surface Sand Filter	●	▶	○	○	⊕	○
	Underground SF	●	●	▶	○	○	○
	Perimeter SF	●	●	▶	○	○	○
	Organic SF	●	▶	○	○	⊕	○
	Biorctention	▶	▶	○	○	⊕	○
Open Channels	Dry Swale	○	▶	○	▶	⊕	▶
	Wet Swale	○	●	○	●	●	●

○: Yes. Good option in most cases.
 ▶: Depends. Suitable under certain conditions, or may be used to treat a portion of the site.
 ●: No. Seldom or never suitable.
 ⊕: Acceptable option, but may require a pond liner to reduce risk of groundwater contamination.

7-3

Fig. No. 6 –Land Use Selection Matrix

The “Physical Feasibility Factors Matrix” (See Matrix 7.2 reproduced below)⁸
 For Shallow Infiltration Basin the treated area is less than the recommended
 10 acre maximum. The selected treatment mode meets the “Physical
 Feasibility Factors Matrix Requirements.

New York State Stormwater Management Design Manual
 Chapter 7: SMP Selection
 Section 7.2 Physical Feasibility Factors

Table 7.2 Physical Feasibility Matrix

SMP Group	SMP Design	Soils	Water Table	Drainage Area (acres)	Site Slope	Head (ft)
Pond	Micropond ED	HSG A soils may require pond liner.	2 foot separation if hotspot or aquifer	10 min ¹	No more than 15%	6 to 8 ft
	Wet Pond			25 min ¹		
	Wet ED Pond					
	Multiple Pond					
	Pocket Pond	OK	below WT	5 max ²		4 ft
Wetland	Shallow Wetland	HSG A soils may require liner	2 foot separation if hotspot or aquifer	25 min	No more than 8%	3 to 5 ft
	ED Wetland					
	Pond/Wetland					
	Pocket Wetland	OK	below WT	5 max		2 to 3 ft
Infiltration	Infiltration Trench	f _s > 0.5 inch/hr; additional pretreatment required over 2.0 in/hr (See Section 6.3.3)	3 feet, 4 feet if sole source aquifer.	5 max	No more than 15%	1 ft ⁶
	Shallow I-Basin			10 max ³		3 ft
	Dry Well			1 max ⁴		1 ft
Filters	Surface SF	OK	2 feet ⁵	10 max ²	No more than 6%	5 ft
	Underground SF			2 max ²		5 to 7 ft
	Perimeter SF			2 max ²		2 to 3 ft
	Organic SF			5 max ²		2 to 4 ft
	Bioretention			5 max ²		5 ft
Open Channels	Dry Swale	Made Soil	2 feet	5 max	No more than 4%	3-5 ft
	Wet Swale	OK	below WT	5 max		1 ft

Notes:
 1: Unless adequate water balance and anti-clogging device installed
 2: Drainage area can be larger in some instances
 3: May be larger in areas where the soil percolation rate is greater than 5.0 in/hr
 4: Designed to treat rooftop runoff only
 5: If designed with a permeable bottom, must meet the depth requirements for infiltration practices.
 6: Required ponding depth above geotextile layer.

Fig. No. 7 –Physical Feasibility Factors Matrix

⁸ Ibid. Page 7-5

The Watershed Regional Selection Matrices (Table 7.3a 7 7.3b) are reproduced on the next page. There are no lakes or sensitive streams impacted by this site. The Schenectady-Niskayuna Sole Source Aquifer impacts many areas in the vicinity of the Town of Guilderland. The area of this project appears to be outside the sole source aquifer as shown on the Environmental Resource Mapping by NYSDEC.

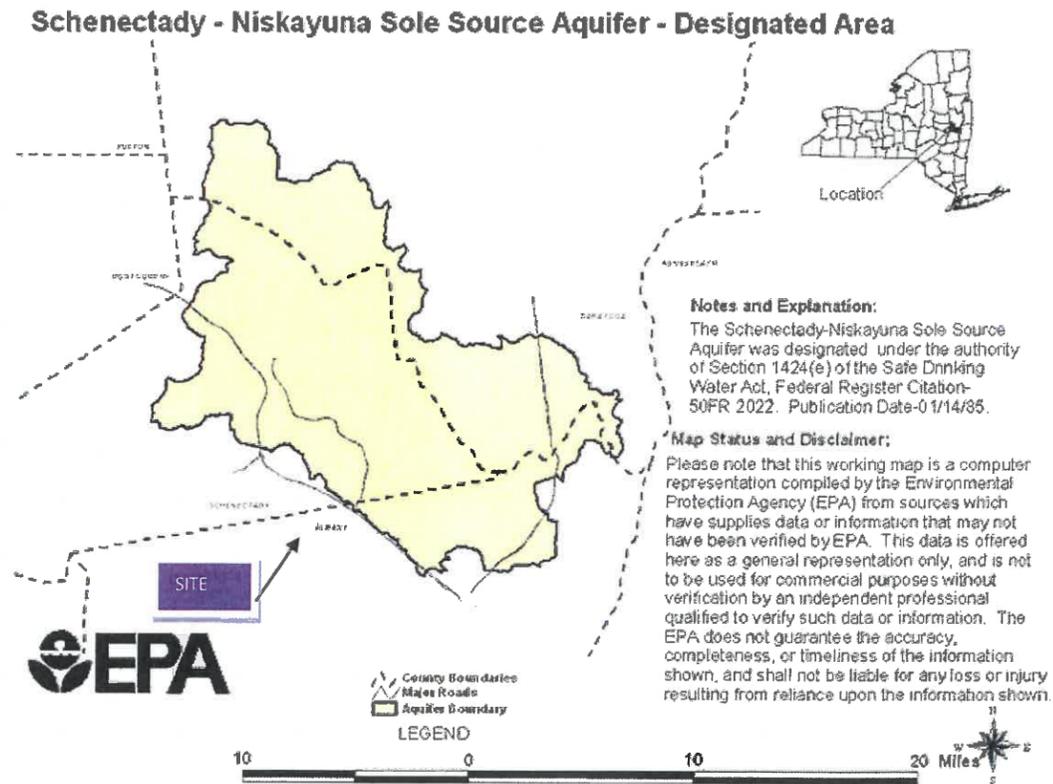


Fig. No. 8 - Schenectady Niskayuna Sole Source Aquifer

SMP Group	Sensitive Stream	Aquifer	Lakes
Ponds	Emphasize channel protection. Restrict in-stream practices. In trout waters, minimize permanent pool area, and encourage shading.	May require liner if HSG A soils are present. Pretreat 100% of WQ, from hotspots.	Encourage the use of a large permanent pool to improve phosphorus removal.
Wetlands	Require channel protection. Restrict in-stream practices. Restrict use in trout waters.	Provide a 2' separation distance to water table.	
Infiltration	Strongly encourage use for groundwater recharge. Combine with a detention facility to provide channel protection.	Provide 100' horizontal separation distance from wells and 4' vertical distance from the water table.	OK. Provides high phosphorus removal.
Filtering Systems	Combine with a detention facility to provide channel protection.	Excellent pretreatment for infiltration or open channel practices.	OK, but designs with a submerged filter may result in phosphorus release.
Open Channels	Combine with a detention facility to provide channel protection.	OK, but hotspot runoff must be adequately pretreated	OK. Moderate P removal.

Fig No. 9 - Watershed Regional Selection Matrix -1

SMP Group	Reservoir	Estuary/Coastal	Cold Climates
Ponds	Encourage the use of a large permanent pool to improve sediment and phosphorus removal. Promote long detention times to encourage bacteria removal.	Encourage long detention times to promote bacteria removal. Provides high nitrogen removal. In flat coastal areas, a pond drain may not be feasible.	Incorporate design features to improve winter performance.
Wetlands			Encourage the use of salt-tolerant vegetation.
Infiltration	Provide a separation distance from bedrock and water table Pretreat runoff prior to infiltration practices.	OK, but provide a separation distance to seasonally high groundwater. In the sandy soils typical of coastal areas, additional pretreatment may be required (See Section 6.3.3)	Incorporate features to minimize the risk of frost heave. Discourage infiltration of chlorides.
Filtering Systems	Excellent pretreatment for infiltrations or open channel practices. Moderate to high coliform removal	Moderate to high coliform removal Designs with a submerged filter bed appear to have very high nitrogen removal	Incorporate design features to improve winter performance.
Open Channels	Poor coliform removal for wet swales.	Poor coliform removal for grass wet swales.	Encourage the use of salt-tolerant vegetation.

Fig No. 10 - Watershed Regional Selection Matrix -2

The Stormwater Management Capability Matrix (Table 7.4) is reproduced below. The Infiltration Trench & Basin are a “Good” option for meeting management goals for Metals, Nitrogen and Bacteria. The Dry Swale is “Depends” for the management goal for Nitrogen and “Good” for Metals but has little effect on Bacteria. .

New York State Stormwater Management Design Manual
 Chapter 7: SMP Selection
 Section 7.4 Stormwater Management Capability

TABLE 7.4 STORMWATER MANAGEMENT CAPABILITY MATRIX

SMP Group	SMP Design	Water Quality			Channel Protection	Flood Control
		Nitrogen	Metals	Bacteria		
Pond	Micropool ED				○	⊙
	Wet Pond				○	○
	Wet ED Pond	○	○	○	○	○
	Multiple Pond				○	○
	Pocket Pond				○	○
Wetland	Shallow Wetland				○	⊙
	ED Wetland	○	●	○	○	○
	Pond/Wetland				○	○
	Pocket Wetland				○	●
Infiltration	Infiltration Trench				●	●
	Shallow I-Basin	○	○	○	⊙	⊙
	Dry Well				●	●
Filters	Surface Sand Filter				○	●
	Underground SF				●	●
	Perimeter SF	○	○	●	●	●
	Organic SF				●	●
	Bioretention				○	●
Open Channels	Dry Swale	●	○	●	●	●
	Wet Swale				●	●

○: Good option for meeting management goal
 ⊙: Good pollutant removal (>50% TN, >60% Metals, >70% Bacteria)
 ●: Fair pollutant removal (15-30% TN, 30-60% Metals, 35-70% Bacteria)
 ●: Cannot meet management goal.
 ○: Poor pollutant removal (<15% TN, <30 Metals, <35% Bacteria)
 ⊙: In most cases, cannot meet this goal, but the design may be adapted to add storage.
 ⊙: Generally cannot meet this goal, except in areas with soil percolation rates greater than 5.0 in/hr

7-10

Fig. No. 11 – Stormwater Management Capability Matrix

The Community and Environmental Factors Matrix (Table 7.5)⁹ is reproduced below. The Infiltration Basin has “Moderate” values for Affordability, “Good” for Safety and Low acceptance value for everything analyzed in this table. The Dry Swale is “Good” for ease of Maintenance, Community Acceptance and Safety. It has a “Moderate” rating for Affordability and Low acceptance value for habitat although no Habitat is impacted where the dry swale is utilized.

New York State Stormwater Management Design Manual
 Chapter 7: SMP Selection
 Section 7.5 Community and Environmental Factors

Table 7.5 Community and Environmental Factors Matrix

SMP Group	SMP List	Ease of Maintenance	Community Acceptance	Affordability	Safety	Habitat
Ponds	Micropond ED	▮	▮	○	○	▮
	Wet Pond	○	○	○	●	○
	Wet ED Pond	○	○	○	●	○
	Multiple Pond	○	○	▮	●	○
	Pocket Pond	●	▮	○	▮	●
Wetlands	Shallow Wetland	▮	○	▮	○	○
	ED Wetland	▮	▮	▮	▮	○
	Pond/Wetland	○	○	▮	●	○
	Pocket Wetland	●	●	○	○	▮
Infiltration	Infiltration Trench	●	○	▮	○	●
	Shallow I-Basin	●	●	▮	○	●
	Dry Well	●	▮	▮	○	●
Filters	Surface SF	▮	▮	●	○	●
	Underground SF	●	○	●	▮	●
	Perimeter SF	●	○	●	○	●
	Organic SF	▮	○	●	○	●
	Bioretention	▮	▮	▮	○	▮
Open Channels	Dry Swale	○	○	▮	○	●
	Wet Swale	○	▮	○	○	▮

Note: ○ High, ▮ Moderate, ● Low

7-12

Fig. No. 12 – Community & Environmental Factors Matrix

⁹ Ibid., Page 7-12

CONCLUSION:

The drainage concept as presented herein is, in the engineer's opinion, feasible.



Prepared by:

A handwritten signature in black ink, appearing to read "D. Hershberg", written over a horizontal line.

HERSHBERG & HERSHBERG
Daniel R. Hershberg, P.E. & L.S.

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INTERPRETATION OF SUBSURFACE LOGS

The Subsurface Logs present observations and the results of tests performed in the field by the Driller, Technicians, Geologists and Geotechnical Engineers as noted. Soil/Rock Classifications are made visually, unless otherwise noted, on a portion of the materials recovered through the sampling process and may not necessarily be representative of the materials between sampling intervals or locations.

The following defines some of the terms utilized in the preparation of the Subsurface Logs.

SOIL CLASSIFICATIONS

Soil Classifications are visual descriptions on the basis of the Unified Soil Classification ASTM D-2487 and USBR, 1973 with additional comments by weight of constituents by BUHRMASTER. The soil density or consistency is based on the penetration resistance determined by ASTM METHOD D1586. Soil Moisture of the recovered materials is described as DRY, MOIST, WET or SATURATED.

SIZE DESCRIPTION		RELATIVE DENSITY/CONSISTENCY (basis ASTM D1586)			
SOIL TYPE	PARTICLE SIZE	GRANULAR SOIL		COHESIVE SOIL	
		DENSITY	BLOWS/FT.	CONSISTENCY	BLOWS/FT.
BOULDER	> 12				
COBBLE	3" - 12"	LOOSE	< 10	VERY SOFT	< 3
GRAVEL-COARSE	3" - 3/4"	FIRM	11 - 30	SOFT	4 - 5
GRAVEL - FINE	3/4" - #4	COMPACT	31 - 50	MEDIUM	6 - 15
SAND - COARSE	#4 - #10	VERY COMPACT	50 +	STIFF	16 - 25
SAND - MEDIUM	#10 - #40			HARD	25 +
SAND - FINE	#40 - #200				
SILT/NONPLASTIC	< #200				
CLAY/PLASTIC	< #200				

SOIL STRUCTURE		RELATIVE PROPORTION OF SOIL TYPES	
STRUCTURE	DESCRIPTION	DESCRIPTION	% OF SAMPLE BY WEIGHT
LAYER	6" THICK OR GREATER	AND	35 - 50
SEAM	6" THICK OR LESS	SOME	20 - 35
PARTING	LESS THAN 1/4" THICK	LITTLE	10 - 20
VARVED	UNIFORM HORIZONTAL PARTINGS OR SEAMS	TRACE	LESS THAN 10

Note that the classification of soils or soil like materials is subject to the limitations imposed by the size of the sampler, the size of the sample and its degree of disturbance and moisture.

ROCK CLASSIFICATIONS

Rock Classifications are visual descriptions on the basis of the Driller's, Technician's, Geologist's or Geotechnical Engineer's observations of the coring activity and the recovered samples applying the following classifications.

CLASSIFICATION TERM	DESCRIPTION
VERY HARD	NOT SCRATCHED BY KNIFE
HARD	SCRATCHED WITH DIFFICULTY
MEDIUM HARD	SCRATCHED EASILY
SOFT	SCRATCHED WITH FINGERNAIL
VERY WEATHERED	DISINTEGRATED WITH NUMEROUS SOIL SEAM
WEATHERED	SLIGHT DISINTEGRATION, STAINING, NO SEAMS
SOUND	NO EVIDENCE OF ABOVE
MASSIVE	ROCK LAYER GREATER THAN 36" THICK
THICK BEDDED	ROCK LAYER 12" - 36"
BEDDED	ROCK LAYER 4" - 12"
THIN BEDDED	ROCK LAYER 1" - 4"
LAMINATED	ROCK LAYER LESS THAN 1"
FRACTURES	NATURAL BREAKS AT SOME ANGLE TO BEDS

Core sample recovery is expressed as percent recovered of total sampled. The ROCK QUALITY DESIGNATION (RQD) is the total length of core sample pieces exceeding 4" length divided by the total core sample length for N size cored.

GENERAL

- Soil and Rock classifications are made visually on samples recovered. The presence of Gravel, Cobbles and Boulders will influence sample recovery classification density/consistency determination.
- Groundwater, if encountered, was measured and its depth recorded at the time and under the conditions as noted.
- Topsoil or pavements, if present, were measured and recorded at the time and under the conditions as noted.
- Stratification Lines are approximate boundaries between soil types. These transitions may be gradual or distinct and are approximated.

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-1
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 283'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
1'	± 4" FOREST BOTTOM / TOPSOIL / ROOTS	E	
2'	FILL: Brown Fine SAND, Little Silt with roots noted (MOIST)	E	
3'		E	
4'		E	
5'		E	
6'		Possible ±6" thick Original Topsoil Layer at ±5'-6" depth	E
7'	Orange / Brown Fine SAND, Little Silt (MOIST)	E	
8'		E	
9'	End of test pit at 8' depth from ground surface.		
10'	No groundwater in test pit at completion of excavation.		
11'	Area appears to have been filled using on site soils to create roadway into site.		
12'			
13'			
14'			
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Kerner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E MODERATE.....M DIFFICULT.....D
6" - 18"	A		
18" - 36"	B		
36" & OVER	C		

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-2
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 290'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
	± 3" FOREST BOTTOM / SANDY TOPSOIL	E	
1'	Brown Fine SAND, Little Silt with roots noted (MOIST) Grades to Brown / Orange around 2' depth from ground surface	E	
2'		E	
3'		E	
4'		E	
5'		E	
6'		E	
7'		E	
8'		E	
9'	End of test pit at 8' depth from ground surface.		
10'	No groundwater in test pit at completion of excavation.		
11'			
12'			
13'			
14'			
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Karner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E
6" - 18"	A		MODERATE.....M
18" - 36"	B		DIFFICULT.....D
36" & OVER	C		

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-3
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 280'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
1'	FILL: Brown Fine SAND, Little Silt with roots noted (MOIST)	E	
2'		E	
3'		E	
4'		E	
5'		E	
6'	Possible ± 2" thick Original Topsoil Layer at ±5' depth	E	
7'	Orange Fine SAND, Little Silt	E	
8'	End of test pit at 7' depth from ground surface. No groundwater in test pit at completion of excavation.		
9'			
10'			
11'			
12'			
13'			
14'			
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Kerner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E MODERATE.....M DIFFICULT.....D
6" - 18"	A		
18" - 36"	B		
36" & OVER	C		

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-4
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 288'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
1'	± 8" SANDY TOPSOIL	E	
2'	Tan / Brown Fine SAND, Little Silt (MOIST)	E	
3'		E	
4'		E	
5'		E	
6'		E	
7'		End of test pit at 6' depth from ground surface.	
8'	No groundwater in test pit at completion of excavation.		
9'	Mixed debris including metal, plastic, section of wood fence, noted on top of the ground surface at this test pit location.		
10'			
11'			
12'			
13'			
14'			
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Karner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E MODERATE.....M DIFFICULT.....D
6" - 18"	A		
18" - 36"	B		
36" & OVER	C		

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-5
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 286'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
1'	± 1' TOPSOIL / ROOTS / PLASTIC	E	
2'	Tan Fine SAND, Little Silt (MOIST)	E	
3'		E	
4'		E	
5'		E	
6'		E	
7'		E	
8'		E	
9'		End of test pit at 8' depth from ground surface.	
10'	No groundwater in test pit at completion of excavation.		
11'	Thick brush with concrete fragments, plastic and metal at the ground surface at this location.		
12'			
13'			
14'			
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Karner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E
6" - 18"	A		MODERATE.....M
18" - 36"	B		DIFFICULT.....D
36" & OVER	C		

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-6
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 282'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
1'	± 1' DARK BROWN TOPSOIL WITH METAL AND PLASTIC NOTED	E	
2'	Tan Fine SAND, Little Silt (MOIST)	E	
3'		E	
4'		E	
5'		E	
6'		E	
7'		E	
8'	End of test pit at 7' depth from ground surface. No groundwater in test pit at completion of excavation. Concrete fragments noted at ground surface.		
9'			
10'			
11'			
12'			
13'			
14'			
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Karner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E
6" - 18"	A		MODERATE.....M
18" - 36"	B		DIFFICULT.....D
36" & OVER	C		

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-7
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 280'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
1'	FILL: Dark Brown F-C SAND, SILT and GRAVEL with cobbles, boulders, glass, metal fragments and wire noted Multiple C sized boulders were noted in the fill	D	
2'		D	
3'		D	
4'		D	
5'		D	
6'		D	
7'		D	
8'			
9'	End of test pit at 8' depth from ground surface due to difficulty excavating and presence of large boulders.		
10'	No groundwater in test pit at completion of excavation.		
11'			
12'			
13'	The native site soils were not encountered through the depths explored. Fills appear to have been placed at the head of a ravine		
14'	finger.		
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Karner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E
6" - 18"	A		MODERATE.....M
18" - 36"	B		DIFFICULT.....D
36" & OVER	C		

DENTE ENGINEERING

TEST PIT FIELD LOG

PROJECT: Senior Living Facility		NUMBER: TP-8
LOCATION: Guilderland, New York		FILE NO. FDE-14-075
CONTRACTOR: Wm. J. Keller & Sons Construction Corp.		DATE: 5-19-14
MAKE: Kubota	MODEL: KX121-3 Mini	ENGINEER: J.Robichaud, P.E.
WEATHER: Mostly Sunny	CAPACITY: 1/4 yd ³	BOOM REACH: 12'
GROUND LEVEL: ± 280'	TIME START: N/A	TIME STOP: N/A

DEPTH	SOIL DESCRIPTION	EXCAVATION EFFORT	BOULDER COUNT
1'	± 18" DARK BROWN SANDY TOPSOIL Orange / Brown Fine SAND, Little Silt (MOIST)	E	
2'		E	
3'		E	
4'		E	
5'		E	
6'		E	
7'	End of test pit at 6' depth from ground surface. No groundwater in test pit at completion of excavation.		
8'			
9'			
10'			
11'			
12'			
13'			
14'			
15'			

Remarks: Ground surface elevation is interpolated from "Preliminary Concept Plan For No. 145 New Karner Road," Sheet C1, last revision dated 2/28/14, prepared by Hershberg & Hershberg. Plan shows 5' topo intervals.

BOULDER COUNT		ABBREVIATIONS	EXCAVATION EFFORT
SIZE RANGE CLASSIFICATION	LETTER DESIGNATION	F = FINE M = MEDIUM C = COARSE F-M = FINE TO MEDIUM F-C = FINE TO COARSE GR = GRAY BN = BROWN YEL = YELLOW	EASY.....E
6" - 18"	A		MODERATE.....M
18" - 36"	B		DIFFICULT.....D
36" & OVER	C		

APPENDIX 2
WQV & RRV COMPUTATION

COMPUTATION OF WATER QUALITY VOLUME (WQ_v) OF DEVELOPED SITE

Impervious Area (Acres)	4.470	
I (Impervious Cover)	40.64%	
Rv = 0.05+0.009I	0.42	Minimum Rv = 0.20
P	1.2	
A (site area in acres)	11.000	
WQ _v TOTAL= [(P)(R _v)(A)]/12 (in acre-feet)	0.457	

COMPUTATION OF MIN. RUNOFF REDUCTION VOLUME (RR_v) OF DEVELOPED SITE

Aic - Total Impervious Area -(Acres)	4.470	
I (Impervious Cover)	40.64%	
Rv = 0.95	0.95	Rv = 0.95
P	1.2	
A (site area in acres)	11.000	
S (Hydrologic Group Specific Reduction Factor)	0.47	Hydrologic Class A & B mix
Ai (Impervious cover targeted for runoff reduction)	2.10	Aic * S
RR _v = [(P)(R _v)(Ai)]/12 (in acre-feet)	0.200	
RR _v (in CF)	8694	