Stormwater Management Plan

Greco Independent & Assisted Living
Minnetonka, MN

Prepared by Loucks
October 16, 2023
Revised January 30, 2024
Revised February 28, 2024

Loucks Project No. 23055A

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Greco Independent & Assisted Living

Minnetonka, Minnesota

Stormwater Management Plan

Table of Contents

Appendices

Figures

Greco Independent & Assisted Living

Minnetonka, Minnesota

Stormwater Management Plan

Introduction

This stormwater management plan was created for the Greco Independent and Assisted Living apartments project located at 15407 & 15409 Wayzata Boulevard in Minnetonka, MN. The project site encompasses roughly 19.18 acres.

The project generally consists of constructing two new apartment buildings, parking lot, and associated utilities.

Included in this plan are calculations for the existing and proposed discharge of storm water from the site.

Methodology

City of Minnetonka and Minnehaha Creek Watershed District:

1. Rate Control – Runoff rates for the proposed activity shall not exceed runoff rates for the 1, 10, & 100-year critical storm events.
2. Volume/Water Quality Control –Treat onsite the equivalent to 1.1" of runoff generated from new impervious. If filtration is used only 50% is received.
3. 60% annual total removal of Phosphorus and 90% annual Total Suspended Solids removal for proposed project.

Methodology

The stormwater calculations were made utilizing the stormwater-modeling program HydroCAD 10.00. Calculations were performed for Atlas-14 1-year, 2-year, 10-year, and 100-year rainfall events of 2.48 inches, 2.86 inches, 4.26 inches, and 7.32 inches respectively.

Existing Conditions

The existing site is a former healthcare and rehabilitation center. The existing site is 19.18 acres, for the storm report the areas used in this report are for the disturbed area of 6.973 acres. The existing site will be broken up into two drainage areas. Drainage area DA-1E drains off-site to the wetlands and drainage area DA-2E drains off-site to Clare Lane. There is no existing stormwater treatment onsite.

Proposed Conditions

The proposed site consists of constructing a multi-story apartment building with below ground parking garage, a assisted living single story building with parking lots, entrance drives, utilities, and stormwater management practices. To meet stormwater requirements for the site, two underground filtration storm vaults will be used. The site will be broken up into four drainage areas.

Drainage area DA-1P will drain to the west underground filtration storm vault. Drainage area DA-2P will drain to the east underground filtration storm vault. Drainage area DA-4P will drain off-site to the wetlands. Drainage area DA-3P will drain off-site to Clare Lane.

Rate Control

The rate control requirements are that peak rates shall not exceed existing rates for the 2, 10, and 100-year events.

Tables 1.1 below lists the existing areas and runoff rates
Tables 1.2 below lists the proposed areas and runoff rates

Table 1.1 – Existing Peak Runoff Rates

Existing Conditions						
			1-YR Event	2-YR Event	10-YR Event	100-YR Event
Subcatch	Area (SF)	Impervious (SF)	Rate (cfs)	Rate (cfs)	Rate (cfs)	Rate (cfs)
DA-1E Wetland	257,732	108,763	10.42	12.90	22.26	42.77
DA-2E Street	45,829	28,816	2.14	2.60	4.27	7.88
TOTAL EXISTING	**303,561**	**137,579**	**12.56**	**15.50**	**26.52**	**50.65**

Table 1.2 – Proposed Peak Runoff Rates

Proposed Conditions						
			1-YR Event	2-YR Event	10-YR Event	100-YR Event
Subcatch	Area (SF)	Impervious (SF)	Rate (cfs)	Rate (cfs)	Rate (cfs)	Rate (cfs)
DA-1P West Vault	126,198	110,109	0.43	0.43	0.43	1.15
DA-2P East Vault	66,757	62,147	0.21	0.21	0.21	1.60
DA-4P	93,539	14,769	2.86	3.69	6.95	14.38
Total WETLAND	**289,175**	**187,025**	**3.30**	**4.34**	**7.60**	**15.55**
DA-3P Street	17,067	2,980	0.75	0.96	1.80	3.68
TOTAL PROPOSED	**303,561**	**190,005**	**3.60**	**4.75**	**8.35**	**17.01**

Volume Control

A water quality volume of 1.1" of runoff from the new impervious surfaces created by the project is treated. Required volume calculations are shown below:

Volume Required:	190,313 SF x 1.1" x 1'/12"	=	17,445 CF
Volume Provided:	West Vault (946.50-948.50)	=	26,745 CF
Volume Provided:	East Vault (945.50-947.50)	=	13,111 CF
Total Volume Provided:		=	39,856 CF

With filtration being used only 50% credit is allowed for filtration. Therefore 50% of 39,856 =19,928 CF which meets the requirement of 17,382 CF

Water Quality

The P & TSS removal of the proposed project are 60% P and 91% TSS. See figure MIDS Proposed Results. This will be accomplished with the underground filtration vaults and Jellyfish manholes

Best Management Practices

Best management practices (BMP's) will be implemented during construction per the project Stormwater Pollution Prevention Plan (C3-2 & C3-3). During construction, erosion control measures will include dust control, silt fencing, bio logs, inlet protection, and a temporary rock construction entrance. Permanent BMP's will include stormwater management systems, surface pavements, and turf establishment (vegetation) of disturbed areas.

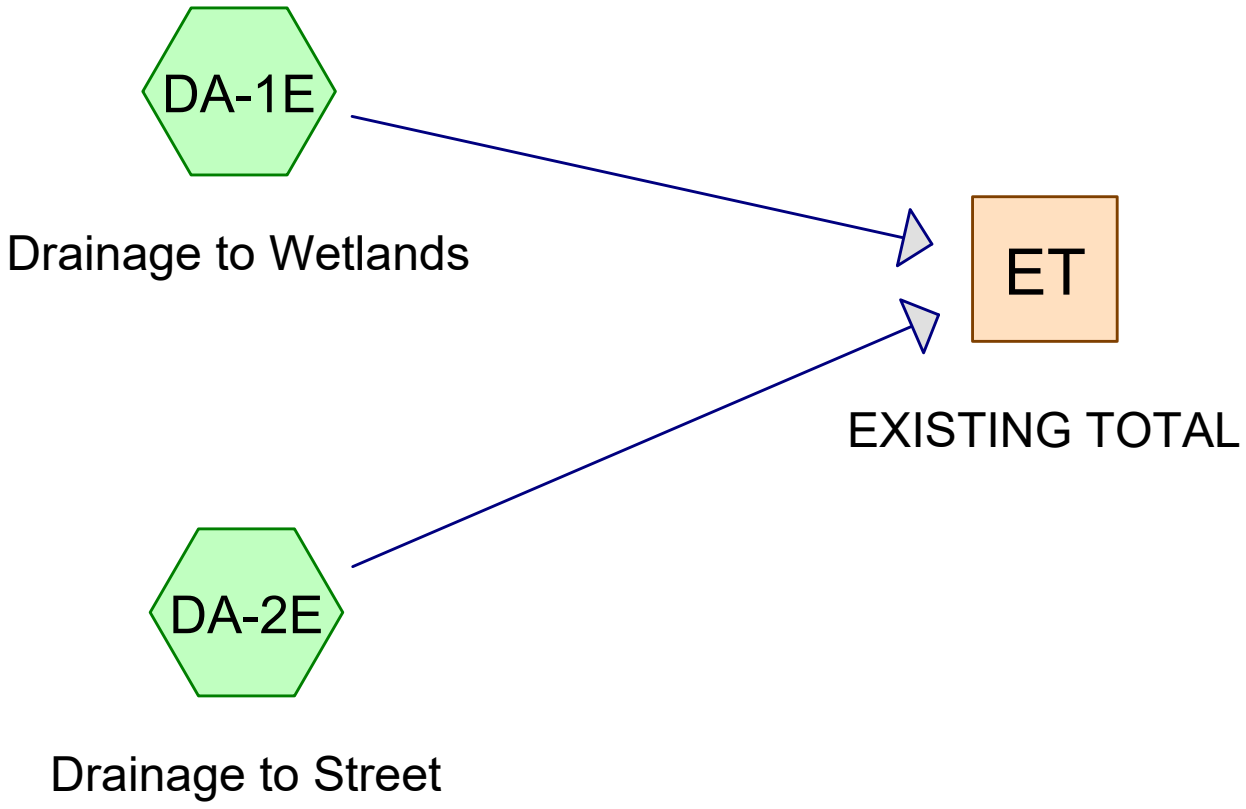
Conclusion

The proposed Stormwater Management Plan for the project provides a solution for the conveyance of stormwater from the site. The underground filtration vaults and Jellyfish manholescapture the runoff before discharging into the existing wetlands. They will provide rate control for the development and meet water quality requirements through the proposed filtration.

Appendix A

Existing HydroCAD Report

EXISTING SITE



Subcat Reach Pond Link

Routing Diagram for Greco

Prepared by {enter your company name here}, Printed 2/28/2024

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1E: Drainage to Runoff Area=257,732 sf 42.20% Impervious Runoff Depth=1.36"
Tc=15.0 min CN=88 Runoff=10.42 cfs 29,304 cf

Subcatchment DA-2E: Drainage to Street Runoff Area=45,829 sf 62.88% Impervious Runoff Depth=1.59"
Tc=15.0 min CN=91 Runoff=2.14 cfs 6,081 cf

Reach ET: EXISTING TOTAL Inflow=12.56 cfs 35,384 cf
Outflow=12.56 cfs 35,384 cf

Total Runoff Area = 303,561 sf Runoff Volume = 35,384 cf Average Runoff Depth = 1.40"
54.68% Pervious = 165,982 sf 45.32% Impervious = 137,579 sf

Summary for Subcatchment DA-1E: Drainage to Wetlands

Runoff = 10.42 cfs @ 12.24 hrs, Volume= 29,304 cf, Depth= 1.36"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
108,763	98	Paved parking, HSG D
148,969	80	>75% Grass cover, Good, HSG D
257,732	88	Weighted Average
148,969		57.80% Pervious Area
108,763		42.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment DA-2E: Drainage to Street

Runoff = 2.14 cfs @ 12.23 hrs, Volume= 6,081 cf, Depth= 1.59"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
28,816	98	Paved parking, HSG D
17,013	80	>75% Grass cover, Good, HSG D
45,829	91	Weighted Average
17,013		37.12% Pervious Area
28,816		62.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach ET: EXISTING TOTAL

Inflow Area = 303,561 sf, 45.32% Impervious, Inflow Depth = 1.40" for 1-Year event
Inflow = 12.56 cfs @ 12.24 hrs, Volume= 35,384 cf
Outflow = 12.56 cfs @ 12.24 hrs, Volume= 35,384 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1E: Drainage to Runoff Area=257,732 sf 42.20% Impervious Runoff Depth=1.69"
Tc=15.0 min CN=88 Runoff=12.90 cfs 36,389 cf

Subcatchment DA-2E: Drainage to Street Runoff Area=45,829 sf 62.88% Impervious Runoff Depth=1.94"
Tc=15.0 min CN=91 Runoff=2.60 cfs 7,413 cf

Reach ET: EXISTING TOTAL Inflow=15.50 cfs 43,803 cf
Outflow=15.50 cfs 43,803 cf

Total Runoff Area = 303,561 sf Runoff Volume = 43,803 cf Average Runoff Depth = 1.73"
54.68% Pervious = 165,982 sf 45.32% Impervious = 137,579 sf

Summary for Subcatchment DA-1E: Drainage to Wetlands

Runoff = 12.90 cfs @ 12.24 hrs, Volume= 36,389 cf, Depth= 1.69"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
108,763	98	Paved parking, HSG D
148,969	80	>75% Grass cover, Good, HSG D
257,732	88	Weighted Average
148,969		57.80% Pervious Area
108,763		42.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment DA-2E: Drainage to Street

Runoff = 2.60 cfs @ 12.23 hrs, Volume= 7,413 cf, Depth= 1.94"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
28,816	98	Paved parking, HSG D
17,013	80	>75% Grass cover, Good, HSG D
45,829	91	Weighted Average
17,013		37.12% Pervious Area
28,816		62.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach ET: EXISTING TOTAL

Inflow Area = 303,561 sf, 45.32% Impervious, Inflow Depth = 1.73" for 2-Year event
Inflow = 15.50 cfs @ 12.24 hrs, Volume= 43,803 cf
Outflow = 15.50 cfs @ 12.24 hrs, Volume= 43,803 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1E: Drainage to Runoff Area=257,732 sf 42.20% Impervious Runoff Depth=2.97"
Tc=15.0 min CN=88 Runoff=22.26 cfs 63,813 cf

Subcatchment DA-2E: Drainage to Street Runoff Area=45,829 sf 62.88% Impervious Runoff Depth=3.27"
Tc=15.0 min CN=91 Runoff=4.27 cfs 12,476 cf

Reach ET: EXISTING TOTAL Inflow=26.52 cfs 76,290 cf
Outflow=26.52 cfs 76,290 cf

Total Runoff Area = 303,561 sf Runoff Volume = 76,290 cf Average Runoff Depth = 3.02"
54.68% Pervious = 165,982 sf 45.32% Impervious = 137,579 sf

Summary for Subcatchment DA-1E: Drainage to Wetlands

Runoff = 22.26 cfs @ 12.23 hrs, Volume= 63,813 cf, Depth= 2.97"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
108,763	98	Paved parking, HSG D
148,969	80	>75% Grass cover, Good, HSG D
257,732	88	Weighted Average
148,969		57.80% Pervious Area
108,763		42.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment DA-2E: Drainage to Street

Runoff = 4.27 cfs @ 12.23 hrs, Volume= 12,476 cf, Depth= 3.27"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
28,816	98	Paved parking, HSG D
17,013	80	>75% Grass cover, Good, HSG D
45,829	91	Weighted Average
17,013		37.12% Pervious Area
28,816		62.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach ET: EXISTING TOTAL

Inflow Area = 303,561 sf, 45.32% Impervious, Inflow Depth = 3.02" for 10-Year event
Inflow = 26.52 cfs @ 12.23 hrs, Volume= 76,290 cf
Outflow = 26.52 cfs @ 12.23 hrs, Volume= 76,290 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1E: Drainage to Runoff Area=257,732 sf 42.20% Impervious Runoff Depth=5.90"
Tc=15.0 min CN=88 Runoff=42.77 cfs 126,820 cf

Subcatchment DA-2E: Drainage to Street Runoff Area=45,829 sf 62.88% Impervious Runoff Depth=6.25"
Tc=15.0 min CN=91 Runoff=7.88 cfs 23,884 cf

Reach ET: EXISTING TOTAL Inflow=50.65 cfs 150,703 cf
Outflow=50.65 cfs 150,703 cf

Total Runoff Area = 303,561 sf Runoff Volume = 150,703 cf Average Runoff Depth = 5.96"
54.68% Pervious = 165,982 sf 45.32% Impervious = 137,579 sf

Summary for Subcatchment DA-1E: Drainage to Wetlands

Runoff = 42.77 cfs @ 12.23 hrs, Volume= 126,820 cf, Depth= 5.90"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
108,763	98	Paved parking, HSG D
148,969	80	>75% Grass cover, Good, HSG D
257,732	88	Weighted Average
148,969		57.80% Pervious Area
108,763		42.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment DA-2E: Drainage to Street

Runoff = 7.88 cfs @ 12.23 hrs, Volume= 23,884 cf, Depth= 6.25"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
28,816	98	Paved parking, HSG D
17,013	80	>75% Grass cover, Good, HSG D
45,829	91	Weighted Average
17,013		37.12% Pervious Area
28,816		62.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach ET: EXISTING TOTAL

Inflow Area = 303,561 sf, 45.32% Impervious, Inflow Depth = 5.96" for 100-Year event
Inflow = 50.65 cfs @ 12.23 hrs, Volume= 150,703 cf
Outflow = 50.65 cfs @ 12.23 hrs, Volume= 150,703 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1E: Drainage to Runoff Area=257,732 sf 42.20% Impervious Runoff Depth=3.67"
Tc=15.0 min CN=88 Runoff=27.23 cfs 78,800 cf

Subcatchment DA-2E: Drainage to Street Runoff Area=45,829 sf 62.88% Impervious Runoff Depth=3.98"
Tc=15.0 min CN=91 Runoff=5.15 cfs 15,208 cf

Reach ET: EXISTING TOTAL Inflow=32.38 cfs 94,008 cf
Outflow=32.38 cfs 94,008 cf

Total Runoff Area = 303,561 sf Runoff Volume = 94,008 cf Average Runoff Depth = 3.72"
54.68% Pervious = 165,982 sf 45.32% Impervious = 137,579 sf

Summary for Subcatchment DA-1E: Drainage to Wetlands

Runoff = 27.23 cfs @ 12.23 hrs, Volume= 78,800 cf, Depth= 3.67"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 Custom Rainfall=5.00"

Area (sf)	CN	Description
108,763	98	Paved parking, HSG D
148,969	80	>75% Grass cover, Good, HSG D
257,732	88	Weighted Average
148,969		57.80% Pervious Area
108,763		42.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Subcatchment DA-2E: Drainage to Street

Runoff = 5.15 cfs @ 12.23 hrs, Volume= 15,208 cf, Depth= 3.98"
Routed to Reach ET : EXISTING TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 Custom Rainfall=5.00"

Area (sf)	CN	Description
28,816	98	Paved parking, HSG D
17,013	80	>75% Grass cover, Good, HSG D
45,829	91	Weighted Average
17,013		37.12% Pervious Area
28,816		62.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

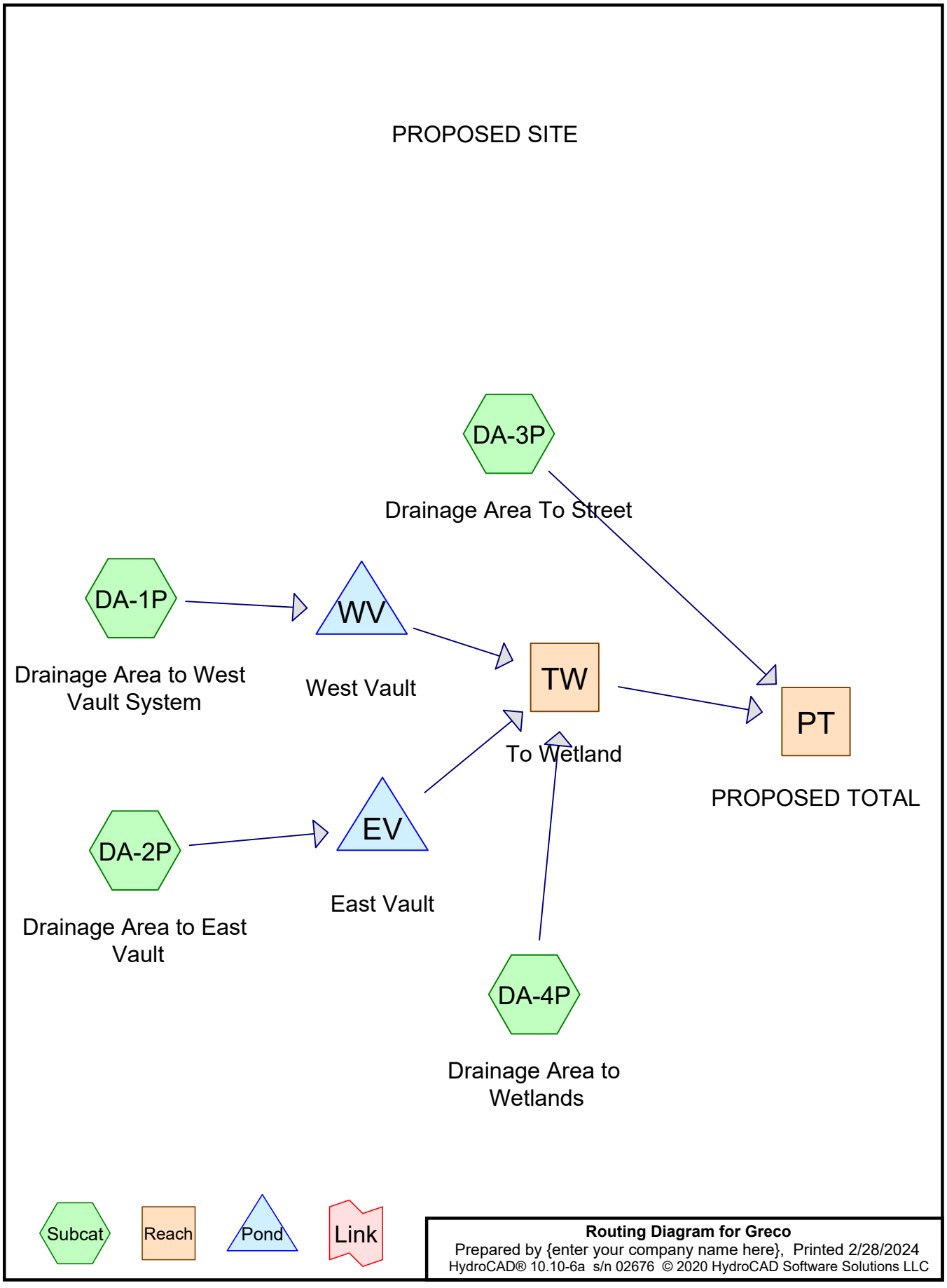
Summary for Reach ET: EXISTING TOTAL

Inflow Area = 303,561 sf, 45.32% Impervious, Inflow Depth = 3.72" for Custom event
Inflow = 32.38 cfs @ 12.23 hrs, Volume= 94,008 cf
Outflow = 32.38 cfs @ 12.23 hrs, Volume= 94,008 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Appendix B

Proposed HydroCAD Report


PROPOSED SITE
DA-3P
Drainage Area To Street
DA-1P
Drainage Area to West Vault System
WV
West Vault
TW
To Wetland
PT
PROPOSED TOTAL
DA-2P
Drainage Area to East Vault
EV
East Vault
DA-4P
Drainage Area to Wetlands
Subcat
Reach
Pond
Link
Routing Diagram for Greco
Prepared by {enter your company name here}, Printed 2/28/2024
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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Drainage Area to Runoff Area=126,198 sf 87.25% Impervious Runoff Depth=2.04"
Tc=5.0 min CN=96 Runoff=10.03 cfs 21,472 cf

SubcatchmentDA-2P: Drainage Area to Runoff Area=66,757 sf 93.09% Impervious Runoff Depth=2.14"
Tc=5.0 min CN=97 Runoff=5.45 cfs 11,927 cf

SubcatchmentDA-3P: Drainage Area To Runoff Area=17,067 sf 17.46% Impervious Runoff Depth=1.04"
Tc=5.0 min CN=83 Runoff=0.75 cfs 1,480 cf

SubcatchmentDA-4P: Drainage Area to Runoff Area=93,539 sf 15.79% Impervious Runoff Depth=1.04"
Tc=15.0 min CN=83 Runoff=2.86 cfs 8,113 cf

Reach PT: PROPOSED TOTAL Inflow=3.60 cfs 42,991 cf
Outflow=3.60 cfs 42,991 cf

Reach TW: To Wetland Inflow=3.30 cfs 41,511 cf
Outflow=3.30 cfs 41,511 cf

Pond EV: East Vault Peak Elev=947.04' Storage=7,374 cf Inflow=5.45 cfs 11,927 cf
Outflow=0.21 cfs 11,927 cf

Pond WV: West Vault Peak Elev=946.26' Storage=13,777 cf Inflow=10.03 cfs 21,472 cf
Outflow=0.43 cfs 21,471 cf

Total Runoff Area = 303,561 sf Runoff Volume = 42,991 cf Average Runoff Depth = 1.70"
37.41% Pervious = 113,556 sf 62.59% Impervious = 190,005 sf

Summary for Subcatchment DA-1P: Drainage Area to West Vault System

Runoff = 10.03 cfs @ 12.11 hrs, Volume= 21,472 cf, Depth= 2.04"
Routed to Pond WV : West Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
110,109	98	Paved parking, HSG D
16,089	80	>75% Grass cover, Good, HSG D
126,198	96	Weighted Average
16,089		12.75% Pervious Area
110,109		87.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-2P: Drainage Area to East Vault

Runoff = 5.45 cfs @ 12.11 hrs, Volume= 11,927 cf, Depth= 2.14"
Routed to Pond EV : East Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
62,147	98	Paved parking, HSG D
4,610	80	>75% Grass cover, Good, HSG D
66,757	97	Weighted Average
4,610		6.91% Pervious Area
62,147		93.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-3P: Drainage Area To Street

Runoff = 0.75 cfs @ 12.12 hrs, Volume= 1,480 cf, Depth= 1.04"
Routed to Reach PT : PROPOSED TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
2,980	98	Paved parking, HSG D
14,087	80	>75% Grass cover, Good, HSG D
17,067	83	Weighted Average
14,087		82.54% Pervious Area
2,980		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-4P: Drainage Area to Wetlands

Runoff = 2.86 cfs @ 12.24 hrs, Volume= 8,113 cf, Depth= 1.04"
Routed to Reach TW : To Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 1-Year Rainfall=2.48"

Area (sf)	CN	Description
14,769	98	Paved parking, HSG D
78,770	80	>75% Grass cover, Good, HSG D
93,539	83	Weighted Average
78,770		84.21% Pervious Area
14,769		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach PT: PROPOSED TOTAL

Inflow Area = 303,561 sf, 62.59% Impervious, Inflow Depth = 1.70" for 1-Year event
Inflow = 3.60 cfs @ 12.24 hrs, Volume= 42,991 cf
Outflow = 3.60 cfs @ 12.24 hrs, Volume= 42,991 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach TW: To Wetland

Inflow Area = 286,494 sf, 65.28% Impervious, Inflow Depth = 1.74" for 1-Year event
Inflow = 3.30 cfs @ 12.26 hrs, Volume= 41,511 cf
Outflow = 3.30 cfs @ 12.26 hrs, Volume= 41,511 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach PT : PROPOSED TOTAL

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond EV: East Vault

Inflow Area = 66,757 sf, 93.09% Impervious, Inflow Depth = 2.14" for 1-Year event
Inflow = 5.45 cfs @ 12.11 hrs, Volume= 11,927 cf
Outflow = 0.21 cfs @ 12.00 hrs, Volume= 11,927 cf, Atten= 96%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.00 hrs, Volume= 11,927 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 947.04' @ 13.52 hrs Surf.Area= 18,423 sf Storage= 7,374 cf

Plug-Flow detention time= 344.9 min calculated for 11,919 cf (100% of inflow)
Center-of-Mass det. time= 345.2 min (1,108.7 - 763.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	5,387 cf	**20.00'W x 217.00'L x 5.50'H Field A** 23,870 cf Overall - 10,401 cf Embedded = 13,469 cf x 40.0% Voids
#2A	946.50'	10,401 cf	**CMP Round 54** x 33 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -14.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 2 = 572.6 cf Inside
#3	944.00'	2,580 cf	**20.00'W x 215.00'L x 2.00'H Prismatoid** 8,600 cf Overall x 30.0% Voids
#4B	946.00'	6,031 cf	**53.75'W x 91.00'L x 5.50'H Field B** 26,902 cf Overall - 11,825 cf Embedded = 15,077 cf x 40.0% Voids
#5B	946.50'	11,825 cf	**CMP Round 54** x 32 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 32 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#6	944.00'	29 cf	**53.75'W x 91.00'L x 2.00'H Prismatoid** 9,783 cf Overall x 0.3% Voids
		36,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**15.0" Round Culvert** L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 944.00' / 943.94' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert** L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 948.50' / 948.47' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 12.00 hrs HW=946.01' (Free Discharge)
└**1=Culvert** (Passes 0.21 cfs of 6.50 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.21 cfs)
  └**3=Culvert** (Controls 0.00 cfs)

Summary for Pond WV: West Vault

Inflow Area = 126,198 sf, 87.25% Impervious, Inflow Depth = 2.04" for 1-Year event
Inflow = 10.03 cfs @ 12.11 hrs, Volume= 21,472 cf
Outflow = 0.43 cfs @ 12.30 hrs, Volume= 21,471 cf, Atten= 96%, Lag= 11.2 min
Primary = 0.43 cfs @ 12.30 hrs, Volume= 21,471 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 946.26' @ 13.47 hrs Surf.Area= 37,578 sf Storage= 13,777 cf

Plug-Flow detention time= 470.4 min calculated for 21,471 cf (100% of inflow)
Center-of-Mass det. time= 470.1 min (1,240.1 - 770.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	8,449 cf	**53.75'W x 151.00'L x 5.00'H Field A** 40,581 cf Overall - 19,459 cf Embedded = 21,122 cf x 40.0% Voids
#2A	946.00'	19,459 cf	**CMP Round 54** x 56 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 56 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#3	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid** 16,233 cf Overall x 30.0% Voids
#4B	946.00'	3,062 cf	**20.00'W x 122.50'L x 5.50'H Field B** 13,475 cf Overall - 5,821 cf Embedded = 7,654 cf x 40.0% Voids
#5B	946.50'	5,821 cf	**CMP Round 54** x 18 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -4.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 1 = 286.3 cf Inside
#6	944.00'	1,470 cf	**20.00'W x 122.50'L x 2.00'H Prismatoid** 4,900 cf Overall x 30.0% Voids
#7C	946.00'	882 cf	**40.25'W x 16.00'L x 5.50'H Field C** 3,542 cf Overall - 1,336 cf Embedded = 2,206 cf x 40.0% Voids
#8C	946.50'	1,336 cf	**CMP Round 54** x 6 Inside #7 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -6.00' x 15.90 sf x 6 rows
#9	944.00'	386 cf	**16.00'W x 40.25'L x 2.00'H Prismatoid** 1,288 cf Overall x 30.0% Voids
#10D	946.00'	8,725 cf	**53.75'W x 131.00'L x 5.50'H Field D** 38,727 cf Overall - 16,914 cf Embedded = 21,813 cf x 40.0% Voids
#11D	946.50'	16,914 cf	**CMP Round 54** x 48 Inside #10 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L

			48 Chambers in 8 Rows
			51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#12	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid**
			16,233 cf Overall x 30.0% Voids
		76,244 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard
Storage Group C created with Chamber Wizard
Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**12.0" Round Culvert**
			L= 59.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 944.00' / 943.00' S= 0.0169 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert**
			L= 10.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 948.50' / 948.45' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.30 hrs HW=946.01' (Free Discharge)
└**1=Culvert** (Passes 0.43 cfs of 4.65 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.43 cfs)
  └**3=Culvert** (Controls 0.00 cfs)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Drainage Area to Runoff Area=126,198 sf 87.25% Impervious Runoff Depth=2.41"
Tc=5.0 min CN=96 Runoff=11.73 cfs 25,391 cf

SubcatchmentDA-2P: Drainage Area to Runoff Area=66,757 sf 93.09% Impervious Runoff Depth=2.52"
Tc=5.0 min CN=97 Runoff=6.34 cfs 14,017 cf

SubcatchmentDA-3P: Drainage Area To Runoff Area=17,067 sf 17.46% Impervious Runoff Depth=1.33"
Tc=5.0 min CN=83 Runoff=0.96 cfs 1,898 cf

SubcatchmentDA-4P: Drainage Area to Runoff Area=93,539 sf 15.79% Impervious Runoff Depth=1.33"
Tc=15.0 min CN=83 Runoff=3.69 cfs 10,404 cf

Reach PT: PROPOSED TOTAL Inflow=4.75 cfs 51,710 cf
Outflow=4.75 cfs 51,710 cf

Reach TW: To Wetland Inflow=4.34 cfs 49,811 cf
Outflow=4.34 cfs 49,811 cf

Pond EV: East Vault Peak Elev=947.28' Storage=8,904 cf Inflow=6.34 cfs 14,017 cf
Outflow=0.21 cfs 14,017 cf

Pond WV: West Vault Peak Elev=946.57' Storage=16,633 cf Inflow=11.73 cfs 25,391 cf
Outflow=0.43 cfs 25,390 cf

Total Runoff Area = 303,561 sf Runoff Volume = 51,710 cf Average Runoff Depth = 2.04"
37.41% Pervious = 113,556 sf 62.59% Impervious = 190,005 sf

Summary for Subcatchment DA-1P: Drainage Area to West Vault System

Runoff = 11.73 cfs @ 12.11 hrs, Volume= 25,391 cf, Depth= 2.41"
Routed to Pond WV : West Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
110,109	98	Paved parking, HSG D
16,089	80	>75% Grass cover, Good, HSG D
126,198	96	Weighted Average
16,089		12.75% Pervious Area
110,109		87.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-2P: Drainage Area to East Vault

Runoff = 6.34 cfs @ 12.11 hrs, Volume= 14,017 cf, Depth= 2.52"
Routed to Pond EV : East Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
62,147	98	Paved parking, HSG D
4,610	80	>75% Grass cover, Good, HSG D
66,757	97	Weighted Average
4,610		6.91% Pervious Area
62,147		93.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-3P: Drainage Area To Street

Runoff = 0.96 cfs @ 12.12 hrs, Volume= 1,898 cf, Depth= 1.33"
Routed to Reach PT : PROPOSED TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
2,980	98	Paved parking, HSG D
14,087	80	>75% Grass cover, Good, HSG D
17,067	83	Weighted Average
14,087		82.54% Pervious Area
2,980		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-4P: Drainage Area to Wetlands

Runoff = 3.69 cfs @ 12.24 hrs, Volume= 10,404 cf, Depth= 1.33"
Routed to Reach TW : To Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 2-Year Rainfall=2.86"

Area (sf)	CN	Description
14,769	98	Paved parking, HSG D
78,770	80	>75% Grass cover, Good, HSG D
93,539	83	Weighted Average
78,770		84.21% Pervious Area
14,769		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach PT: PROPOSED TOTAL

Inflow Area = 303,561 sf, 62.59% Impervious, Inflow Depth = 2.04" for 2-Year event
Inflow = 4.75 cfs @ 12.23 hrs, Volume= 51,710 cf
Outflow = 4.75 cfs @ 12.23 hrs, Volume= 51,710 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach TW: To Wetland

Inflow Area = 286,494 sf, 65.28% Impervious, Inflow Depth = 2.09" for 2-Year event
Inflow = 4.34 cfs @ 12.24 hrs, Volume= 49,811 cf
Outflow = 4.34 cfs @ 12.24 hrs, Volume= 49,811 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach PT : PROPOSED TOTAL

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond EV: East Vault

Inflow Area = 66,757 sf, 93.09% Impervious, Inflow Depth = 2.52" for 2-Year event
Inflow = 6.34 cfs @ 12.11 hrs, Volume= 14,017 cf
Outflow = 0.21 cfs @ 11.95 hrs, Volume= 14,017 cf, Atten= 97%, Lag= 0.0 min
Primary = 0.21 cfs @ 11.95 hrs, Volume= 14,017 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 947.28' @ 13.57 hrs Surf.Area= 18,423 sf Storage= 8,904 cf

Plug-Flow detention time= 407.8 min calculated for 14,017 cf (100% of inflow)
Center-of-Mass det. time= 407.1 min (1,167.7 - 760.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	5,387 cf	**20.00'W x 217.00'L x 5.50'H Field A** 23,870 cf Overall - 10,401 cf Embedded = 13,469 cf x 40.0% Voids
#2A	946.50'	10,401 cf	**CMP Round 54** x 33 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -14.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 2 = 572.6 cf Inside
#3	944.00'	2,580 cf	**20.00'W x 215.00'L x 2.00'H Prismatoid** 8,600 cf Overall x 30.0% Voids
#4B	946.00'	6,031 cf	**53.75'W x 91.00'L x 5.50'H Field B** 26,902 cf Overall - 11,825 cf Embedded = 15,077 cf x 40.0% Voids
#5B	946.50'	11,825 cf	**CMP Round 54** x 32 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 32 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#6	944.00'	29 cf	**53.75'W x 91.00'L x 2.00'H Prismatoid** 9,783 cf Overall x 0.3% Voids
		36,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**15.0" Round Culvert** L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 944.00' / 943.94' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert** L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 948.50' / 948.47' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 11.95 hrs HW=946.03' (Free Discharge)
└**1=Culvert** (Passes 0.21 cfs of 6.59 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.21 cfs)
  └**3=Culvert** (Controls 0.00 cfs)

Summary for Pond WV: West Vault

Inflow Area = 126,198 sf, 87.25% Impervious, Inflow Depth = 2.41" for 2-Year event
Inflow = 11.73 cfs @ 12.11 hrs, Volume= 25,391 cf
Outflow = 0.43 cfs @ 12.20 hrs, Volume= 25,390 cf, Atten= 96%, Lag= 5.2 min
Primary = 0.43 cfs @ 12.20 hrs, Volume= 25,390 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 946.57' @ 13.54 hrs Surf.Area= 37,578 sf Storage= 16,633 cf

Plug-Flow detention time= 490.6 min calculated for 25,390 cf (100% of inflow)
Center-of-Mass det. time= 490.3 min (1,257.2 - 766.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	8,449 cf	**53.75'W x 151.00'L x 5.00'H Field A** 40,581 cf Overall - 19,459 cf Embedded = 21,122 cf x 40.0% Voids
#2A	946.00'	19,459 cf	**CMP Round 54** x 56 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 56 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#3	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid** 16,233 cf Overall x 30.0% Voids
#4B	946.00'	3,062 cf	**20.00'W x 122.50'L x 5.50'H Field B** 13,475 cf Overall - 5,821 cf Embedded = 7,654 cf x 40.0% Voids
#5B	946.50'	5,821 cf	**CMP Round 54** x 18 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -4.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 1 = 286.3 cf Inside
#6	944.00'	1,470 cf	**20.00'W x 122.50'L x 2.00'H Prismatoid** 4,900 cf Overall x 30.0% Voids
#7C	946.00'	882 cf	**40.25'W x 16.00'L x 5.50'H Field C** 3,542 cf Overall - 1,336 cf Embedded = 2,206 cf x 40.0% Voids
#8C	946.50'	1,336 cf	**CMP Round 54** x 6 Inside #7 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -6.00' x 15.90 sf x 6 rows
#9	944.00'	386 cf	**16.00'W x 40.25'L x 2.00'H Prismatoid** 1,288 cf Overall x 30.0% Voids
#10D	946.00'	8,725 cf	**53.75'W x 131.00'L x 5.50'H Field D** 38,727 cf Overall - 16,914 cf Embedded = 21,813 cf x 40.0% Voids
#11D	946.50'	16,914 cf	**CMP Round 54** x 48 Inside #10 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L

			48 Chambers in 8 Rows
			51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#12	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid**
			16,233 cf Overall x 30.0% Voids
		76,244 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard
Storage Group C created with Chamber Wizard
Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**12.0" Round Culvert**
			L= 59.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 944.00' / 943.00' S= 0.0169 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert**
			L= 10.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 948.50' / 948.45' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.20 hrs HW=946.11' (Free Discharge)
└**1=Culvert** (Passes 0.43 cfs of 4.81 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.43 cfs)
  └**3=Culvert** (Controls 0.00 cfs)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Drainage Area to Runoff Area=126,198 sf 87.25% Impervious Runoff Depth=3.80"
Tc=5.0 min CN=96 Runoff=17.94 cfs 39,940 cf

SubcatchmentDA-2P: Drainage Area to Runoff Area=66,757 sf 93.09% Impervious Runoff Depth=3.91"
Tc=5.0 min CN=97 Runoff=9.60 cfs 21,752 cf

SubcatchmentDA-3P: Drainage Area To Runoff Area=17,067 sf 17.46% Impervious Runoff Depth=2.51"
Tc=5.0 min CN=83 Runoff=1.80 cfs 3,575 cf

SubcatchmentDA-4P: Drainage Area to Runoff Area=93,539 sf 15.79% Impervious Runoff Depth=2.51"
Tc=15.0 min CN=83 Runoff=6.95 cfs 19,592 cf

Reach PT: PROPOSED TOTAL Inflow=8.35 cfs 84,857 cf
Outflow=8.35 cfs 84,857 cf

Reach TW: To Wetland Inflow=7.60 cfs 81,282 cf
Outflow=7.60 cfs 81,282 cf

Pond EV: East Vault Peak Elev=948.13' Storage=14,811 cf Inflow=9.60 cfs 21,752 cf
Outflow=0.21 cfs 21,752 cf

Pond WV: West Vault Peak Elev=947.45' Storage=27,659 cf Inflow=17.94 cfs 39,940 cf
Outflow=0.43 cfs 39,938 cf

Total Runoff Area = 303,561 sf Runoff Volume = 84,858 cf Average Runoff Depth = 3.35"
37.41% Pervious = 113,556 sf 62.59% Impervious = 190,005 sf

Summary for Subcatchment DA-1P: Drainage Area to West Vault System

Runoff = 17.94 cfs @ 12.11 hrs, Volume= 39,940 cf, Depth= 3.80"
Routed to Pond WV : West Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
110,109	98	Paved parking, HSG D
16,089	80	>75% Grass cover, Good, HSG D
126,198	96	Weighted Average
16,089		12.75% Pervious Area
110,109		87.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-2P: Drainage Area to East Vault

Runoff = 9.60 cfs @ 12.11 hrs, Volume= 21,752 cf, Depth= 3.91"
Routed to Pond EV : East Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
62,147	98	Paved parking, HSG D
4,610	80	>75% Grass cover, Good, HSG D
66,757	97	Weighted Average
4,610		6.91% Pervious Area
62,147		93.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-3P: Drainage Area To Street

Runoff = 1.80 cfs @ 12.12 hrs, Volume= 3,575 cf, Depth= 2.51"
Routed to Reach PT : PROPOSED TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
2,980	98	Paved parking, HSG D
14,087	80	>75% Grass cover, Good, HSG D
17,067	83	Weighted Average
14,087		82.54% Pervious Area
2,980		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-4P: Drainage Area to Wetlands

Runoff = 6.95 cfs @ 12.24 hrs, Volume= 19,592 cf, Depth= 2.51"
Routed to Reach TW : To Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 10-Year Rainfall=4.26"

Area (sf)	CN	Description
14,769	98	Paved parking, HSG D
78,770	80	>75% Grass cover, Good, HSG D
93,539	83	Weighted Average
78,770		84.21% Pervious Area
14,769		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach PT: PROPOSED TOTAL

Inflow Area = 303,561 sf, 62.59% Impervious, Inflow Depth = 3.35" for 10-Year event
Inflow = 8.35 cfs @ 12.22 hrs, Volume= 84,857 cf
Outflow = 8.35 cfs @ 12.22 hrs, Volume= 84,857 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach TW: To Wetland

Inflow Area = 286,494 sf, 65.28% Impervious, Inflow Depth = 3.40" for 10-Year event
Inflow = 7.60 cfs @ 12.24 hrs, Volume= 81,282 cf
Outflow = 7.60 cfs @ 12.24 hrs, Volume= 81,282 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach PT : PROPOSED TOTAL

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond EV: East Vault

Inflow Area = 66,757 sf, 93.09% Impervious, Inflow Depth = 3.91" for 10-Year event
Inflow = 9.60 cfs @ 12.11 hrs, Volume= 21,752 cf
Outflow = 0.21 cfs @ 11.65 hrs, Volume= 21,752 cf, Atten= 98%, Lag= 0.0 min
Primary = 0.21 cfs @ 11.65 hrs, Volume= 21,752 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 948.13' @ 14.97 hrs Surf.Area= 18,423 sf Storage= 14,811 cf

Plug-Flow detention time= 654.4 min calculated for 21,752 cf (100% of inflow)
Center-of-Mass det. time= 653.9 min (1,407.0 - 753.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	5,387 cf	**20.00'W x 217.00'L x 5.50'H Field A** 23,870 cf Overall - 10,401 cf Embedded = 13,469 cf x 40.0% Voids
#2A	946.50'	10,401 cf	**CMP Round 54** x 33 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -14.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 2 = 572.6 cf Inside
#3	944.00'	2,580 cf	**20.00'W x 215.00'L x 2.00'H Prismatoid** 8,600 cf Overall x 30.0% Voids
#4B	946.00'	6,031 cf	**53.75'W x 91.00'L x 5.50'H Field B** 26,902 cf Overall - 11,825 cf Embedded = 15,077 cf x 40.0% Voids
#5B	946.50'	11,825 cf	**CMP Round 54** x 32 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 32 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#6	944.00'	29 cf	**53.75'W x 91.00'L x 2.00'H Prismatoid** 9,783 cf Overall x 0.3% Voids
		36,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**15.0" Round Culvert** L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 944.00' / 943.94' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert** L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 948.50' / 948.47' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.21 cfs @ 11.65 hrs HW=946.01' (Free Discharge)
└**1=Culvert** (Passes 0.21 cfs of 6.52 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.21 cfs)
  └**3=Culvert** (Controls 0.00 cfs)

Summary for Pond WV: West Vault

Inflow Area = 126,198 sf, 87.25% Impervious, Inflow Depth = 3.80" for 10-Year event
Inflow = 17.94 cfs @ 12.11 hrs, Volume= 39,940 cf
Outflow = 0.43 cfs @ 12.05 hrs, Volume= 39,938 cf, Atten= 98%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.05 hrs, Volume= 39,938 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 947.45' @ 14.37 hrs Surf.Area= 37,578 sf Storage= 27,659 cf

Plug-Flow detention time= 671.9 min calculated for 39,910 cf (100% of inflow)
Center-of-Mass det. time= 672.9 min (1,431.5 - 758.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	8,449 cf	**53.75'W x 151.00'L x 5.00'H Field A** 40,581 cf Overall - 19,459 cf Embedded = 21,122 cf x 40.0% Voids
#2A	946.00'	19,459 cf	**CMP Round 54** x 56 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 56 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#3	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid** 16,233 cf Overall x 30.0% Voids
#4B	946.00'	3,062 cf	**20.00'W x 122.50'L x 5.50'H Field B** 13,475 cf Overall - 5,821 cf Embedded = 7,654 cf x 40.0% Voids
#5B	946.50'	5,821 cf	**CMP Round 54** x 18 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -4.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 1 = 286.3 cf Inside
#6	944.00'	1,470 cf	**20.00'W x 122.50'L x 2.00'H Prismatoid** 4,900 cf Overall x 30.0% Voids
#7C	946.00'	882 cf	**40.25'W x 16.00'L x 5.50'H Field C** 3,542 cf Overall - 1,336 cf Embedded = 2,206 cf x 40.0% Voids
#8C	946.50'	1,336 cf	**CMP Round 54** x 6 Inside #7 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -6.00' x 15.90 sf x 6 rows
#9	944.00'	386 cf	**16.00'W x 40.25'L x 2.00'H Prismatoid** 1,288 cf Overall x 30.0% Voids
#10D	946.00'	8,725 cf	**53.75'W x 131.00'L x 5.50'H Field D** 38,727 cf Overall - 16,914 cf Embedded = 21,813 cf x 40.0% Voids
#11D	946.50'	16,914 cf	**CMP Round 54** x 48 Inside #10 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L

			48 Chambers in 8 Rows
			51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#12	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid**
			16,233 cf Overall x 30.0% Voids
		76,244 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard
Storage Group C created with Chamber Wizard
Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**12.0" Round Culvert**
			L= 59.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 944.00' / 943.00' S= 0.0169 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert**
			L= 10.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 948.50' / 948.45' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.05 hrs HW=946.11' (Free Discharge)
└**1=Culvert** (Passes 0.43 cfs of 4.79 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.43 cfs)
  └**3=Culvert** (Controls 0.00 cfs)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Drainage Area to Runoff Area=126,198 sf 87.25% Impervious Runoff Depth=6.84"
Tc=5.0 min CN=96 Runoff=31.36 cfs 71,961 cf

SubcatchmentDA-2P: Drainage Area to Runoff Area=66,757 sf 93.09% Impervious Runoff Depth=6.96"
Tc=5.0 min CN=97 Runoff=16.66 cfs 38,727 cf

SubcatchmentDA-3P: Drainage Area To Runoff Area=17,067 sf 17.46% Impervious Runoff Depth=5.33"
Tc=5.0 min CN=83 Runoff=3.68 cfs 7,581 cf

SubcatchmentDA-4P: Drainage Area to Runoff Area=93,539 sf 15.79% Impervious Runoff Depth=5.33"
Tc=15.0 min CN=83 Runoff=14.38 cfs 41,550 cf

Reach PT: PROPOSED TOTAL Inflow=17.01 cfs 159,797 cf
Outflow=17.01 cfs 159,797 cf

Reach TW: To Wetland Inflow=15.55 cfs 152,216 cf
Outflow=15.55 cfs 152,216 cf

Pond EV: East Vault Peak Elev=949.28' Storage=23,369 cf Inflow=16.66 cfs 38,727 cf
Outflow=1.60 cfs 38,727 cf

Pond WV: West Vault Peak Elev=949.03' Storage=50,386 cf Inflow=31.36 cfs 71,961 cf
Outflow=1.15 cfs 71,938 cf

Total Runoff Area = 303,561 sf Runoff Volume = 159,820 cf Average Runoff Depth = 6.32"
37.41% Pervious = 113,556 sf 62.59% Impervious = 190,005 sf

Summary for Subcatchment DA-1P: Drainage Area to West Vault System

Runoff = 31.36 cfs @ 12.11 hrs, Volume= 71,961 cf, Depth= 6.84"
Routed to Pond WV : West Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
110,109	98	Paved parking, HSG D
16,089	80	>75% Grass cover, Good, HSG D
126,198	96	Weighted Average
16,089		12.75% Pervious Area
110,109		87.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-2P: Drainage Area to East Vault

Runoff = 16.66 cfs @ 12.11 hrs, Volume= 38,727 cf, Depth= 6.96"
Routed to Pond EV : East Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
62,147	98	Paved parking, HSG D
4,610	80	>75% Grass cover, Good, HSG D
66,757	97	Weighted Average
4,610		6.91% Pervious Area
62,147		93.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-3P: Drainage Area To Street

Runoff = 3.68 cfs @ 12.11 hrs, Volume= 7,581 cf, Depth= 5.33"
Routed to Reach PT : PROPOSED TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
2,980	98	Paved parking, HSG D
14,087	80	>75% Grass cover, Good, HSG D
17,067	83	Weighted Average
14,087		82.54% Pervious Area
2,980		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-4P: Drainage Area to Wetlands

Runoff = 14.38 cfs @ 12.23 hrs, Volume= 41,550 cf, Depth= 5.33"
Routed to Reach TW : To Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 100-Year Rainfall=7.32"

Area (sf)	CN	Description
14,769	98	Paved parking, HSG D
78,770	80	>75% Grass cover, Good, HSG D
93,539	83	Weighted Average
78,770		84.21% Pervious Area
14,769		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach PT: PROPOSED TOTAL

Inflow Area = 303,561 sf, 62.59% Impervious, Inflow Depth = 6.32" for 100-Year event
Inflow = 17.01 cfs @ 12.22 hrs, Volume= 159,797 cf
Outflow = 17.01 cfs @ 12.22 hrs, Volume= 159,797 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach TW: To Wetland

Inflow Area = 286,494 sf, 65.28% Impervious, Inflow Depth = 6.38" for 100-Year event
Inflow = 15.55 cfs @ 12.24 hrs, Volume= 152,216 cf
Outflow = 15.55 cfs @ 12.24 hrs, Volume= 152,216 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach PT : PROPOSED TOTAL

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond EV: East Vault

Inflow Area = 66,757 sf, 93.09% Impervious, Inflow Depth = 6.96" for 100-Year event
Inflow = 16.66 cfs @ 12.11 hrs, Volume= 38,727 cf
Outflow = 1.60 cfs @ 12.61 hrs, Volume= 38,727 cf, Atten= 90%, Lag= 29.7 min
Primary = 1.60 cfs @ 12.61 hrs, Volume= 38,727 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 949.28' @ 12.61 hrs Surf.Area= 18,423 sf Storage= 23,369 cf

Plug-Flow detention time= 630.8 min calculated for 38,727 cf (100% of inflow)
Center-of-Mass det. time= 630.4 min (1,375.2 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	5,387 cf	**20.00'W x 217.00'L x 5.50'H Field A** 23,870 cf Overall - 10,401 cf Embedded = 13,469 cf x 40.0% Voids
#2A	946.50'	10,401 cf	**CMP Round 54** x 33 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -14.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 2 = 572.6 cf Inside
#3	944.00'	2,580 cf	**20.00'W x 215.00'L x 2.00'H Prismatoid** 8,600 cf Overall x 30.0% Voids
#4B	946.00'	6,031 cf	**53.75'W x 91.00'L x 5.50'H Field B** 26,902 cf Overall - 11,825 cf Embedded = 15,077 cf x 40.0% Voids
#5B	946.50'	11,825 cf	**CMP Round 54** x 32 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 32 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#6	944.00'	29 cf	**53.75'W x 91.00'L x 2.00'H Prismatoid** 9,783 cf Overall x 0.3% Voids
		36,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**15.0" Round Culvert** L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 944.00' / 943.94' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert** L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 948.50' / 948.47' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.60 cfs @ 12.61 hrs HW=949.28' (Free Discharge)
└**1=Culvert** (Passes 1.60 cfs of 12.75 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.21 cfs)
  └**3=Culvert** (Barrel Controls 1.38 cfs @ 2.90 fps)

Summary for Pond WV: West Vault

Inflow Area = 126,198 sf, 87.25% Impervious, Inflow Depth = 6.84" for 100-Year event
Inflow = 31.36 cfs @ 12.11 hrs, Volume= 71,961 cf
Outflow = 1.15 cfs @ 13.54 hrs, Volume= 71,938 cf, Atten= 96%, Lag= 85.7 min
Primary = 1.15 cfs @ 13.54 hrs, Volume= 71,938 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 949.03' @ 13.54 hrs Surf.Area= 37,578 sf Storage= 50,386 cf

Plug-Flow detention time= 923.6 min calculated for 71,888 cf (100% of inflow)
Center-of-Mass det. time= 924.6 min (1,673.7 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	8,449 cf	**53.75'W x 151.00'L x 5.00'H Field A** 40,581 cf Overall - 19,459 cf Embedded = 21,122 cf x 40.0% Voids
#2A	946.00'	19,459 cf	**CMP Round 54** x 56 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 56 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#3	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid** 16,233 cf Overall x 30.0% Voids
#4B	946.00'	3,062 cf	**20.00'W x 122.50'L x 5.50'H Field B** 13,475 cf Overall - 5,821 cf Embedded = 7,654 cf x 40.0% Voids
#5B	946.50'	5,821 cf	**CMP Round 54** x 18 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -4.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 1 = 286.3 cf Inside
#6	944.00'	1,470 cf	**20.00'W x 122.50'L x 2.00'H Prismatoid** 4,900 cf Overall x 30.0% Voids
#7C	946.00'	882 cf	**40.25'W x 16.00'L x 5.50'H Field C** 3,542 cf Overall - 1,336 cf Embedded = 2,206 cf x 40.0% Voids
#8C	946.50'	1,336 cf	**CMP Round 54** x 6 Inside #7 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -6.00' x 15.90 sf x 6 rows
#9	944.00'	386 cf	**16.00'W x 40.25'L x 2.00'H Prismatoid** 1,288 cf Overall x 30.0% Voids
#10D	946.00'	8,725 cf	**53.75'W x 131.00'L x 5.50'H Field D** 38,727 cf Overall - 16,914 cf Embedded = 21,813 cf x 40.0% Voids
#11D	946.50'	16,914 cf	**CMP Round 54** x 48 Inside #10 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L

			48 Chambers in 8 Rows
			51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#12	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid**
			16,233 cf Overall x 30.0% Voids
		76,244 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard
Storage Group C created with Chamber Wizard
Storage Group D created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**12.0" Round Culvert**
			L= 59.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 944.00' / 943.00' S= 0.0169 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert**
			L= 10.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 948.50' / 948.45' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.15 cfs @ 13.54 hrs HW=949.03' (Free Discharge)
└**1=Culvert** (Passes 1.15 cfs of 7.72 cfs potential flow)
  ├**2=Exfiltration** (Exfiltration Controls 0.43 cfs)
  └**3=Culvert** (Barrel Controls 0.72 cfs @ 2.49 fps)

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1P: Drainage Area to Runoff Area=126,198 sf 87.25% Impervious Runoff Depth=4.53"
Tc=5.0 min CN=96 Runoff=21.20 cfs 47,667 cf

SubcatchmentDA-2P: Drainage Area to Runoff Area=66,757 sf 93.09% Impervious Runoff Depth=4.65"
Tc=5.0 min CN=97 Runoff=11.31 cfs 25,852 cf

SubcatchmentDA-3P: Drainage Area To Runoff Area=17,067 sf 17.46% Impervious Runoff Depth=3.17"
Tc=5.0 min CN=83 Runoff=2.25 cfs 4,514 cf

SubcatchmentDA-4P: Drainage Area to Runoff Area=93,539 sf 15.79% Impervious Runoff Depth=3.17"
Tc=15.0 min CN=83 Runoff=8.73 cfs 24,742 cf

Reach PT: PROPOSED TOTAL Inflow=10.33 cfs 102,772 cf
Outflow=10.33 cfs 102,772 cf

Reach TW: To Wetland Inflow=9.38 cfs 98,257 cf
Outflow=9.38 cfs 98,257 cf

Pond EV: East Vault Peak Elev=948.57' Storage=18,073 cf Inflow=11.31 cfs 25,852 cf
Outflow=0.22 cfs 25,852 cf

Pond WV: West Vault Peak Elev=947.90' Storage=33,974 cf Inflow=21.20 cfs 47,667 cf
Outflow=0.43 cfs 47,663 cf

Total Runoff Area = 303,561 sf Runoff Volume = 102,775 cf Average Runoff Depth = 4.06"
37.41% Pervious = 113,556 sf 62.59% Impervious = 190,005 sf

Summary for Subcatchment DA-1P: Drainage Area to West Vault System

Runoff = 21.20 cfs @ 12.11 hrs, Volume= 47,667 cf, Depth= 4.53"
Routed to Pond WV : West Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 Custom Rainfall=5.00"

Area (sf)	CN	Description
110,109	98	Paved parking, HSG D
16,089	80	>75% Grass cover, Good, HSG D
126,198	96	Weighted Average
16,089		12.75% Pervious Area
110,109		87.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-2P: Drainage Area to East Vault

Runoff = 11.31 cfs @ 12.11 hrs, Volume= 25,852 cf, Depth= 4.65"
Routed to Pond EV : East Vault

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 Custom Rainfall=5.00"

Area (sf)	CN	Description
62,147	98	Paved parking, HSG D
4,610	80	>75% Grass cover, Good, HSG D
66,757	97	Weighted Average
4,610		6.91% Pervious Area
62,147		93.09% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-3P: Drainage Area To Street

Runoff = 2.25 cfs @ 12.12 hrs, Volume= 4,514 cf, Depth= 3.17"
Routed to Reach PT : PROPOSED TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 Custom Rainfall=5.00"

Area (sf)	CN	Description
2,980	98	Paved parking, HSG D
14,087	80	>75% Grass cover, Good, HSG D
17,067	83	Weighted Average
14,087		82.54% Pervious Area
2,980		17.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Summary for Subcatchment DA-4P: Drainage Area to Wetlands

Runoff = 8.73 cfs @ 12.23 hrs, Volume= 24,742 cf, Depth= 3.17"
Routed to Reach TW : To Wetland

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 Custom Rainfall=5.00"

Area (sf)	CN	Description
14,769	98	Paved parking, HSG D
78,770	80	>75% Grass cover, Good, HSG D
93,539	83	Weighted Average
78,770		84.21% Pervious Area
14,769		15.79% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					**Direct Entry,**

Summary for Reach PT: PROPOSED TOTAL

Inflow Area = 303,561 sf, 62.59% Impervious, Inflow Depth = 4.06" for Custom event
Inflow = 10.33 cfs @ 12.22 hrs, Volume= 102,772 cf
Outflow = 10.33 cfs @ 12.22 hrs, Volume= 102,772 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Reach TW: To Wetland

Inflow Area = 286,494 sf, 65.28% Impervious, Inflow Depth = 4.12" for Custom event
Inflow = 9.38 cfs @ 12.23 hrs, Volume= 98,257 cf
Outflow = 9.38 cfs @ 12.23 hrs, Volume= 98,257 cf, Atten= 0%, Lag= 0.0 min
Routed to Reach PT : PROPOSED TOTAL

Routing by Stor-Ind+Trans method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Summary for Pond EV: East Vault

Inflow Area = 66,757 sf, 93.09% Impervious, Inflow Depth = 4.65" for Custom event
Inflow = 11.31 cfs @ 12.11 hrs, Volume= 25,852 cf
Outflow = 0.22 cfs @ 15.04 hrs, Volume= 25,852 cf, Atten= 98%, Lag= 175.8 min
Primary = 0.22 cfs @ 15.04 hrs, Volume= 25,852 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 948.57' @ 15.04 hrs Surf.Area= 18,423 sf Storage= 18,073 cf

Plug-Flow detention time= 782.3 min calculated for 25,852 cf (100% of inflow)
Center-of-Mass det. time= 781.9 min (1,532.3 - 750.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	5,387 cf	**20.00'W x 217.00'L x 5.50'H Field A** 23,870 cf Overall - 10,401 cf Embedded = 13,469 cf x 40.0% Voids
#2A	946.50'	10,401 cf	**CMP Round 54** x 33 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -14.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 2 = 572.6 cf Inside
#3	944.00'	2,580 cf	**20.00'W x 215.00'L x 2.00'H Prismatoid** 8,600 cf Overall x 30.0% Voids
#4B	946.00'	6,031 cf	**53.75'W x 91.00'L x 5.50'H Field B** 26,902 cf Overall - 11,825 cf Embedded = 15,077 cf x 40.0% Voids
#5B	946.50'	11,825 cf	**CMP Round 54** x 32 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 32 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#6	944.00'	29 cf	**53.75'W x 91.00'L x 2.00'H Prismatoid** 9,783 cf Overall x 0.3% Voids
		36,254 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**15.0" Round Culvert** L= 16.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 944.00' / 943.94' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 1.23 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert** L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 948.50' / 948.47' S= 0.0037 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 15.04 hrs HW=948.57' (Free Discharge)
└**1=Culvert** (Passes 0.22 cfs of 11.73 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.21 cfs)
  └**3=Culvert** (Barrel Controls 0.01 cfs @ 0.76 fps)

Summary for Pond WV: West Vault

Inflow Area = 126,198 sf, 87.25% Impervious, Inflow Depth = 4.53" for Custom event
Inflow = 21.20 cfs @ 12.11 hrs, Volume= 47,667 cf
Outflow = 0.43 cfs @ 12.00 hrs, Volume= 47,663 cf, Atten= 98%, Lag= 0.0 min
Primary = 0.43 cfs @ 12.00 hrs, Volume= 47,663 cf
Routed to Reach TW : To Wetland

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 947.90' @ 15.03 hrs Surf.Area= 37,578 sf Storage= 33,974 cf

Plug-Flow detention time= 792.3 min calculated for 47,663 cf (100% of inflow)
Center-of-Mass det. time= 792.1 min (1,547.7 - 755.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	946.00'	8,449 cf	**53.75'W x 151.00'L x 5.00'H Field A** 40,581 cf Overall - 19,459 cf Embedded = 21,122 cf x 40.0% Voids
#2A	946.00'	19,459 cf	**CMP Round 54** x 56 Inside #1 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L 56 Chambers in 8 Rows 51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#3	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid** 16,233 cf Overall x 30.0% Voids
#4B	946.00'	3,062 cf	**20.00'W x 122.50'L x 5.50'H Field B** 13,475 cf Overall - 5,821 cf Embedded = 7,654 cf x 40.0% Voids
#5B	946.50'	5,821 cf	**CMP Round 54** x 18 Inside #4 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -4.00' x 15.90 sf x 3 rows 18.00' Header x 15.90 sf x 1 = 286.3 cf Inside
#6	944.00'	1,470 cf	**20.00'W x 122.50'L x 2.00'H Prismatoid** 4,900 cf Overall x 30.0% Voids
#7C	946.00'	882 cf	**40.25'W x 16.00'L x 5.50'H Field C** 3,542 cf Overall - 1,336 cf Embedded = 2,206 cf x 40.0% Voids
#8C	946.50'	1,336 cf	**CMP Round 54** x 6 Inside #7 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L Row Length Adjustment= -6.00' x 15.90 sf x 6 rows
#9	944.00'	386 cf	**16.00'W x 40.25'L x 2.00'H Prismatoid** 1,288 cf Overall x 30.0% Voids
#10D	946.00'	8,725 cf	**53.75'W x 131.00'L x 5.50'H Field D** 38,727 cf Overall - 16,914 cf Embedded = 21,813 cf x 40.0% Voids
#11D	946.50'	16,914 cf	**CMP Round 54** x 48 Inside #10 Effective Size= 54.0"W x 54.0"H => 15.90 sf x 20.00'L = 318.1 cf Overall Size= 54.0"W x 54.0"H x 20.00'L

			48 Chambers in 8 Rows
			51.75' Header x 15.90 sf x 2 = 1,646.1 cf Inside
#12	944.00'	4,870 cf	**53.75'W x 151.00'L x 2.00'H Prismatoid**
			16,233 cf Overall x 30.0% Voids
		76,244 cf	Total Available Storage

Storage Group A created with Chamber Wizard
Storage Group B created with Chamber Wizard
Storage Group C created with Chamber Wizard
Storage Group D created with Chamber Wizard

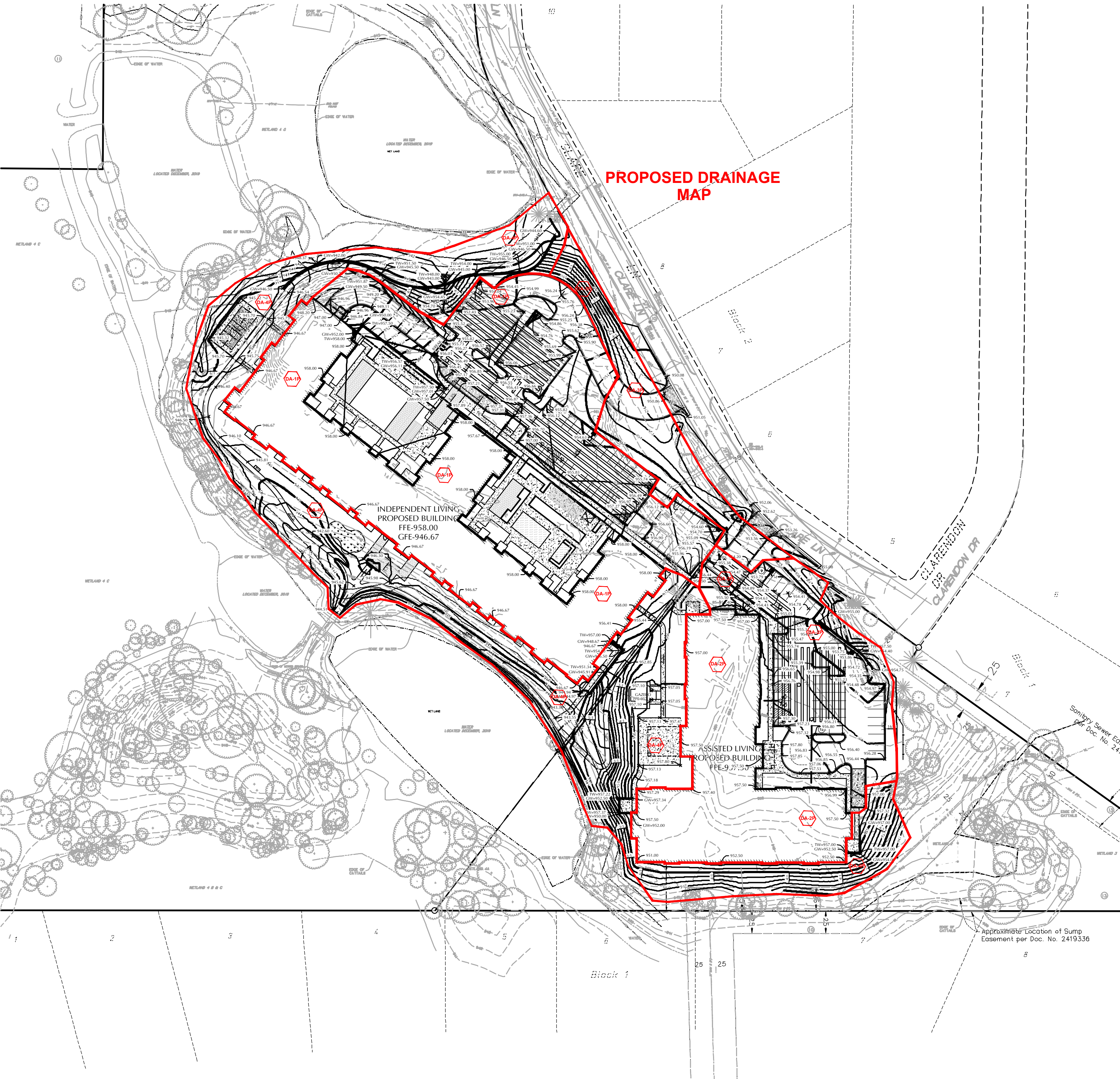
Device	Routing	Invert	Outlet Devices
#1	Primary	944.00'	**12.0" Round Culvert**
			L= 59.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 944.00' / 943.00' S= 0.0169 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	944.00'	**0.500 in/hr Exfiltration over Surface area**
#3	Device 1	948.50'	**12.0" Round Culvert**
			L= 10.0' RCP, square edge headwall, Ke= 0.500
			Inlet / Outlet Invert= 948.50' / 948.45' S= 0.0050 '/' Cc= 0.900
			n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.00 hrs HW=946.16' (Free Discharge)
└**1=Culvert** (Passes 0.43 cfs of 4.88 cfs potential flow)
  └**2=Exfiltration** (Exfiltration Controls 0.43 cfs)
  └**3=Culvert** (Controls 0.00 cfs)

Figures

Existing Drainage Exhibit
Proposed Drainage Exhibit
West Vault Storage Data
East Vault Storage Data
Mids Proposed Results

EXISTING DRAINAGE MAP


PROPOSED DRAINAGE MAP
INDEPENDENT LIVING
PROPOSED BUILDING
FFE-958.00
GFE-946.67
ASSISTED LIVING
PROPOSED BUILDING
CLARE LN
CLARENDON DR
Block 1
Block 2
DA-1P
DA-2P
DA-3P
DA-4P
Approximate Location of Sump
Easement per Doc. No. 2419336
Sanitary Sewer Easement
per Doc. No.

Stage-Area-Storage for Pond WV: West Vault

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
944.00	19,327	0
944.01	19,327	58
944.02	19,327	116
944.03	19,327	174
944.04	19,327	232
944.05	19,327	290
944.06	19,327	348
944.07	19,327	406
944.08	19,327	464
944.09	19,327	522
944.10	19,327	580
944.11	19,327	638
944.12	19,327	696
944.13	19,327	754
944.14	19,327	812
944.15	19,327	870
944.16	19,327	928
944.17	19,327	986
944.18	19,327	1,044
944.19	19,327	1,102
944.20	19,327	1,160
944.21	19,327	1,218
944.22	19,327	1,276
944.23	19,327	1,334
944.24	19,327	1,392
944.25	19,327	1,449
944.26	19,327	1,507
944.27	19,327	1,565
944.28	19,327	1,623
944.29	19,327	1,681
944.30	19,327	1,739
944.31	19,327	1,797
944.32	19,327	1,855
944.33	19,327	1,913
944.34	19,327	1,971
944.35	19,327	2,029
944.36	19,327	2,087
944.37	19,327	2,145
944.38	19,327	2,203
944.39	19,327	2,261
944.40	19,327	2,319
944.41	19,327	2,377
944.42	19,327	2,435
944.43	19,327	2,493
944.44	19,327	2,551
944.45	19,327	2,609
944.46	19,327	2,667
944.47	19,327	2,725
944.48	19,327	2,783
944.49	19,327	2,841
944.50	19,327	2,899
944.51	19,327	2,957
944.52	19,327	3,015
944.53	19,327	3,073
944.54	19,327	3,131
944.55	19,327	3,189
944.56	19,327	3,247
944.57	19,327	3,305
944.58	19,327	3,363
944.59	19,327	3,421
944.60	19,327	3,479
944.61	19,327	3,537
944.62	19,327	3,595
944.63	19,327	3,653
944.64	19,327	3,711
944.65	19,327	3,769
944.66	19,327	3,827
944.67	19,327	3,885
944.68	19,327	3,943
944.69	19,327	4,001
944.70	19,327	4,059
944.71	19,327	4,117
944.72	19,327	4,175
944.73	19,327	4,233
944.74	19,327	4,290
944.75	19,327	4,348
944.76	19,327	4,406
944.77	19,327	4,464
944.78	19,327	4,522
944.79	19,327	4,580
944.80	19,327	4,638
944.81	19,327	4,696
944.82	19,327	4,754
944.83	19,327	4,812
944.84	19,327	4,870
944.85	19,327	4,928
944.86	19,327	4,986
944.87	19,327	5,044
944.88	19,327	5,102
944.89	19,327	5,160
944.90	19,327	5,218
944.91	19,327	5,276
944.92	19,327	5,334
944.93	19,327	5,392
944.94	19,327	5,450
944.95	19,327	5,508
944.96	19,327	5,566
944.97	19,327	5,624
944.98	19,327	5,682
944.99	19,327	5,740
945.00	19,327	5,798
945.01	19,327	5,856
945.02	19,327	5,914
945.03	19,327	5,972

42,711 CF - 15,955 CF = 26,745 CF

Stage-Area-Storage for Pond WV: West Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
945.04	19,327	6,030
945.05	19,327	6,088
945.06	19,327	6,146
945.07	19,327	6,204
945.08	19,327	6,262
945.09	19,327	6,320
945.10	19,327	6,378
945.11	19,327	6,436
945.12	19,327	6,494
945.13	19,327	6,552
945.14	19,327	6,610
945.15	19,327	6,668
945.16	19,327	6,726
945.17	19,327	6,784
945.18	19,327	6,842
945.19	19,327	6,900
945.20	19,327	6,958
945.21	19,327	7,016
945.22	19,327	7,073
945.23	19,327	7,131
945.24	19,327	7,189
945.25	19,327	7,247
945.26	19,327	7,305
945.27	19,327	7,363
945.28	19,327	7,421
945.29	19,327	7,479
945.30	19,327	7,537
945.31	19,327	7,595
945.32	19,327	7,653
945.33	19,327	7,711
945.34	19,327	7,769
945.35	19,327	7,827
945.36	19,327	7,885
945.37	19,327	7,943
945.38	19,327	8,001
945.39	19,327	8,059
945.40	19,327	8,117
945.41	19,327	8,175
945.42	19,327	8,233
945.43	19,327	8,291
945.44	19,327	8,349
945.45	19,327	8,407
945.46	19,327	8,465
945.47	19,327	8,523
945.48	19,327	8,581
945.49	19,327	8,639
945.50	19,327	8,697
945.51	19,327	8,755
945.52	19,327	8,813
945.53	19,327	8,871
945.54	19,327	8,929
945.55	19,327	8,987
945.56	19,327	9,045
945.57	19,327	9,103
945.58	19,327	9,161
945.59	19,327	9,219
945.60	19,327	9,277
945.61	19,327	9,335
945.62	19,327	9,393
945.63	19,327	9,451
945.64	19,327	9,509
945.65	19,327	9,567
945.66	19,327	9,625
945.67	19,327	9,683
945.68	19,327	9,741
945.69	19,327	9,799
945.70	19,327	9,857
945.71	19,327	9,914
945.72	19,327	9,972
945.73	19,327	10,030
945.74	19,327	10,088
945.75	19,327	10,146
945.76	19,327	10,204
945.77	19,327	10,262
945.78	19,327	10,320
945.79	19,327	10,378
945.80	19,327	10,436
945.81	19,327	10,494
945.82	19,327	10,552
945.83	19,327	10,610
945.84	19,327	10,668
945.85	19,327	10,726
945.86	19,327	10,784
945.87	19,327	10,842
945.88	19,327	10,900
945.89	19,327	10,958
945.90	19,327	11,016
945.91	19,327	11,074
945.92	19,327	11,132
945.93	19,327	11,190
945.94	19,327	11,248
945.95	19,327	11,306
945.96	19,327	11,364
945.97	19,327	11,422
945.98	19,327	11,480
945.99	19,327	11,538
946.00	**37,578**	11,596
946.01	37,578	11,670
946.02	37,578	11,745
946.03	37,578	11,821
946.04	37,578	11,900
946.05	37,578	11,984
946.06	37,578	12,064
946.07	37,578	12,145

Stage-Area-Storage for Pond WV: West Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
946.08	37,578	12,226
946.09	37,578	12,309
946.10	37,578	12,391
946.11	37,578	12,474
946.12	37,578	12,557
946.13	37,578	12,641
946.14	37,578	12,726
946.15	37,578	12,810
946.16	37,578	12,895
946.17	37,578	12,981
946.18	37,578	13,067
946.19	37,578	13,153
946.20	37,578	13,239
946.21	37,578	13,326
946.22	37,578	13,413
946.23	37,578	13,501
946.24	37,578	13,588
946.25	37,578	13,676
946.26	37,578	13,764
946.27	37,578	13,853
946.28	37,578	13,942
946.29	37,578	14,031
946.30	37,578	14,120
946.31	37,578	14,210
946.32	37,578	14,300
946.33	37,578	14,390
946.34	37,578	14,480
946.35	37,578	14,571
946.36	37,578	14,662
946.37	37,578	14,753
946.38	37,578	14,844
946.39	37,578	14,935
946.40	37,578	15,027
946.41	37,578	15,119
946.42	37,578	15,211
946.43	37,578	15,304
946.44	37,578	15,396
946.45	37,578	15,489
946.46	37,578	15,582
946.47	37,578	15,675
946.48	37,578	15,768
946.49	37,578	15,862
946.50	37,578	15,955
946.51	37,578	16,050
946.52	37,578	16,147
946.53	37,578	16,246
946.54	37,578	16,346
946.55	37,578	16,455
946.56	37,578	16,559
946.57	37,578	16,663
946.58	37,578	16,768
946.59	37,578	16,875
946.60	37,578	16,982
946.61	37,578	17,090
946.62	37,578	17,199
946.63	37,578	17,308
946.64	37,578	17,418
946.65	37,578	17,529
946.66	37,578	17,640
946.67	37,578	17,752
946.68	37,578	17,864
946.69	37,578	17,977
946.70	37,578	18,091
946.71	37,578	18,205
946.72	37,578	18,319
946.73	37,578	18,434
946.74	37,578	18,550
946.75	37,578	18,666
946.76	37,578	18,783
946.77	37,578	18,900
946.78	37,578	19,017
946.79	37,578	19,135
946.80	37,578	19,254
946.81	37,578	19,372
946.82	37,578	19,492
946.83	37,578	19,612
946.84	37,578	19,732
946.85	37,578	19,852
946.86	37,578	19,973
946.87	37,578	20,095
946.88	37,578	20,216
946.89	37,578	20,338
946.90	37,578	20,461
946.91	37,578	20,584
946.92	37,578	20,707
946.93	37,578	20,831
946.94	37,578	20,955
946.95	37,578	21,079
946.96	37,578	21,204
946.97	37,578	21,329
946.98	37,578	21,454
946.99	37,578	21,580
947.00	37,578	21,706
947.01	37,578	21,832
947.02	37,578	21,959
947.03	37,578	22,085
947.04	37,578	22,213
947.05	37,578	22,340
947.06	37,578	22,468
947.07	37,578	22,596
947.08	37,578	22,725
947.09	37,578	22,854
947.10	37,578	22,983
947.11	37,578	23,112

Stage-Area-Storage for Pond WV: West Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
947.12	37,578	23,242	947.64	37,578	30,293
947.13	37,578	23,371	947.65	37,578	30,434
947.14	37,578	23,502	947.66	37,578	30,574
947.15	37,578	23,632	947.67	37,578	30,715
947.16	37,578	23,763	947.68	37,578	30,856
947.17	37,578	23,894	947.69	37,578	30,997
947.18	37,578	24,025	947.70	37,578	31,138
947.19	37,578	24,156	947.71	37,578	31,279
947.20	37,578	24,288	947.72	37,578	31,420
947.21	37,578	24,420	947.73	37,578	31,562
947.22	37,578	24,552	947.74	37,578	31,704
947.23	37,578	24,685	947.75	37,578	31,845
947.24	37,578	24,817	947.76	37,578	31,987
947.25	37,578	24,950	947.77	37,578	32,129
947.26	37,578	25,083	947.78	37,578	32,271
947.27	37,578	25,217	947.79	37,578	32,414
947.28	37,578	25,351	947.80	37,578	32,556
947.29	37,578	25,484	947.81	37,578	32,698
947.30	37,578	25,618	947.82	37,578	32,841
947.31	37,578	25,753	947.83	37,578	32,984
947.32	37,578	25,887	947.84	37,578	33,126
947.33	37,578	26,022	947.85	37,578	33,269
947.34	37,578	26,157	947.86	37,578	33,412
947.35	37,578	26,292	947.87	37,578	33,556
947.36	37,578	26,428	947.88	37,578	33,699
947.37	37,578	26,563	947.89	37,578	33,842
947.38	37,578	26,699	947.90	37,578	33,986
947.39	37,578	26,835	947.91	37,578	34,129
947.40	37,578	26,971	947.92	37,578	34,273
947.41	37,578	27,107	947.93	37,578	34,416
947.42	37,578	27,244	947.94	37,578	34,560
947.43	37,578	27,381	947.95	37,578	34,704
947.44	37,578	27,518	947.96	37,578	34,848
947.45	37,578	27,655	947.97	37,578	34,992
947.46	37,578	27,792	947.98	37,578	35,136
947.47	37,578	27,930	947.99	37,578	35,281
947.48	37,578	28,067	948.00	37,578	35,425
947.49	37,578	28,205	948.01	37,578	35,569
947.50	37,578	28,343	948.02	37,578	35,714
947.51	37,578	28,482	948.03	37,578	35,858
947.52	37,578	28,620	948.04	37,578	36,003
947.53	37,578	28,759	948.05	37,578	36,148
947.54	37,578	28,897	948.06	37,578	36,292
947.55	37,578	29,036	948.07	37,578	36,437
947.56	37,578	29,175	948.08	37,578	36,582
947.57	37,578	29,314	948.09	37,578	36,727
947.58	37,578	29,454	948.10	37,578	36,872
947.59	37,578	29,593	948.11	37,578	37,017
947.60	37,578	29,733	948.12	37,578	37,163
947.61	37,578	29,873	948.13	37,578	37,308
947.62	37,578	30,013	948.14	37,578	37,453
947.63	37,578	30,153	948.15	37,578	37,598

Stage-Area-Storage for Pond WV: West Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
948.16	37,578	37,744
948.17	37,578	37,889
948.18	37,578	38,035
948.19	37,578	38,180
948.20	37,578	38,326
948.21	37,578	38,472
948.22	37,578	38,618
948.23	37,578	38,763
948.24	37,578	38,909
948.25	37,578	39,055
948.26	37,578	39,201
948.27	37,578	39,347
948.28	37,578	39,493
948.29	37,578	39,639
948.30	37,578	39,785
948.31	37,578	39,931
948.32	37,578	40,077
948.33	37,578	40,223
948.34	37,578	40,369
948.35	37,578	40,516
948.36	37,578	40,662
948.37	37,578	40,808
948.38	37,578	40,954
948.39	37,578	41,101
948.40	37,578	41,247
948.41	37,578	41,393
948.42	37,578	41,540
948.43	37,578	41,686
948.44	37,578	41,833
948.45	37,578	41,979
948.46	37,578	42,125
948.47	37,578	42,272
948.48	37,578	42,418
948.49	37,578	42,565
948.50	37,578	42,711
948.51	37,578	42,858
948.52	37,578	43,004
948.53	37,578	43,150
948.54	37,578	43,297
948.55	37,578	43,443
948.56	37,578	43,590
948.57	37,578	43,736
948.58	37,578	43,883
948.59	37,578	44,029
948.60	37,578	44,175
948.61	37,578	44,322
948.62	37,578	44,468
948.63	37,578	44,615
948.64	37,578	44,761
948.65	37,578	44,907
948.66	37,578	45,054
948.67	37,578	45,200
948.68	37,578	45,346
948.69	37,578	45,493
948.70	37,578	45,639
948.71	37,578	45,785
948.72	37,578	45,931
948.73	37,578	46,077
948.74	37,578	46,224
948.75	37,578	46,370
948.76	37,578	46,516
948.77	37,578	46,662
948.78	37,578	46,808
948.79	37,578	46,954
948.80	37,578	47,100
948.81	37,578	47,245
948.82	37,578	47,391
948.83	37,578	47,537
948.84	37,578	47,683
948.85	37,578	47,828
948.86	37,578	47,974
948.87	37,578	48,120
948.88	37,578	48,265
948.89	37,578	48,411
948.90	37,578	48,556
948.91	37,578	48,702
948.92	37,578	48,847
948.93	37,578	48,992
948.94	37,578	49,137
948.95	37,578	49,282
948.96	37,578	49,428
948.97	37,578	49,573
948.98	37,578	49,717
948.99	37,578	49,862
949.00	37,578	50,007
949.01	37,578	50,152
949.02	37,578	50,297
949.03	37,578	50,441
949.04	37,578	50,586
949.05	37,578	50,730
949.06	37,578	50,874
949.07	37,578	51,019
949.08	37,578	51,163
949.09	37,578	51,307
949.10	37,578	51,451
949.11	37,578	51,595
949.12	37,578	51,739
949.13	37,578	51,882
949.14	37,578	52,026
949.15	37,578	52,170
949.16	37,578	52,313
949.17	37,578	52,456
949.18	37,578	52,600
949.19	37,578	52,743

Stage-Area-Storage for Pond WV: West Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
949.20	37,578	52,886	949.72	37,578	60,135
949.21	37,578	53,029	949.73	37,578	60,270
949.22	37,578	53,172	949.74	37,578	60,404
949.23	37,578	53,314	949.75	37,578	60,538
949.24	37,578	53,457	949.76	37,578	60,673
949.25	37,578	53,599	949.77	37,578	60,806
949.26	37,578	53,742	949.78	37,578	60,940
949.27	37,578	53,884	949.79	37,578	61,074
949.28	37,578	54,026	949.80	37,578	61,207
949.29	37,578	54,168	949.81	37,578	61,340
949.30	37,578	54,310	949.82	37,578	61,472
949.31	37,578	54,452	949.83	37,578	61,605
949.32	37,578	54,594	949.84	37,578	61,737
949.33	37,578	54,735	949.85	37,578	61,869
949.34	37,578	54,877	949.86	37,578	62,001
949.35	37,578	55,018	949.87	37,578	62,132
949.36	37,578	55,159	949.88	37,578	62,264
949.37	37,578	55,300	949.89	37,578	62,395
949.38	37,578	55,441	949.90	37,578	62,525
949.39	37,578	55,582	949.91	37,578	62,656
949.40	37,578	55,722	949.92	37,578	62,786
949.41	37,578	55,863	949.93	37,578	62,916
949.42	37,578	56,003	949.94	37,578	63,046
949.43	37,578	56,143	949.95	37,578	63,175
949.44	37,578	56,283	949.96	37,578	63,304
949.45	37,578	56,423	949.97	37,578	63,433
949.46	37,578	56,563	949.98	37,578	63,561
949.47	37,578	56,702	949.99	37,578	63,690
949.48	37,578	56,842	950.00	37,578	63,817
949.49	37,578	56,981	950.01	37,578	63,945
949.50	37,578	57,120	950.02	37,578	64,072
949.51	37,578	57,259	950.03	37,578	64,199
949.52	37,578	57,398	950.04	37,578	64,326
949.53	37,578	57,536	950.05	37,578	64,452
949.54	37,578	57,675	950.06	37,578	64,578
949.55	37,578	57,813	950.07	37,578	64,704
949.56	37,578	57,951	950.08	37,578	64,829
949.57	37,578	58,089	950.09	37,578	64,954
949.58	37,578	58,227	950.10	37,578	65,079
949.59	37,578	58,364	950.11	37,578	65,203
949.60	37,578	58,501	950.12	37,578	65,327
949.61	37,578	58,639	950.13	37,578	65,451
949.62	37,578	58,776	950.14	37,578	65,574
949.63	37,578	58,912	950.15	37,578	65,697
949.64	37,578	59,049	950.16	37,578	65,820
949.65	37,578	59,185	950.17	37,578	65,942
949.66	37,578	59,322	950.18	37,578	66,063
949.67	37,578	59,458	950.19	37,578	66,185
949.68	37,578	59,593	950.20	37,578	66,306
949.69	37,578	59,729	950.21	37,578	66,426
949.70	37,578	59,865	950.22	37,578	66,546
949.71	37,578	60,000	950.23	37,578	66,666

Stage-Area-Storage for Pond WV: West Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
950.24	37,578	66,785	950.76	37,578	72,168
950.25	37,578	66,904	950.77	37,578	72,259
950.26	37,578	67,022	950.78	37,578	72,350
950.27	37,578	67,140	950.79	37,578	72,440
950.28	37,578	67,258	950.80	37,578	72,530
950.29	37,578	67,375	950.81	37,578	72,620
950.30	37,578	67,491	950.82	37,578	72,709
950.31	37,578	67,607	950.83	37,578	72,798
950.32	37,578	67,723	950.84	37,578	72,886
950.33	37,578	67,838	950.85	37,578	72,974
950.34	37,578	67,952	950.86	37,578	73,061
950.35	37,578	68,066	950.87	37,578	73,149
950.36	37,578	68,179	950.88	37,578	73,235
950.37	37,578	68,292	950.89	37,578	73,321
950.38	37,578	68,404	950.90	37,578	73,406
950.39	37,578	68,516	950.91	37,578	73,491
950.40	37,578	68,626	950.92	37,578	73,575
950.41	37,578	68,737	950.93	37,578	73,658
950.42	37,578	68,846	950.94	37,578	73,741
950.43	37,578	68,955	950.95	37,578	73,823
950.44	37,578	69,063	950.96	37,578	73,904
950.45	37,578	69,170	950.97	37,578	73,984
950.46	37,578	69,276	950.98	37,578	74,061
950.47	37,578	69,381	950.99	37,578	74,137
950.48	37,578	69,484	951.00	37,578	74,217
950.49	37,578	69,585	951.01	37,578	74,258
950.50	37,578	69,689	951.02	37,578	74,298
950.51	37,578	69,788	951.03	37,578	74,339
950.52	37,578	69,886	951.04	37,578	74,379
950.53	37,578	69,984	951.05	37,578	74,420
950.54	37,578	70,082	951.06	37,578	74,460
950.55	37,578	70,180	951.07	37,578	74,501
950.56	37,578	70,277	951.08	37,578	74,541
950.57	37,578	70,375	951.09	37,578	74,582
950.58	37,578	70,471	951.10	37,578	74,622
950.59	37,578	70,568	951.11	37,578	74,663
950.60	37,578	70,665	951.12	37,578	74,703
950.61	37,578	70,761	951.13	37,578	74,744
950.62	37,578	70,857	951.14	37,578	74,785
950.63	37,578	70,952	951.15	37,578	74,825
950.64	37,578	71,047	951.16	37,578	74,866
950.65	37,578	71,142	951.17	37,578	74,906
950.66	37,578	71,237	951.18	37,578	74,947
950.67	37,578	71,332	951.19	37,578	74,987
950.68	37,578	71,426	951.20	37,578	75,028
950.69	37,578	71,520	951.21	37,578	75,068
950.70	37,578	71,613	951.22	37,578	75,109
950.71	37,578	71,706	951.23	37,578	75,149
950.72	37,578	71,799	951.24	37,578	75,190
950.73	37,578	71,892	951.25	37,578	75,230
950.74	37,578	71,984	951.26	37,578	75,271
950.75	37,578	72,076	951.27	37,578	75,312

Stage-Area-Storage for Pond WV: West Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
951.28	37,578	75,352
951.29	37,578	75,393
951.30	37,578	75,433
951.31	37,578	75,474
951.32	37,578	75,514
951.33	37,578	75,555
951.34	37,578	75,595
951.35	37,578	75,636
951.36	37,578	75,676
951.37	37,578	75,717
951.38	37,578	75,758
951.39	37,578	75,798
951.40	37,578	75,839
951.41	37,578	75,879
951.42	37,578	75,920
951.43	37,578	75,960
951.44	37,578	76,001
951.45	37,578	76,041
951.46	37,578	76,082
951.47	37,578	76,122
951.48	37,578	76,163
951.49	37,578	76,203
951.50	37,578	**76,244**

Stage-Area-Storage for Pond EV: East Vault

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
944.00	9,191	0
944.01	9,191	13
944.02	9,191	26
944.03	9,191	39
944.04	9,191	52
944.05	9,191	65
944.06	9,191	78
944.07	9,191	91
944.08	9,191	104
944.09	9,191	117
944.10	9,191	130
944.11	9,191	144
944.12	9,191	157
944.13	9,191	170
944.14	9,191	183
944.15	9,191	196
944.16	9,191	209
944.17	9,191	222
944.18	9,191	235
944.19	9,191	248
944.20	9,191	261
944.21	9,191	274
944.22	9,191	287
944.23	9,191	300
944.24	9,191	313
944.25	9,191	326
944.26	9,191	339
944.27	9,191	352
944.28	9,191	365
944.29	9,191	378
944.30	9,191	391
944.31	9,191	404
944.32	9,191	417
944.33	9,191	431
944.34	9,191	444
944.35	9,191	457
944.36	9,191	470
944.37	9,191	483
944.38	9,191	496
944.39	9,191	509
944.40	9,191	522
944.41	9,191	535
944.42	9,191	548
944.43	9,191	561
944.44	9,191	574
944.45	9,191	587
944.46	9,191	600
944.47	9,191	613
944.48	9,191	626
944.49	9,191	639
944.50	9,191	652
944.51	9,191	665
944.52	9,191	678
944.53	9,191	691
944.54	9,191	705
944.55	9,191	718
944.56	9,191	731
944.57	9,191	744
944.58	9,191	757
944.59	9,191	770
944.60	9,191	783
944.61	9,191	796
944.62	9,191	809
944.63	9,191	822
944.64	9,191	835
944.65	9,191	848
944.66	9,191	861
944.67	9,191	874
944.68	9,191	887
944.69	9,191	900
944.70	9,191	913
944.71	9,191	926
944.72	9,191	939
944.73	9,191	952
944.74	9,191	965
944.75	9,191	979
944.76	9,191	992
944.77	9,191	1,005
944.78	9,191	1,018
944.79	9,191	1,031
944.80	9,191	1,044
944.81	9,191	1,057
944.82	9,191	1,070
944.83	9,191	1,083
944.84	9,191	1,096
944.85	9,191	1,109
944.86	9,191	1,122
944.87	9,191	1,135
944.88	9,191	1,148
944.89	9,191	1,161
944.90	9,191	1,174
944.91	9,191	1,187
944.92	9,191	1,200
944.93	9,191	1,213
944.94	9,191	1,226
944.95	9,191	1,239
944.96	9,191	1,252
944.97	9,191	1,266
944.98	9,191	1,279
944.99	9,191	1,292
945.00	9,191	1,305
945.01	9,191	1,318
945.02	9,191	1,331
945.03	9,191	1,344

17,567 CF - 4,456 CF = 13,111 CF

Stage-Area-Storage for Pond EV: East Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
945.04	9,191	1,357
945.05	9,191	1,370
945.06	9,191	1,383
945.07	9,191	1,396
945.08	9,191	1,409
945.09	9,191	1,422
945.10	9,191	1,435
945.11	9,191	1,448
945.12	9,191	1,461
945.13	9,191	1,474
945.14	9,191	1,487
945.15	9,191	1,500
945.16	9,191	1,513
945.17	9,191	1,526
945.18	9,191	1,540
945.19	9,191	1,553
945.20	9,191	1,566
945.21	9,191	1,579
945.22	9,191	1,592
945.23	9,191	1,605
945.24	9,191	1,618
945.25	9,191	1,631
945.26	9,191	1,644
945.27	9,191	1,657
945.28	9,191	1,670
945.29	9,191	1,683
945.30	9,191	1,696
945.31	9,191	1,709
945.32	9,191	1,722
945.33	9,191	1,735
945.34	9,191	1,748
945.35	9,191	1,761
945.36	9,191	1,774
945.37	9,191	1,787
945.38	9,191	1,800
945.39	9,191	1,813
945.40	9,191	1,827
945.41	9,191	1,840
945.42	9,191	1,853
945.43	9,191	1,866
945.44	9,191	1,879
945.45	9,191	1,892
945.46	9,191	1,905
945.47	9,191	1,918
945.48	9,191	1,931
945.49	9,191	1,944
945.50	9,191	1,957
945.51	9,191	1,970
945.52	9,191	1,983
945.53	9,191	1,996
945.54	9,191	2,009
945.55	9,191	2,022
945.56	9,191	2,035
945.57	9,191	2,048
945.58	9,191	2,061
945.59	9,191	2,074
945.60	9,191	2,087
945.61	9,191	2,101
945.62	9,191	2,114
945.63	9,191	2,127
945.64	9,191	2,140
945.65	9,191	2,153
945.66	9,191	2,166
945.67	9,191	2,179
945.68	9,191	2,192
945.69	9,191	2,205
945.70	9,191	2,218
945.71	9,191	2,231
945.72	9,191	2,244
945.73	9,191	2,257
945.74	9,191	2,270
945.75	9,191	2,283
945.76	9,191	2,296
945.77	9,191	2,309
945.78	9,191	2,322
945.79	9,191	2,335
945.80	9,191	2,348
945.81	9,191	2,361
945.82	9,191	2,375
945.83	9,191	2,388
945.84	9,191	2,401
945.85	9,191	2,414
945.86	9,191	2,427
945.87	9,191	2,440
945.88	9,191	2,453
945.89	9,191	2,466
945.90	9,191	2,479
945.91	9,191	2,492
945.92	9,191	2,505
945.93	9,191	2,518
945.94	9,191	2,531
945.95	9,191	2,544
945.96	9,191	2,557
945.97	9,191	2,570
945.98	9,191	2,583
945.99	9,191	2,596
946.00	**18,423**	2,609
946.01	18,423	2,646
946.02	18,423	2,683
946.03	18,423	2,720
946.04	18,423	2,757
946.05	18,423	2,794
946.06	18,423	2,831
946.07	18,423	2,868

Stage-Area-Storage for Pond EV: East Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
946.08	18,423	2,905
946.09	18,423	2,942
946.10	18,423	2,979
946.11	18,423	3,016
946.12	18,423	3,052
946.13	18,423	3,089
946.14	18,423	3,126
946.15	18,423	3,163
946.16	18,423	3,200
946.17	18,423	3,237
946.18	18,423	3,274
946.19	18,423	3,311
946.20	18,423	3,348
946.21	18,423	3,385
946.22	18,423	3,422
946.23	18,423	3,459
946.24	18,423	3,496
946.25	18,423	3,532
946.26	18,423	3,569
946.27	18,423	3,606
946.28	18,423	3,643
946.29	18,423	3,680
946.30	18,423	3,717
946.31	18,423	3,754
946.32	18,423	3,791
946.33	18,423	3,828
946.34	18,423	3,865
946.35	18,423	3,902
946.36	18,423	3,939
946.37	18,423	3,976
946.38	18,423	4,012
946.39	18,423	4,049
946.40	18,423	4,086
946.41	18,423	4,123
946.42	18,423	4,160
946.43	18,423	4,197
946.44	18,423	4,234
946.45	18,423	4,271
946.46	18,423	4,308
946.47	18,423	4,345
946.48	18,423	4,382
946.49	18,423	4,419
946.50	18,423	4,456
946.51	18,423	4,493
946.52	18,423	4,533
946.53	18,423	4,574
946.54	18,423	4,617
946.55	18,423	4,667
946.56	18,423	4,712
946.57	18,423	4,758
946.58	18,423	4,804
946.59	18,423	4,852
946.60	18,423	4,899
946.61	18,423	4,948
946.62	18,423	4,996
946.63	18,423	5,046
946.64	18,423	5,096
946.65	18,423	5,146
946.66	18,423	5,196
946.67	18,423	5,248
946.68	18,423	5,299
946.69	18,423	5,351
946.70	18,423	5,403
946.71	18,423	5,456
946.72	18,423	5,509
946.73	18,423	5,562
946.74	18,423	5,616
946.75	18,423	5,670
946.76	18,423	5,725
946.77	18,423	5,779
946.78	18,423	5,834
946.79	18,423	5,890
946.80	18,423	5,945
946.81	18,423	6,001
946.82	18,423	6,057
946.83	18,423	6,114
946.84	18,423	6,170
946.85	18,423	6,227
946.86	18,423	6,285
946.87	18,423	6,342
946.88	18,423	6,400
946.89	18,423	6,458
946.90	18,423	6,516
946.91	18,423	6,575
946.92	18,423	6,634
946.93	18,423	6,693
946.94	18,423	6,752
946.95	18,423	6,811
946.96	18,423	6,871
946.97	18,423	6,931
946.98	18,423	6,991
946.99	18,423	7,051
947.00	18,423	7,112
947.01	18,423	7,173
947.02	18,423	7,233
947.03	18,423	7,295
947.04	18,423	7,356
947.05	18,423	7,418
947.06	18,423	7,479
947.07	18,423	7,541
947.08	18,423	7,603
947.09	18,423	7,666
947.10	18,423	7,728
947.11	18,423	7,791

Stage-Area-Storage for Pond EV: East Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
947.12	18,423	7,854	947.64	18,423	11,321
947.13	18,423	7,917	947.65	18,423	11,391
947.14	18,423	7,980	947.66	18,423	11,461
947.15	18,423	8,043	947.67	18,423	11,531
947.16	18,423	8,107	947.68	18,423	11,601
947.17	18,423	8,170	947.69	18,423	11,671
947.18	18,423	8,234	947.70	18,423	11,741
947.19	18,423	8,298	947.71	18,423	11,812
947.20	18,423	8,363	947.72	18,423	11,882
947.21	18,423	8,427	947.73	18,423	11,953
947.22	18,423	8,491	947.74	18,423	12,023
947.23	18,423	8,556	947.75	18,423	12,094
947.24	18,423	8,621	947.76	18,423	12,165
947.25	18,423	8,686	947.77	18,423	12,236
947.26	18,423	8,751	947.78	18,423	12,307
947.27	18,423	8,816	947.79	18,423	12,378
947.28	18,423	8,882	947.80	18,423	12,449
947.29	18,423	8,947	947.81	18,423	12,520
947.30	18,423	9,013	947.82	18,423	12,591
947.31	18,423	9,079	947.83	18,423	12,662
947.32	18,423	9,145	947.84	18,423	12,734
947.33	18,423	9,211	947.85	18,423	12,805
947.34	18,423	9,277	947.86	18,423	12,877
947.35	18,423	9,344	947.87	18,423	12,948
947.36	18,423	9,410	947.88	18,423	13,020
947.37	18,423	9,477	947.89	18,423	13,092
947.38	18,423	9,544	947.90	18,423	13,164
947.39	18,423	9,611	947.91	18,423	13,236
947.40	18,423	9,678	947.92	18,423	13,308
947.41	18,423	9,745	947.93	18,423	13,380
947.42	18,423	9,812	947.94	18,423	13,452
947.43	18,423	9,879	947.95	18,423	13,524
947.44	18,423	9,947	947.96	18,423	13,596
947.45	18,423	10,015	947.97	18,423	13,668
947.46	18,423	10,082	947.98	18,423	13,741
947.47	18,423	10,150	947.99	18,423	13,813
947.48	18,423	10,218	948.00	18,423	13,886
947.49	18,423	10,286	948.01	18,423	13,958
947.50	18,423	10,355	948.02	18,423	14,031
947.51	18,423	10,423	948.03	18,423	14,103
947.52	18,423	10,492	948.04	18,423	14,176
947.53	18,423	10,560	948.05	18,423	14,249
947.54	18,423	10,629	948.06	18,423	14,322
947.55	18,423	10,698	948.07	18,423	14,395
947.56	18,423	10,766	948.08	18,423	14,467
947.57	18,423	10,835	948.09	18,423	14,540
947.58	18,423	10,905	948.10	18,423	14,613
947.59	18,423	10,974	948.11	18,423	14,686
947.60	18,423	11,043	948.12	18,423	14,760
947.61	18,423	11,113	948.13	18,423	14,833
947.62	18,423	11,182	948.14	18,423	14,906
947.63	18,423	11,252	948.15	18,423	14,979

Stage-Area-Storage for Pond EV: East Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
948.16	18,423	15,053
948.17	18,423	15,126
948.18	18,423	15,199
948.19	18,423	15,273
948.20	18,423	15,346
948.21	18,423	15,420
948.22	18,423	15,493
948.23	18,423	15,567
948.24	18,423	15,641
948.25	18,423	15,714
948.26	18,423	15,788
948.27	18,423	15,862
948.28	18,423	15,936
948.29	18,423	16,010
948.30	18,423	16,083
948.31	18,423	16,157
948.32	18,423	16,231
948.33	18,423	16,305
948.34	18,423	16,379
948.35	18,423	16,453
948.36	18,423	16,527
948.37	18,423	16,601
948.38	18,423	16,676
948.39	18,423	16,750
948.40	18,423	16,824
948.41	18,423	16,898
948.42	18,423	16,972
948.43	18,423	17,047
948.44	18,423	17,121
948.45	18,423	17,195
948.46	18,423	17,270
948.47	18,423	17,344
948.48	18,423	17,418
948.49	18,423	17,493
948.50	18,423	17,567
948.51	18,423	17,642
948.52	18,423	17,716
948.53	18,423	17,790
948.54	18,423	17,865
948.55	18,423	17,939
948.56	18,423	18,014
948.57	18,423	18,088
948.58	18,423	18,163
948.59	18,423	18,238
948.60	18,423	18,312
948.61	18,423	18,387
948.62	18,423	18,461
948.63	18,423	18,536
948.64	18,423	18,611
948.65	18,423	18,685
948.66	18,423	18,760
948.67	18,423	18,834
948.68	18,423	18,909
948.69	18,423	18,984
948.70	18,423	19,058
948.71	18,423	19,133
948.72	18,423	19,208
948.73	18,423	19,282
948.74	18,423	19,357
948.75	18,423	19,432
948.76	18,423	19,506
948.77	18,423	19,581
948.78	18,423	19,656
948.79	18,423	19,730
948.80	18,423	19,805
948.81	18,423	19,880
948.82	18,423	19,954
948.83	18,423	20,029
948.84	18,423	20,103
948.85	18,423	20,178
948.86	18,423	20,253
948.87	18,423	20,327
948.88	18,423	20,402
948.89	18,423	20,476
948.90	18,423	20,551
948.91	18,423	20,626
948.92	18,423	20,700
948.93	18,423	20,775
948.94	18,423	20,849
948.95	18,423	20,924
948.96	18,423	20,998
948.97	18,423	21,073
948.98	18,423	21,147
948.99	18,423	21,222
949.00	18,423	21,296
949.01	18,423	21,371
949.02	18,423	21,445
949.03	18,423	21,519
949.04	18,423	21,594
949.05	18,423	21,668
949.06	18,423	21,742
949.07	18,423	21,817
949.08	18,423	21,891
949.09	18,423	21,965
949.10	18,423	22,039
949.11	18,423	22,113
949.12	18,423	22,188
949.13	18,423	22,262
949.14	18,423	22,336
949.15	18,423	22,410
949.16	18,423	22,484
949.17	18,423	22,558
949.18	18,423	22,632
949.19	18,423	22,706

Stage-Area-Storage for Pond EV: East Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
949.20	18,423	22,780	949.72	18,423	26,557
949.21	18,423	22,854	949.73	18,423	26,628
949.22	18,423	22,928	949.74	18,423	26,698
949.23	18,423	23,001	949.75	18,423	26,769
949.24	18,423	23,075	949.76	18,423	26,840
949.25	18,423	23,149	949.77	18,423	26,910
949.26	18,423	23,223	949.78	18,423	26,981
949.27	18,423	23,296	949.79	18,423	27,051
949.28	18,423	23,370	949.80	18,423	27,122
949.29	18,423	23,443	949.81	18,423	27,192
949.30	18,423	23,517	949.82	18,423	27,262
949.31	18,423	23,590	949.83	18,423	27,332
949.32	18,423	23,664	949.84	18,423	27,402
949.33	18,423	23,737	949.85	18,423	27,472
949.34	18,423	23,811	949.86	18,423	27,542
949.35	18,423	23,884	949.87	18,423	27,612
949.36	18,423	23,957	949.88	18,423	27,681
949.37	18,423	24,030	949.89	18,423	27,751
949.38	18,423	24,104	949.90	18,423	27,820
949.39	18,423	24,177	949.91	18,423	27,889
949.40	18,423	24,250	949.92	18,423	27,959
949.41	18,423	24,323	949.93	18,423	28,028
949.42	18,423	24,396	949.94	18,423	28,097
949.43	18,423	24,469	949.95	18,423	28,166
949.44	18,423	24,542	949.96	18,423	28,234
949.45	18,423	24,614	949.97	18,423	28,303
949.46	18,423	24,687	949.98	18,423	28,372
949.47	18,423	24,760	949.99	18,423	28,440
949.48	18,423	24,832	950.00	18,423	28,508
949.49	18,423	24,905	950.01	18,423	28,577
949.50	18,423	24,978	950.02	18,423	28,645
949.51	18,423	25,050	950.03	18,423	28,713
949.52	18,423	25,122	950.04	18,423	28,781
949.53	18,423	25,195	950.05	18,423	28,849
949.54	18,423	25,267	950.06	18,423	28,916
949.55	18,423	25,339	950.07	18,423	28,984
949.56	18,423	25,411	950.08	18,423	29,051
949.57	18,423	25,484	950.09	18,423	29,118
949.58	18,423	25,556	950.10	18,423	29,186
949.59	18,423	25,628	950.11	18,423	29,253
949.60	18,423	25,699	950.12	18,423	29,320
949.61	18,423	25,771	950.13	18,423	29,386
949.62	18,423	25,843	950.14	18,423	29,453
949.63	18,423	25,915	950.15	18,423	29,520
949.64	18,423	25,986	950.16	18,423	29,586
949.65	18,423	26,058	950.17	18,423	29,652
949.66	18,423	26,129	950.18	18,423	29,718
949.67	18,423	26,201	950.19	18,423	29,784
949.68	18,423	26,272	950.20	18,423	29,850
949.69	18,423	26,343	950.21	18,423	29,916
949.70	18,423	26,415	950.22	18,423	29,981
949.71	18,423	26,486	950.23	18,423	30,047

Stage-Area-Storage for Pond EV: East Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
950.24	18,423	30,112	950.76	18,423	33,247
950.25	18,423	30,177	950.77	18,423	33,301
950.26	18,423	30,242	950.78	18,423	33,354
950.27	18,423	30,307	950.79	18,423	33,407
950.28	18,423	30,372	950.80	18,423	33,460
950.29	18,423	30,436	950.81	18,423	33,512
950.30	18,423	30,501	950.82	18,423	33,564
950.31	18,423	30,565	950.83	18,423	33,616
950.32	18,423	30,629	950.84	18,423	33,667
950.33	18,423	30,693	950.85	18,423	33,717
950.34	18,423	30,756	950.86	18,423	33,767
950.35	18,423	30,820	950.87	18,423	33,817
950.36	18,423	30,883	950.88	18,423	33,867
950.37	18,423	30,947	950.89	18,423	33,915
950.38	18,423	31,010	950.90	18,423	33,964
950.39	18,423	31,072	950.91	18,423	34,011
950.40	18,423	31,135	950.92	18,423	34,059
950.41	18,423	31,198	950.93	18,423	34,105
950.42	18,423	31,260	950.94	18,423	34,151
950.43	18,423	31,322	950.95	18,423	34,196
950.44	18,423	31,384	950.96	18,423	34,241
950.45	18,423	31,446	950.97	18,423	34,284
950.46	18,423	31,507	950.98	18,423	34,325
950.47	18,423	31,569	950.99	18,423	34,364
950.48	18,423	31,630	951.00	18,423	34,408
950.49	18,423	31,691	951.01	18,423	34,445
950.50	18,423	31,751	951.02	18,423	34,481
950.51	18,423	31,812	951.03	18,423	34,518
950.52	18,423	31,872	951.04	18,423	34,555
950.53	18,423	31,932	951.05	18,423	34,592
950.54	18,423	31,992	951.06	18,423	34,629
950.55	18,423	32,052	951.07	18,423	34,666
950.56	18,423	32,111	951.08	18,423	34,703
950.57	18,423	32,171	951.09	18,423	34,740
950.58	18,423	32,230	951.10	18,423	34,777
950.59	18,423	32,288	951.11	18,423	34,814
950.60	18,423	32,347	951.12	18,423	34,851
950.61	18,423	32,405	951.13	18,423	34,888
950.62	18,423	32,463	951.14	18,423	34,925
950.63	18,423	32,521	951.15	18,423	34,961
950.64	18,423	32,578	951.16	18,423	34,998
950.65	18,423	32,636	951.17	18,423	35,035
950.66	18,423	32,693	951.18	18,423	35,072
950.67	18,423	32,749	951.19	18,423	35,109
950.68	18,423	32,806	951.20	18,423	35,146
950.69	18,423	32,862	951.21	18,423	35,183
950.70	18,423	32,918	951.22	18,423	35,220
950.71	18,423	32,974	951.23	18,423	35,257
950.72	18,423	33,029	951.24	18,423	35,294
950.73	18,423	33,084	951.25	18,423	35,331
950.74	18,423	33,139	951.26	18,423	35,368
950.75	18,423	33,193	951.27	18,423	35,405

Stage-Area-Storage for Pond EV: East Vault (continued)

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
951.28	18,423	35,442
951.29	18,423	35,478
951.30	18,423	35,515
951.31	18,423	35,552
951.32	18,423	35,589
951.33	18,423	35,626
951.34	18,423	35,663
951.35	18,423	35,700
951.36	18,423	35,737
951.37	18,423	35,774
951.38	18,423	35,811
951.39	18,423	35,848
951.40	18,423	35,885
951.41	18,423	35,922
951.42	18,423	35,958
951.43	18,423	35,995
951.44	18,423	36,032
951.45	18,423	36,069
951.46	18,423	36,106
951.47	18,423	36,143
951.48	18,423	36,180
951.49	18,423	36,217
951.50	18,423	**36,254**

Project Information

Calculator Version:	Version 4: July 2020
Project Name:	Hillcrest Minnetonka
User Name / Company Name:	
Date:	
Project Description:	
Construction Permit?:	No

Site Information

Retention Requirement (inches):	1.1
Site's Zip Code:	55391
Annual Rainfall (inches):	29.9
Phosphorus EMC (mg/l):	0.3
TSS EMC (mg/l):	54.5

Total Site Area

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				2.61	2.61
				Impervious Area (acres)	4.369
				Total Area (acres)	6.979

Site Areas Routed to BMPs

Land Cover	A Soils (acres)	B Soils (acres)	C Soils (acres)	D Soils (acres)	Total (acres)
Forest/Open Space - Undisturbed, protected forest/open space or reforested land					0
Managed Turf - disturbed, graded for yards or other turf to be mowed/managed				2.311	2.311
				Impervious Area (acres)	4.32715
				Total Area (acres)	6.63815

Summary Information

Performance Goal Requirement

Performance goal volume retention requirement:	17445	ft3
Volume removed by BMPs towards performance goal:	581	ft^3
Percent volume removed towards performance goal	**3**	**%**

Annual Volume and Pollutant Load Reductions

Post development annual runoff volume	10.7708	acre-ft
Annual runoff volume removed by BMPs:	0.2053	acre-ft
Percent annual runoff volume removed:	**2**	**%**
Post development annual particulate P load:	4.834	lbs
Annual particulate P removed by BMPs:	3.636	lbs
Post development annual dissolved P load:	3.955	lbs
Annual dissolved P removed by BMPs:	1.654	lbs
Total P removed by BMPs	5.29	lbs
Percent annual total phosphorus removed:	**60**	**%**
Post development annual TSS load:	1596.7	lbs
Annual TSS removed by BMPs:	1459.9	lbs
Percent annual TSS removed:	**91**	**%**

BMP Summary

Performance Goal Summary

BMP Name	BMP Volume Capacity (ft3)	Volume Recieved (ft3)	Volume Retained (ft3)	Volume Outflow (ft3)	Percent Retained (%)
1 - Stormwater disconnection (Impervious	581	1382	581	801	42
1 - Sand filter	0	10094	0	10094	0
2 - Sand filter	0	5802	0	5802	0
1 - Other (User Defined Reductions)	0	10094	0	10094	0
2 - Other (User Defined Reductions)	0	5802	0	5802	0

Annual Volume Summary

BMP Name	Volume From Direct Watershed (acre-ft)	Volume From Upstream BMPs (acre-ft)	Volume Retained (acre-ft)	Volume outflow (acre-ft)	Percent Retained (%)
1 - Stormwater disconnection (Impervious	1.7387	0	0.2053	1.5334	12
1 - Sand filter	5.5364	0	0	5.5364	0
2 - Sand filter	3.239	0	0	3.239	0
1 - Other (User Defined Reductions)	0	5.5364	0	5.5364	0
2 - Other (User Defined Reductions)	0	3.239	0	3.239	0

Particulate Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Stormwater disconnection (Impervious	0.7803	0	0.0921	0.6882	12
1 - Sand filter	2.4847	0	1.2424	1.2423	50
2 - Sand filter	1.4536	0	0.7268	0.7268	50
1 - Other (User Defined Reductions)	0	1.2423	0.9938	0.2485	80
2 - Other (User Defined Reductions)	0	0.7268	0.5814	0.1454	80

Dissolved Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Stormwater disconnection (Impervious	0.6385	0	0.0754	0.5631	12
1 - Sand filter	2.033	0	0.8132	1.2198	40
2 - Sand filter	1.1893	0	0.4757	0.7136	40
1 - Other (User Defined Reductions)	0	1.2198	0.183	1.0368	15
2 - Other (User Defined Reductions)	0	0.7136	0.107	0.6066	15

Total Phosphorus Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Stormwater disconnection (Impervious	1.4188	0	0.1675	1.2513	12
1 - Sand filter	4.5177	0	2.0556	2.4621	45
2 - Sand filter	2.6429	0	1.2025	1.4404	45
1 - Other (User Defined Reductions)	0	2.4621	1.1768	1.2853	48
2 - Other (User Defined Reductions)	0	1.4404	0.6884	0.752	48

TSS Summary

BMP Name	Load From Direct Watershed (lbs)	Load From Upstream BMPs (lbs)	Load Retained (lbs)	Outflow Load (lbs)	Percent Retained (%)
1 - Stormwater disconnection (Impervious	257.75	0	185.01	72.74	72
1 - Sand filter	820.72	0	738.65	82.070000000	90
2 - Sand filter	480.14	0	432.13	48.01	90
1 - Other (User Defined Reductions)	0	82.070000000	65.66	16.410000000	80
2 - Other (User Defined Reductions)	0	48.01	38.41	9.5999999999	80

BMP Schematic