

I. Stormwater Management

1. Introduction

This section provides a summary of the stormwater management plan for the proposed project. The complete Stormwater Management Report is included in the Appendix of this DEIS. The purpose of this section is to evaluate the stormwater management requirements of the proposed site plan. The report quantifies stormwater runoff on the site for existing and post-development conditions. Peak discharge has been estimated in accordance with the document released by the Engineering Division of the U.S. Department of Agriculture Soil Conservation Service titled "Urban Hydrology for Small Watershed," Technical Release No. 55, dated June 1986, Type III Storm Distribution.

The project's stormwater quality management objective is to improve the quality of stormwater runoff in the areas of redevelopment on the site, as well as to meet or exceed the requirements set forth in the NYSDEC SPDES General Permit for Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001) regarding post-development stormwater quantity and stormwater quality for new construction.

2. Existing Conditions

a. Site Characteristics

The site ranges from gently sloped farm land, in the northwest corner of the site, to the rolling hills of the existing nine hole golf course located west of the Swamp River, to the expansive wetlands in the center of the site, to the dense institutional development and steep wooded slopes to the east. The U.S. Department of Agriculture Soil Conservation Service has classified soil types as shown on Exhibit III.I-1, Existing Soils Map. The site presently does not provide for any water quality treatment or detention of surface water runoff (including from buildings, roads, parking lots, and the nine-hole golf course) prior to discharging into the Swamp River.

b. Existing Conditions – West Parcel

The existing conditions of the West Parcel are shown on Exhibit III.I-2, Existing Drainage Conditions. The area west of the Swamp River site includes a nine-hole golf course with cart paths and club house, various agriculture buildings, former crisis residences, agricultural fields, ponds, woods, and a sewage treatment plant. Wheeler Road crosses the site in the east-west direction.

The subject site contains sloping land that drops from a high point of approximately 540 feet in the northwestern quadrant of the site to an elevation of approximately 420 feet along the banks of the Swamp River. The majority of the runoff from the site discharges into the Swamp River, exiting the site in the northeast corner of the West Parcel. Additional runoff discharges to the north along Pleasant Ridge Road, through a series of four culverts, and a small portion of land discharges overland to the south. The site contains both NYSDEC, USACOE and local wetlands (as defined under Chapter 65 of the local Town Code). The wetlands are found primarily in the Great Swamp and along the Swamp River, with additional wetlands located in the southwest and the northeast portions of the site.

The West Parcel has been divided into 9 watershed sub-basins for evaluation. The drainage characteristics of each of the sub-basins are shown on Table III.I-1, Existing Drainage Conditions, and described in detail in the full Stormwater Management Report included in the Appendix.

**Table III.I-1
Existing Drainage Conditions**

WATERSH ED/SUBBAS IN ID	AREA (AC)					(1)	(2)	(3)	(4)	(4)	Design Point #
	IMPERVIOUS TOTAL	PERVIOUS			TOTAL AREA	I	R _v	CN	T _c	T _t	
		LAWN/ LSCP	WOODED	PER. TOTAL		(%)			(HRS)	(HRS)	
W1	0.30	2.27	0.00	2.27	2.57	11.67	0.20	65	0.15	---	1
W2	0.92	41.09	12.49	53.58	54.50	1.69	0.20	71	0.17	---	2
W3	0.13	21.34	23.65	44.99	45.12	0.29	0.20	70	0.30	---	3
W4	0.00	0.00	3.52	3.52	3.52	0.00	0.20	72	0.25	---	n/a
W5	1.38	11.07	16.63	27.70	29.08	4.75	0.20	77	0.37	---	4
W6	1.06	30.09	13.78	43.87	44.93	2.36	0.20	73	0.32	---	4
W7	2.33	8.88	0.90	9.78	12.11	19.24	0.22	80	0.17	---	4
W8	4.35	120.38	68.04	188.42	192.77	2.26	0.20	72	0.65	---	4
W9	0.07	5.44	13.53	18.97	19.04	0.37	0.20	69	0.35	---	5
E1	3.46	13.70	5.39	19.09	22.55	15.34	0.20	83	0.32	---	6
E2	3.29	9.43	1.20	10.63	13.92	23.64	0.26	84	0.33	---	6
E3	0.76	8.20	17.50	25.70	26.46	2.87	0.20	80	0.31	---	6
E4	9.52	25.19	18.52	43.71	53.23	17.88	0.21	79	0.30	---	7
E5	11.84	20.61	8.77	29.38	41.22	28.72	0.31	82	0.27	---	7
E6	9.49	32.47	68.85	101.32	110.81	8.56	0.20	75	0.37	---	8
E7	2.98	15.39	2.07	17.46	20.44	14.58	0.20	82	0.35	---	8
E8	7.21	30.76	82.30	113.06	120.27	5.99	0.20	76	0.38	---	8
E9	0.80	9.40	86.21	95.61	96.41	0.83	0.20	72	0.47	---	8
E10	0.00	45.16	233.30	278.46	278.46	0.00	0.20	72	0.35	0.03	8
TOTAL AREA	60	451	677	1128	1187	5.04					
WGT. CN								74			

1. I=Percent Impervious, (Impervious Area/Total Area)*100%
2. R_v = 0.05+0.009(I), Minimum R_v=0.2
3. CN=Curve Number
4. T_c=Time of Concentration, T_t=Travel Time

(1) Design Points

Six design points have been designated for comparison of the pre- and post-development drainage conditions. Design Points W1, W2, W3, and W4 are located along the northern portion of the West Parcel, where concentrated flow exits the site through storm pipes across Pleasant Ridge Road. Design Point Wetland 22 is NYSDEC Wetland DP-22 along the western side of the Swamp River. Sub-basins W5, W6, W7 and W8 drain to this wetland. Design Point W9 is the wetland located at the southwestern portion of the West Parcel.

c. Existing Conditions – East Parcel

The existing conditions of the East Parcel are shown on Exhibit III.I-2. The east side of the Swamp River includes mostly vacant buildings from the former Harlem Valley Psychiatric Center, roadways, a water treatment facility and reservoir. The subject site contains sloping land that drops from a high point of approximately 930 feet in the southeastern portion of the site to an elevation of approximately 420 feet along the banks of the Swamp River. The runoff from the site discharges into the Swamp River after crossing NYS Route 22, in six locations. The East Parcel contains USACOE, NYSDEC and local wetlands. The wetlands are in the land area between the Swamp River and NYS Route 22, the northwest portion of the site, and areas around the reservoir at the east side of the parcel. The Eastern Parcel has been divided into 10 sub-basins for watershed evaluation. The drainage characteristics of each of the sub-basins are shown on Table III.I-1, Existing Drainage Conditions, and described in detail in the full Stormwater Management Report included in the Appendix.

(1) Design Points

Three design points have been designated for comparison of the pre- and post-development drainage conditions. Design Point Wetland 22 is NYSDEC Wetland DP-22 along the eastern side of the Swamp River. Sub-basins E1, E2, and E3 drain to this wetland. Design Point 1 is the southwest edge of the Eastern Parcel, along Route 22. Sub-basins E4 and E5 drain to this area. Design Point Wetland 30 is NYSDEC Wetland DP-30 along the northwest edge of the Eastern Parcel, along Route 22. Sub-basins E5, E6, E7, E8, E9, and E10 drain to this wetland.

3. Potential Impacts of the Proposed Project

a. Proposed Conditions – West Parcel

Post-development site conditions on the West Parcel are shown on Exhibit III.I-3, Proposed Drainage Conditions. On the west side of the Swamp River the amount of impervious area will increase by approximately 32.3 acres, from 10.5 to 42.8 acres. The nine sub-basins identified in the existing conditions have been further divided into 31 sub-basins for the purposes of evaluation and sizing of stormwater treatment measures. The drainage characteristics of the sub-basins are shown on Table III.I-2, Developed Drainage Conditions, and described in detail in the full text of the Stormwater Management Report included in the Appendix.

**Table III.I-2
Developed Drainage Conditions**

WATERSH ED/SUBBAS IN ID	AREA (AC)					(1)	(2)	(3)	(4)	(4)	Design Point #
	IMPERVIOUS	PERVIOUS			TOTAL AREA	I	R _v	CN	T _c	T _t	
	TOTAL	LAWN/ LSCP	WOODED	PER. TOTAL		(%)			(HRS)	(HRS)	
W1exist	0.30	2.27	0.00	2.27	2.57	11.67	0.20	65	0.15		1
W2exist	0.92	36.94	6.80	43.74	44.66	2.06	0.20	71	0.17		2
W2A	0.91	2.59	0.00	2.59	3.50	26.08	0.28	80	0.15		2
W2B	1.03	1.68	0.00	1.68	2.71	38.00	0.39	83	0.14		2
W2D	1.29	2.11	0.00	2.11	3.40	38.00	0.39	83	0.15		2
W3exist	0.13	13.62	21.06	34.68	34.81	0.37	0.20	72	0.30		3
W3A	0.35	0.35	0.00	0.35	0.70	49.71	0.50	89	0.14		3
W3C	0.16	8.25	0.00	8.25	8.78	1.82	0.20	59	0.15		3
W4exist	0.00	0.00	3.52	3.52	3.52	0.00	0.20	72	0.25		n/a
W5exist	1.38	11.07	16.63	27.70	29.08	4.75	0.20	77	0.37		4
W6exist	3.39	23.66	4.05	27.71	31.10	10.90	0.20	74	0.32		4
W6A	1.46	2.39	0.00	2.39	3.85	38.00	0.39	82	0.15		4
W6B	5.94	3.25	0.00	3.25	9.19	64.59	0.63	90	0.16		4
W7exist	1.66	4.61	0.00	4.61	6.27	26.48	0.29	83	0.17		4
W7A	4.97	2.99	0.00	2.99	7.96	62.46	0.61	89	0.15		4
W8exist	0.80	132.38	17.30	149.68	150.48	0.53	0.20	72	0.65		4
W8A	1.16	0.66	0.00	0.66	1.82	63.81	0.62	89	0.14		4
W8B	2.44	1.32	0.00	1.32	3.76	65.00	0.64	90	0.15		4
W8D	1.29	1.34	0.00	1.34	2.63	49.19	0.49	86	0.15		4
W8F	1.57	2.56	0.00	2.56	4.13	38.00	0.39	83	0.15		4
W8G	1.50	2.45	0.00	2.45	3.95	38.00	0.39	79	0.15		4
W8H	0.95	1.55	0.00	1.55	2.50	38.00	0.39	75	0.15		4
W8I	1.01	1.66	0.00	1.66	2.67	38.00	0.39	75	0.15		4
W8J	0.43	0.69	0.00	0.69	1.12	38.00	0.39	75	0.14		4
W8K	2.33	3.80	0.00	3.80	6.19	37.63	0.39	75	0.15		4

WATERSH ED/SUBBAS IN ID	AREA (AC)				TOTAL AREA	(1)	(2)	(3)	(4)	(4)	Design Point #
	IMPERVIOUS TOTAL	PERVIOUS				I	R _v	CN	T _c	T _t	
		LAWN/ LSCP	WOODED	PER. TOTAL		(%)			(HRS)	(HRS)	
W8L	0.46	0.74	0.00	0.74	1.20	38.00	0.39	75	0.14		4
W8M	1.65	2.69	0.00	2.69	4.34	38.00	0.39	83	0.15		4
W8N	0.80	1.31	0.00	1.31	2.11	38.00	0.39	83	0.14		4
W8O	1.27	2.07	0.00	2.07	3.34	38.00	0.39	83	0.15		4
W9exist	0.07	4.30	12.52	16.82	16.89	0.41	0.20	68	0.35		5
W9A	1.19	1.95	0.00	1.95	3.14	38.00	0.39	83	0.15		5
E1exist	0.83	13.80	5.23	19.03	19.86	4.18	0.20	80	0.32		6
E1A	2.83	0.31	0.00	0.31	3.14	90.00	0.86	96	0.15		6
E2exist	0.27	8.25	0.75	9.00	9.27	2.91	0.20	80	0.33		6
E2A	3.78	0.42	0.00	0.42	4.20	90.00	0.86	96	0.15		6
E3exist	0.73	4.41	21.32	25.73	26.46	2.76	0.20	80	0.31		6
E4exist	1.82	12.21	21.21	33.42	35.24	5.16	0.20	74	0.30		7
E4A	7.34	6.78	0.00	6.78	14.12	52.00	0.52	87	0.17		7
E5exist	1.54	4.61	0.00	4.61	6.15	25.00	0.28	85	0.27		7
E5A	9.85	16.06	0.00	16.06	25.91	38.00	0.39	85	0.16		7
E5B	10.99	1.94	0.00	1.94	12.93	85.00	0.82	95	0.17		7
E6exist	3.63	31.57	46.52	78.09	81.72	4.44	0.20	74	0.37		8
E6B	4.16	5.38	1.40	6.78	10.94	38.00	0.39	83	0.17		8
E7exist	0.37	6.75	2.25	9.00	9.37	3.95	0.20	80	0.35		8
E7A	7.89	7.28	0.00	7.28	15.17	52.00	0.52	89	0.16		8
E8exist	1.10	39.49	57.72	97.21	98.31	1.12	0.20	75	0.38		8
E8A	3.97	6.47	0.00	6.47	10.44	38.00	0.39	83	0.16		8
E8B	1.75	2.86	0.00	2.86	4.61	38.00	0.39	83	0.16		8
E8C	7.14	11.65	0.00	11.65	18.79	38.00	0.39	83	0.19		8
E9exist	0.00	22.70	53.92	76.62	76.62	0.00	0.20	73	0.47		8
E9A	1.57	2.57	0.00	2.57	4.14	38.00	0.39	81	0.15		8
E9B	4.67	14.00	0.00	14.00	18.66	25.00	0.28	80	0.18		8

WATERSH ED/SUBBAS IN ID	AREA (AC)				TOTAL AREA	(1)	(2)	(3)	(4)	(4)	Design Point #
	IMPERVIOUS	PERVIOUS				I	R _v	CN	T _c	T _t	
	TOTAL	LAWN/ LSCP	WOODED	PER. TOTAL		(%)			(HRS)	(HRS)	
E10exist	0.00	42.36	228.99	271.35	271.35	0.00	0.20	72	0.35	0.03	8
E10A	0.68	2.03	0.00	2.03	2.70	25.00	0.28	80	0.28		8
E10B	0.93	2.78	0.00	2.78	3.70	25.00	0.28	80	0.28		8
TOTAL AREA	121	544	521	1065	1186	10.17					
WGT. CN								76			

1. I=Percent Impervious, (Impervious Area/Total Area)*100%
2. R_v = 0.05+0.009(I), Minimum R_v=0.2
3. CN=Curve Number
4. T_c=Time of Concentration, T_t=Travel Time

b. Proposed Conditions – East Parcel

Post-development site conditions on the East Parcel are shown on Exhibit III.I-3. On the east side of the Swamp River the amount of impervious area will increase by approximately 28.5 acres, from 49.3 to 77.8 acres. The 10 sub-basins identified in the existing conditions have been further divided into 24 sub-basins for the purposes of evaluation and sizing of stormwater treatment measures. The drainage characteristics of the sub-basins are shown on Table III.I-2, Developed Drainage Conditions, and described in detail in the full Stormwater Management Report included in the Appendix.

c. Stormwater Quantity

Under proposed conditions, the total volume of runoff is expected to increase due to an increase in on-site impervious area. However, the increase in the peak rates of runoff will be mitigated by the use of stormwater basins, such that the peak runoff rates will either remain the same or decrease from existing conditions. The stormwater runoff from developed areas will be directed to the stormwater basins via underground piping and surface swales. The outlet controls of the detention systems will control the rate of release of the detained water such that the peak rate of runoff at each of the design points is less than or equal to existing flows. The peak rate of runoff has been calculated for pipe sizing. A comparison of the pre- and post-development peak runoff rates is shown on Table III.I-3, Design Flow Summary.

**Table III.I-3
Design Flow Summary**

DESIGN POINT NO.		1-YEAR (CFS)	10-YEAR (CFS)	100-YEAR (CFS)
Wingdale, New York (IN) ⁽¹⁾		2.7	4.8	8.0
West Side of Swamp River				
1	Existing	1	4	10
	Developed	<u>1</u>	<u>4</u>	<u>10</u>
	Delta	0	0	0
2	Existing	26	100	235
	Developed	<u>23</u>	<u>88</u>	<u>214</u>
	Delta	-3	-13	-21
3	Existing	16	66	161
	Developed	<u>16</u>	<u>59</u>	<u>157</u>
	Delta	-1	-8	-4
4	Existing	97	339	776
	Developed	<u>84</u>	<u>315</u>	<u>757</u>
	Delta	-13	-23	-19
5	Existing	6	25	63
	Developed	<u>5</u>	<u>25</u>	<u>61</u>
	Delta	-1	0	-1

DESIGN POINT NO.		1-YEAR (CFS)	10-YEAR (CFS)	100-YEAR (CFS)
East Side of Swamp River				
6	Existing	56	143	285
	Developed	<u>45</u>	<u>120</u>	<u>273</u>
	Delta	-11	-23	-11
7	Existing	78	211	429
	Developed	<u>47</u>	<u>181</u>	<u>423</u>
	Delta	-31	-31	-6
8	Existing	201	683	1647
	Developed	<u>183</u>	<u>666</u>	<u>1646</u>
	Delta	-18	-16	-1

(1) Northeast Regional Climate Center. New York State 24 Hour Precipitation Figures, Data Ending 2003.

(1) Proposed Stormwater Management

One objective of a stormwater management plan is to limit the proposed peak rate of stormwater runoff to levels equal to or less than the existing peak rates of flows. This will be accomplished by temporarily detaining a portion of the stormwater runoff in the stormwater basins. Orifices are set on the outlet control structure to retain 20 percent of the 90 percent storm volume (water quality volume), detain the 1-year storm for 24 hours, and control the release rate of storms up to the 100-year storm. An emergency overflow weir is located at the top of each stormwater basin to safely convey the runoff if it exceeds the capacity of the outlet control structure. Table III.I-4, Detention Basin Summary, presents storage volumes and high water elevations associated with various size storm events. The stormwater management facilities have been designed in accordance with NYSDEC guidelines, with the basins designs based on the 1, 10 and 100 year storm events. These basins will be modified as required to accommodate the 2 and 25 year storm events as well, once the plan has advanced further in the design and review process. Basin modifications are not expected to have any significant impact on the design of the basins.

**Table III.I-4
Detention Basin Summary**

BASIN ID	BOTTOM ELEV.	TOP ELEV.	1-YEAR	10-YEAR	100-Year	
			HWE ⁽¹⁾	HWE ⁽¹⁾	HWE ⁽¹⁾	SV ⁽²⁾
W2A	450.0	456.0	452.0	452.5	453.7	0.71
W2B	446.0	452.3	449.5	450.6	451.3	0.43
W2D	442.0	452.3	448.0	449.7	451.3	0.55
W3A	434.0	438.0	435.6	436.3	436.9	0.15
W3C	432.0	438.2	434.9	436.7	437.2	0.32
W6A	416.0	426.0	420.9	422.7	424.3	0.62
W6B	410.0	420.9	418.0	419.1	419.9	3.14

BASIN ID	BOTTOM ELEV.	TOP ELEV.	1-YEAR HWE ⁽¹⁾	10- YEAR HWE ⁽¹⁾	100-Year	
					HWE ⁽¹⁾	SV ⁽²⁾
W7A	412.0	418.9	416.6	417.2	417.9	2.37
W8A	412.0	420.0	416.2	417.7	418.7	0.48
W8B	416.0	426.1	422.0	423.4	425.1	0.93
W8D	420.0	428.0	424.3	425.4	426.7	0.56
W8F	424.0	434.0	427.1	428.2	429.9	0.92
W8G	444.0	452.5	448.8	450.4	451.5	0.47
W8H	454.0	462.1	458.5	459.6	461.1	0.26
W8I	446.0	452.4	449.6	450.9	451.4	0.24
W8J	446.0	452.0	448.5	449.3	450.0	0.21
W8K	430.0	440.0	434.2	435.9	438.5	1.02
W8L	458.0	466.0	460.9	462.0	462.7	0.15
W8M	460.0	470.0	463.5	464.7	466.5	1.01
W8N	450.0	460.0	453.9	455.0	456.2	0.35
W8O	458.0	466.5	463.5	465.0	465.5	0.42
W9A	448.0	458.1	454.0	455.4	457.1	0.52
E1A	410.0	418.4	415.8	417.0	417.4	1.22
E2A	412.0	418.6	416.4	417.2	417.6	1.14
E4A	418.0	428.1	424.7	426.2	427.1	3.15
E5A	412.0	422.6	419.7	420.6	421.6	4.54
E6B	724.0	732.5	730.3	731.0	731.5	0.88
E7A	420.0	430.0	425.3	427.1	428.8	4.27
E8A	424.0	434.3	430.5	432.1	433.3	1.42
E8B	420.0	430.0	423.9	425.2	427.0	1.01
E8C	430.0	440.5	437.4	438.6	439.5	3.07
E9A	432.0	440.0	437.6	438.3	438.6	0.32
E9B	440.0	450.0	445.0	446.7	448.9	3.01
E10A	780.0	788.0	783.4	784.4	785.7	0.50
E10B	780.0	788.0	784.0	785.2	786.3	0.57

(1) High Water Elevation (feet)

(2) Storage Volume (acre feet)

(2) Flood Zones

The low areas of the site near the Swamp River and adjacent wetlands are subject to flooding as they lie within the 100-Year Floodplain of the Swamp River. Exhibit III.I-4, Flood Map – Existing Conditions shows the approximate extent of flooding in the 100 year storm frequency. Development within the 100 year flood zone will generally be avoided; however, some portion of the parking lot to the rear of the Store House and Power House may experience some flooding during extreme storm events. New homes and commercial buildings will be placed at elevations to avoid flooding in these areas. The proposed development is shown with the 100 year flood zone is shown of Exhibit III.I-5, Flood Map – Proposed Conditions. All utilities and critical

mechanical systems will be designed so as to minimize disruptions in service during flood events.

d. Stormwater Quality

(1) Post-Development Conditions Without Treatment

The change in land use and increase in impervious area will result in an increase in pollutant loading. Without treatment, the pollutant loads would increase for Total Suspended Solids, Total Phosphorus, Total Nitrogen, Metals, and Bacteria.

(2) Post-Development Conditions With Treatment

The use of wet extended detention ponds, rain gardens, water quality swales, and hydrodynamic separators is expected to reduce the pollutant loading from the treated runoff. The treatment methods will be designed in compliance with the NYSDSDEC Stormwater Management Design Manual.

e. Stormwater Quality Management Measures

The strategy of the Stormwater Management Plan is to tailor the treatment measures for the various proposed land uses. A variety of measures will be used to maximize infiltration of runoff into the ground when possible in areas of clustered development; centralized open stormwater basins will be used. In low density development sites, lots will include onsite stormwater infiltration systems and the public roads will be provided open channels, whenever possible, to convey and treat the stormwater runoff. A portion of the redevelopment areas on the west side of the Swamp River will use the alternative practices defined in *Chapter 9, Redevelopment Projects, of the NYS Stormwater Management Design Manual*.

The Stormwater Management Plan is based on the analysis of the existing and proposed stormwater conditions discussed in the previous section of this report and the design criteria of the stormwater management practices noted below. As the proposed development will involve the creation of an approximately 61-acre increase in on-site impervious surfaces associated with pavements and roofs, higher pollutant loadings would be expected to occur on the developed site. A total water quality volume, as calculated and shown on Table No. 10 included in the full Stormwater Management Report in the Appendix, of 416,000 cubic feet will be provided. An outline of the varying stormwater quality management Best Management Practice's (BMP's), both structural and non-structural, to be implemented both during construction and/or after project completion are presented below.

(1) Wet Extended Detention Pond

A wet extended detention pond will provide treatment of the required water quality volume through extended detention and incorporates a pool of water at the outlet of the pond to reduce sediment re-suspension. The treatment system includes a stone-lined sediment forebay, stone rip-rap berm, permanent pool, outlet control drain structure, and emergency overflow weir. The wetpool extended detention pond will

treat the 90 percent rainfall event through filtration and detain all storm events up to the 100 year frequency. The outlet structure is designed such that downstream flow will be less than or equal to existing conditions.

(2) Rain Gardens

A rain garden is a stormwater management practice to manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression. The method is a variation on bioretention and combines physical filtering and adsorption with biogeochemical processes to remove pollutants¹.

(3) Hydrodynamic Separators

Hydrodynamic Separators are proprietary systems that move water in a circular centrifugal manner to accelerate the separation and deposition of primarily sediment from the water. These systems will be employed in the areas of the redeveloped parts of the site where conventional systems cannot be used.

(4) Open Channels

Three types of open channels will be utilized on this project site.

- (a) Dry Swale – An open drainage channel, within a grass or stone lined surface, designed with a permeable layer of soil and perforated underdrain to detain and promote the filtration of stormwater runoff into the soil media.
- (b) Wet Swale – A flat sloped, planted and open drainage channel designed to retain stormwater for water quality treatment. These are usually placed in areas where soils are poorly drained and may have normally high ground water conditions.
- (c) Grass Swale – A vegetated channel designed to filter stormwater runoff and meet velocity targets for the water quality design storm and the two year storm events. A grass channel is parabolic shaped with a minimum 2-foot wide center section and side walls at 2:1 slope or flatter.

(5) Infiltration Trench/Dry Well

Stormwater infiltration practices capture and temporarily store the water quality volume before allowing it to infiltrate into the soil over a two-day period. Design variants include the infiltration trench, infiltration basin, and dry well. The infiltration facility will be preceded by a pre-treatment measure (sedimentation basin, sump pit, grass channel or plunge pool. The measures are well suited for smaller development areas and will be utilized for lots that can not be drained to share a central stormwater management practices.

(6) Catch Basin Sumps

¹ New York State Stormwater Management Design Manual, P. 9-9.

All new catch basins will be provided with sumps to capture and collect sediment and debris prior to it entering the municipal stormwater conveyance system. Each catch basin sump will be cleaned out periodically to remove the dirt and debris as part of routine maintenance.

(7) Stormwater Pollution Prevention Control Plan

In compliance with requirements established for the NYSDEC SPDES General Permit For Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001) a Stormwater Pollution Prevention Plan will be prepared and implemented. As a result, an Erosion Control Plan shall be prepared as part of the contract documents and will require that the erosion and sedimentation controls set forth thereon be implemented before the start of construction and further will be monitored and maintained during construction. Stabilization of the site shall also comply with the conditions or requirements set forth therein and further established by the Town of Dover.

Several temporary structural practices to be utilized to mitigate any potential impacts include, but shall not be limited to, surrounding material stockpiles with silt fencing and hay bale dams, excavated and embankment areas will be graded to permit drainage and the runoff will be intercepted in ditches with silt barriers or collected in settling basins to permit sedimentation, and stabilized construction entrances will be constructed and maintained during construction to minimize the off-site migration of sediment.

4. Mitigation Measures

Project implementation will increase the quantity of impervious surfaces on the site. However, the project would include a comprehensive stormwater management system designed to satisfactorily address both stormwater volumes and quality. As described above, the proposed approach employs a variety of mechanisms, including low impact development techniques, such as wet extended detention ponds, rain gardens, water quality swales, and hydrodynamic separators.

In compliance with requirements established for the NYSDEC SPDES General Permit For Stormwater Discharges from Construction Activity (Permit No. GP-0-08-001) a Stormwater Pollution Prevention Plan will be prepared and implemented. As a result, an Erosion Control Plan shall be prepared as part of the contract documents and will require that the erosion and sedimentation controls set forth thereon be implemented before the start of construction. Further, the plan will establish the guidelines for monitoring and maintaining the control measures both during and after construction. Stabilization of the site shall also comply with the conditions or requirements set forth therein and as established by the Town of Dover.

Several temporary structural practices to be utilized to mitigate any potential impacts include, but shall not be limited to, surrounding material stockpiles with silt fencing and hay bale dams, excavated and embankment areas will be graded to permit drainage and the runoff will be intercepted in ditches with silt barriers or collected in settling basins to

permit sedimentation, and stabilized construction entrances will be constructed and maintained during construction to minimize the off-site migration of sediment.