Attachment 2

Scenario C WaterCAD Output

Scenario: Base

Analysis Results
Scenario: Base
Steady State Analysis

Title: CWM: RMU-2 Leachate System Evaluation
Project Engineer: ARCADIS
Project Date: 05/02/13
Comments: RMU-2 landfill cell primary pumps through SLF 12 lift station. Landfill cells modeled as constant-head reservoirs.

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Liquid Characteristics			
Liquid	Water at 20C(68F)	Specific Gravity	1.00
Kinematic Viscosity	1.0804e-5 ft²/s		

Network Inventory			
Pressure Pipes	77	Number of Tanks	1
Number of Reservoirs	16	- Constant Area:	1
Number of Pressure Junctions	45	- Variable Area:	0
Number of Pumps	16	Number of Valves	0
- Constant Power:	0	- FCV's:	0
- One Point (Design Point):	0	- PBV's:	0
- Standard (3 Point):	16	- PRV's:	0
- Standard Extended:	0	- PSV's:	0
- Custom Extended:	0	- TCV's:	0
- Multiple Point:	0	- GPV's:	0
Number of Spot Elevations	0		

Pressure Pipes Inventory			
1.92 in	100.00 ft	3.63 in	110.00 ft
2.00 in	451.00 ft	5.35 in	7,433.40 ft
2.83 in	803.00 ft	6.00 in	11.00 ft
3.00 in	1,311.00 ft	6.96 in	270.00 ft
Total Length	10,489.40 ft		

Analysis Results

Scenario: Base

Steady State Analysis

Pressure Pipes @ 0.00 hr

Label	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
2" HDPE-1	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
2" HDPE-2	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
2" HDPE-3	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
2" HDPE-4	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
2" HDPE-5	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
3" HDPE-10	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
3" HDPE-13	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
3" HDPE-14	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
3" HDPE-15	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00
3" HDPE-16	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00
3" HDPE-17	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
3" HDPE-18	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
3" HDPE-19	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
3" HDPE-6	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
3" HDPE-7	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
3" HDPE - 20	Open	198.84	10.14	336.79	319.78	2.50	14.51	17.01	708.73
Flex-1	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
Flex-2	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
Flex-3	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
Flex-4	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
Flex-5	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
Flex-6	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
Flex-7	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
Flex-10	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
Flex-13	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
Flex-14	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
Flex-15	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00
Flex-16	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00
Flex-17	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
Flex-18	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
Flex-19	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
Flex-20	Open	198.84	9.03	356.49	336.79	19.59	0.10	19.69	127.05
P-21	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
P-22	Open	198.84	2.84	312.89	311.64	0.97	0.28	1.25	6.04
P-25	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
P-27	Open	-0.00	0.00	312.89	312.89	-0.00	0.00	0.00	0.00
P-29	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
P-31	Open	-0.00	0.00	312.89	312.89	-0.00	0.00	0.00	0.00
P-33	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
P-35	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00
P-50	Open	0.00	0.00	310.00	310.00	0.00	0.00	0.00	0.00
P-52	Open	0.00	0.00	312.00	312.00	0.00	0.00	0.00	0.00
P-53	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00
P-54	Open	0.00	0.00	313.20	313.20	0.00	0.00	0.00	0.00
P-55	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00
P-56	Open	0.00	0.00	314.50	314.50	0.00	0.00	0.00	0.00
P-59	Open	0.00	0.00	313.00	313.00	0.00	0.00	0.00	0.00
P-60	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
P-63	Open	0.00	0.00	315.50	315.50	0.00	0.00	0.00	0.00
P-65	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Analysis Results
Scenario: Base
Steady State Analysis

Pressure Pipes @ 0.00 hr

Label	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
P-68	Open	0.00	0.00	312.41	312.41	0.00	0.00	0.00	0.00
P-73	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
P-76	Open	0.00	0.00	312.16	312.16	0.00	0.00	0.00	0.00
P-77	Open	0.00	0.00	306.80	306.80	0.00	0.00	0.00	0.00
P-80	Open	0.00	0.00	305.30	305.30	0.00	0.00	0.00	0.00
P-108	Open	198.84	2.84	308.56	308.17	0.22	0.17	0.39	8.21
P-115	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
P-116	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00
P-117	Open	198.84	2.26	313.30	313.30	0.00	0.00	0.00	2.87
P-126	Open	198.84	1.68	302.95	302.50	0.35	0.09	0.45	1.65
P-129	Open	0.00	0.00	309.60	309.60	0.00	0.00	0.00	0.00
P-132	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
P-136	Open	0.00	0.00	309.10	309.10	0.00	0.00	0.00	0.00
P-139	Open	0.00	0.00	310.50	310.50	0.00	0.00	0.00	0.00
P-141	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00
P-142	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00
P-143	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00
P-144	Open	198.84	6.16	319.78	312.89	3.42	3.47	6.89	62.63
P-147	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
P-148	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
P-149	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
P-150	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00
P-151	Open	198.84	2.84	308.17	305.97	2.13	0.07	2.20	4.85
P-152	Open	198.84	2.84	310.04	308.56	1.46	0.03	1.48	4.78
P-154	Open	198.84	2.84	311.64	310.04	1.46	0.14	1.60	5.16
P-160	Open	198.84	2.84	305.97	302.95	2.96	0.06	3.02	4.80
P-161	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Pressure Junctions @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
Bottom Wall	302.95	-6.41	-14.81	0.00
J-29	308.56	-11.44	-26.44	0.00
J-30	308.56	-11.44	-26.44	0.00
J-31	308.56	-11.44	-26.44	0.00
J-32	308.56	-11.44	-26.44	0.00
J-33	308.56	-11.44	-26.44	0.00
J-34	312.89	-9.56	-22.11	0.00
J-35	312.89	-9.56	-22.11	0.00
J-36	312.89	-9.56	-22.11	0.00
J-38	312.89	-9.56	-22.11	0.00
J-41	312.89	-9.56	-22.11	0.00
J-43	312.89	-9.56	-22.11	0.00
J-50	312.89	-9.56	-22.11	0.00
J-52	305.97	-19.05	-44.03	0.00
J-53	305.97	-19.05	-44.03	0.00
J-68	336.79	-5.71	-13.21	0.00
J-70	302.95	-20.36	-47.05	0.00
J-76	302.95	-20.36	-47.05	0.00

Analysis Results
Scenario: Base
Steady State Analysis

Pressure Junctions @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
J-77	302.95	-20.36	-47.05	0.00
L-55	308.56	-8.41	-19.44	0.00
L-56	312.89	-5.67	-13.11	0.00
L-57	308.56	-8.41	-19.44	0.00
L-58	312.89	-6.54	-15.11	0.00
MH-1	308.56	-7.57	-17.49	0.00
MH-10	312.89	-7.37	-17.05	0.00
MH-11	311.64	-6.30	-14.56	0.00
MH-12	310.04	-6.04	-13.96	0.00
MH-16	305.97	-17.32	-40.03	0.00
NEW MH- 17	302.95	-18.63	-43.05	0.00
NEW MH-13	308.17	-4.09	-9.45	0.00
NEW MH-14	305.97	-3.91	-9.03	0.00
New MH-15	302.95	-3.70	-8.55	0.00
New MH-18	302.95	-5.21	-12.05	0.00
Vault-5	308.56	-8.41	-19.44	0.00
Vault-6	312.89	-6.54	-15.11	0.00
Vault-7	308.56	-8.41	-19.44	0.00
Vault-10	312.89	-6.54	-15.11	0.00
Vault-14	312.89	-6.54	-15.11	0.00
Vault 13	312.89	-6.54	-15.11	0.00
Vault 15	305.97	-17.32	-40.03	0.00
Vault 16	305.97	-17.32	-40.03	0.00
Vault 17	302.95	-18.63	-43.05	0.00
Vault 18	302.95	-18.63	-43.05	0.00
Vault 19	302.95	-18.63	-43.05	0.00
Vault 20	319.78	-11.34	-26.22	0.00

Reservoirs @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
Cell 1	310.00	0.00	0.00
Cell 2	313.20	0.00	0.00
Cell 3	313.00	0.00	0.00
Cell 4	314.00	0.00	0.00
Cell 5	312.00	0.00	0.00
Cell 6	314.50	0.00	0.00
Cell 7	314.00	0.00	0.00
Cell 9/10	315.50	0.00	0.00
Cell 11/13	312.16	0.00	0.00
Cell 12/14	312.41	0.00	0.00
Cell 15	306.80	0.00	0.00
Cell 16	305.30	0.00	0.00
Cell 17	310.50	0.00	0.00
Cell 18	309.10	0.00	0.00
Cell 19	309.60	0.00	0.00
Cell 20	313.30	-198.84	198.84

Analysis Results
Scenario: Base
Steady State Analysis

Pumps @ 0.00 hr

Label	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
PUMP-1	Off	310.00	308.56	0.00	0.00	1.00	0.00
PUMP-2	Off	313.20	312.89	0.00	0.00	1.00	0.00
PUMP-3	Off	313.00	308.56	0.00	0.00	1.00	0.00
PUMP-4	Off	314.00	312.89	0.00	0.00	1.00	0.00
PUMP-5	Off	312.00	308.56	0.00	0.00	1.00	0.00
Pump-6	Off	314.50	312.89	0.00	0.00	1.00	0.00
Pump-7	Off	314.00	308.56	0.00	0.00	1.00	0.00
Pump-10	Off	315.50	312.89	0.00	0.00	1.00	0.00
Pump-12	Off	312.41	312.89	0.00	0.00	1.00	0.00
Pump-13	Off	312.16	312.89	0.00	0.00	1.00	0.00
Pump - 15	Off	306.80	305.97	0.00	0.00	1.00	0.00
Pump - 16	Off	305.30	305.97	0.00	0.00	1.00	0.00
Pump - 17	Off	310.50	302.95	0.00	0.00	1.00	0.00
Pump - 18	Off	309.10	302.95	0.00	0.00	1.00	0.00
Pump - 19	Off	309.60	302.95	0.00	0.00	1.00	0.00
Pump - 20	On	313.30	356.49	198.84	43.19	1.00	2.17

Tanks @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Calculated Level (ft)	Pressure (psi)	Calculated Percent Full (%)	Calculated Volume (ft^3)	Inflow (gpm)	Outflow (gpm)	Current Status
SLF12 Lift Stn	302.50	0.50	0.22	0.0	0.00	198.84	-198.84	Filling

Detailed Report for Pressure Pipe: 2" HDPE-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	10.10
Check Valve?	false	Length	20.00 ft
From Node	L-55	To Node	J-30

Elevations			
From Elevation	328.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	10.10
Check Valve?	false	Length	20.00 ft
From Node	J-34	To Node	L-56

Elevations			
From Elevation	335.00 ft	To Elevation	326.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	8.62
Check Valve?	false	Length	20.00 ft
From Node	J-31	To Node	L-57

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	10.10
Check Valve?	false	Length	20.00 ft
From Node	J-35	To Node	L-58

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	9.04
Check Valve?	false	Length	20.00 ft
From Node	J-32	To Node	Vault-5

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.67
Check Valve?	false	Length	24.00 ft
From Node	J-38	To Node	Vault-10

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.67
Check Valve?	false	Length	24.00 ft
From Node	J-50	To Node	Vault 13

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.67
Check Valve?	false	Length	24.00 ft
From Node	J-43	To Node	Vault-14

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-53	To Node	Vault 15

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-52	To Node	Vault 16

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-70	To Node	Vault 17

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-76	To Node	Vault 18

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-77	To Node	Vault 19

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.04
Check Valve?	false	Length	24.00 ft
From Node	J-36	To Node	Vault-6

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.04
Check Valve?	false	Length	20.00 ft
From Node	J-33	To Node	Vault-7

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE - 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.08
Check Valve?	true	Length	24.00 ft
From Node	J-68	To Node	Vault 20

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	10.14	336.79	319.78	2.50	14.51	17.01	708.73

Detailed Report for Pressure Junction: Bottom Wall

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,142.58 ft	Elevation	317.76 ft
Easting	9,560.75 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-6.41	-14.81	0.00

Detailed Report for Reservoir: Cell 1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	12,314.43 ft	Elevation	310.00 ft
Y	9,994.17 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	310.00	0.00	0.00

Detailed Report for Reservoir: Cell 2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	12,306.54 ft	Elevation	313.20 ft
Y	9,740.62 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	313.20	0.00	0.00

Detailed Report for Reservoir: Cell 3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
X	12,700.17 ft	Elevation	313.00 ft
Y	9,986.47 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	313.00	0.00	0.00

Detailed Report for Reservoir: Cell 4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	12,653.82 ft	Elevation	314.00 ft
Y	9,743.45 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	314.00	0.00	0.00

Detailed Report for Reservoir: Cell 5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,078.63 ft	Elevation	312.00 ft
Y	9,983.02 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	312.00	0.00	0.00

Detailed Report for Reservoir: Cell 6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,864.25 ft	Elevation	314.50 ft
Y	8,858.68 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	314.50	0.00	0.00

Detailed Report for Reservoir: Cell 7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,551.94 ft	Elevation	314.00 ft
Y	9,974.23 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	314.00	0.00	0.00

Detailed Report for Reservoir: Cell 9/10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,869.56 ft	Elevation	315.50 ft
Y	8,511.06 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	315.50	0.00	0.00

Detailed Report for Reservoir: Cell 11/13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,998.22 ft	Elevation	312.16 ft
Y	8,191.21 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	312.16	0.00	0.00

Detailed Report for Reservoir: Cell 12/14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,466.86 ft	Elevation	312.41 ft
Y	7,964.23 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	312.41	0.00	0.00

Detailed Report for Reservoir: Cell 15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	10,249.89 ft	Elevation	306.80 ft
Y	9,846.37 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	306.80	0.00	0.00

Detailed Report for Reservoir: Cell 16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	11,158.19 ft	Elevation	305.30 ft
Y	9,877.84 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	305.30	0.00	0.00

Detailed Report for Reservoir: Cell 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	11,185.74 ft	Elevation	310.50 ft
Y	9,348.00 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	310.50	0.00	0.00

Detailed Report for Reservoir: Cell 18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	11,191.70 ft	Elevation	309.10 ft
Y	8,856.38 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	309.10	0.00	0.00

Detailed Report for Reservoir: Cell 19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	11,188.72 ft	Elevation	309.60 ft
Y	8,305.18 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	309.60	0.00	0.00

Detailed Report for Reservoir: Cell 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
X	12,273.95	ft	Elevation	313.30 ft
Y	7,932.97	ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	313.30	-198.84	198.84

Detailed Report for Pressure Pipe: Flex-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	91.00 ft
From Node	PUMP-1	To Node	J-30

Elevations			
From Elevation	308.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	91.00 ft
From Node	PUMP-2	To Node	J-34

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	91.00 ft
From Node	PUMP-3	To Node	J-31

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	82.00 ft
From Node	PUMP-4	To Node	J-35

Elevations			
From Elevation	312.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	96.00 ft
From Node	PUMP-5	To Node	J-32

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-6	To Node	J-36

Elevations			
From Elevation	312.25 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	83.00 ft
From Node	Pump-7	To Node	J-33

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-10	To Node	J-38

Elevations			
From Elevation	0.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-13	To Node	J-50

Elevations			
From Elevation	0.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-12	To Node	J-43

Elevations			
From Elevation	0.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 15	To Node	J-53

Elevations			
From Elevation	301.80 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 16	To Node	J-52

Elevations			
From Elevation	300.30 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 17	To Node	J-70

Elevations			
From Elevation	305.50 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 18	To Node	J-76

Elevations			
From Elevation	304.10 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	155.00 ft
From Node	Pump - 19	To Node	J-77

Elevations			
From Elevation	304.60 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 20	To Node	J-68

Elevations			
From Elevation	308.30 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	9.03	356.49	336.79	19.59	0.10	19.69	127.05

Detailed Report for Pressure Junction: J-29

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,851.39 ft	Elevation	335.00 ft
Easting	13,788.26 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-11.44	-26.44	0.00

Detailed Report for Pressure Junction: J-30

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,529.51 ft	Elevation	335.00 ft
Easting	12,315.11 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-11.44	-26.44	0.00

Detailed Report for Pressure Junction: J-31

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,510.55 ft	Elevation	335.00 ft
Easting	12,704.06 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-11.44	-26.44	0.00

Detailed Report for Pressure Junction: J-32

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,504.00 ft	Elevation	335.00 ft
Easting	13,080.09 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-11.44	-26.44	0.00

Detailed Report for Pressure Junction: J-33

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,517.32 ft	Elevation	335.00 ft
Easting	13,548.45 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-11.44	-26.44	0.00

Detailed Report for Pressure Junction: J-34

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,253.56 ft	Elevation	335.00 ft
Easting	12,305.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-9.56	-22.11	0.00

Detailed Report for Pressure Junction: J-35

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,263.66 ft	Elevation	335.00 ft
Easting	12,657.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-9.56	-22.11	0.00

Detailed Report for Pressure Junction: J-36

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,855.33 ft	Elevation	335.00 ft
Easting	13,290.51 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-9.56	-22.11	0.00

Detailed Report for Pressure Junction: J-38

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,511.25 ft	Elevation	335.00 ft
Easting	13,257.29 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-9.56	-22.11	0.00

Detailed Report for Pressure Junction: J-41

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,420.81 ft	Elevation	335.00 ft
Easting	12,987.71 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-9.56	-22.11	0.00

Detailed Report for Pressure Junction: J-43

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,607.79 ft	Elevation	335.00 ft
Easting	13,466.86 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-9.56	-22.11	0.00

Detailed Report for Pressure Junction: J-50

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,833.41 ft	Elevation	335.00 ft
Easting	13,998.71 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-9.56	-22.11	0.00

Detailed Report for Pressure Junction: J-52

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,434.45 ft	Elevation	350.00 ft
Easting	11,161.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	305.97	-19.05	-44.03	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: J-53

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,500.00 ft	Elevation	350.00 ft
Easting	10,250.00 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	305.97	-19.05	-44.03	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: J-68

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,457.35 ft	Elevation	350.00 ft
Easting	12,265.01 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	336.79	-5.71	-13.21	0.00

Detailed Report for Pressure Junction: J-70

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,365.87 ft	Elevation	350.00 ft
Easting	10,214.43 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-20.36	-47.05	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: J-76

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,868.30 ft	Elevation	350.00 ft
Easting	10,256.14 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-20.36	-47.05	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: J-77

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,317.10 ft	Elevation	350.00 ft
Easting	10,238.27 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-20.36	-47.05	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: L-55

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,859.13 ft	Elevation	328.00 ft
Easting	12,314.84 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-8.41	-19.44	0.00

Detailed Report for Pressure Junction: L-56

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,907.62 ft	Elevation	326.00 ft
Easting	12,308.03 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-5.67	-13.11	0.00

Detailed Report for Pressure Junction: L-57

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,862.23 ft	Elevation	328.00 ft
Easting	12,701.06 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-8.41	-19.44	0.00

Detailed Report for Pressure Junction: L-58

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,910.36 ft	Elevation	328.00 ft
Easting	12,656.21 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-6.54	-15.11	0.00

Detailed Report for Pressure Junction: MH-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,860.09 ft	Elevation	326.05 ft
Easting	11,923.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-7.57	-17.49	0.00

Detailed Report for Pressure Junction: MH-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,196.31 ft	Elevation	329.94 ft
Easting	12,983.74 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-7.37	-17.05	0.00

Detailed Report for Pressure Junction: MH-11

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,902.75 ft	Elevation	326.20 ft
Easting	11,927.81 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.64	-6.30	-14.56	0.00

Detailed Report for Pressure Junction: MH-12

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,050.44 ft	Elevation	324.00 ft
Easting	11,771.72 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	310.04	-6.04	-13.96	0.00

Detailed Report for Pressure Junction: MH-16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,755.09 ft	Elevation	346.00 ft
Easting	10,784.40 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	305.97	-17.32	-40.03	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: NEW MH- 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,138.07 ft	Elevation	346.00 ft
Easting	9,804.45 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-18.63	-43.05	0.00

Detailed Report for Pressure Junction: NEW MH-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	11,020.27 ft	Elevation	317.62 ft
Easting	11,774.79 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.17	-4.09	-9.45	0.00

Detailed Report for Pressure Junction: NEW MH-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,934.32 ft	Elevation	315.00 ft
Easting	10,780.71 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	305.97	-3.91	-9.03	0.00

Detailed Report for Pressure Junction: New MH-15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,942.04 ft	Elevation	311.50 ft
Easting	9,574.49 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-3.70	-8.55	0.00

Detailed Report for Pressure Junction: New MH-18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,185.09 ft	Elevation	315.00 ft
Easting	9,578.80 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-5.21	-12.05	0.00

Detailed Report for Pressure Pipe: P-21

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	195.00 ft
From Node	L-55	To Node	MH-1

Elevations			
From Elevation	328.00 ft	To Elevation	326.05 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-22

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	2.22
Check Valve?	false	Length	207.00 ft
From Node	L-56	To Node	MH-11

Elevations			
From Elevation	326.00 ft	To Elevation	326.20 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	2.84	312.89	311.64	0.97	0.28	1.25	6.04

Detailed Report for Pressure Pipe: P-25

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	275.00 ft
From Node	L-57	To Node	L-55

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-27

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	275.00 ft
From Node	L-58	To Node	L-56

Elevations			
From Elevation	328.00 ft	To Elevation	326.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-0.00	0.00	312.89	312.89	-0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-29

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	329.00 ft
From Node	Vault-5	To Node	L-57

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-31

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	160.00 ft
From Node	Vault-6	To Node	L-58

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	-0.00	0.00	312.89	312.89	-0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-33

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	375.00 ft
From Node	Vault-7	To Node	Vault-5

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-35

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	242.00 ft
From Node	Vault-7	To Node	J-29

Elevations			
From Elevation	328.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.56	308.56	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-50

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	PUMP-1	To Node	Cell 1

Elevations			
From Elevation	308.00 ft	To Elevation	310.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	310.00	310.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-52

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 5	To Node	PUMP-5

Elevations			
From Elevation	312.00 ft	To Elevation	311.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.00	312.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-53

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 7	To Node	Pump-7

Elevations			
From Elevation	314.00 ft	To Elevation	311.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-54

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 2	To Node	PUMP-2

Elevations			
From Elevation	313.20 ft	To Elevation	311.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	313.20	313.20	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-55

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 4	To Node	PUMP-4

Elevations			
From Elevation	314.00 ft	To Elevation	312.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-56

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 6	To Node	Pump-6

Elevations			
From Elevation	314.50 ft	To Elevation	312.25 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	314.50	314.50	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-59

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	PUMP-3	To Node	Cell 3

Elevations			
From Elevation	311.00 ft	To Elevation	313.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	313.00	313.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-60

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	111.00 ft
From Node	Vault-10	To Node	Vault-6

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-63

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 9/10	To Node	Pump-10

Elevations			
From Elevation	315.50 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.50	315.50	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-65

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.28
Check Valve?	false	Length	233.00 ft
From Node	Vault-14	To Node	J-41

Elevations			
From Elevation	328.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-68

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 12/14	To Node	Pump-12

Elevations			
From Elevation	312.41 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.41	312.41	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-73

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	450.00 ft
From Node	Vault 13	To Node	Vault-14

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-76

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 11/13	To Node	Pump-13

Elevations			
From Elevation	312.16 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.16	312.16	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-77

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 15	To Node	Pump - 15

Elevations			
From Elevation	306.80 ft	To Elevation	301.80 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	306.80	306.80	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-80

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 16	To Node	Pump - 16

Elevations			
From Elevation	305.30 ft	To Elevation	300.30 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.30	305.30	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-108

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	47.40 ft
From Node	MH-1	To Node	NEW MH-13

Elevations			
From Elevation	326.05 ft	To Elevation	317.62 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	2.84	308.56	308.17	0.22	0.17	0.39	8.21

Detailed Report for Pressure Pipe: P-115

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.37
Check Valve?	false	Length	286.80 ft
From Node	J-41	To Node	MH-10

Elevations			
From Elevation	335.00 ft	To Elevation	329.94 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-116

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	681.20 ft
From Node	MH-10	To Node	Vault-10

Elevations			
From Elevation	329.94 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.89	312.89	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-117

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 20	To Node	Pump - 20

Elevations			
From Elevation	313.30 ft	To Elevation	308.30 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	2.26	313.30	313.30	0.00	0.00	0.00	2.87

Detailed Report for Pressure Pipe: P-126

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	6.96 in	Minor Loss Coefficient	2.16
Check Valve?	true	Length	270.00 ft
From Node	New MH-15	To Node	SLF12 Lift Stn

Elevations			
From Elevation	311.50 ft	To Elevation	316.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	1.68	302.95	302.50	0.35	0.09	0.45	1.65

Detailed Report for Pressure Pipe: P-129

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 19	To Node	Pump - 19

Elevations			
From Elevation	309.60 ft	To Elevation	304.60 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	309.60	309.60	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-132

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.40
Check Valve?	false	Length	360.00 ft
From Node	Vault 19	To Node	Vault 18

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-136

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 18	To Node	Pump - 18

Elevations			
From Elevation	309.10 ft	To Elevation	304.10 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	309.10	309.10	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-139

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 17	To Node	Pump - 17

Elevations			
From Elevation	310.50 ft	To Elevation	305.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	310.50	310.50	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-141

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	262.00 ft
From Node	Vault 15	To Node	MH-16

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-142

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	2.07
Check Valve?	true	Length	80.00 ft
From Node	MH-16	To Node	NEW MH-14

Elevations			
From Elevation	346.00 ft	To Elevation	315.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-143

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	111.00 ft
From Node	Vault 16	To Node	MH-16

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.97	305.97	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-144

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	3.63 in	Minor Loss Coefficient	5.88
Check Valve?	true	Length	110.00 ft
From Node	Vault 20	To Node	L-56

Elevations			
From Elevation	346.00 ft	To Elevation	326.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	6.16	319.78	312.89	3.42	3.47	6.89	62.63

Detailed Report for Pressure Pipe: P-147

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	167.00 ft
From Node	Vault 17	To Node	NEW MH- 17

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-148

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	167.00 ft
From Node	Vault 18	To Node	NEW MH- 17

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-149

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	2.07
Check Valve?	false	Length	60.00 ft
From Node	NEW MH- 17	To Node	Bottom Wall

Elevations			
From Elevation	346.00 ft	To Elevation	317.76 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-150

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.65
Check Valve?	false	Length	528.00 ft
From Node	Bottom Wall	To Node	New MH-18

Elevations			
From Elevation	317.76 ft	To Elevation	315.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-151

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.55
Check Valve?	false	Length	453.00 ft
From Node	NEW MH-13	To Node	NEW MH-14

Elevations			
From Elevation	317.62 ft	To Elevation	315.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	2.84	308.17	305.97	2.13	0.07	2.20	4.85

Detailed Report for Pressure Pipe: P-152

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.20
Check Valve?	false	Length	310.00 ft
From Node	MH-12	To Node	MH-1

Elevations			
From Elevation	324.00 ft	To Elevation	326.05 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	2.84	310.04	308.56	1.46	0.03	1.48	4.78

Detailed Report for Pressure Pipe: P-154

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.14
Check Valve?	false	Length	311.00 ft
From Node	MH-11	To Node	MH-12

Elevations			
From Elevation	326.20 ft	To Elevation	324.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	2.84	311.64	310.04	1.46	0.14	1.60	5.16

Detailed Report for Pressure Pipe: P-160

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.50
Check Valve?	false	Length	630.00 ft
From Node	NEW MH-14	To Node	New MH-15

Elevations			
From Elevation	315.00 ft	To Elevation	311.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	198.84	2.84	305.97	302.95	2.96	0.06	3.02	4.80

Detailed Report for Pressure Pipe: P-161

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.58
Check Valve?	false	Length	667.00 ft
From Node	New MH-18	To Node	New MH-15

Elevations			
From Elevation	315.00 ft	To Elevation	311.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	302.95	302.95	0.00	0.00	0.00	0.00

Detailed Report for Pump: PUMP-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,150.71	ft	Upstream Pipe	P-50
Easting	12,315.02	ft	Downstream Pipe	Flex-1
Elevation	308.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	310.00	308.56	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-1

Detailed Report for Pump: PUMP-2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	9,570.47	ft	Upstream Pipe	P-54
Easting	12,305.40	ft	Downstream Pipe	Flex-2
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	313.20	312.89	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-2

Detailed Report for Pump: PUMP-3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,144.86	ft	Upstream Pipe	P-59
Easting	12,698.18	ft	Downstream Pipe	Flex-3
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	313.00	308.56	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-3

Detailed Report for Pump: PUMP-4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	9,585.90	ft	Upstream Pipe	P-55
Easting	12,655.50	ft	Downstream Pipe	Flex-4
Elevation	312.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	314.00	312.89	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-4

Detailed Report for Pump: PUMP-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,158.03	ft	Upstream Pipe	P-52
Easting	13,077.21	ft	Downstream Pipe	Flex-5
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	312.00	308.56	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-5

Detailed Report for Pump: Pump-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,853.41	ft	Upstream Pipe	P-56
Easting	13,590.66	ft	Downstream Pipe	Flex-6
Elevation	312.25	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	314.50	312.89	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-6

Detailed Report for Pump: Pump-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,115.70	ft	Upstream Pipe	P-53
Easting	13,550.28	ft	Downstream Pipe	Flex-7
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	0.78

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	314.00	308.56	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-7

Detailed Report for Pump: Pump-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,511.00	ft	Upstream Pipe	P-63
Easting	13,551.09	ft	Downstream Pipe	Flex-10
Elevation	0.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	124.00	ft	Shutoff Discharge	0.00	gpm
Design Head	80.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	9.00	ft	Maximum Operating Discharge	85.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	315.50	312.89	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-10

Detailed Report for Pump: Pump-12

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	7,794.78	ft	Upstream Pipe	P-68
Easting	13,466.86	ft	Downstream Pipe	Flex-14
Elevation	0.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	160.00	ft	Shutoff Discharge	0.00	gpm
Design Head	80.00	ft	Design Discharge	100.00	gpm
Maximum Operating Head	45.00	ft	Maximum Operating Discharge	150.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	312.41	312.89	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-12

Detailed Report for Pump: Pump-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,014.37	ft	Upstream Pipe	P-76
Easting	13,998.71	ft	Downstream Pipe	Flex-13
Elevation	0.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	124.00	ft	Shutoff Discharge	0.00	gpm
Design Head	80.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	9.00	ft	Maximum Operating Discharge	85.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	312.16	312.89	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-13

Detailed Report for Pump: Pump - 15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,150.00	ft	Upstream Pipe	P-77
Easting	10,250.00	ft	Downstream Pipe	Flex-15
Elevation	301.80	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	306.80	305.97	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 15

Detailed Report for Pump: Pump - 16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,138.08	ft	Upstream Pipe	P-80
Easting	11,161.17	ft	Downstream Pipe	Flex-16
Elevation	300.30	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	305.30	305.97	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 16

Detailed Report for Pump: Pump - 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	9,359.92	ft	Upstream Pipe	P-139
Easting	10,709.02	ft	Downstream Pipe	Flex-17
Elevation	305.50	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	310.50	302.95	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 17

Detailed Report for Pump: Pump - 18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,865.32	ft	Upstream Pipe	P-136
Easting	10,714.98	ft	Downstream Pipe	Flex-18
Elevation	304.10	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	309.10	302.95	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 18

Detailed Report for Pump: Pump - 19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,311.14	ft	Upstream Pipe	P-129
Easting	10,712.00	ft	Downstream Pipe	Flex-19
Elevation	304.60	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	309.60	302.95	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 19

Message List

Time (hr)	Message
0.00	Warning: Link closure is causing system disconnection.

Detailed Report for Pump: Pump - 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,144.51	ft	Upstream Pipe	P-117
Easting	12,265.01	ft	Downstream Pipe	Flex-20
Elevation	308.30	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	On	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	On	313.30	356.49	198.84	43.19	1.00	2.17

Detailed Report for Pump: Pump - 20

Detailed Report for Tank: SLF12 Lift Stn

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	11,288.22	ft	Elevation	316.00 ft
Easting	8,685.58	ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

Operating Range Summary				
Maximum Elevation	316.00	ft	Maximum Level	14.00 ft
Initial HGL	302.50	ft	Initial Level	0.50 ft
Minimum Elevation	302.50	ft	Minimum Level	0.50 ft
Base Elevation	302.00	ft		

Storage				
Section Type	Constant Area		Circular Tank Shape?	true
Diameter	10.00	ft	Average Area	78.5 ft^2
Inactive Volume	0.00	ft^3	Total Active Volume	1,060.29 ft^3

User Data			
Date Installed		Date Retired	
Inspection Date		SCADA ID	
Lining		Condition	
Metered	false	Clearwell Storage	false
Elevated Tank	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Calculated Level (ft)	Pressure (psi)	Calculated Percent Full (%)	Calculated Volume (ft^3)	Inflow (gpm)	Outflow (gpm)	Current Status
0.00	302.50	0.50	0.22	0.0	0.00	198.84	-198.84	Filling

Detailed Report for Tank: SLF12 Lift Stn

Detailed Report for Pressure Junction: Vault-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,857.43 ft	Elevation	328.00 ft
Easting	13,077.03 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-8.41	-19.44	0.00

Detailed Report for Pressure Junction: Vault-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,852.30 ft	Elevation	328.00 ft
Easting	12,991.87 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-6.54	-15.11	0.00

Detailed Report for Pressure Junction: Vault-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,858.80 ft	Elevation	328.00 ft
Easting	13,546.32 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.56	-8.41	-19.44	0.00

Detailed Report for Pressure Junction: Vault-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,513.50 ft	Elevation	328.00 ft
Easting	12,990.63 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-6.54	-15.11	0.00

Detailed Report for Pressure Junction: Vault-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,420.81 ft	Elevation	328.00 ft
Easting	13,472.70 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-6.54	-15.11	0.00

Detailed Report for Pressure Junction: Vault 13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	7,648.27	ft	Elevation	328.00 ft
Easting	13,997.97	ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.89	-6.54	-15.11	0.00

Detailed Report for Pressure Junction: Vault 15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,750.00 ft	Elevation	346.00 ft
Easting	10,250.00 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	305.97	-17.32	-40.03	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: Vault 16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,752.98 ft	Elevation	346.00 ft
Easting	11,158.19 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	305.97	-17.32	-40.03	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: Vault 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,371.83 ft	Elevation	346.00 ft
Easting	9,803.26 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-18.63	-43.05	0.00

Detailed Report for Pressure Junction: Vault 18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,875.71 ft	Elevation	346.00 ft
Easting	9,800.28 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-18.63	-43.05	0.00

Detailed Report for Pressure Junction: Vault 19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,317.10 ft	Elevation	346.00 ft
Easting	9,811.02 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	302.95	-18.63	-43.05	0.00

Detailed Report for Pressure Junction: Vault 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,749.34 ft	Elevation	346.00 ft
Easting	12,270.97 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	319.78	-11.34	-26.22	0.00

Attachment 3

Scenario D WaterCAD Output

Scenario: Base

Analysis Results
Scenario: Base
Steady State Analysis

Title: CWM: RMU-2 Leachate System Evaluation
Project Engineer: ARCADIS
Project Date: 05/02/13
Comments: RMU-2 landfill cell primary pumps through SLF 12 lift station. Landfill cells modeled as constant-head reservoirs.

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Liquid Characteristics			
Liquid	Water at 20C(68F)	Specific Gravity	1.00
Kinematic Viscosity	1.0804e-5 ft²/s		

Network Inventory			
Pressure Pipes	77	Number of Tanks	1
Number of Reservoirs	16	- Constant Area:	1
Number of Pressure Junctions	45	- Variable Area:	0
Number of Pumps	16	Number of Valves	0
- Constant Power:	0	- FCV's:	0
- One Point (Design Point):	0	- PBV's:	0
- Standard (3 Point):	16	- PRV's:	0
- Standard Extended:	0	- PSV's:	0
- Custom Extended:	0	- TCV's:	0
- Multiple Point:	0	- GPV's:	0
Number of Spot Elevations	0		

Pressure Pipes Inventory			
1.92 in	100.00 ft	3.63 in	110.00 ft
2.00 in	451.00 ft	5.35 in	7,433.40 ft
2.83 in	803.00 ft	6.00 in	11.00 ft
3.00 in	1,311.00 ft	6.96 in	270.00 ft
Total Length	10,489.40 ft		

Analysis Results

Scenario: Base

Steady State Analysis

Pressure Pipes @ 0.00 hr

Label	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
2" HDPE-1	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
2" HDPE-2	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
2" HDPE-3	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
2" HDPE-4	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
2" HDPE-5	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
3" HDPE-10	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
3" HDPE-13	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
3" HDPE-14	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
3" HDPE-15	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00
3" HDPE-16	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00
3" HDPE-17	Open	0.00	0.00	325.66	325.66	0.00	0.00	0.00	0.00
3" HDPE-18	Open	182.93	9.33	348.25	328.64	2.13	17.48	19.61	817.25
3" HDPE-19	Open	182.17	9.29	349.57	330.12	2.12	17.34	19.45	810.53
3" HDPE-6	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
3" HDPE-7	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
3" HDPE - 20	Open	196.79	10.04	338.84	322.18	2.45	14.22	16.66	694.34
Flex-1	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
Flex-2	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
Flex-3	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
Flex-4	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
Flex-5	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
Flex-6	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
Flex-7	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
Flex-10	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
Flex-13	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
Flex-14	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
Flex-15	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00
Flex-16	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00
Flex-17	Open	0.00	0.00	325.66	325.66	0.00	0.00	0.00	0.00
Flex-18	Open	182.93	8.30	365.12	348.25	16.79	0.09	16.87	108.87
Flex-19	Open	182.17	8.27	366.23	349.57	16.66	0.00	16.66	107.48
Flex-20	Open	196.79	8.93	358.16	338.84	19.22	0.10	19.32	124.63
P-21	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
P-22	Open	196.79	2.81	315.42	314.20	0.95	0.27	1.23	5.92
P-25	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
P-27	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
P-29	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
P-31	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
P-33	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
P-35	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00
P-50	Open	0.00	0.00	310.00	310.00	0.00	0.00	0.00	0.00
P-52	Open	0.00	0.00	312.00	312.00	0.00	0.00	0.00	0.00
P-53	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00
P-54	Open	0.00	0.00	313.20	313.20	0.00	0.00	0.00	0.00
P-55	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00
P-56	Open	0.00	0.00	314.50	314.50	0.00	0.00	0.00	0.00
P-59	Open	0.00	0.00	313.00	313.00	0.00	0.00	0.00	0.00
P-60	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
P-63	Open	0.00	0.00	315.50	315.50	0.00	0.00	0.00	0.00
P-65	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Analysis Results
Scenario: Base
Steady State Analysis

Pressure Pipes @ 0.00 hr

Label	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
P-68	Open	0.00	0.00	312.41	312.41	0.00	0.00	0.00	0.00
P-73	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
P-76	Open	0.00	0.00	312.16	312.16	0.00	0.00	0.00	0.00
P-77	Open	0.00	0.00	306.80	306.80	0.00	0.00	0.00	0.00
P-80	Open	0.00	0.00	305.30	305.30	0.00	0.00	0.00	0.00
P-108	Open	196.79	2.81	311.17	310.79	0.22	0.16	0.38	8.05
P-115	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
P-116	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00
P-117	Open	196.79	2.23	313.30	313.30	0.00	0.00	0.00	2.81
P-126	Open	561.89	4.74	305.67	302.50	2.41	0.75	3.17	11.72
P-129	Open	182.17	2.07	309.60	309.60	0.00	0.00	0.00	2.44
P-132	Open	182.17	2.60	330.12	328.64	1.44	0.04	1.48	4.11
P-136	Open	182.93	2.08	309.10	309.10	0.00	0.00	0.00	2.44
P-139	Open	0.00	0.00	310.50	310.50	0.00	0.00	0.00	0.00
P-141	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00
P-142	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00
P-143	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00
P-144	Open	196.79	6.10	322.18	315.42	3.35	3.40	6.75	61.39
P-147	Open	0.00	0.00	325.66	325.66	0.00	0.00	0.00	0.00
P-148	Open	365.11	5.21	328.64	325.66	2.42	0.56	2.98	17.84
P-149	Open	365.11	5.21	325.66	323.92	0.87	0.87	1.74	29.03
P-150	Open	365.11	5.21	323.92	315.99	7.65	0.27	7.92	15.00
P-151	Open	196.79	2.81	310.79	308.63	2.09	0.07	2.16	4.76
P-152	Open	196.79	2.81	312.62	311.17	1.43	0.02	1.45	4.69
P-154	Open	196.79	2.81	314.20	312.62	1.43	0.14	1.57	5.06
P-160	Open	196.79	2.81	308.63	305.67	2.90	0.06	2.97	4.71
P-161	Open	365.11	5.21	315.99	305.67	9.66	0.67	10.33	15.48

Pressure Junctions @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
Bottom Wall	323.92	2.66	6.16	0.00
J-29	311.17	-10.31	-23.83	0.00
J-30	311.17	-10.31	-23.83	0.00
J-31	311.17	-10.31	-23.83	0.00
J-32	311.17	-10.31	-23.83	0.00
J-33	311.17	-10.31	-23.83	0.00
J-34	315.42	-8.47	-19.58	0.00
J-35	315.42	-8.47	-19.58	0.00
J-36	315.42	-8.47	-19.58	0.00
J-38	315.42	-8.47	-19.58	0.00
J-41	315.42	-8.47	-19.58	0.00
J-43	315.42	-8.47	-19.58	0.00
J-50	315.42	-8.47	-19.58	0.00
J-52	308.63	-17.90	-41.37	0.00
J-53	308.63	-17.90	-41.37	0.00
J-68	338.84	-4.83	-11.16	0.00
J-70	325.66	-10.53	-24.34	0.00
J-76	348.25	-0.76	-1.75	0.00

Analysis Results
Scenario: Base
Steady State Analysis

Pressure Junctions @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
J-77	349.57	-0.19	-0.43	0.00
L-55	311.17	-7.28	-16.83	0.00
L-56	315.42	-4.58	-10.58	0.00
L-57	311.17	-7.28	-16.83	0.00
L-58	315.42	-5.44	-12.58	0.00
MH-1	311.17	-6.44	-14.88	0.00
MH-10	315.42	-6.28	-14.52	0.00
MH-11	314.20	-5.19	-12.00	0.00
MH-12	312.62	-4.92	-11.38	0.00
MH-16	308.63	-16.17	-37.37	0.00
NEW MH- 17	325.66	-8.80	-20.34	0.00
NEW MH-13	310.79	-2.96	-6.83	0.00
NEW MH-14	308.63	-2.76	-6.37	0.00
New MH-15	305.67	-2.52	-5.83	0.00
New MH-18	315.99	0.43	0.99	0.00
Vault-5	311.17	-7.28	-16.83	0.00
Vault-6	315.42	-5.44	-12.58	0.00
Vault-7	311.17	-7.28	-16.83	0.00
Vault-10	315.42	-5.44	-12.58	0.00
Vault-14	315.42	-5.44	-12.58	0.00
Vault 13	315.42	-5.44	-12.58	0.00
Vault 15	308.63	-16.17	-37.37	0.00
Vault 16	308.63	-16.17	-37.37	0.00
Vault 17	325.66	-8.80	-20.34	0.00
Vault 18	328.64	-7.51	-17.36	0.00
Vault 19	330.12	-6.87	-15.88	0.00
Vault 20	322.18	-10.31	-23.82	0.00

Reservoirs @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
Cell 1	310.00	0.00	0.00
Cell 2	313.20	0.00	0.00
Cell 3	313.00	0.00	0.00
Cell 4	314.00	0.00	0.00
Cell 5	312.00	0.00	0.00
Cell 6	314.50	0.00	0.00
Cell 7	314.00	0.00	0.00
Cell 9/10	315.50	0.00	0.00
Cell 11/13	312.16	0.00	0.00
Cell 12/14	312.41	0.00	0.00
Cell 15	306.80	0.00	0.00
Cell 16	305.30	0.00	0.00
Cell 17	310.50	0.00	0.00
Cell 18	309.10	-182.93	182.93
Cell 19	309.60	-182.17	182.17
Cell 20	313.30	-196.79	196.79

Analysis Results

Scenario: Base

Steady State Analysis

Pumps @ 0.00 hr

Label	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
PUMP-1	Off	310.00	311.17	0.00	0.00	1.00	0.00
PUMP-2	Off	313.20	315.42	0.00	0.00	1.00	0.00
PUMP-3	Off	313.00	311.17	0.00	0.00	1.00	0.00
PUMP-4	Off	314.00	315.42	0.00	0.00	1.00	0.00
PUMP-5	Off	312.00	311.17	0.00	0.00	1.00	0.00
Pump-6	Off	314.50	315.42	0.00	0.00	1.00	0.00
Pump-7	Off	314.00	311.17	0.00	0.00	1.00	0.00
Pump-10	Off	315.50	315.42	0.00	0.00	1.00	0.00
Pump-12	Off	312.41	315.42	0.00	0.00	1.00	0.00
Pump-13	Off	312.16	315.42	0.00	0.00	1.00	0.00
Pump - 15	Off	306.80	308.63	0.00	0.00	1.00	0.00
Pump - 16	Off	305.30	308.63	0.00	0.00	1.00	0.00
Pump - 17	Off	310.50	325.66	0.00	0.00	1.00	0.00
Pump - 18	On	309.10	365.12	182.93	56.03	1.00	2.59
Pump - 19	On	309.60	366.23	182.17	56.63	1.00	2.60
Pump - 20	On	313.30	358.16	196.79	44.86	1.00	2.23

Tanks @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Calculated Level (ft)	Pressure (psi)	Calculated Percent Full (%)	Calculated Volume (ft^3)	Inflow (gpm)	Outflow (gpm)	Current Status
SLF12 Lift Stn	302.50	0.50	0.22	0.0	0.00	561.89	-561.89	Filling

Detailed Report for Pressure Pipe: 2" HDPE-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	10.10
Check Valve?	false	Length	20.00 ft
From Node	L-55	To Node	J-30

Elevations			
From Elevation	328.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	10.10
Check Valve?	false	Length	20.00 ft
From Node	J-34	To Node	L-56

Elevations			
From Elevation	335.00 ft	To Elevation	326.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	8.62
Check Valve?	false	Length	20.00 ft
From Node	J-31	To Node	L-57

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	10.10
Check Valve?	false	Length	20.00 ft
From Node	J-35	To Node	L-58

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 2" HDPE-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	1.92 in	Minor Loss Coefficient	9.04
Check Valve?	false	Length	20.00 ft
From Node	J-32	To Node	Vault-5

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.67
Check Valve?	false	Length	24.00 ft
From Node	J-38	To Node	Vault-10

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.67
Check Valve?	false	Length	24.00 ft
From Node	J-50	To Node	Vault 13

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.67
Check Valve?	false	Length	24.00 ft
From Node	J-43	To Node	Vault-14

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-53	To Node	Vault 15

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-52	To Node	Vault 16

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-70	To Node	Vault 17

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	325.66	325.66	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-76	To Node	Vault 18

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	182.93	9.33	348.25	328.64	2.13	17.48	19.61	817.25

Detailed Report for Pressure Pipe: 3" HDPE-19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	12.92
Check Valve?	true	Length	24.00 ft
From Node	J-77	To Node	Vault 19

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	182.17	9.29	349.57	330.12	2.12	17.34	19.45	810.53

Detailed Report for Pressure Pipe: 3" HDPE-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.04
Check Valve?	false	Length	24.00 ft
From Node	J-36	To Node	Vault-6

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.04
Check Valve?	false	Length	20.00 ft
From Node	J-33	To Node	Vault-7

Elevations			
From Elevation	335.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: 3" HDPE - 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	9.08
Check Valve?	true	Length	24.00 ft
From Node	J-68	To Node	Vault 20

Elevations			
From Elevation	350.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	10.04	338.84	322.18	2.45	14.22	16.66	694.34

Detailed Report for Pressure Junction: Bottom Wall

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,142.58 ft	Elevation	317.76 ft
Easting	9,560.75 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	323.92	2.66	6.16	0.00

Detailed Report for Reservoir: Cell 1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	12,314.43 ft	Elevation	310.00 ft
Y	9,994.17 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	310.00	0.00	0.00

Detailed Report for Reservoir: Cell 2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	12,306.54 ft	Elevation	313.20 ft
Y	9,740.62 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	313.20	0.00	0.00

Detailed Report for Reservoir: Cell 3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
X	12,700.17	ft	Elevation	313.00 ft
Y	9,986.47	ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	313.00	0.00	0.00

Detailed Report for Reservoir: Cell 4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	12,653.82 ft	Elevation	314.00 ft
Y	9,743.45 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	314.00	0.00	0.00

Detailed Report for Reservoir: Cell 5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,078.63 ft	Elevation	312.00 ft
Y	9,983.02 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	312.00	0.00	0.00

Detailed Report for Reservoir: Cell 6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,864.25 ft	Elevation	314.50 ft
Y	8,858.68 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	314.50	0.00	0.00

Detailed Report for Reservoir: Cell 7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,551.94 ft	Elevation	314.00 ft
Y	9,974.23 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	314.00	0.00	0.00

Detailed Report for Reservoir: Cell 9/10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,869.56 ft	Elevation	315.50 ft
Y	8,511.06 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	315.50	0.00	0.00

Detailed Report for Reservoir: Cell 11/13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,998.22 ft	Elevation	312.16 ft
Y	8,191.21 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	312.16	0.00	0.00

Detailed Report for Reservoir: Cell 12/14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	13,466.86 ft	Elevation	312.41 ft
Y	7,964.23 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	312.41	0.00	0.00

Detailed Report for Reservoir: Cell 15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	10,249.89 ft	Elevation	306.80 ft
Y	9,846.37 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	306.80	0.00	0.00

Detailed Report for Reservoir: Cell 16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	11,158.19 ft	Elevation	305.30 ft
Y	9,877.84 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	305.30	0.00	0.00

Detailed Report for Reservoir: Cell 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	11,185.74 ft	Elevation	310.50 ft
Y	9,348.00 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	310.50	0.00	0.00

Detailed Report for Reservoir: Cell 18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
X	11,191.70 ft	Elevation	309.10 ft
Y	8,856.38 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	309.10	-182.93	182.93

Detailed Report for Reservoir: Cell 19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
X	11,188.72	ft	Elevation	309.60 ft
Y	8,305.18	ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	309.60	-182.17	182.17

Detailed Report for Reservoir: Cell 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
X	12,273.95 ft		Elevation	313.30 ft
Y	7,932.97 ft		Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	313.30	-196.79	196.79

Detailed Report for Pressure Pipe: Flex-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	91.00 ft
From Node	PUMP-1	To Node	J-30

Elevations			
From Elevation	308.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	91.00 ft
From Node	PUMP-2	To Node	J-34

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	91.00 ft
From Node	PUMP-3	To Node	J-31

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	82.00 ft
From Node	PUMP-4	To Node	J-35

Elevations			
From Elevation	312.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	2.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	96.00 ft
From Node	PUMP-5	To Node	J-32

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-6	To Node	J-36

Elevations			
From Elevation	312.25 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	83.00 ft
From Node	Pump-7	To Node	J-33

Elevations			
From Elevation	311.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-10	To Node	J-38

Elevations			
From Elevation	0.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-13	To Node	J-50

Elevations			
From Elevation	0.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	74.00 ft
From Node	Pump-12	To Node	J-43

Elevations			
From Elevation	0.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 15	To Node	J-53

Elevations			
From Elevation	301.80 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 16	To Node	J-52

Elevations			
From Elevation	300.30 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 17	To Node	J-70

Elevations			
From Elevation	305.50 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	325.66	325.66	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: Flex-18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 18	To Node	J-76

Elevations			
From Elevation	304.10 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	182.93	8.30	365.12	348.25	16.79	0.09	16.87	108.87

Detailed Report for Pressure Pipe: Flex-19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	155.00 ft
From Node	Pump - 19	To Node	J-77

Elevations			
From Elevation	304.60 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	182.17	8.27	366.23	349.57	16.66	0.00	16.66	107.48

Detailed Report for Pressure Pipe: Flex-20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	3.00 in	Minor Loss Coefficient	0.08
Check Valve?	false	Length	155.00 ft
From Node	Pump - 20	To Node	J-68

Elevations			
From Elevation	308.30 ft	To Elevation	350.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	8.93	358.16	338.84	19.22	0.10	19.32	124.63

Detailed Report for Pressure Junction: J-29

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,851.39 ft	Elevation	335.00 ft
Easting	13,788.26 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-10.31	-23.83	0.00

Detailed Report for Pressure Junction: J-30

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,529.51 ft	Elevation	335.00 ft
Easting	12,315.11 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-10.31	-23.83	0.00

Detailed Report for Pressure Junction: J-31

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,510.55 ft	Elevation	335.00 ft
Easting	12,704.06 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-10.31	-23.83	0.00

Detailed Report for Pressure Junction: J-32

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,504.00 ft	Elevation	335.00 ft
Easting	13,080.09 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-10.31	-23.83	0.00

Detailed Report for Pressure Junction: J-33

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,517.32 ft	Elevation	335.00 ft
Easting	13,548.45 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-10.31	-23.83	0.00

Detailed Report for Pressure Junction: J-34

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,253.56 ft	Elevation	335.00 ft
Easting	12,305.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-8.47	-19.58	0.00

Detailed Report for Pressure Junction: J-35

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,263.66 ft	Elevation	335.00 ft
Easting	12,657.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-8.47	-19.58	0.00

Detailed Report for Pressure Junction: J-36

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,855.33 ft	Elevation	335.00 ft
Easting	13,290.51 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-8.47	-19.58	0.00

Detailed Report for Pressure Junction: J-38

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,511.25 ft	Elevation	335.00 ft
Easting	13,257.29 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-8.47	-19.58	0.00

Detailed Report for Pressure Junction: J-41

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,420.81 ft	Elevation	335.00 ft
Easting	12,987.71 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-8.47	-19.58	0.00

Detailed Report for Pressure Junction: J-43

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,607.79 ft	Elevation	335.00 ft
Easting	13,466.86 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-8.47	-19.58	0.00

Detailed Report for Pressure Junction: J-50

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,833.41 ft	Elevation	335.00 ft
Easting	13,998.71 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-8.47	-19.58	0.00

Detailed Report for Pressure Junction: J-52

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,434.45 ft	Elevation	350.00 ft
Easting	11,161.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.63	-17.90	-41.37	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: J-53

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,500.00 ft	Elevation	350.00 ft
Easting	10,250.00 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.63	-17.90	-41.37	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: J-68

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,457.35 ft	Elevation	350.00 ft
Easting	12,265.01 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	338.84	-4.83	-11.16	0.00

Detailed Report for Pressure Junction: J-70

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,365.87 ft	Elevation	350.00 ft
Easting	10,214.43 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	325.66	-10.53	-24.34	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: J-76

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,868.30 ft	Elevation	350.00 ft
Easting	10,256.14 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	348.25	-0.76	-1.75	0.00

Detailed Report for Pressure Junction: J-77

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,317.10 ft	Elevation	350.00 ft
Easting	10,238.27 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	349.57	-0.19	-0.43	0.00

Detailed Report for Pressure Junction: L-55

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,859.13 ft	Elevation	328.00 ft
Easting	12,314.84 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-7.28	-16.83	0.00

Detailed Report for Pressure Junction: L-56

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,907.62 ft	Elevation	326.00 ft
Easting	12,308.03 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-4.58	-10.58	0.00

Detailed Report for Pressure Junction: L-57

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,862.23 ft	Elevation	328.00 ft
Easting	12,701.06 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-7.28	-16.83	0.00

Detailed Report for Pressure Junction: L-58

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,910.36 ft	Elevation	328.00 ft
Easting	12,656.21 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-5.44	-12.58	0.00

Detailed Report for Pressure Junction: MH-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,860.09 ft	Elevation	326.05 ft
Easting	11,923.17 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-6.44	-14.88	0.00

Detailed Report for Pressure Junction: MH-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,196.31 ft	Elevation	329.94 ft
Easting	12,983.74 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-6.28	-14.52	0.00

Detailed Report for Pressure Junction: MH-11

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,902.75 ft	Elevation	326.20 ft
Easting	11,927.81 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	314.20	-5.19	-12.00	0.00

Detailed Report for Pressure Junction: MH-12

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,050.44 ft	Elevation	324.00 ft
Easting	11,771.72 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	312.62	-4.92	-11.38	0.00

Detailed Report for Pressure Junction: MH-16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,755.09 ft	Elevation	346.00 ft
Easting	10,784.40 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.63	-16.17	-37.37	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: NEW MH- 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,138.07 ft	Elevation	346.00 ft
Easting	9,804.45 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	325.66	-8.80	-20.34	0.00

Detailed Report for Pressure Junction: NEW MH-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	11,020.27 ft	Elevation	317.62 ft
Easting	11,774.79 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	310.79	-2.96	-6.83	0.00

Detailed Report for Pressure Junction: NEW MH-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,934.32 ft	Elevation	315.00 ft
Easting	10,780.71 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.63	-2.76	-6.37	0.00

Detailed Report for Pressure Junction: New MH-15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,942.04 ft	Elevation	311.50 ft
Easting	9,574.49 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	305.67	-2.52	-5.83	0.00

Detailed Report for Pressure Junction: New MH-18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,185.09 ft	Elevation	315.00 ft
Easting	9,578.80 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.99	0.43	0.99	0.00

Detailed Report for Pressure Pipe: P-21

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	195.00 ft
From Node	L-55	To Node	MH-1

Elevations			
From Elevation	328.00 ft	To Elevation	326.05 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-22

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	2.22
Check Valve?	false	Length	207.00 ft
From Node	L-56	To Node	MH-11

Elevations			
From Elevation	326.00 ft	To Elevation	326.20 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	2.81	315.42	314.20	0.95	0.27	1.23	5.92

Detailed Report for Pressure Pipe: P-25

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	275.00 ft
From Node	L-57	To Node	L-55

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-27

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	275.00 ft
From Node	L-58	To Node	L-56

Elevations			
From Elevation	328.00 ft	To Elevation	326.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-29

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	329.00 ft
From Node	Vault-5	To Node	L-57

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-31

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	160.00 ft
From Node	Vault-6	To Node	L-58

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-33

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	375.00 ft
From Node	Vault-7	To Node	Vault-5

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-35

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	242.00 ft
From Node	Vault-7	To Node	J-29

Elevations			
From Elevation	328.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	311.17	311.17	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-50

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	PUMP-1	To Node	Cell 1

Elevations			
From Elevation	308.00 ft	To Elevation	310.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	310.00	310.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-52

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 5	To Node	PUMP-5

Elevations			
From Elevation	312.00 ft	To Elevation	311.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.00	312.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-53

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 7	To Node	Pump-7

Elevations			
From Elevation	314.00 ft	To Elevation	311.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-54

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 2	To Node	PUMP-2

Elevations			
From Elevation	313.20 ft	To Elevation	311.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	313.20	313.20	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-55

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 4	To Node	PUMP-4

Elevations			
From Elevation	314.00 ft	To Elevation	312.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	314.00	314.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-56

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 6	To Node	Pump-6

Elevations			
From Elevation	314.50 ft	To Elevation	312.25 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	314.50	314.50	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-59

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	PUMP-3	To Node	Cell 3

Elevations			
From Elevation	311.00 ft	To Elevation	313.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	313.00	313.00	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-60

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	111.00 ft
From Node	Vault-10	To Node	Vault-6

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-63

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 9/10	To Node	Pump-10

Elevations			
From Elevation	315.50 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.50	315.50	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-65

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.28
Check Valve?	false	Length	233.00 ft
From Node	Vault-14	To Node	J-41

Elevations			
From Elevation	328.00 ft	To Elevation	335.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-68

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 12/14	To Node	Pump-12

Elevations			
From Elevation	312.41 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.41	312.41	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-73

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	450.00 ft
From Node	Vault 13	To Node	Vault-14

Elevations			
From Elevation	328.00 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-76

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	3.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 11/13	To Node	Pump-13

Elevations			
From Elevation	312.16 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	312.16	312.16	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-77

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 15	To Node	Pump - 15

Elevations			
From Elevation	306.80 ft	To Elevation	301.80 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	306.80	306.80	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-80

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 16	To Node	Pump - 16

Elevations			
From Elevation	305.30 ft	To Elevation	300.30 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	305.30	305.30	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-108

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	47.40 ft
From Node	MH-1	To Node	NEW MH-13

Elevations			
From Elevation	326.05 ft	To Elevation	317.62 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	2.81	311.17	310.79	0.22	0.16	0.38	8.05

Detailed Report for Pressure Pipe: P-115

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.37
Check Valve?	false	Length	286.80 ft
From Node	J-41	To Node	MH-10

Elevations			
From Elevation	335.00 ft	To Elevation	329.94 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-116

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.35
Check Valve?	false	Length	681.20 ft
From Node	MH-10	To Node	Vault-10

Elevations			
From Elevation	329.94 ft	To Elevation	328.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	315.42	315.42	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-117

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 20	To Node	Pump - 20

Elevations			
From Elevation	313.30 ft	To Elevation	308.30 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	2.23	313.30	313.30	0.00	0.00	0.00	2.81

Detailed Report for Pressure Pipe: P-126

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	6.96 in	Minor Loss Coefficient	2.16
Check Valve?	true	Length	270.00 ft
From Node	New MH-15	To Node	SLF12 Lift Stn

Elevations			
From Elevation	311.50 ft	To Elevation	316.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	561.89	4.74	305.67	302.50	2.41	0.75	3.17	11.72

Detailed Report for Pressure Pipe: P-129

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 19	To Node	Pump - 19

Elevations			
From Elevation	309.60 ft	To Elevation	304.60 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	182.17	2.07	309.60	309.60	0.00	0.00	0.00	2.44

Detailed Report for Pressure Pipe: P-132

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.40
Check Valve?	false	Length	360.00 ft
From Node	Vault 19	To Node	Vault 18

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	182.17	2.60	330.12	328.64	1.44	0.04	1.48	4.11

Detailed Report for Pressure Pipe: P-136

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 18	To Node	Pump - 18

Elevations			
From Elevation	309.10 ft	To Elevation	304.10 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	182.93	2.08	309.10	309.10	0.00	0.00	0.00	2.44

Detailed Report for Pressure Pipe: P-139

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	PVC	Hazen- Williams C	150.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	Cell 17	To Node	Pump - 17

Elevations			
From Elevation	310.50 ft	To Elevation	305.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	310.50	310.50	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-141

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	262.00 ft
From Node	Vault 15	To Node	MH-16

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-142

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	2.07
Check Valve?	true	Length	80.00 ft
From Node	MH-16	To Node	NEW MH-14

Elevations			
From Elevation	346.00 ft	To Elevation	315.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-143

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	111.00 ft
From Node	Vault 16	To Node	MH-16

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	308.63	308.63	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-144

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	3.63 in	Minor Loss Coefficient	5.88
Check Valve?	true	Length	110.00 ft
From Node	Vault 20	To Node	L-56

Elevations			
From Elevation	346.00 ft	To Elevation	326.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	6.10	322.18	315.42	3.35	3.40	6.75	61.39

Detailed Report for Pressure Pipe: P-147

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	2.83 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	167.00 ft
From Node	Vault 17	To Node	NEW MH- 17

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	0.00	0.00	325.66	325.66	0.00	0.00	0.00	0.00

Detailed Report for Pressure Pipe: P-148

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.33
Check Valve?	false	Length	167.00 ft
From Node	Vault 18	To Node	NEW MH- 17

Elevations			
From Elevation	346.00 ft	To Elevation	346.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	365.11	5.21	328.64	325.66	2.42	0.56	2.98	17.84

Detailed Report for Pressure Pipe: P-149

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	2.07
Check Valve?	false	Length	60.00 ft
From Node	NEW MH- 17	To Node	Bottom Wall

Elevations			
From Elevation	346.00 ft	To Elevation	317.76 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	365.11	5.21	325.66	323.92	0.87	0.87	1.74	29.03

Detailed Report for Pressure Pipe: P-150

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.65
Check Valve?	false	Length	528.00 ft
From Node	Bottom Wall	To Node	New MH-18

Elevations			
From Elevation	317.76 ft	To Elevation	315.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	365.11	5.21	323.92	315.99	7.65	0.27	7.92	15.00

Detailed Report for Pressure Pipe: P-151

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.55
Check Valve?	false	Length	453.00 ft
From Node	NEW MH-13	To Node	NEW MH-14

Elevations			
From Elevation	317.62 ft	To Elevation	315.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	2.81	310.79	308.63	2.09	0.07	2.16	4.76

Detailed Report for Pressure Pipe: P-152

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.20
Check Valve?	false	Length	310.00 ft
From Node	MH-12	To Node	MH-1

Elevations			
From Elevation	324.00 ft	To Elevation	326.05 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	2.81	312.62	311.17	1.43	0.02	1.45	4.69

Detailed Report for Pressure Pipe: P-154

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.14
Check Valve?	false	Length	311.00 ft
From Node	MH-11	To Node	MH-12

Elevations			
From Elevation	326.20 ft	To Elevation	324.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	2.81	314.20	312.62	1.43	0.14	1.57	5.06

Detailed Report for Pressure Pipe: P-160

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	0.50
Check Valve?	false	Length	630.00 ft
From Node	NEW MH-14	To Node	New MH-15

Elevations			
From Elevation	315.00 ft	To Elevation	311.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	196.79	2.81	308.63	305.67	2.90	0.06	2.97	4.71

Detailed Report for Pressure Pipe: P-161

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	5.35 in	Minor Loss Coefficient	1.58
Check Valve?	false	Length	667.00 ft
From Node	New MH-18	To Node	New MH-15

Elevations			
From Elevation	315.00 ft	To Elevation	311.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	365.11	5.21	315.99	305.67	9.66	0.67	10.33	15.48

Detailed Report for Pump: PUMP-1

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,150.71	ft	Upstream Pipe	P-50
Easting	12,315.02	ft	Downstream Pipe	Flex-1
Elevation	308.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	310.00	311.17	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-1

Detailed Report for Pump: PUMP-2

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	9,570.47	ft	Upstream Pipe	P-54
Easting	12,305.40	ft	Downstream Pipe	Flex-2
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	313.20	315.42	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-2

Detailed Report for Pump: PUMP-3

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,144.86	ft	Upstream Pipe	P-59
Easting	12,698.18	ft	Downstream Pipe	Flex-3
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	313.00	311.17	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-3

Detailed Report for Pump: PUMP-4

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	9,585.90	ft	Upstream Pipe	P-55
Easting	12,655.50	ft	Downstream Pipe	Flex-4
Elevation	312.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	314.00	315.42	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-4

Detailed Report for Pump: PUMP-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,158.03	ft	Upstream Pipe	P-52
Easting	13,077.21	ft	Downstream Pipe	Flex-5
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	312.00	311.17	0.00	0.00	1.00	0.00

Detailed Report for Pump: PUMP-5

Detailed Report for Pump: Pump-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,853.41	ft	Upstream Pipe	P-56
Easting	13,590.66	ft	Downstream Pipe	Flex-6
Elevation	312.25	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	314.50	315.42	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-6

Detailed Report for Pump: Pump-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,115.70	ft	Upstream Pipe	P-53
Easting	13,550.28	ft	Downstream Pipe	Flex-7
Elevation	311.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	0.78

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	314.00	311.17	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-7

Detailed Report for Pump: Pump-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,511.00	ft	Upstream Pipe	P-63
Easting	13,551.09	ft	Downstream Pipe	Flex-10
Elevation	0.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	124.00	ft	Shutoff Discharge	0.00	gpm
Design Head	80.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	9.00	ft	Maximum Operating Discharge	85.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	315.50	315.42	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-10

Detailed Report for Pump: Pump-12

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	7,794.78	ft	Upstream Pipe	P-68
Easting	13,466.86	ft	Downstream Pipe	Flex-14
Elevation	0.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	160.00	ft	Shutoff Discharge	0.00	gpm
Design Head	80.00	ft	Design Discharge	100.00	gpm
Maximum Operating Head	45.00	ft	Maximum Operating Discharge	150.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	312.41	315.42	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-12

Detailed Report for Pump: Pump-13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,014.37	ft	Upstream Pipe	P-76
Easting	13,998.71	ft	Downstream Pipe	Flex-13
Elevation	0.00	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	124.00	ft	Shutoff Discharge	0.00	gpm
Design Head	80.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	9.00	ft	Maximum Operating Discharge	85.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	312.16	315.42	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump-13

Detailed Report for Pump: Pump - 15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,150.00	ft	Upstream Pipe	P-77
Easting	10,250.00	ft	Downstream Pipe	Flex-15
Elevation	301.80	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	306.80	308.63	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 15

Detailed Report for Pump: Pump - 16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,138.08	ft	Upstream Pipe	P-80
Easting	11,161.17	ft	Downstream Pipe	Flex-16
Elevation	300.30	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	45.00	ft	Shutoff Discharge	0.00	gpm
Design Head	33.00	ft	Design Discharge	40.00	gpm
Maximum Operating Head	20.00	ft	Maximum Operating Discharge	60.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	305.30	308.63	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 16

Detailed Report for Pump: Pump - 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	9,359.92	ft	Upstream Pipe	P-139
Easting	10,709.02	ft	Downstream Pipe	Flex-17
Elevation	305.50	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	Off	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	Off	310.50	325.66	0.00	0.00	1.00	0.00

Detailed Report for Pump: Pump - 17

Message List

Time (hr)	Message
0.00	Warning: Link closure is causing system disconnection.

Detailed Report for Pump: Pump - 18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,865.32	ft	Upstream Pipe	P-136
Easting	10,714.98	ft	Downstream Pipe	Flex-18
Elevation	304.10	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	On	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	On	309.10	365.12	182.93	56.03	1.00	2.59

Detailed Report for Pump: Pump - 18

Detailed Report for Pump: Pump - 19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,311.14	ft	Upstream Pipe	P-129
Easting	10,712.00	ft	Downstream Pipe	Flex-19
Elevation	304.60	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	On	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	On	309.60	366.23	182.17	56.63	1.00	2.60

Detailed Report for Pump: Pump - 19

Detailed Report for Pump: Pump - 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	8,144.51	ft	Upstream Pipe	P-117
Easting	12,265.01	ft	Downstream Pipe	Flex-20
Elevation	308.30	ft		

Pump Definition Summary					
Pump Type	Standard (3 Point)				
Shutoff Head	170.00	ft	Shutoff Discharge	0.00	gpm
Design Head	100.00	ft	Design Discharge	125.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	250.00	gpm

Initial Status			
Initial Pump Status	On	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	On	313.30	358.16	196.79	44.86	1.00	2.23

Detailed Report for Pump: Pump - 20

Detailed Report for Tank: SLF12 Lift Stn

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	11,288.22	ft	Elevation	316.00 ft
Easting	8,685.58	ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

Operating Range Summary				
Maximum Elevation	316.00	ft	Maximum Level	14.00 ft
Initial HGL	302.50	ft	Initial Level	0.50 ft
Minimum Elevation	302.50	ft	Minimum Level	0.50 ft
Base Elevation	302.00	ft		

Storage				
Section Type	Constant Area		Circular Tank Shape?	true
Diameter	10.00	ft	Average Area	78.5 ft^2
Inactive Volume	0.00	ft^3	Total Active Volume	1,060.29 ft^3

User Data			
Date Installed		Date Retired	
Inspection Date		SCADA ID	
Lining		Condition	
Metered	false	Clearwell Storage	false
Elevated Tank	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Calculated Level (ft)	Pressure (psi)	Calculated Percent Full (%)	Calculated Volume (ft^3)	Inflow (gpm)	Outflow (gpm)	Current Status
0.00	302.50	0.50	0.22	0.0	0.00	561.89	-561.89	Filling

Detailed Report for Tank: SLF12 Lift Stn

Detailed Report for Pressure Junction: Vault-5

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,857.43 ft	Elevation	328.00 ft
Easting	13,077.03 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-7.28	-16.83	0.00

Detailed Report for Pressure Junction: Vault-6

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,852.30 ft	Elevation	328.00 ft
Easting	12,991.87 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-5.44	-12.58	0.00

Detailed Report for Pressure Junction: Vault-7

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,858.80 ft	Elevation	328.00 ft
Easting	13,546.32 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	311.17	-7.28	-16.83	0.00

Detailed Report for Pressure Junction: Vault-10

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,513.50 ft	Elevation	328.00 ft
Easting	12,990.63 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-5.44	-12.58	0.00

Detailed Report for Pressure Junction: Vault-14

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,420.81 ft	Elevation	328.00 ft
Easting	13,472.70 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-5.44	-12.58	0.00

Detailed Report for Pressure Junction: Vault 13

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	7,648.27 ft	Elevation	328.00 ft
Easting	13,997.97 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	315.42	-5.44	-12.58	0.00

Detailed Report for Pressure Junction: Vault 15

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,750.00 ft	Elevation	346.00 ft
Easting	10,250.00 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.63	-16.17	-37.37	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: Vault 16

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,752.98 ft	Elevation	346.00 ft
Easting	11,158.19 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	308.63	-16.17	-37.37	0.00

Message List

Time (hr)	Message
0.00	Warning: Node is hydraulically disconnected (isolated) from

Detailed Report for Pressure Junction: Vault 17

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	9,371.83 ft	Elevation	346.00 ft
Easting	9,803.26 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	325.66	-8.80	-20.34	0.00

Detailed Report for Pressure Junction: Vault 18

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,875.71 ft	Elevation	346.00 ft
Easting	9,800.28 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	328.64	-7.51	-17.36	0.00

Detailed Report for Pressure Junction: Vault 19

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,317.10 ft	Elevation	346.00 ft
Easting	9,811.02 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	330.12	-6.87	-15.88	0.00

Detailed Report for Pressure Junction: Vault 20

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	8,749.34 ft	Elevation	346.00 ft
Easting	12,270.97 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	322.18	-10.31	-23.82	0.00

Attachment 4

WaterCAD Output for SLF 12 Lift Station to LTF.

Scenario: Base

HYDRAULIC MODEL SCHEMATIC

SLF 12 LIFT STATION TO TANK FARM

Analysis Results
Scenario: Base
Steady State Analysis

Title: CWM: RMU-2 Leachate System Evaluation
Project Engineer: ARCADIS
Project Date: 12/28/11
Comments: SLF 12 lift station. to LTF

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Liquid Characteristics			
Liquid	Water at 20C(68F)	Specific Gravity	1.00
Kinematic Viscosity	1.0804e-5 ft²/s		

Network Inventory			
Pressure Pipes	6	Number of Tanks	0
Number of Reservoirs	2	- Constant Area:	0
Number of Pressure Junctions	4	- Variable Area:	0
Number of Pumps	1	Number of Valves	0
- Constant Power:	0	- FCV's:	0
- One Point (Design Point):	1	- PBV's:	0
- Standard (3 Point):	0	- PRV's:	0
- Standard Extended:	0	- PSV's:	0
- Custom Extended:	0	- TCV's:	0
- Multiple Point:	0	- GPV's:	0
Number of Spot Elevations	0		

Pressure Pipes Inventory			
6.00 in	16.00 ft	7.98 in	145.00 ft
6.07 in	32.00 ft	24.00 in	1.00 ft
6.96 in	467.00 ft		
Total Length	661.00 ft		

Analysis Results

Scenario: Base

Steady State Analysis

Pressure Pipes @ 0.00 hr

Label	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
6" Steel	Open	644.45	7.14	366.12	365.85	0.10	0.17	0.28	137.70
8" HDPE	Open	644.45	5.43	365.85	356.33	5.36	4.16	9.52	20.38
Existing 6" Ste	Open	644.45	7.14	353.47	350.50	1.51	1.46	2.97	99.12
Existing 8" ste	Open	644.45	4.13	356.33	353.47	1.93	0.92	2.86	19.69
flex hose	Open	644.45	7.31	366.73	366.12	0.61	0.00	0.61	38.13
P-34	Open	644.45	0.46	307.00	307.00	0.00	0.00	0.00	0.03

Pressure Junctions @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
J-35	356.33	15.93	36.83	0.00
J-36	365.85	18.97	43.85	0.00
J-37	353.47	14.70	33.97	0.00
J-38	366.12	158.40	366.12	0.00

Pumps @ 0.00 hr

Label	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
Lift Station Pur	On	307.00	366.73	644.45	59.73	1.00	9.72

Reservoirs @ 0.00 hr

Label	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
LTF	350.50	644.45	-644.45
T-150	307.00	-644.45	644.45

Detailed Report for Pressure Pipe: 6" Steel

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Steel	Hazen- Williams C	100.0
Diameter	6.07 in	Minor Loss Coefficient	0.22
Check Valve?	false	Length	2.00 ft
From Node	J-38	To Node	J-36

Elevations			
From Elevation	0.00 ft	To Elevation	322.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	644.45	7.14	366.12	365.85	0.10	0.17	0.28	137.70

Detailed Report for Pressure Pipe: 8" HDPE

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	6.96 in	Minor Loss Coefficient	9.07
Check Valve?	false	Length	467.00 ft
From Node	J-36	To Node	J-35

Elevations			
From Elevation	322.00 ft	To Elevation	319.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	644.45	5.43	365.85	356.33	5.36	4.16	9.52	20.38

Detailed Report for Pressure Pipe: Existing 6" Steel

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Steel	Hazen- Williams C	100.0
Diameter	6.07 in	Minor Loss Coefficient	1.84
Check Valve?	false	Length	30.00 ft
From Node	J-37	To Node	LTF

Elevations			
From Elevation	319.50 ft	To Elevation	350.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	644.45	7.14	353.47	350.50	1.51	1.46	2.97	99.12

Detailed Report for Pressure Pipe: Existing 8" steel

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	Steel	Hazen- Williams C	100.0
Diameter	7.98 in	Minor Loss Coefficient	3.48
Check Valve?	false	Length	145.00 ft
From Node	J-35	To Node	J-37

Elevations			
From Elevation	319.50 ft	To Elevation	319.50 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	644.45	4.13	356.33	353.47	1.93	0.92	2.86	19.69

Detailed Report for Pressure Pipe: flex hose

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	flex hose	Hazen- Williams C	120.0
Diameter	6.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	16.00 ft
From Node	Lift Station Pump	To Node	J-38

Elevations			
From Elevation	307.00 ft	To Elevation	0.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	644.45	7.31	366.73	366.12	0.61	0.00	0.61	38.13

Detailed Report for Pressure Junction: J-35

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,834.16 ft	Elevation	319.50 ft
Easting	10,268.88 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	356.33	15.93	36.83	0.00

Detailed Report for Pressure Junction: J-36

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,833.46 ft	Elevation	322.00 ft
Easting	11,323.92 ft	Zone	Zone-1

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	365.85	18.97	43.85	0.00

Detailed Report for Pressure Junction: J-37

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,989.52 ft	Elevation	319.50 ft
Easting	10,269.60 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	353.47	14.70	33.97	0.00

Detailed Report for Pressure Junction: J-38

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
Northing	10,839.93 ft	Elevation	0.00 ft
Easting	11,614.28 ft	Zone	Zone-1

Demand Summary

Type	Base Flow (gpm)	Pattern
Demand	0.00	Fixed

User Data			
SCADA ID		Sampling Point	false
Hydrant Location	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Pressure (psi)	Pressure Head (ft)	Demand (Calculated) (gpm)
0.00	366.12	158.40	366.12	0.00

Detailed Report for Pump: Lift Station Pump

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
Northing	10,840.59	ft	Upstream Pipe	P-34
Easting	11,849.40	ft	Downstream Pipe	flex hose
Elevation	307.00	ft		

Pump Definition Summary					
Pump Type	Design Point (1 Point)				
Shutoff Head	79.60	ft	Shutoff Discharge	0.00	gpm
Design Head	59.70	ft	Design Discharge	645.00	gpm
Maximum Operating Head	0.00	ft	Maximum Operating Discharge	1,290.00	gpm

Initial Status			
Initial Pump Status	On	Initial Relative Speed Factor	1.00

User Data				
Date Installed			Date Retired	
Inspection Date			SCADA ID	
Rated Power	0	Hp	Condition	
Manufacturer			Model	
Serial Number			Metered	false
Existing	false			

Calculated Results Summary

Time (hr)	Control Status	Intake Pump Grade (ft)	Discharge Pump Grade (ft)	Discharge (gpm)	Pump Head (ft)	Relative Speed	Calculated Water Power (Hp)
0.00	On	307.00	366.73	644.45	59.73	1.00	9.72

Detailed Report for Pump: Lift Station Pump

Detailed Report for Reservoir: LTF

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary			
X	10,276.17 ft	Elevation	350.50 ft
Y	11,189.15 ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	350.50	644.45	-644.45

Detailed Report for Pressure Pipe: P-34

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Pipe Characteristics			
Material	HDPE	Hazen- Williams C	155.0
Diameter	24.00 in	Minor Loss Coefficient	0.00
Check Valve?	false	Length	1.00 ft
From Node	T-150	To Node	Lift Station Pump

Elevations			
From Elevation	307.00 ft	To Elevation	307.00 ft

Initial Status	
Initial Status	Open

User Data			
Date Installed		Date Retired	
Inspection Date		Lining	
Pipe Class		Exterior Coating	
Nominal Diameter	0.00 in	Condition	
Skeletonized	false	Metered	false
Existing	false		

Calculated Results Summary

Time (hr)	Control Status	Discharge (gpm)	Velocity (ft/s)	Upstream Structure Hydraulic Grade (ft)	Downstream Structure Hydraulic Grade (ft)	Calculated Friction Headloss (ft)	Calculated Minor Headloss (ft)	Pressure Pipe Headloss (ft)	Headloss Gradient (ft/1000ft)
0.00	Open	644.45	0.46	307.00	307.00	0.00	0.00	0.00	0.03

Detailed Report for Reservoir: T-150

Scenario Summary	
Scenario	Base
Physical Alternative	Base-Physical
Active Topology Alternative	Base-Active Topology
Demand Alternative	Default-Average Daily
Initial Settings Alternative	Base-Initial Settings
Operational Alternative	Base-Operational Controls
Logical Control Set Alternative	<All Logical Controls>
Age Alternative	Default-Age Scenario
Constituent Alternative	Default-Constituent
Trace Alternative	Default-Trace Scenario
Fire Flow Alternative	Base-Fire Flow
Capital Cost Alternative	Base-Capital Cost
Energy Cost Alternative	Base-Energy Cost
User Data Alternative	Base-User Data

Global Adjustments Summary			
Demand	<None>	Roughness	<None>

Geometric Summary				
X	12,168.27	ft	Elevation	307.00 ft
Y	10,840.59	ft	Zone	Zone-1

User Data			
Date Installed		Date Retired	
Inspection Date		Condition	
Clearwell Storage	false	Existing	false

Calculated Results Summary

Time (hr)	Calculated Hydraulic Grade (ft)	Inflow (gpm)	Outflow (gpm)
0.00	307.00	-644.45	644.45

ARCADIS

Appendix F-2

RMU-1/RMU-2 Leachate
Forcemain and Tank T-150
Transfer Line Pipe Crush Analysis

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

Calculation Sheet

Client: CWM Chemical Services, LLC

Project Location: Model City, New York

Project: RMU-2 Design Calculations **Project No.: B0023725.2011**

Subject: Appendix F-2: RMU-1/RMU-2 Leachate Forcemain & Tank T-150 Transfer Line Pipe Crush Analysis

Prepared By: BMS **Date: February 2013**

Reviewed By: PHB **Date: February 2013**

Checked By: JM **Date: February 2013**

OBJECTIVE:

Demonstrate that the proposed Residuals Management Unit 1 (RMU-1)/Residuals Management Unit 2 (RMU-2) leachate forcemain and Tank T-150 transfer line are capable of withstanding the anticipated applied load associated with burial and truck traffic.

REFERENCES:

1. RMU-2 Permit Drawing No. 27 entitled "Leachate Collection and Transfer System Details," ARCADIS, August 2009 (revised February 2013).

2. RMU-2 Permit Drawing No. 34 entitled "Tank T-150 Transfer Pipelines," ARCADIS, August 2009 (revised February 2013).

3. Literature from Performance Pipe (attached).

4. Goddard, J.B. "The Structural Performance of Polyethylene Pipe," *Geotechnical Fabrics Report.* September 1991.

5. CANDE-89 Culvert Analysis and Design Computer Program, U.S. Department of Transportation Federal Highway Administration. Publication No. FHWA-RD-89-169. March 1990.

6. Paruvakat, N. "Deflection Analysis of Polyethylene Leachate Collection Pipes," *Geosynthetics '93*. Vancouver, Canada.

7. "Truck Loads on Pipe Buried at Shallow Depths," Ductile Iron Pipe Research Association, 2009 (attached).

8. *National Engineering Handbook*, U.S. Department of Agriculture, Natural Resources Conservation Service, Chapter 52 – Structural Design of Flexible Conduits, pp. 52-8, 52-11, and 52-12 (attached).

9. Principles of Geotechnical Engineering, 2nd Edition, Das, Braja M., pp 195-196 and 267, 1990 (attached).

ASSUMPTIONS:

1. Both the proposed RMU-1/RMU-2 leachate forcemain and the Tank T-150 transfer pipeline consist of a double-contained high-density polyethylene (HDPE) pipe. Because the two pipelines utilize the same pipe material, pipe diameter, trench configuration, and assumed traffic load, the analysis

Calculation Sheet

presented herein applies to both applications. The carrier pipe is not subjected to the exterior forces associated with burial and vehicle traffic on the ground surface because this pipe lies within the containment pipe. Hence, the pipe crush analysis focuses on the containment pipe only.

2. The carrier and containment pipe diameters are 8 and 12 inches, respectively. Both the carrier and containment pipes are DR-11 and are iron pipe size (IPS) based. The containment pipe has an outer diameter of 12.750 inches, an average inner diameter of 10.293 inches, and a minimum wall thickness of 1.159 inches (Reference 3).

3. Reference 5 is used to model the buried pipe. The critical performance parameter for flexible pipe is typically ring deflection, which is the amount of vertical deflection of the pipe diameter due to applied external loads. The maximum recommended vertical deflection of HDPE pipe is 5.0 percent (References 6 and 8).

4. Vehicle traffic is assumed to consist of a semi-truck with a maximum single axle load of 40,000 pounds (lbs) (based on American Association of State Highway and Transportation Officials HS-25 loading). The tire inflation pressure is assumed to be 80 pounds per square inch (psi). The ground contact pressure beneath a pneumatic tire is approximately equal to the tire inflation pressure. The tire inflation pressure is multiplied by an impact factor of 1.5 (Reference 7) to account for dynamic effects due to the truck traveling at speed over an uneven road surface. It is noted that Reference 8 indicates that for a cover depth equal to or greater than 3 feet, the impact factor reduces to unity. However, a value of 1.5 is used for conservatism.

5. The bedding material and remaining backfill are conservatively assumed to have a unit weight of 130 pounds per cubic foot (pcf).

CALCULATIONS:

Both the RMU-1/RMU-2 leachate forcemain and Tank T-150 transfer pipeline are designed to withstand the applied loading due to burial and assuming the occurrence of surface loads consisting of loaded semi-trucks. Similar to other buried pipe deflection calculations for RMU-2, this calculation includes two analytical methods: CANDE-89 (Reference 5) and the modified Iowa Formula. The former method is considered more accurate; the latter method is included because it is more widely used by designers.

1. Soil Modulus and Overburden Pressure at Top of Pipe Due to Vehicle Load at Ground Surface

A critical parameter in the structural performance of a buried flexible pipe, such as HDPE, is the modulus of the soil surrounding the pipe. Based on References 1 and 2, the pipelines are surrounded by sand bedding material, which is a coarse-grained soil. The RMU-2 specifications stipulate that this material is to be compacted to a minimum of 90 percent modified Proctor. According to Reference 8, a reasonable soil modulus for sand compacted to this density is 2,000 psi.

As stated in Assumption 4, vehicle traffic over the top of the pipe is assumed to consist of semi-trucks or other heavy trucks with a maximum axle load of 40,000 lbs. Using an assumed tire inflation pressure of 80 psi, the ground contact area is approximated as follows:

Axle Load = 40,000 lbs
Load at Each End of Each Axle = 20,000 lbs
Ground Contact Area Beneath Set of Tires at Each End of Axle = (20,000 lbs)/(80 psi) = 250 in^2
Diameter of Assumed Circular Ground Contact Area = D = $((250\ in^2)(4)/\pi)^{1/2}$ = 17.8 in

The diameter of the ground contact area is used with Reference 9 to estimate the dissipation of the

Calculation Sheet

overburden pressure due to the cover depth over the top of the pipe. The estimated at-depth increase in pressure, Δp, due to traffic loads is as follows:

Ratio of cover depth, z, to radius of loaded area, R = 36 in/8.9 in = 4.0
Ratio of at-depth pressure increase, Δp, to ground surface pressure, q = 0.08
At-depth pressure increase (static load) = (80 psi)(0.08) = 6.4 psi
At-depth pressure increase (dynamic load) = (6.4 psi)(1.5) = 9.6 psi

Thus, the design load at the ground surface translates to approximately 9.6 psi in overburden pressure at the top of the pipe after accounting for the wheel impact factor.

2. CANDE-89 Analysis

The following assumptions are used for the CANDE analysis:

Average pipe diameter	= 11.52 inches (average of outer and inner diameters, Assumption 2)
Young's Modulus of HDPE	= 110,000 psi (Reference 4)
Poisson's Ratio of HDPE	= 0.35 (Reference 4)
Yield Stress of Pipe	= 3,200 psi (Reference 4)
Minimum Thickness of Pipe Wall	= 1.159 inches (Assumption 2)
Young's Modulus of Soil	= 2,000 psi (see discussion above)
Poisson's Ratio of Soil	= 0.35 (average value for sand, Reference 9)

A homogeneous finite element mesh with no frictional interface elements is used for simplicity. Furthermore, one construction step is assumed, meaning that the loading is assumed to be applied at one time. Based on these assumptions, the CANDE model indicates a maximum deflection of 0.05 inches. This deflection is calculated based on the difference between the y-displacement at nodes 38 and 56 (i.e., the bottom and top of the pipe, respectively) as shown in the attached CANDE output. A deflection of 0.05 inches corresponds to 0.4 percent deflection as compared to the average pipe diameter. This is less than the recommended maximum deflection of 5.0 percent (Assumption 3).

3. Modified Iowa Formula Analysis

The vertical deflection of the containment pipe is also estimated using the Modified Iowa formula:

$$\Delta y = \frac{D\sigma k_b}{\frac{2}{3}E\left(\frac{1}{SDR-1}\right)^3 + 0.061E'}$$

where,

Δy = vertical deflection of pipe
D = average pipe diameter = 11.52 in
σ = overburden pressure (see calculation below)
k_b = bedding factor = 0.1
E = modulus of elasticity for HDPE = 110,000 psi
SDR = standard diameter ratio of pipe (pipe OD/wall thickness) = 11
E' = soil modulus of pipe bedding = 2,000 psi (compacted sand bedding as discussed above)

The overburden pressure is due to both loading from the cover soil and the vehicle load at the ground surface. The total overburden pressure is the sum of the two components. The indicated cover depth of 3

Calculation Sheet

feet (minimum) produces an overburden pressure of approximately 390 pounds per square feet (3 feet x 130 pcf) or 2.7 psi. The overburden pressure due to the vehicle load is quantified earlier in this calculation sheet as 9.6 psi. The total overburden pressure is, therefore, 12.3 psi.

Using the Modified Iowa Formula, the vertical deflection of the pipe is 0.07 inches, which corresponds to a 0.6 percent deflection (as compared to the average diameter). This is less than the recommended maximum deflection of 5.0 percent (Assumption 3).

SUMMARY:

The buried pipe analysis indicates that the proposed RMU-1/RMU-2 leachate forcemain and Tank T-150 transfer pipeline configurations are acceptable because the predicted vertical deflections (0.4 to 0.6 percent, depending on analytical method) are less than the recommended maximum deflection of 5.0 percent.

Attachment 1

CANDE-89 Output

1

```
       CCCC   AA     N    N  DDDD   EEEEE      8888   9999
      CC     AAA    NN   N  DD  D  EE         88  8  99  9
     CC     AA A   NNN  N  DD  D  EEEE  DDD  88888   9999
    CC     AAAAA  NN N N  DD  D  EE         88  8      9
    CCCC  AA   A NN  NN  DDDDD  EEEEE       8888      9

 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
         IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
                                                III
            (C)ULVERT (AN)ALYSIS AND (DE)SIGN   II
                                                I

                      VERSION  1.0
                       MARCH 1990

           PUBLIC DOMAIN SOFTWARE CONTRIBUTED BY
             THE FEDERAL HIGHWAY ADMINISTRATION



        PIPE TYPE LIBRARIES:
             ALUMINUM (CORRUGATED)
             BASIC (ANALYSIS ONLY)
                   (UNCONNECTED ELEMENT OPTION)
             CONCRETE (REINFORCED)
             PLASTIC (SOLID WALL)
             STEEL (CORRUGATED)
                   (SLOTTED JOINT OPTION)

        SOLUTION LEVELS:
             LEVEL 1: ELASTIC THEORY - BURNS
             LEVEL 2: FINITE ELEMENT - AUTO
                      CIRCULAR AND ELLIPTICAL (CAN1)
                      CONCRETE BOX CULVERT  (CANBOX)
                      2 OR 3 SEGMENT ARCHES (CANAR1)
             LEVEL 3: FINITE ELEMENT - USER
```

1

```
*** PROBLEM NUMBER  1 ***


   RMU-2 FORCEMAIN DESIGN


EXECUTION MODE .....ANAL

SOLUTION LEVEL .....F.E.AUTO

CULVERT TYPE ...... PLASTIC



PIPE PROPERTIES ARE AS FOLLOWS ...

     AVERAGE PIPE DIAMETER (IN.) .......      11.52
```

```
YOUNGS MODULUS OF PIPE (PSI).......  110000.00

POISSONS RATIO OF PIPE (-) ........        .35

YIELD STRESS OF PIPE (PSI).........    3200.00

DENSITY OF PIPE (PCI)..............        .00


SECTION PROPERTIES OF PIPE ...

THICKNESS OF PIPEWALL (IN).........   1.15900

THRUST AREA (IN**2/IN) ............   1.15900

MOM. OF INERTIA (IN**4/IN) ........    .12974

SECTION MODULUS (IN**3/IN) ........    .22388

1* * BEGIN GENERATION OF CANNED MESH * *


0THE DATA TO BE RUN IS ENTITLED

0     HOMOGENEOUS

0TYPE OF MESH---------------------------HOMOGENOUS
0PLOTTING DATA SAVED--------------------    1
0PRINT SOIL RESPONSES-------------------    1
0PRINT CONTROL FOR PREP OUTPUT----------    1
0NUMBER OF CONSTRUCTION INCREMENTS------    1
0PIPE DIAMETER RATIO--------------------     1.00
0LIVE LOAD PRESSURE ON LAST INCR.-------     9.60
0SOIL HEIGHT ABOVE SPRINGLINE (FEET)----     3.53
0MESH HEIGHT ABOVE SPRINGLINE (FEET)----     2.11
0SOIL DENSITY ABOVE MESH (PCF)----------   130.00
0PRESSURE OF TRUNCATED SOIL (PSI)-------     1.28



 IDENTIFICATION OF MATERIAL ZONE WITH MATERIAL NUMBERS.


           MATERIAL-ZONE    MATERIAL NO.

                INSITU      1
                BEDDING     1
                BACKFILL    1
1* * BEGIN PREP OF FINITE ELEMENT INPUT * *


0THE DATA TO BE RUN IS ENTITLED

0     HOMOGENEOUS


0NUMBER OF CONSTRUCTION INCREMENTS------    1
0PRINT CONTROL FOR PREP OUTPUT----------    1
```

```
0INPUT DATA CHECK-----------------------    0
0PLOT TAPE GENERATION-------------------    1
0ENTIRE FINITE ELEMENT RESULTS OUTPUT---    1
0THE NUMBER OF NODES IS-----------------  110
0THE NUMBER OF ELEMENTS IS--------------   96
0THE NUMBER OF BOUNDARY CONDITIONS IS---   45
1* * * * * * FOR MESH GENERATION OF * * * * * *


0     HOMOGENEOUS


0THE NUMBER OF DATA ERRORS IS-----------    0
0THE NUMBER OF SOIL MATERIALS IS--------    1
0THE NUMBER OF PIPE MATERIALS IS--------   10
0THE NUMBER OF INTERFACE MATERIALS IS---    0
0BAND WIDTH ESTIMATE (MAX)--------------   36
0* * * * * * * MESH DATA HAS BEEN SAVED * * * * * * *



           AN ORDERED LIST OF BEAM ELEMENTS AROUND PIPE.
           ORDERING IS CLOCKWISE FROM TOP TO BOTTOM OR LEFT TO RIGHT

              1    2    3    4    5    6    7    8    9   10
1

           MATERIAL CHARACTERIZATION FOR SOILS.
0

     PROPERTIES FOR MATERIAL  1   ********

          DENSITY =     .13000E+03
0          YOUNGS MODULUS=  .2000E+04
           POISSONS RATIO=  .3500E+00
           CONFINED MOD.=   .3210E+04
           LATERAL COEFF.=  .5385E+00
1


      CONSTRUCTION INCREMENT   1

      NODE       X-COORD.       Y-COORD.        X-DISP.        Y-DISP.
       1        .0000E+00     -.2536E+02      .0000E+00      .0000E+00
       2        .3295E+01     -.2536E+02      .0000E+00      .0000E+00
       3        .7446E+01     -.2536E+02      .0000E+00      .0000E+00
       4        .1268E+02     -.2536E+02      .0000E+00      .0000E+00
       5        .1927E+02     -.2536E+02      .0000E+00      .0000E+00
       6        .2757E+02     -.2536E+02      .0000E+00      .0000E+00
       7        .3804E+02     -.2536E+02      .0000E+00      .0000E+00
       8        .0000E+00     -.1882E+02      .0000E+00     -.2890E-01
       9        .3295E+01     -.1881E+02      .3562E-04     -.2899E-01
      10        .7446E+01     -.1880E+02      .1479E-03     -.2918E-01
      11        .1268E+02     -.1879E+02      .3370E-03     -.2939E-01
      12        .1927E+02     -.1879E+02      .4865E-03     -.2940E-01
      13        .2757E+02     -.1879E+02      .3779E-03     -.2934E-01
      14        .3804E+02     -.1879E+02      .0000E+00     -.2931E-01
      15        .0000E+00     -.1363E+02      .0000E+00     -.5121E-01
      16        .3295E+01     -.1362E+02      .2677E-03     -.5136E-01
      17        .7446E+01     -.1362E+02      .6886E-03     -.5186E-01
```

18	.1268E+02	-.1361E+02	.1208E-02	-.5204E-01
19	.1927E+02	-.1361E+02	.1235E-02	-.5184E-01
20	.2757E+02	-.1361E+02	.7751E-03	-.5165E-01
21	.3804E+02	-.1361E+02	.0000E+00	-.5159E-01
22	.0000E+00	-.9509E+01	.0000E+00	-.6825E-01
23	.3286E+01	-.9509E+01	.6154E-03	-.6913E-01
24	.7446E+01	-.9509E+01	.2061E-02	-.6987E-01
25	.1268E+02	-.9509E+01	.2567E-02	-.6939E-01
26	.1927E+02	-.9509E+01	.2071E-02	-.6893E-01
27	.2757E+02	-.9509E+01	.1109E-02	-.6869E-01
28	.3804E+02	-.9509E+01	.0000E+00	-.6865E-01
29	.0000E+00	-.7396E+01	.0000E+00	-.7655E-01
30	.2284E+01	-.7034E+01	.2764E-03	-.7920E-01
31	.4346E+01	-.5984E+01	.2688E-02	-.8571E-01
32	.5983E+01	-.4348E+01	.7220E-02	-.9349E-01
33	.9509E+01	-.6340E+01	.4473E-02	-.8303E-01
34	.1268E+02	-.6340E+01	.4079E-02	-.8224E-01
35	.1927E+02	-.6340E+01	.2740E-02	-.8166E-01
36	.2757E+02	-.6340E+01	.1322E-02	-.8151E-01
37	.3804E+02	-.6340E+01	.0000E+00	-.8152E-01
38	**.0000E+00**	**-.6340E+01**	**.0000E+00**	**-.8020E-01**
39	.1958E+01	-.6030E+01	-.2924E-03	-.8318E-01
40	.3726E+01	-.5130E+01	.2390E-02	-.9036E-01
41	.5129E+01	-.3727E+01	.8294E-02	-.9774E-01
42	.6029E+01	-.1960E+01	.1447E-01	-.1023E+00
43	.7034E+01	-.2287E+01	.1174E-01	-.9997E-01
44	.9509E+01	-.3170E+01	.7685E-02	-.9513E-01
45	.1268E+02	-.3170E+01	.5772E-02	-.9416E-01
46	.1927E+02	-.3170E+01	.3217E-02	-.9396E-01
47	.2757E+02	-.3170E+01	.1486E-02	-.9404E-01
48	.3804E+02	-.3170E+01	.0000E+00	-.9414E-01
49	.6340E+01	.0000E+00	.1703E-01	-.1040E+00
50	.7396E+01	.0000E+00	.1372E-01	-.1044E+00
51	.9509E+01	.0000E+00	.9837E-02	-.1048E+00
52	.1268E+02	.0000E+00	.6564E-02	-.1053E+00
53	.1927E+02	.0000E+00	.3472E-02	-.1059E+00
54	.2757E+02	.0000E+00	.1563E-02	-.1063E+00
55	.3804E+02	.0000E+00	.0000E+00	-.1065E+00
56	**.0000E+00**	**.6340E+01**	**.0000E+00**	**-.1273E+00**
57	.1959E+01	.6030E+01	-.2766E-03	-.1244E+00
58	.3727E+01	.5129E+01	.2332E-02	-.1174E+00
59	.5129E+01	.3726E+01	.8117E-02	-.1102E+00
60	.6030E+01	.1959E+01	.1430E-01	-.1058E+00
61	.7034E+01	.2285E+01	.1183E-01	-.1086E+00
62	.9509E+01	.3170E+01	.7898E-02	-.1143E+00
63	.1268E+02	.3170E+01	.6039E-02	-.1162E+00
64	.1927E+02	.3170E+01	.3413E-02	-.1176E+00
65	.2757E+02	.3170E+01	.1567E-02	-.1183E+00
66	.3804E+02	.3170E+01	.0000E+00	-.1186E+00
67	.0000E+00	.7396E+01	.0000E+00	-.1308E+00
68	.2286E+01	.7034E+01	.3704E-03	-.1282E+00
69	.4347E+01	.5983E+01	.2756E-02	-.1219E+00
70	.5984E+01	.4347E+01	.7248E-02	-.1150E+00
71	.9509E+01	.6340E+01	.5071E-02	-.1259E+00
72	.1268E+02	.6340E+01	.4620E-02	-.1275E+00
73	.1927E+02	.6340E+01	.3064E-02	-.1291E+00
74	.2757E+02	.6340E+01	.1492E-02	-.1301E+00
75	.3804E+02	.6340E+01	.0000E+00	-.1305E+00
76	.0000E+00	.8453E+01	.0000E+00	-.1346E+00
77	.2471E+01	.8453E+01	.5414E-03	-.1339E+00

78	.5585E+01	.7396E+01	.2938E-02	-.1284E+00
79	.0000E+00	.9509E+01	.0000E+00	-.1385E+00
80	.2471E+01	.9509E+01	.6610E-03	-.1381E+00
81	.5585E+01	.9509E+01	.1816E-02	-.1376E+00
82	.9509E+01	.9509E+01	.2860E-02	-.1384E+00
83	.1268E+02	.9509E+01	.3103E-02	-.1392E+00
84	.1927E+02	.9509E+01	.2534E-02	-.1407E+00
85	.2757E+02	.9509E+01	.1346E-02	-.1418E+00
86	.3804E+02	.9509E+01	.0000E+00	-.1422E+00
87	.0000E+00	.1361E+02	.0000E+00	-.1540E+00
88	.2471E+01	.1361E+02	.3781E-03	-.1540E+00
89	.5585E+01	.1362E+02	.9241E-03	-.1540E+00
90	.9509E+01	.1363E+02	.1558E-02	-.1542E+00
91	.1268E+02	.1363E+02	.1826E-02	-.1546E+00
92	.1927E+02	.1360E+02	.1802E-02	-.1555E+00
93	.2757E+02	.1356E+02	.1108E-02	-.1564E+00
94	.3804E+02	.1352E+02	.0000E+00	-.1567E+00
95	.0000E+00	.1879E+02	.0000E+00	-.1731E+00
96	.2471E+01	.1880E+02	.2473E-03	-.1731E+00
97	.5585E+01	.1881E+02	.5503E-03	-.1732E+00
98	.9509E+01	.1882E+02	.8923E-03	-.1733E+00
99	.1268E+02	.1882E+02	.1105E-02	-.1735E+00
100	.1927E+02	.1878E+02	.1215E-02	-.1741E+00
101	.2757E+02	.1874E+02	.8526E-03	-.1748E+00
102	.3804E+02	.1869E+02	.0000E+00	-.1750E+00
103	.0000E+00	.2536E+02	.0000E+00	-.1962E+00
104	.2458E+01	.2536E+02	.2166E-03	-.1962E+00
105	.5570E+01	.2536E+02	.4851E-03	-.1962E+00
106	.9509E+01	.2536E+02	.8019E-03	-.1963E+00
107	.1268E+02	.2536E+02	.1017E-02	-.1964E+00
108	.1923E+02	.2536E+02	.1228E-02	-.1968E+00
109	.2753E+02	.2536E+02	.9409E-03	-.1974E+00
110	.3804E+02	.2536E+02	.0000E+00	-.1978E+00

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CONSTRUCTION INCREMENT 1

BENDING ELEMENT RESULTANT FORCES ..

ELMNT	X-CENTER	Y-CENTER	THRUST	SHEAR	MOMENT
1	.9797E+00	.6185E+01	-.5316E+02	.2368E+01	.2248E+02
2	.2843E+01	.5579E+01	-.6108E+02	.6138E+01	.1404E+02
3	.4428E+01	.4428E+01	-.7393E+02	.7604E+01	.4145E+00
4	.5579E+01	.2843E+01	-.8712E+02	.6591E+01	-.1366E+02
5	.6185E+01	.9796E+00	-.9593E+02	.2686E+01	-.2286E+02
6	.6185E+01	-.9801E+00	-.9660E+02	-.2297E+01	-.2325E+02
7	.5579E+01	-.2844E+01	-.8920E+02	-.6448E+01	-.1457E+02
8	.4427E+01	-.4429E+01	-.7643E+02	-.8110E+01	-.1347E+00
9	.2842E+01	-.5580E+01	-.6339E+02	-.6492E+01	.1435E+02
10	.9791E+00	-.6185E+01	-.5539E+02	-.2459E+01	.2322E+02

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CONSTRUCTION INCREMENT 1

ELEMENT ELEMENT STRAINS AND STRESSES

NO. X Y EPSILON-X EPSILON-Y GAMA-XY SIGMA-X SIGMA-Y TAU-XY SIGMA-1 SIGMA-2 ANG

11	1.06E+00	6.70E+00	7.94E-05	-3.71E-03	9.85E-04	-6.16E+00	-1.18E+01	7.30E-01	-6.06E+00	-1.19E+01	7.29E+00
12	3.08E+00	6.04E+00	1.27E-03	-5.01E-03	8.58E-04	-4.58E+00	-1.39E+01	6.35E-01	-4.54E+00	-1.39E+01	3.89E+00
13	4.80E+00	4.80E+00	1.55E-03	-5.52E-03	-2.63E-03	-4.57E+00	-1.50E+01	-1.95E+00	-4.22E+00	-1.54E+01	-1.02E+01
14	6.04E+00	3.08E+00	-2.27E-04	-3.96E-03	-5.04E-03	-7.58E+00	-1.31E+01	-3.74E+00	-5.70E+00	-1.50E+01	-2.67E+01
15	6.70E+00	1.06E+00	-2.47E-03	-1.66E-03	-2.75E-03	-1.08E+01	-9.61E+00	-2.04E+00	-8.08E+00	-1.23E+01	1.27E+02
16	6.70E+00	-1.06E+00	-2.60E-03	-1.59E-03	2.10E-03	-1.11E+01	-9.58E+00	1.55E+00	-8.61E+00	-1.21E+01	5.79E+01
17	6.04E+00	-3.08E+00	-4.09E-04	-3.70E-03	4.54E-03	-7.71E+00	-1.26E+01	3.36E+00	-5.99E+00	-1.43E+01	2.70E+01
18	4.80E+00	-4.80E+00	1.50E-03	-5.49E-03	2.41E-03	-4.66E+00	-1.50E+01	1.79E+00	-4.36E+00	-1.53E+01	9.53E+00
19	3.08E+00	-6.04E+00	1.24E-03	-5.18E-03	-7.84E-04	-4.97E+00	-1.45E+01	-5.81E-01	-4.93E+00	-1.45E+01	-3.48E+00
20	1.06E+00	-6.70E+00	4.72E-05	-3.86E-03	-9.77E-04	-6.52E+00	-1.23E+01	-7.24E-01	-6.43E+00	-1.24E+01	-7.03E+00
21	1.19E+00	7.83E+00	2.02E-04	-3.86E-03	4.19E-04	-6.02E+00	-1.20E+01	3.10E-01	-6.00E+00	-1.20E+01	2.95E+00
22	3.67E+00	7.22E+00	8.09E-04	-4.56E-03	1.68E-04	-5.28E+00	-1.32E+01	1.25E-01	-5.28E+00	-1.32E+01	8.99E-01
23	6.36E+00	6.02E+00	6.52E-04	-4.47E-03	-1.83E-03	-5.64E+00	-1.32E+01	-1.36E+00	-5.40E+00	-1.35E+01	-9.82E+00
24	8.01E+00	4.04E+00	-2.85E-04	-3.69E-03	-2.46E-03	-7.29E+00	-1.23E+01	-1.82E+00	-6.70E+00	-1.29E+01	-1.79E+01
25	8.36E+00	1.36E+00	-1.51E-03	-2.60E-03	-1.62E-03	-9.35E+00	-1.10E+01	-1.20E+00	-8.71E+00	-1.16E+01	-2.80E+01
26	8.36E+00	-1.36E+00	-1.46E-03	-2.70E-03	1.25E-03	-9.36E+00	-1.12E+01	9.26E-01	-8.98E+00	-1.16E+01	2.27E+01
27	8.01E+00	-4.04E+00	-2.92E-04	-3.84E-03	2.17E-03	-7.57E+00	-1.28E+01	1.61E+00	-7.12E+00	-1.33E+01	1.58E+01
28	6.82E+00	-6.55E+00	4.85E-04	-4.58E-03	1.14E-03	-6.35E+00	-1.38E+01	8.43E-01	-6.26E+00	-1.39E+01	6.34E+00
29	4.34E+00	-8.01E+00	6.10E-04	-4.58E-03	-4.32E-06	-5.96E+00	-1.36E+01	-3.20E-03	-5.96E+00	-1.36E+01	-2.38E-02
30	1.39E+00	-8.36E+00	1.82E-04	-4.11E-03	-3.94E-04	-6.53E+00	-1.29E+01	-2.92E-01	-6.51E+00	-1.29E+01	-2.62E+00
31	1.65E+00	-2.21E+01	5.41E-06	-4.42E-03	-6.57E-06	-7.63E+00	-1.42E+01	-4.87E-03	-7.63E+00	-1.42E+01	-4.25E-02
32	5.37E+00	-2.21E+01	1.35E-05	-4.44E-03	-4.07E-06	-7.63E+00	-1.42E+01	-3.01E-03	-7.63E+00	-1.42E+01	-2.61E-02
33	1.01E+01	-2.21E+01	1.80E-05	-4.46E-03	2.13E-05	-7.66E+00	-1.43E+01	1.58E-02	-7.66E+00	-1.43E+01	1.36E-01
34	1.60E+01	-2.21E+01	1.13E-05	-4.48E-03	6.17E-05	-7.70E+00	-1.44E+01	4.57E-02	-7.70E+00	-1.44E+01	3.94E-01
35	2.34E+01	-2.21E+01	-6.54E-06	-4.47E-03	6.99E-05	-7.75E+00	-1.44E+01	5.18E-02	-7.75E+00	-1.44E+01	4.48E-01
36	3.28E+01	-2.21E+01	-1.81E-05	-4.47E-03	3.02E-05	-7.78E+00	-1.44E+01	2.23E-02	-7.78E+00	-1.44E+01	1.94E-01
37	1.65E+00	-1.62E+01	4.60E-05	-4.30E-03	-5.58E-06	-7.29E+00	-1.37E+01	-4.13E-03	-7.29E+00	-1.37E+01	-3.68E-02
38	5.37E+00	-1.62E+01	6.41E-05	-4.34E-03	-5.94E-07	-7.30E+00	-1.38E+01	-4.40E-04	-7.30E+00	-1.38E+01	-3.87E-03
39	1.01E+01	-1.62E+01	6.74E-05	-4.37E-03	1.07E-04	-7.34E+00	-1.39E+01	7.90E-02	-7.33E+00	-1.39E+01	6.88E-01
40	1.60E+01	-1.62E+01	1.35E-05	-4.35E-03	1.71E-04	-7.47E+00	-1.39E+01	1.26E-01	-7.47E+00	-1.39E+01	1.12E+00

41	2.34E+01	-1.62E+01	-3.42E-05	-4.31E-03	1.26E-04	-7.57E+00	-1.39E+01	9.32E-02	-7.57E+00	-1.39E+01	8.42E-01
42	3.28E+01	-1.62E+01	-5.51E-05	-4.30E-03	4.27E-05	-7.61E+00	-1.39E+01	3.16E-02	-7.61E+00	-1.39E+01	2.88E-01
43	1.65E+00	-1.16E+01	1.34E-04	-4.23E-03	-1.10E-04	-6.88E+00	-1.33E+01	-8.17E-02	-6.88E+00	-1.33E+01	-7.24E-01
44	5.37E+00	-1.16E+01	2.24E-04	-4.35E-03	6.36E-05	-6.80E+00	-1.36E+01	4.71E-02	-6.80E+00	-1.36E+01	3.98E-01
45	1.01E+01	-1.16E+01	9.77E-05	-4.31E-03	3.65E-04	-7.14E+00	-1.37E+01	2.71E-01	-7.12E+00	-1.37E+01	2.37E+00
46	1.60E+01	-1.16E+01	-3.55E-05	-4.20E-03	3.18E-04	-7.38E+00	-1.35E+01	2.36E-01	-7.37E+00	-1.36E+01	2.18E+00
47	2.34E+01	-1.16E+01	-8.57E-05	-4.17E-03	1.68E-04	-7.47E+00	-1.35E+01	1.24E-01	-7.47E+00	-1.35E+01	1.18E+00
48	3.28E+01	-1.16E+01	-9.00E-05	-4.16E-03	4.58E-05	-7.48E+00	-1.35E+01	3.39E-02	-7.48E+00	-1.35E+01	3.22E-01
49	1.06E+01	-7.92E+00	2.55E-05	-4.17E-03	7.63E-04	-7.12E+00	-1.33E+01	5.65E-01	-7.07E+00	-1.34E+01	5.15E+00
50	1.60E+01	-7.92E+00	-1.39E-04	-4.04E-03	4.23E-04	-7.42E+00	-1.32E+01	3.13E-01	-7.41E+00	-1.32E+01	3.10E+00
51	2.34E+01	-7.92E+00	-1.43E-04	-4.03E-03	1.62E-04	-7.43E+00	-1.32E+01	1.20E-01	-7.42E+00	-1.32E+01	1.19E+00
52	3.28E+01	-7.92E+00	-1.16E-04	-4.05E-03	3.53E-05	-7.38E+00	-1.32E+01	2.62E-02	-7.38E+00	-1.32E+01	2.57E-01
53	1.11E+01	-4.76E+00	-3.64E-04	-3.79E-03	1.05E-03	-7.72E+00	-1.28E+01	7.79E-01	-7.60E+00	-1.29E+01	8.53E+00
54	1.60E+01	-4.76E+00	-2.95E-04	-3.82E-03	4.02E-04	-7.55E+00	-1.28E+01	2.98E-01	-7.54E+00	-1.28E+01	3.25E+00
55	2.34E+01	-4.76E+00	-1.90E-04	-3.92E-03	1.05E-04	-7.38E+00	-1.29E+01	7.77E-02	-7.38E+00	-1.29E+01	8.06E-01
56	3.28E+01	-4.76E+00	-1.34E-04	-3.97E-03	2.08E-05	-7.28E+00	-1.30E+01	1.54E-02	-7.28E+00	-1.30E+01	1.55E-01
57	1.11E+01	-1.59E+00	-8.18E-04	-3.28E-03	5.43E-04	-8.30E+00	-1.20E+01	4.03E-01	-8.26E+00	-1.20E+01	6.22E+00
58	1.60E+01	-1.59E+00	-4.28E-04	-3.64E-03	1.35E-04	-7.66E+00	-1.24E+01	1.00E-01	-7.66E+00	-1.24E+01	1.21E+00
59	2.34E+01	-1.59E+00	-2.19E-04	-3.81E-03	2.22E-05	-7.30E+00	-1.26E+01	1.64E-02	-7.30E+00	-1.26E+01	1.77E-01
60	3.28E+01	-1.59E+00	-1.46E-04	-3.88E-03	-1.43E-06	-7.18E+00	-1.27E+01	-1.06E-03	-7.18E+00	-1.27E+01	-1.10E-02
61	1.11E+01	1.59E+00	-8.10E-04	-3.23E-03	-7.56E-04	-8.17E+00	-1.18E+01	-5.60E-01	-8.09E+00	-1.18E+01	-8.69E+00
62	1.60E+01	1.59E+00	-4.34E-04	-3.56E-03	-2.39E-04	-7.55E+00	-1.22E+01	-1.77E-01	-7.55E+00	-1.22E+01	-2.19E+00
63	2.34E+01	1.59E+00	-2.26E-04	-3.74E-03	-8.03E-05	-7.19E+00	-1.24E+01	-5.95E-02	-7.19E+00	-1.24E+01	-6.55E-01
64	3.28E+01	1.59E+00	-1.50E-04	-3.81E-03	-2.22E-05	-7.06E+00	-1.25E+01	-1.64E-02	-7.06E+00	-1.25E+01	-1.74E-01
65	1.11E+01	4.76E+00	-3.64E-04	-3.60E-03	-1.20E-03	-7.40E+00	-1.22E+01	-8.90E-01	-7.24E+00	-1.24E+01	-1.02E+01
66	1.60E+01	4.76E+00	-3.17E-04	-3.60E-03	-5.08E-04	-7.24E+00	-1.21E+01	-3.77E-01	-7.21E+00	-1.21E+01	-4.40E+00
67	2.34E+01	4.76E+00	-2.06E-04	-3.69E-03	-1.74E-04	-7.04E+00	-1.22E+01	-1.29E-01	-7.03E+00	-1.22E+01	-1.43E+00
68	3.28E+01	4.76E+00	-1.46E-04	-3.74E-03	-4.35E-05	-6.93E+00	-1.23E+01	-3.22E-02	-6.93E+00	-1.23E+01	-3.47E-01
69	1.24E+00	8.98E+00	2.43E-04	-3.87E-03	2.64E-04	-5.91E+00	-1.20E+01	1.95E-01	-5.91E+00	-1.20E+01	1.83E+00
70	4.03E+00	8.72E+00	5.08E-04	-4.22E-03	-3.96E-05	-5.67E+00	-1.27E+01	-2.93E-02	-5.67E+00	-1.27E+01	-2.40E-01

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     71       7.55E+00   8.19E+00   3.07E-04  -4.08E-03  -9.45E-04  -6.07E+00  -
1.26E+01  -7.00E-01  -6.00E+00  -1.26E+01  -6.07E+00
     72       1.11E+01   7.92E+00  -3.28E-05  -3.81E-03  -9.54E-04  -6.69E+00  -
1.23E+01  -7.07E-01  -6.60E+00  -1.24E+01  -7.09E+00
     73       1.60E+01   7.92E+00  -1.61E-04  -3.67E-03  -5.64E-04  -6.86E+00  -
1.21E+01  -4.18E-01  -6.83E+00  -1.21E+01  -4.57E+00
     74       2.34E+01   7.92E+00  -1.66E-04  -3.66E-03  -2.33E-04  -6.85E+00  -
1.20E+01  -1.73E-01  -6.85E+00  -1.20E+01  -1.91E+00
     75       3.28E+01   7.92E+00  -1.36E-04  -3.68E-03  -6.22E-05  -6.80E+00  -
1.20E+01  -4.61E-02  -6.80E+00  -1.20E+01  -5.03E-01
     76       1.24E+00   1.16E+01   2.10E-04  -3.83E-03   5.25E-05  -5.94E+00  -
1.19E+01   3.89E-02  -5.94E+00  -1.19E+01   3.72E-01
     77       4.03E+00   1.16E+01   2.73E-04  -3.93E-03  -4.26E-05  -5.91E+00  -
1.21E+01  -3.16E-02  -5.91E+00  -1.21E+01  -2.91E-01
     78       7.55E+00   1.16E+01   2.14E-04  -3.91E-03  -3.88E-04  -6.07E+00  -
1.22E+01  -2.87E-01  -6.06E+00  -1.22E+01  -2.69E+00
     79       1.11E+01   1.16E+01   8.07E-05  -3.79E-03  -5.03E-04  -6.29E+00  -
1.20E+01  -3.72E-01  -6.26E+00  -1.20E+01  -3.70E+00
     80       1.60E+01   1.16E+01  -4.56E-05  -3.68E-03  -4.39E-04  -6.51E+00  -
1.19E+01  -3.25E-01  -6.49E+00  -1.19E+01  -3.44E+00
     81       2.34E+01   1.15E+01  -1.14E-04  -3.62E-03  -2.47E-04  -6.62E+00  -
1.18E+01  -1.83E-01  -6.62E+00  -1.18E+01  -2.02E+00
     82       3.28E+01   1.15E+01  -1.17E-04  -3.62E-03  -7.32E-05  -6.63E+00  -
1.18E+01  -5.42E-02  -6.63E+00  -1.18E+01  -5.99E-01
     83       1.24E+00   1.62E+01   1.27E-04  -3.68E-03  -6.82E-06  -5.96E+00  -
1.16E+01  -5.05E-03  -5.96E+00  -1.16E+01  -5.13E-02
     84       4.03E+00   1.62E+01   1.36E-04  -3.70E-03  -3.74E-05  -5.95E+00  -
1.16E+01  -2.77E-02  -5.95E+00  -1.16E+01  -2.79E-01
     85       7.55E+00   1.62E+01   1.25E-04  -3.70E-03  -1.36E-04  -5.99E+00  -
1.17E+01  -1.01E-01  -5.99E+00  -1.17E+01  -1.02E+00
     86       1.11E+01   1.62E+01   7.59E-05  -3.67E-03  -2.24E-04  -6.09E+00  -
1.16E+01  -1.66E-01  -6.09E+00  -1.16E+01  -1.71E+00
     87       1.60E+01   1.62E+01   5.92E-06  -3.61E-03  -2.58E-04  -6.22E+00  -
1.16E+01  -1.91E-01  -6.22E+00  -1.16E+01  -2.04E+00
     88       2.34E+01   1.62E+01  -6.40E-05  -3.56E-03  -1.95E-04  -6.36E+00  -
1.15E+01  -1.44E-01  -6.35E+00  -1.15E+01  -1.60E+00
     89       3.28E+01   1.61E+01  -9.38E-05  -3.54E-03  -6.85E-05  -6.42E+00  -
1.15E+01  -5.07E-02  -6.42E+00  -1.15E+01  -5.69E-01
     90       1.23E+00   2.21E+01   9.41E-05  -3.52E-03  -3.60E-06  -5.78E+00  -
1.11E+01  -2.66E-03  -5.78E+00  -1.11E+01  -2.85E-02
     91       4.02E+00   2.21E+01   9.18E-05  -3.52E-03  -1.38E-05  -5.79E+00  -
1.11E+01  -1.02E-02  -5.79E+00  -1.11E+01  -1.09E-01
     92       7.54E+00   2.21E+01   8.38E-05  -3.52E-03  -3.21E-05  -5.81E+00  -
1.11E+01  -2.38E-02  -5.81E+00  -1.11E+01  -2.55E-01
     93       1.11E+01   2.21E+01   6.75E-05  -3.51E-03  -5.66E-05  -5.85E+00  -
1.11E+01  -4.19E-02  -5.85E+00  -1.11E+01  -4.54E-01
     94       1.60E+01   2.21E+01   2.45E-05  -3.48E-03  -8.89E-05  -5.94E+00  -
1.11E+01  -6.58E-02  -5.94E+00  -1.11E+01  -7.26E-01
     95       2.34E+01   2.21E+01  -3.91E-05  -3.44E-03  -8.09E-05  -6.08E+00  -
1.11E+01  -5.99E-02  -6.08E+00  -1.11E+01  -6.81E-01
     96       3.28E+01   2.20E+01  -8.55E-05  -3.42E-03  -3.16E-05  -6.18E+00  -
1.11E+01  -2.34E-02  -6.18E+00  -1.11E+01  -2.72E-01
1

          STRUCTURAL RESPONSES OF CULVERT    LOAD STEP = 1

     X-COORD.      X-DISP.      N-PRES.       MOMENT       THRUST        SHEAR
     Y-COORD.      Y-DISP.      S-PRES.     M-STRESS     T-STRESS     S-STRESS

          .00     .000E+00    -.107E+02     .248E+02    -.532E+02     .000E+00
```

6.34	-.127E+00	.000E+00	.111E+03	-.459E+02	.000E+00
1.96	-.277E-03	-.109E+02	.201E+02	-.571E+02	.425E+01
6.03	-.124E+00	-.327E+01	.899E+02	-.493E+02	.367E+01
3.73	.233E-02	-.114E+02	.796E+01	-.675E+02	.687E+01
5.13	-.117E+00	-.532E+01	.355E+02	-.582E+02	.593E+01
5.13	.812E-02	-.122E+02	-.713E+01	-.805E+02	.710E+01
3.73	-.110E+00	-.545E+01	-.318E+02	-.695E+02	.612E+01
6.03	.143E-01	-.125E+02	-.202E+02	-.915E+02	.464E+01
1.96	-.106E+00	-.365E+01	-.902E+02	-.790E+02	.400E+01
6.34	.170E-01	-.127E+02	-.255E+02	-.963E+02	.194E+00
.00	-.104E+00	-.305E+00	-.114E+03	-.831E+02	.168E+00
6.03	.145E-01	-.126E+02	-.210E+02	-.929E+02	-.437E+01
-1.96	-.102E+00	.299E+01	-.937E+02	-.802E+02	-.377E+01
5.13	.829E-02	-.122E+02	-.818E+01	-.828E+02	-.728E+01
-3.73	-.977E-01	.521E+01	-.365E+02	-.715E+02	-.628E+01
3.73	.239E-02	-.118E+02	.791E+01	-.699E+02	-.730E+01
-5.13	-.904E-01	.535E+01	.353E+02	-.603E+02	-.630E+01
1.96	-.292E-03	-.114E+02	.208E+02	-.594E+02	-.448E+01
-6.03	-.832E-01	.328E+01	.928E+02	-.512E+02	-.386E+01
.00	.000E+00	-.112E+02	.257E+02	-.554E+02	.000E+00
-6.34	-.802E-01	.000E+00	.115E+03	-.478E+02	.000E+00

1

CALCULATED SAFETY FACTORS AT STEP 1

DISPLACEMENT ..... (DIAMETER*0.2/MAX-DISP.) = 53.83

OUTER-FIBER STRESS ... (ULTIMATE / MAXIMUM) = 16.19

ELASTIC BUCKLING ..... (P-CRITICAL/P-AVERAGE) = 55.36

PERFORMANCE FACTORS

HANDELING ..... (FF*E*I/D**2) = 29.56

* * * * NORMAL EXIT FROM CANDE * * * *

Attachment 2

References

PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

Revised 04-07-2009

IPS Size and Dimension Data

PE4710 (PE3408)

DriscoPlex® Municipal & Industrial & Energy Series/IPS Pipe Data

Pressure Ratings are calculated using 0.63 design factor for HDS at 73°F as listed in PPI TR-4 for PE 4710 materials.
Temperature, Chemical, and Environmental use considerations may require use of additional design factors.

Pressure Rating	317 psi DR 7.3			250 psi DR 9.0			200 psi DR 11.0			160 psi DR 13.5			
IPS Pipe Size	Nominal OD (in)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	Minimum Wall (in)	Average ID (in)	Weight (lbs/ft)	IPS Pipe Size
1/2	0.840	0.115	0.679	0.25	0.093	0.697	0.21	0.076	0.714	0.17	0.062	0.731	0.14	1/2
3/4	1.050	0.143	0.848	0.38	0.117	0.871	0.32	0.095	0.892	0.26	0.078	0.913	0.21	3/4
1	1.315	0.179	1.062	0.59	0.146	1.091	0.49	0.119	1.117	0.40	0.098	1.144	0.32	1
1 1/4	1.660	0.226	1.340	0.92	0.184	1.377	0.77	0.151	1.410	0.63	0.123	1.443	0.51	1 1/4
1 1/2	1.900	0.259	1.534	1.21	0.211	1.576	1.00	0.173	1.614	0.82	0.141	1.652	0.67	1 1/2
2	2.375	0.324	1.916	1.89	0.264	1.969	1.57	0.216	2.017	1.28	0.176	2.065	1.04	2
3	3.500	0.477	2.822	4.10	0.389	2.900	3.40	0.318	2.970	2.77	0.259	3.041	2.26	3
4	4.500	0.614	3.629	6.78	0.500	3.729	5.62	0.409	3.819	4.58	0.333	3.909	3.73	4
6	6.625	0.903	5.340	14.69	0.736	5.488	12.18	0.602	5.622	9.93	0.491	5.754	8.08	6
8	8.625	1.176	6.953	24.87	0.958	7.144	20.63	0.784	7.316	16.81	0.639	7.488	13.68	8
10	10.750	1.466	8.666	38.61	1.194	8.905	32.02	0.977	9.118	26.09	0.796	9.332	21.24	10
12	12.750	1.738	10.275	54.26	1.417	10.560	45.00	1.159	10.811	36.66	0.944	11.066	29.85	12
14	14.000	1.909	11.284	65.5	1.556	11.600	54.34	1.273	11.872	44.27	1.037	12.145	36.05	14
16	16.000	2.182	12.900	85.6	1.778	13.257	71.00	1.455	13.568	57.83	1.185	13.879	47.09	16
18	18.000	2.455	14.516	108.4	2.000	14.914	89.9	1.636	15.264	73.2	1.333	15.612	59.6	18
20	20.000	2.727	16.131	133.8	2.222	16.571	111.0	1.818	16.960	90.4	1.481	17.344	73.6	20
22	22.000	3.000	17.747	161.9	2.444	18.228	134.3	2.000	18.656	109.4	1.630	19.076	89.1	22
24	24.000	3.273	19.362	192.8	2.667	19.885	159.9	2.182	20.352	130.2	1.778	20.808	106.0	24
26	26.000				2.889	21.542	187.9	2.364	22.048	153.0	1.926	21.537	124.5	26
28	28.000				3.111	23.199	218.0	2.545	23.744	177.5	2.074	23.269	144.5	28
30	30.000				3.333	24.857	250.2	2.727	25.440	203.7	2.222	24.933	165.8	30
32	32.000				3.556	26.514	284.6	2.909	27.136	231.8	2.370	26.597	188.6	32
34	34.000							3.091	28.832	261.2	2.519	28.261	212.6	34
36	36.000							3.273	30.528	292.8	2.667	29.925	238.2	36
42	42.000										3.111	34.915	333.8	42
48	48.000													48
54	54.000													54

Pipe weights are calculated in accordance with PPI TR-7. Average inside diameter is calculated using nomnal OD and Minimum wall plus 6% for use in estimating fluid flows. Actual ID will vary. When designing components to fit the pipe ID, refer to pipe dimension and tolerances in the applicable pipe manufacturing specification.

Visit www.performancepipe.com for the most current literature.

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TRUCK LOADS ON PIPE BURIED AT SHALLOW DEPTHS

By
Richard W. Bonds, P.E.
DIPRA Research/Technical Director

Depth of cover less than 2½ feet is generally not recommended under roads and highways due to the possibility of high dynamic loading. Such loadings could result in damage to the pavements and/or the pipes. If impact factors higher than 1.5 (which is used in this paper) are anticipated, then such should be employed. For any given project, the ultimate responsibility for the proper use of the equations and other data provided in this paper rests with the design engineer. Call DIPRA with questions before applying this paper.

The procedure for calculating truck loads on buried Ductile Iron pipe is provided in ANSI/AWWA Standard C150/A21.50.[1] This procedure is based on the teachings of Merlin Spangler and others and utilizes the same procedures used in the venerable design standard ANSI A21.1[2] for Cast Iron pipe. The design method is based on two assumptions:

1. A single concentrated wheel load at the surface, and
2. Uniform load distribution over an effective pipe length of 3 feet.

The truck load on pipe buried under flexible pavement is given by Equation 5 in ANSI/AWWA C150/A21.50. It is shown below as Equation 1.

Equation 1

$$P_t = RF\,\frac{CP}{bD}$$

where
P_t = Truck load in pounds per square inch
R = Reduction factor (see Table 4 in C150/A21.50). This factor takes account of the fact that the part of the pipe directly below the wheels receives the truck superload in its full intensity but is aided in carrying the load by adjacent parts of the pipe that receive little or no load from the truck
F = Impact factor of 1.5 (this is consistent with ASCE Manual No. 37)[3]
C = Surface load factor
P = Wheel load in pounds (for design purposes, 16,000 lbs., for a single AASHTO H-20 truck on unpaved road or flexible pavement)
b = Effective pipe length of 36 inches
D = Outside diameter of the pipe in inches

The surface load factor, C, is a measure of how the wheel load at the surface is transmitted and distributed through the soil to the pipe. C is given by Equation 6 in C150/A21.50 and is shown here as Equation 2.

Equation 2

$$C = 1 - \frac{2}{\pi}\,ARCSIN\left[H\sqrt{\frac{A^2+H^2+1.5^2}{(A^2+H^2)(1.5^2+H^2)}}\right] + \frac{2}{\pi}\left(\frac{1.5\,AH}{\sqrt{A^2+H^2+1.5^2}}\right)\left[\frac{1}{A^2+H^2}+\frac{1}{1.5^2+H^2}\right]$$

NOTE: Angles are in radians.

where
H = Depth of cover in feet
A = Outside radius of the pipe in feet

This equation for the surface load factor, C, is derived from Holl's integration of the Boussinesq formula for vertical unit pressure, assuming the load is to be determined on a 3-foot section of pipe directly under the point load.[4]

Regarding the point load assumption, the following Boussinesq equation (Equation 3) gives the vertical stress at any point in an elastic medium when a point load is exerted at the surface,

Equation 3

$$\sigma_z = \left(\frac{3P}{2\pi}\right)\left(\frac{H^3}{R_1^5}\right)$$

where
σ_z = Vertical stress in pounds per square inch
P = Point load at surface in pounds
H = Depth in inches
R_1 = Distance from the point load to the point at which the stress is to be determined in inches (See Figure 1)

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United States
Department of
Agriculture

**Natural
Resources
Conservation
Service**

Part 636 Structural Engineering
National Engineering Handbook

Chapter 52 Structural Design of Flexible Conduits

(210-VI-NEH, First Edition, June 2005)

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Depth of cover	Impact factor
< 1'0"	1.3
1'1" – 2'0"	1.2
2'0" – 2'11"	1.1
≥ 3'0"	1.0

AN IMPACT FACTOR OF 1.5 IS USED FOR CONSERVATISM

Figure 52–9 Load pressure distribution

(a) D_o-t < 2.67hx12

(b) D_o-t ≥ 2.67hx12

The pressure on the pipe from the wheel load may be determined by:

$$P_w = \frac{W_L}{\left(\frac{D_o}{12}\right)} \qquad (52\text{–}21)$$

where:
P_w = pressure on pipe from wheel load, lb/ft^2
D_o = outside diameter of pipe, in

When the depth of fill is 2 feet or more, wheel loads may be considered as uniformly distributed over a square with sides equal to 1 3/4 times the depth of fill.

$$P_w = \frac{P_L}{(1.75h)^2} \qquad (52\text{–}22)$$

(c) Vacuum pressure

Pipe may be subject to an effective external pressure because of an internal vacuum pressure, P_v. Sudden valve closures, shutoff of a pump, or drainage from high points within the system often create a vacuum in pipelines. Siphons will all be subject to negative pressures.

Vacuum pressure should be incorporated into the design of buried and aboveground pipes as described in this chapter. The vacuum pressure may be intermittent (short term), for long durations, or continuously (long term).

The vacuum load per length of pipe may be determined by:

$$W_V = P_V \times \frac{D_i}{12} \qquad (52\text{–}23)$$

where:
W_v = vacuum load per linear foot of pipe, lb/ft
P_v = internal vacuum pressure, lb/ft^2
D_i = inside pipe diameter, in

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Corrugated-plastic pipe as:

$$\frac{\%\Delta X}{D} = \frac{\left(D_L P_S + P_w + P_V\right)\left(\frac{1}{144}\right)K(100)}{\left[0.149PS + 0.061E'\right]} \qquad (52\text{–}31)$$

Profile-wall pipe:

$$\frac{\%\Delta X}{D} = \frac{\left(D_L P_S + P_w + P_V\right)\left(\frac{1}{144}\right)K(100)}{\left[\left(\frac{1.24(RSC)}{D_i}\right) + 0.061E'\right]} \qquad (52\text{–}32)$$

where:

$\frac{\%\Delta X}{D}$ = percent deflection

D_L = deflection lag factor (1.0 to 1.5)

K = bedding constant (0.1)

P_s = pressure on pipe from soil (lb/ft^2)

P_w = pressure on pipe from wheel load (lb/ft^2)

P_v = internal vacuum pressure (lb/ft^2)

E = modulus of elasticity of pipe material (as shown below)

SDR = D_o dimension ratio
  SDR = D_o/t
  D_o = pipe outside diameter, in
  t = minimum wall thickness, in

SIDR = D_i dimension ratio
  SIDR = D_i/t
  D_i = pipe inside diameter, in
  t = minimum wall thickness, in

PS = pipe stiffness

RSC = ring stiffness constant

D_i = inside pipe diameter, in

E' = modulus of soil reaction, lb/in^2 (see table 52–2)

Material	Modulus of elasticity* (lb/in^2)
PVC	400,000 (short term)
ABS	300,000 (short term)
Polyethylene	110,000 (short term)

* Short-term modulus of elasticity varies with the cell class of each plastic. Specific values may be obtained from the manufacturer.

The modulus of soil reaction, E', is an interactive modulus representing support of the soil in reaction to the lateral pipe deflection under load. Amster Howard of the Bureau of Reclamation (Howard, 1977) developed recommended E' values based on the soil prism load described above. The recommended values are provided in table 52–2.

> The allowable deflections for plastic pipe typically are limited to 5 percent for a spillway/outlet conduit in embankment dam practice and 7.5 percent in water or liquid conveyance practice and drains in embankment dam practice.

(3) Wall buckling

Plastic pipe embedded in soil may buckle because of excessive loads and deformations. The total permanent pressure must be less than the allowable buckling pressure. The permanent load should consist of the soil pressure, groundwater pressure, and any internal long-term vacuum pressures. The allowable buckling pressure may be determined from:

$$q_a = \frac{1}{FS}\left(32R_w B'E' \frac{E_{long} I_{pw}}{D_o^3}\right)^{1/2} \qquad (52\text{–}33)$$

(Moser, 2001)

where:

q_a = allowable buckling pressure, lb/in^2

FS = design factor of safety
  = 2.5 for $(h/(D_o/12) > 2$
  = 3.0 for $(h/(D_o/12) < 2$
  where:
  h = height of ground surface above top of pipe, ft
  D_o = outside diameter of the pipe, in

R_w = water buoyancy factor
  = $1-0.33(h_w/h)$, $0<h_w<h$
  where:
  h = height of ground surface above top of pipe, ft
  h_w = height of water above top of pipe, ft

B' = empirical coefficient of elastic support

$$= \frac{4\left(h^2 + \left(\frac{D_o}{12}\right)h\right)}{1.5\left(2h + \left(\frac{D_o}{12}\right)\right)^2}$$

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E_{long} = long term modulus of elasticity, lb/in^2 (see table below)

The long term modulus of elasticity is recommended if the pipe is subject to the pressure in the normal operations. If the pipe is subject to the pressure for short time periods and infrequently, the use of the short-term modulus of elasticity is acceptable.

E' = modulus of soil reaction, lb/in^2 (table 52–2)

I_{pw} = pipe wall moment of inertia

$= \frac{t^3}{12}$, in^4 / in (for solid wall pipe)

where:

t = pipe wall thickness, in

D_o = outside pipe diameter, in

Material	Modulus of elasticity* (lb/in^2)
PVC	140,000 (long term)
ABS	65,000 (long term)
Polyethylene	22,000 (long term)

* Long-term modulus of elasticity varies with the cell class of each plastic. Specific values may be obtained from the manufacturer.

Pipes that are out-of-round or deflected increase in bending moment and have less allowable buckling pressure. The allowable buckling pressure should be reduced by the following factor:

$$C = \left[\frac{\left(1 - \frac{\%\Delta X}{D} \frac{1}{100}\right)}{\left(1 + \frac{\%\Delta X}{D} \frac{1}{100}\right)^2} \right]^3 \qquad (52\text{–}34)$$

where:

C = reduction factor for buckling pressure

$\frac{\%\Delta X}{D}$ = percent deflection

Table 52–2 Average values of the modulus of soil reaction for the Modified Iowa Equation

Soil type – pipe bedding material (Unified Soil Classification – ASTM D2487)	E' for degree of compaction of bedding, lb/in^2 1/ Dumped	Slight, < 85% proctor, < 40% relative density	Moderate, 85-95% proctor, 40-70% relative density	High, > 95% proctor, > 70% relative density
Fine-grained soil (LL>50) 2/ Soil with medium to high plasticity CH, MH, CH-MH	No data available, use E' = 0 or consult with a geotechnical engineer			
Fine-grained soil (LL<50) soil with medium to no plasticity CL, ML, ML-CL, with less than 25% coarse-grained particles	50	200	400	1,000
Fine-grained soil (LL<50) soil with medium to no plasticity CL, ML, ML-CL, with more than 25% coarse-grained particles. Coarse-grained soil with fines GM, GC, SM, SC contains more than 12% fines	100	400	1,000	2,000
Coarse-grained soil with little or no fines GW, GP, SW, SP contains less than 12% fines	200	1,000	2,000	3,000
Crushed rock	1,000	3,000	3,000	3,000

COARSE-GRAINED COMPACTED SAND

1/ Source ASCE Journal of Geotechnical Engineering Division, January 1977
2/ LL = liquid limit

Figure 6.13 Plot of Δp against distance x

6.7 Vertical Stress Below the Center of a Uniformly Loaded Circular Area

Using Boussinesq's solution for vertical stress Δp_z due to a point load [Eq. (6.11)], one can also develop an expression for the vertical stress below the center of a uniformly loaded flexible circular area.

Referring to Figure 6.14, let the intensity of pressure on the circular area of radius R be equal to q. The total load on the elementary area (shaded

Figure 6.14 Vertical stress below the center of a uniformly loaded flexible circular area

in the figure) $= qr\,dr\,d\alpha$. The vertical stress, dp, at point A due to the load on the elementary area (which may be assumed to be a concentrated load) can be obtained from Eq. (6.11):

$$dp = \frac{3(qr\,dr\,d\alpha)}{2\pi}\frac{z^3}{(r^2+z^2)^{5/2}} \tag{6.23}$$

The increase of stress at A due to the entire loaded area can be found by integrating Eq. (6.23), or

$$\Delta p = \int dp = \int_{\alpha=0}^{\alpha=2\pi}\int_{r=0}^{r=R}\frac{3q}{2\pi}\frac{z^3 r}{(r^2+z^2)^{5/2}}\,dr\,d\alpha$$

So

$$\boxed{\Delta p = q\left\{1 - \frac{1}{[(R/z)^2+1]^{3/2}}\right\}} \tag{6.24}$$

The variation of $\Delta p/q$ with z/R as obtained from Eq. (6.24) is given in Table 6.3. A plot of this is also shown in Figure 6.15. The value of Δp decreases rapidly with depth; and, at $z = 5R$, it is about 6% of q, which is the intensity of pressure at the ground surface.

Figure 6.15 Intensity of stress under the center of a uniformly loaded flexible area

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Table 7.6 Representative Values of Young's Modulus

Type of soil	Young's modulus psi	Young's modulus kN/m²[a]
Soft clay	250–500	1380–3450
Hard clay	850–2000	5865–13,800
Loose sand	1500–4000	10,350–27,600
Dense sand	5000–10,000	34,500–69,000

[a] 1 psi = 6.9 kN/m²

Table 7.7 Representative Values of Poisson's Ratio

Type of soil	Poisson's ratio, μ
Loose sand	0.2–0.4
Medium sand	0.25–0.4
Dense sand	0.3–0.45
Silty sand	0.2–0.4
Soft clay	0.15–0.25
Medium clay	0.2–0.5

7.17 Total Foundation Settlement

The total settlement of a foundation can be given as

$$S_T = S + S_s + \rho_i \tag{7.60}$$

where S_T = total settlement
S = primary consolidation settlement
S_s = secondary consolidation settlement
ρ_i = immediate settlement

When foundations are constructed on very compressible clays, the consolidation settlement can be several times larger than the immediate settlement (ρ_i).

Example 7.14

Consider a rectangular column foundation (Figure 7.35) that is located on a sand layer extending to a great depth. Assume $E = 14{,}000$ kN/m² and $\mu = 0.4$. If the net pressure increase (p) on the foundation is 96 kN/m², estimate the elastic settlement assuming that the foundation is rigid.

Solution

From Eq. (7.58)

$$\rho_i = pB\frac{1-\mu^2}{E}I_\rho$$

Given: $B = 1$ m; $L = 2$ m; $m_1 = L/B = 2$ m/1 m = 2. From Table 7.5, for $m_1 = 2$, $I_\rho = 1.21$ (rigid foundation). So

$$\rho_i = (96)(1)\left(\frac{1-0.4^2}{14{,}000}\right)(1.21) = 0.00697 \text{ m} = \mathbf{6.97\ mm}$$

Appendix G

Final Cover Hydraulic Calculations

Appendix G-1

Final Cover Geocomposite Design

ARCADIS
Infrastructure, environment, buildings

Imagine the result

Calculation Sheet

Client: **CWM Chemical Services, LLC**

Project Location: **Model City, New York**

Project: **RMU-2 Design Calculations** **Project No.:** **B0023725.2009**

Subject: **Appendix G-1: Final Cover Geocomposite Design**

Prepared By: **PTO** **Date:** **August 2009**

Reviewed By: **BMS** **Date:** **August 2009**

Checked By: **PHB** **Date:** **August 2009**

OBJECTIVE:

Determine the minimum required transmissivity for the geocomposite in the final cover system of RMU-2. Estimate the maximum applied loading on the final cover geocomposite. Determine the requirements for the geotextile component of the final cover geocomposite.

REFERENCES:

1. RMU-2 Permit Drawing No. 6 entitled "Top of Waste Grades," ARCADIS, August 2009.
2. Appendix C-2 to the RMU-2 Engineering Report entitled "Waste Settlement Analysis," ARCADIS, August 2009.
3. Advanced Geotech Systems website entitled "landfilldesign.com."
4. Visual HELP v2.2.0.1 (Windows-based implementation of HELP model v. 3.07), Waterloo Hydrogeologic, Inc.
5. "Hydraulic Design of Geosynthetic and Granular Liquid Collection Layers Comprising Two Different Slopes," Giroud, J.P., Zornberg, J.G., and Beech, J.F., technical paper presented in Geosynthetics International - Special Issue on Liquid Collection Systems, 2000.
6. Standard Specification for Geotextile for Highway Applications, AASHTO Designation M 288-96.

ASSUMPTIONS:

1. The minimum required transmissivity for the final cover geocomposite is governed by the longest undrained lengths and flattest slopes. Two slope conditions are evaluated- one composite slope beginning along the plateau of RMU-2 and extending to the invert of the uppermost surface water diversion berm and one on the sideslope where the minimum design slope is 20%.
2. The first slope ("Slope 1") consists of approximately 125 feet at 4.9% (post settlement [per Reference 1 and 2]) and approximately 98 feet at 33%. Although waste settlement will reduce the 33% portion of Slope 1 somewhat from the design value of 33%, the combination of a relatively short drainage length and steep slope mean that the required transmissivity for this slope segment is less sensitive to settlement than the 4.9% segment. Consequently, the required transmissivity for the 33% portion of Slope 1 is based on the design grade of 33%.

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Imagine the result

Calculation Sheet

3. The second slope ("Slope 2") consists of approximately 161 feet at 20% (per Reference 1).. Although waste settlement will reduce the slope somewhat from the design value of 20%, the combination of a relatively short drainage length and steep slope mean that the required transmissivity for this slope is less sensitive to slope changes due to waste settlement. Consequently, the required transmissivity for this slope is based on the design grade of 20%. It should be noted that the typical final cover slope between benches is 33%, however the localized 20% grade of Slope 2 is used for calculation purposes and is considered conservatism. For testing purposes, a 33% gradient should be assumed to conform with typical final cover sideslopes.

4. The minimum required transmissivity for each slope is based on Giroud's equation (presented in Reference 3) and the following parameters:

   - Maximum allowable head in the geocomposite is limited to the thickness of the drainage layer (i.e., the thickness of the geocomposite core)

   - Impingement rate (i.e., rate at which liquid infiltrates to geonet core) is calculated using Reference 4 and the following parameters:

     - 25-year, 24-hour rainfall of 4.0 inches (HELP model climatic data was modified to include the design storm)
     - Runoff curve number of 86, which is representative of newly established vegetation and a hydrologic soil group "C"
     - Maximum leaf area index = 1.0 (poor stand of grass)
     - Evaporative zone depth = 12 inches (approximately the middle of the range of guidance values presented in the User's Guide for HELP model v.3.07)
     - Hydraulic conductivities for the topsoil and general soil fill in the final cover are 7.5×10^{-5} cm/s and 5×10^{-5} cm/s, respectively, which are consistent with the transmissivity design calculations in the RMU-1 Permit

5. Typical factors of safety are from Reference 3 (see attached calculations for specific values).

6. Class 2 survivability required for upper geotextile in accordance with AASHTO M 288-96.

<u>CALCULATIONS:</u>

1. Minimum Required Transmissivity for Slope 1

The minimum required transmissivity for Slope 1 is based on Giroud's equation:

$$\Theta = \frac{TSF q_h L}{\sin\beta + \frac{t_{LCL}/L}{TSF}\cos^2\beta}$$

where,

Θ = minimum required transmissivity

TSF = total serviceability factor (a combination of reduction and overall design safety factors)

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Calculation Sheet

q_h = impingement rate (rate at which water infiltrates through the cover soils into the geocomposite)
L = maximum drainage length
β = slope angle of drainage layer
t_{LCL} = thickness of geonet core in geocomposite

Since Slope 1 is a composite slope consisting of two distinct slope lengths and gradients, separate required transmissivities are determined for the 4.9% and 33% slope segments (per Reference 5).

The required transmissivity for the 4.9% slope segment is based on the following parameters:

TSF = 4.72 (see attached calculations for individual factors of safety)
q_h = 0.30 inches/day = 8.8 x 10^{-6} cm/s (calculated using Reference 4, based on Assumption 4)
L = 125 feet= 38.1 m
β = 2.8^o (4.9%)
t_{LCL} = 0.50 cm (based on 200-mil geonet core)

$\therefore$ Θ = 3.2 x 10^{-4} m^2/s = 3.2 cm^2/s = Minimum Required Transmissivity for the 4.9% Component of Slope 1

The required transmissivity for the 33% slope segment is based on the following parameters:

TSF = 4.72 (from above)
q_h = 0.31 inches/day = 9.1 x 10^{-6} cm/s (calculated using Reference 4 based on Assumption 4)
L = 125 feet + 98 feet = 223 feet= 68.0 m (to account for flow through geocomposite from the upgradient 4.9% slope segment per Reference 5)
β = 18.4^o (33%)
t_{LCL} = 0.50 cm (based on 200-mil geonet core)

$\therefore$ Θ = 9.0 x 10^{-5} m^2/s = 0.9 cm^2/s = Minimum Required Transmissivity for the 33% Component of Slope 1

2. Minimum Required Transmissivity for Slope 2

Using Giroud's equation (presented above) with the following parameters for Slope 2:

TSF = 4.72 (see attached calculations for individual factors of safety)
q_h = (calculated using Reference 4 based on Assumption 4) = 0.31 inches/day = 9.0 x 10^{-6} cm/s
L = 161 ft = 49.1 m
β = 9.0^o (20%)
t_{LCL} = 0.5 cm (based on 200-mil geonet core)

$\therefore$ Θ = 1.1 x 10^{-4} m^2/s = 1.1 cm^2/s = Minimum Required Transmissivity for Slope 2

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Calculation Sheet

3. Maximum Applied Load on the Geocomposite

Since the in-place transmissivity of the geocomposite is partly a function of the applied loading, it is necessary to estimate the maximum load that will be applied to the geocomposite. Due to its location within the final cover (2 feet below the top of the topsoil layer), the final cover geocomposite will experience about 260 psf due to soil weight (2 feet x 130 pcf = 260 psf). The operation of small construction equipment over the geocomposite during final cover construction is expected to result in another 1,000 psf (based on the use of low ground pressure equipment exerting about 7 psi). Combining these two loadings and multiplying by a factor of safety of 2.0 yields a design loading of about 2,500 psf.

4. Geotextile Design

The upper geotextile in the geocomposite must provide adequate survivability to resist installation damage, permittivity to allow water to enter the geocomposite, and filtration to avoid excessive loss of retained soil while preventing clogging.

Strength Criteria:

As stated in Assumption 6, Class 2 survivability must be achieved. Table 1 of Reference 6 provides the following criteria for Class 2 geotextiles:

Tensile Strength = 700 N = 158 lbs.
Puncture Strength = 250 N = 57 lbs.

Filter Criteria:

Table 2 of Reference 6 provides the following filter criteria for 15 to 50 percent soil passing No. 200 sieve:

Minimum Permittivity: 0.2 sec^{-1}
Maximum AOS: 0.25 mm

SUMMARY:

The geocomposite installed in the final cover must provide the following minimum transmissivities:

Θ = 3.2 cm^2/s with a hydraulic gradient = 0.1 (approximately representative of a 4.9% slope)
Θ = 1.1 cm^2/s with a hydraulic gradient = 0.33 (representative of a 33% slope)

All final cover geocomposite materials must provide the required transmissivities under an applied loading of 2,500 psf and will be laboratory-tested using field-representative boundary conditions.

The geotextile component of the geocomposite must provide the following parameters:

Minimum Tensile Strength = 700 N = 158 lbs.
Minimum Puncture Strength = 250 N = 57 lbs.
Minimum Permittivity: 0.2 sec^{-1}
Maximum AOS: 0.25 mm

NYSDEC OHMS Document No. 201469232-00007

ARCADIS

Attachment 1

HELP Model Output

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**                                      **
**                                      **
**        HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE          **
**         HELP MODEL VERSION 3.07 (1 November 1997)          **
**          DEVELOPED BY ENVIRONMENTAL LABORATORY            **
**           USAE WATERWAYS EXPERIMENT STATION              **
**       FOR USEPA RISK REDUCTION ENGINEERING LABORATORY         **
**                                      **
**                                      **
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PRECIPITATION DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather1.dat
TEMPERATURE DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather2.dat
SOLAR RADIATION DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather3.dat
EVAPOTRANSPIRATION DATA: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather4.dat
SOIL AND DESIGN DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP\I_386391.inp
OUTPUT DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP\O_386391.prt

TIME: 10: 9 DATE: 7/31/2009

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TITLE: RMU-2 Slope 1

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 15.24 CM
POROSITY = 0.5010 VOL/VOL
FIELD CAPACITY = 0.2827 VOL/VOL
WILTING POINT = 0.1353 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.4590 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.750000000000E-04 CM/SEC
NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 1.80
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 45.72 CM
POROSITY = 0.5010 VOL/VOL
FIELD CAPACITY = 0.2840 VOL/VOL
WILTING POINT = 0.1350 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.3545 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.500000000000E-04 CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 1
THICKNESS = 0.50 CM
POROSITY = 0.8500 VOL/VOL
FIELD CAPACITY = 0.0100 VOL/VOL
WILTING POINT = 0.0050 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0100 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 33.0000000000 CM/SEC
SLOPE = 4.90 PERCENT
DRAINAGE LENGTH = 38.1 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.10 CM
POROSITY = 0.0000 VOL/VOL
FIELD CAPACITY = 0.0000 VOL/VOL
WILTING POINT = 0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.200000000000E-10 CM/SEC
FML PINHOLE DENSITY = 2.47 HOLES/HECTARE
FML INSTALLATION DEFECTS = 9.88 HOLES/HECTARE
FML PLACEMENT QUALITY = 3 - GOOD

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER = 86.00
FRACTION OF AREA ALLOWING RUNOFF = 100.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE = 0.4047 HECTARES
EVAPORATIVE ZONE DEPTH = 30.5 CM
INITIAL WATER IN EVAPORATIVE ZONE = 13.142 CM
UPPER LIMIT OF EVAPORATIVE STORAGE = 15.270 CM
LOWER LIMIT OF EVAPORATIVE STORAGE = 4.119 CM
INITIAL SNOW WATER = 0.000 CM
INITIAL WATER IN LAYER MATERIALS = 23.209 CM
TOTAL INITIAL WATER = 23.209 CM
TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Buffalo NY

STATION LATITUDE = 42.89 DEGREES
MAXIMUM LEAF AREA INDEX = 1.00

START OF GROWING SEASON (JULIAN DATE) = 126
END OF GROWING SEASON (JULIAN DATE) = 285
EVAPORATIVE ZONE DEPTH = 12.0 INCHES
AVERAGE ANNUAL WIND SPEED = 12.10 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 76.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 68.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 72.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 76.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3.02	2.40	2.97	3.06	2.89	2.72
2.96	4.16	3.37	2.93	3.62	3.42

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
23.50	24.50	33.00	45.40	56.10	66.00
70.70	68.90	62.10	51.50	40.30	28.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY
AND STATION LATITUDE = 42.90 DEGREES

****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 5 and their dates (DDDYYYY)

	(INCHES)	(CU. FT.)	
PRECIPITATION	4.00	14519.68352	910001
RUNOFF	3.987	14472.85878	910001
DRAINAGE COLLECTED FROM LAYER 3	0.30055	1090.97687	3350001
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.006654	24.15275	3350001
AVERAGE HEAD ON TOP OF LAYER 4	0.004		
MAXIMUM HEAD ON TOP OF LAYER 4	0.008		
LOCATION OF MAXIMUM HEAD IN LAYER 3 (DISTANCE FROM DRAIN)	0.0 FEET		
SNOW WATER	7.65	27777.7330	640003

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4796

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1352

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

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FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.1492	0.3582
2	6.1833	0.3435
3	0.0020	0.0100
4	0.0000	0.0000

SNOW WATER 0.088

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**                                                                          **
**          HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                   **
**           HELP MODEL VERSION 3.07 (1 November 1997)                      **
**            DEVELOPED BY ENVIRONMENTAL LABORATORY                         **
**             USAE WATERWAYS EXPERIMENT STATION                            **
**         FOR USEPA RISK REDUCTION ENGINEERING LABORATORY                  **
**                                                                          **
**                                                                          **
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PRECIPITATION DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather1.dat
TEMPERATURE DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather2.dat
SOLAR RADIATION DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather3.dat
EVAPOTRANSPIRATION DATA: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather4.dat
SOIL AND DESIGN DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP\I_386391.inp
OUTPUT DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP\O_386391.prt

TIME: 13:24 DATE: 7/31/2009

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TITLE: Slope 1, 33% Segment

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 15.24 CM
POROSITY = 0.5010 VOL/VOL
FIELD CAPACITY = 0.2827 VOL/VOL
WILTING POINT = 0.1353 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.4590 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.750000000000E-04 CM/SEC
NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 1.80
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 45.72 CM
POROSITY = 0.5010 VOL/VOL
FIELD CAPACITY = 0.2840 VOL/VOL
WILTING POINT = 0.1350 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.3545 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.500000000000E-04 CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 1
THICKNESS = 0.50 CM
POROSITY = 0.8500 VOL/VOL
FIELD CAPACITY = 0.0100 VOL/VOL
WILTING POINT = 0.0050 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0100 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 33.0000000000 CM/SEC
SLOPE = 33.00 PERCENT
DRAINAGE LENGTH = 29.9 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.10 CM
POROSITY = 0.0000 VOL/VOL
FIELD CAPACITY = 0.0000 VOL/VOL
WILTING POINT = 0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.200000000000E-10 CM/SEC
FML PINHOLE DENSITY = 2.47 HOLES/HECTARE
FML INSTALLATION DEFECTS = 9.88 HOLES/HECTARE
FML PLACEMENT QUALITY = 3 - GOOD

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER = 86.00
FRACTION OF AREA ALLOWING RUNOFF = 100.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE = 0.4047 HECTARES
EVAPORATIVE ZONE DEPTH = 30.5 CM
INITIAL WATER IN EVAPORATIVE ZONE = 13.142 CM
UPPER LIMIT OF EVAPORATIVE STORAGE = 15.270 CM
LOWER LIMIT OF EVAPORATIVE STORAGE = 4.119 CM
INITIAL SNOW WATER = 0.000 CM
INITIAL WATER IN LAYER MATERIALS = 23.209 CM
TOTAL INITIAL WATER = 23.209 CM
TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Buffalo NY

STATION LATITUDE = 42.89 DEGREES

MAXIMUM LEAF AREA INDEX = 1.00
START OF GROWING SEASON (JULIAN DATE) = 126
END OF GROWING SEASON (JULIAN DATE) = 285
EVAPORATIVE ZONE DEPTH = 12.0 INCHES
AVERAGE ANNUAL WIND SPEED = 12.10 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 76.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 68.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 72.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 76.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3.02	2.40	2.97	3.06	2.89	2.72
2.96	4.16	3.37	2.93	3.62	3.42

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
23.50	24.50	33.00	45.40	56.10	66.00
70.70	68.90	62.10	51.50	40.30	28.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY
AND STATION LATITUDE = 42.90 DEGREES

****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 5 and their dates (DDDYYYY)

	(INCHES)	(CU. FT.)	
PRECIPITATION	4.00	14519.68352	910001

RUNOFF 3.987 14472.85878 910001

DRAINAGE COLLECTED FROM LAYER 3 0.30875 1120.72656 3350001

PERCOLATION/LEAKAGE THROUGH LAYER 4 0.000827 3.00190 3350001

AVERAGE HEAD ON TOP OF LAYER 4 0.004

MAXIMUM HEAD ON TOP OF LAYER 4 0.001

LOCATION OF MAXIMUM HEAD IN LAYER 3
(DISTANCE FROM DRAIN) 0.0 FEET

SNOW WATER 7.65 27777.7330 640003

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4796

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1352

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

****

FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.1492	0.3582
2	6.1833	0.3435
3	0.0028	0.0144
4	0.0000	0.0000

SNOW WATER 0.088

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**                                                                          **
**                                                                          **
**          HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                   **
**           HELP MODEL VERSION 3.07 (1 November 1997)                      **
**            DEVELOPED BY ENVIRONMENTAL LABORATORY                         **
**             USAE WATERWAYS EXPERIMENT STATION                            **
**          FOR USEPA RISK REDUCTION ENGINEERING LABORATORY                 **
**                                                                          **
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PRECIPITATION DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather1.dat
TEMPERATURE DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather2.dat
SOLAR RADIATION DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather3.dat
EVAPOTRANSPIRATION DATA: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP_weather4.dat
SOIL AND DESIGN DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP\I_386391.inp
OUTPUT DATA FILE: G:\TMProj\237\23725.2009\Calculations\G-1 Final Cover Geocomposite\P954.VHP\O_386391.prt

TIME: 13:16 DATE: 7/31/2009

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TITLE: Slope 2, 20%

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 15.24 CM
POROSITY = 0.5010 VOL/VOL
FIELD CAPACITY = 0.2827 VOL/VOL
WILTING POINT = 0.1353 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.4590 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.750000000000E-04 CM/SEC
NOTE: SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY 1.80
FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.

LAYER 2

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5
THICKNESS = 45.72 CM
POROSITY = 0.5010 VOL/VOL
FIELD CAPACITY = 0.2840 VOL/VOL
WILTING POINT = 0.1350 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.3545 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.500000000000E-04 CM/SEC

LAYER 3

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 1
THICKNESS = 0.50 CM
POROSITY = 0.8500 VOL/VOL
FIELD CAPACITY = 0.0100 VOL/VOL
WILTING POINT = 0.0050 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0100 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 33.0000000000 CM/SEC
SLOPE = 20.00 PERCENT
DRAINAGE LENGTH = 49.1 METERS

LAYER 4

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS = 0.10 CM
POROSITY = 0.0000 VOL/VOL
FIELD CAPACITY = 0.0000 VOL/VOL
WILTING POINT = 0.0000 VOL/VOL
INITIAL SOIL WATER CONTENT = 0.0000 VOL/VOL
EFFECTIVE SAT. HYD. COND. = 0.200000000000E-10 CM/SEC
FML PINHOLE DENSITY = 2.47 HOLES/HECTARE
FML INSTALLATION DEFECTS = 9.88 HOLES/HECTARE
FML PLACEMENT QUALITY = 3 - GOOD

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER = 86.00
FRACTION OF AREA ALLOWING RUNOFF = 100.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE = 0.4047 HECTARES
EVAPORATIVE ZONE DEPTH = 30.5 CM
INITIAL WATER IN EVAPORATIVE ZONE = 13.142 CM
UPPER LIMIT OF EVAPORATIVE STORAGE = 15.270 CM
LOWER LIMIT OF EVAPORATIVE STORAGE = 4.119 CM
INITIAL SNOW WATER = 0.000 CM
INITIAL WATER IN LAYER MATERIALS = 23.209 CM
TOTAL INITIAL WATER = 23.209 CM
TOTAL SUBSURFACE INFLOW = 0.00 MM/YR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
Buffalo NY

STATION LATITUDE = 42.89 DEGREES
MAXIMUM LEAF AREA INDEX = 1.00

START OF GROWING SEASON (JULIAN DATE) = 126
END OF GROWING SEASON (JULIAN DATE) = 285
EVAPORATIVE ZONE DEPTH = 12.0 INCHES
AVERAGE ANNUAL WIND SPEED = 12.10 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY = 76.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY = 68.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY = 72.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY = 76.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3.02	2.40	2.97	3.06	2.89	2.72
2.96	4.16	3.37	2.93	3.62	3.42

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR Buffalo NY

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
23.50	24.50	33.00	45.40	56.10	66.00
70.70	68.90	62.10	51.50	40.30	28.80

****

PEAK DAILY VALUES FOR YEARS 1 THROUGH 5 and their dates (DDDYYYY)

	(INCHES)	(CU. FT.)	
PRECIPITATION	4.00	14519.68352	910001
RUNOFF	3.987	14472.85878	910001
DRAINAGE COLLECTED FROM LAYER 3	0.30748	1116.12883	3350001
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.002094	7.59963	3350001

AVERAGE HEAD ON TOP OF LAYER 4 0.004

MAXIMUM HEAD ON TOP OF LAYER 4 0.003

LOCATION OF MAXIMUM HEAD IN LAYER 3
(DISTANCE FROM DRAIN) 0.0 FEET

SNOW WATER 7.65 27777.7330 640003

MAXIMUM VEG. SOIL WATER (VOL/VOL) 0.4796

MINIMUM VEG. SOIL WATER (VOL/VOL) 0.1352

*** Maximum heads are computed using McEnroe's equations. ***

Reference: Maximum Saturated Depth over Landfill Liner
by Bruce M. McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp. 262-270.

****

****

FINAL WATER STORAGE AT END OF YEAR 5

LAYER	(INCHES)	(VOL/VOL)
1	2.1492	0.3582
2	6.1833	0.3435
3	0.0028	0.0144
4	0.0000	0.0000

SNOW WATER 0.088

****
****

NYSDEC OHMS Document No. 201469232-00007

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Attachment 2

Transmissivity Calculations

CWM Chemical Services, LLC
Model City, NY
RMU-2
Giroud's Equation for Minimum Required Geocomposite Transmissivity
Final Cover - 4.9% Segment of Slope 1

Input

Drainage Length [m]:	38.1
Drainage Layer Thickness [cm]:	0.50
Slope of Drainage Layer [%/100]:	0.049
Impingement Rate, q_h, [cm/s][1]:	8.8E-06

Factor of Safety		Typical Range for Factor of Safety		
		Surface Water	Leachate Collection	Leachate Detection
Intrusion Reduction Factor, RF_{in}	1.1	1.0-1.2	1.0-1.2	1.0-1.2
Creep Reduction Factor, RF_{cr}:	1.2	1.1-1.4	1.4-2.0	1.4-2.0
Chemical Clogging Reduction Factor, RF_{cc}	1.1	1.0-1.2	1.5-2.0	1.5-2.0
Biological Clogging Reduction Factor, RF_{bc}	1.3	1.2-1.5	1.5-2.0	1.5-2.0
Overall FS for Drainage, FS_d:	2.5	2.0-3.0	2.0-3.0	2.0-3.0

Output

Total Serviceability Factor[2]	4.72
Required Transmissivity [cm^2/s]:	**3.2**

Note:

1. Impingement rate is equal to the peak daily value for lateral drainage collected by the geocomposite layer as calculated using Visual HELP. The amount of lateral drainage (in cm) is converted into a daily average infiltration rate to the geocomposite.

2. Total serviceability factor is based on typical factors of safety for surface water (i.e., cap drainage). This serviceability factor is approximately the same as that used in the transmissivity calculations for RMU-1.

NYSDEC OHMS Document No. 201469232-00007

CWM Chemical Services, LLC
Model City, NY
RMU-2
Giroud's Equation for Minimum Required Geocomposite Transmissivity
Final Cover - 33% Segment of Slope 1

Input

Drainage Length [m]:	68
Drainage Layer Thickness [cm]:	0.50
Slope of Drainage Layer [%/100]:	0.33
Impingement Rate, q_h, [cm/s][1]:	9.1E-06

Factor of Safety

		Typical Range for Factor of Safety		
		Surface Water	Leachate Collection	Leachate Detection
Intrusion Reduction Factor, RF_{in}	1.1	1.0-1.2	1.0-1.2	1.0-1.2
Creep Reduction Factor, RF_{cr}:	1.2	1.1-1.4	1.4-2.0	1.4-2.0
Chemical Clogging Reduction Factor, RF_{cc}	1.1	1.0-1.2	1.5-2.0	1.5-2.0
Biological Clogging Reduction Factor, RF_{bc}	1.3	1.2-1.5	1.5-2.0	1.5-2.0
Overall FS for Drainage, FS_d:	2.5	2.0-3.0	2.0-3.0	2.0-3.0

Output

Total Serviceability Factor[2]	4.72
Required Transmissivity [cm^2/s]:	**0.9**

Note:

1. Impingement rate is equal to the peak daily value for lateral drainage collected by the geocomposite layer as calculated using Visual HELP. The amount of lateral drainage (in cm) is converted into a daily average infiltration rate to the geocomposite.
2. Total serviceability factor is based on typical factors of safety for surface water (i.e., cap drainage). This serviceability factor is approximately the same as that used in the transmissivity calculations for RMU-1.

NYSDEC OHMS Document No. 201469232-00007

CWM Chemical Services, LLC
Model City, NY
RMU-2
Giroud's Equation for Minimum Required Geocomposite Transmissivity
Final Cover - Slope 2

Input

Drainage Length [m]:	49.1
Drainage Layer Thickness [cm]:	0.5
Slope of Drainage Layer [%/100]:	0.2
Impingement Rate, q_h, [cm/s][1]:	9.0E-06

Factor of Safety		Typical Range for Factor of Safety		
		Surface Water	Leachate Collection	Leachate Detection
Intrusion Reduction Factor, RF_{in}	1.1	1.0-1.2	1.0-1.2	1.0-1.2
Creep Reduction Factor, RF_{cr}:	1.2	1.1-1.4	1.4-2.0	1.4-2.0
Chemical Clogging Reduction Factor, RF_{cc}	1.1	1.0-1.2	1.5-2.0	1.5-2.0
Biological Clogging Reduction Factor, RF_{bc}	1.3	1.2-1.5	1.5-2.0	1.5-2.0
Overall FS for Drainage, FS_d:	2.5	2.0-3.0	2.0-3.0	2.0-3.0

Output

Total Serviceability Factor[2]	4.72
Required Transmissivity [cm^2/s]:	**1.1**

Note:
1. Impingement rate is equal to the peak daily value for lateral drainage collected by the geocomposite layer as calculated using Visual HELP. The amount of lateral drainage (in cm) is converted into a daily average infiltration rate to the geocomposite.
2. Total serviceability factor is based on typical factors of safety for surface water (i.e., cap drainage). This serviceability factor is approximately the same as that used in the transmissivity calculations for RMU-1.

NYSDEC OHMS Document No. 201469232-00007

Appendix G-2

Final Cover Collection Pipe Design

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Imagine the result

Calculation Sheet

Client: CWM Chemical Services, LLC

Project Location: Model City, New York

Project: RMU-2 Design Calculations **Project No.: B0023725.2009**

Subject: Appendix G-2: Final Cover Collection Pipe Design

Prepared By: PTO **Date: August 2009**

Reviewed By: BMS **Date: August 2009**

Checked By: PHB **Date: August 2009**

OBJECTIVE:

Determine the required diameter of the final cover collection pipe along the invert of the surface water diversion berms.

REFERENCES:

1. RMU-2 Permit Drawing No. 7 entitled "Top of Vegetative Cover Grades," ARCADIS, August 2009.

2. Appendix G-1 to the RMU-2 Engineering Report entitled "Final Cover Geocomposite Design," ARCADIS, August 2009.

ASSUMPTIONS:

1. The hydraulic capacity of the final cover collection pipe must equal or exceed that of the geocomposite in the largest tributary drainage area. The hydraulic capacity of the geocomposite is based on the design transmissivity value (from Reference 2), the invert slope of the surface water diversion berms, and the length of the geocomposite that drains to the pipe (i.e., the length measured parallel to the final cover collection pipe).

2. The final cover collection pipes discharge into the downchute pipes depicted on Reference 1 and have a minimum invert slope of 1.0%.

3. The design of the final cover collection pipe is based on the largest drainage area draining to the pipe.

4. All final cover collection pipes will be perforated corrugated smooth-bore HDPE pipe. The Manning "n" for this pipe material is assumed to be 0.012.

CALCULATIONS:

1. Maximum Flowrate to the Final Cover Collection Pipe

Based on Reference 1, the final cover collection pipe on the uppermost surface water diversion berm along the northeast face of RMU-2 has the largest drainage area. The maximum flowrate from the geocomposite is determined using Darcy's law, the definition of transmissivity, and the design transmissivity value from Reference 2.

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Calculation Sheet

Darcy's Law:

$$Q = kiA$$

$$k = \Phi/t$$

$$A = Lt$$

$$\therefore Q = L\Phi i$$

where,

L = length of collection pipe from Reference 1 = 1,143 ft

Φ = design transmissivity of geocomposite from Reference 2 = 1.1 cm^2/s = 0.0012 ft^2/s (for a hydraulic gradient of 0.33)

i = hydraulic gradient perpendicular to the collection pipe upgradient of the surface water diversion berm
= 0.33

Thus,
Q = (1,143 ft)(0.0012 ft^2/s)(0.33) = 0.45 cfs

2. Required Pipe Diameter

The required pipe diameter is determined using the Manning equation and the maximum flowrate from the geocomposite that drains to the final cover collection pipe.

The Manning equation is:

$$Q = \frac{1.49}{n} AR^{2/3} S^{1/2}$$

where,

Q = maximum flowrate from the geocomposite = 0.45 cfs
A = cross sectional area of pipe flowing full = $\pi D^2/4$
n = Manning "n" for corrugated polyethylene plastic pipe = 0.012 (Assumption 4)
R = hydraulic radius = A/P
P = wetted perimeter of pipe flowing full = πD
S = minimum longitudinal slope of pipe = 0.01

Solving for D,

D = 0.45 ft = 5.4 in

Use 6-inch-diameter pipe.

A separate factor of safety has not been included in the calculation of the required pipe diameter because the required pipe diameter is based on the design transmissivity value for the geocomposite (instead of the anticipated peak flowrate from the geocomposite resulting from the 25-year, 24-hour storm event). As discussed in Reference 2, the factor of safety used to establish the design transmissivity value for the geocomposite materials is 4.72 with respect to the anticipated peak flowrate resulting from the design storm.

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Calculation Sheet

SUMMARY:

The final cover collection pipe must be 6-inch diameter perforated corrugated smooth-bore HDPE.

Appendix H

Surface Water Drainage and Erosion Calculations

Appendix H-1

Surface Water Diversion Berm Design

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Imagine the result

Calculation Sheet

Client: **CWM Chemical Services, LLC**

Project Location: **Model City, New York**

Project: **RMU-2 Design Calculations** **Project No.:** **B0023725.2009**

Subject: **Appendix H-1: Surface Water Diversion Berm Design**

Prepared By: **PTO** **Date:** **August 2009**

Reviewed By: **BMS** **Date:** **August 2009**

Checked By: **PHB** **Date:** **August 2009**

OBJECTIVE:

Demonstrate that the proposed final cover surface water diversion berm geometry provides adequate hydraulic capacity to convey the estimated peak discharge from the worst-case watershed. Demonstrate that stable hydraulic conditions exist in the surface water diversion berm immediately after final cover construction.

REFERENCES:

1. Technical Release 55 "Urban Hydrology for Small Watersheds," Soil Conservation Service, June 1986.

2. HydroCAD Software Solutions, LLC. HydroCAD. Version 8.5. Computer Software. 2006. (Output attached).

3. *Open Channel Flow*, Henderson, F.M., pp. 99-101, 1966 (attached).

4. "New York Guidelines for Urban Erosion & Sediment Control," NYSDEC, August 2005.

5. North American Green Erosion Control Materials Design Software v. 4.3, 2003.

6. RMU-2 Permit Drawing No. 7 entitled "Top of Vegetative Cover Grades", ARCADIS, August 2009.

ASSUMPTIONS:

1. The surface water diversion berm consists of a v-notch channel with inboard and outboard sideslopes of 3H:1V and 10H:1V, respectively. The surface water diversion berm measures 15 feet wide from the invert centerline to the outboard edge, resulting in a channel depth of 1.5 feet.

2. The surface water diversion berm geometry is evaluated based on the channel reach receiving the largest 25-year, 24-hour estimated peak discharge.

3. The design invert slope of the design surface water diversion berm reach is 1.0%.

4. The design storm is the 25-year, 24-hour event, which produces 4.0 inches of rainfall.

5. To minimize the erosion of the final cover underlying the surface water diversion berm, a temporary erosion control mat will line the interior surfaces of the surface water diversion berms. The temporary

Calculation Sheet

erosion control mat will degrade over a period of approximately 1 year and is intended to protect the final cover topsoil until vegetation is sufficiently established.

6. The runoff curve number for the tributary watershed to the surface water diversion berm varies according to surface conditions. The runoff curve number for newly capped areas is assumed to be 91 (based on the value presented in Table 2-2a of Reference 1 for newly graded areas with Hydrologic Soil Group "C"). This runoff curve number represents bare soil with no vegetation. The runoff curve number for capped areas with established vegetation is assumed to be 79 (based on the value presented in Table 2-2a of Reference 1 for open spaces with 50-75% grass coverage with Hydrologic Soil Group "C").

7. The Manning "n" for the surface water diversion berm varies according to the condition of the cap vegetation. For newly capped conditions, the Manning "n" is based on the presence of the temporary erosion control mat and is assumed to be 0.043 (based on Reference 5). For vegetated cap conditions, the Manning "n" is calculated based on Reference 3 and assumes a good stand of 6- to 10-inch tall vegetation.

8. The minimum required freeboard for the surface water diversion berm under newly capped conditions is 0.30-feet based on Reference 4 because no vegetation is present adjacent to the edges of the surface water diversion berm. No minimum freeboard is required for the surface water diversion berm under vegetated cap conditions due to the presence of grassed conditions adjacent to the edges of the surface water diversion berm (per Reference 4). Additionally, Reference 4 requires these freeboards for the 10-year, 24-hour storm. In contrast, the surface water diversion berm is designed to provide the freeboards specified in Reference 4 while conveying the peak runoff from the 25-year, 24-hour storm, which is more conservative.

CALCULATIONS:

1. Estimated Peak Discharge to the Surface Water Diversion Berm

A surface water diversion berm on the northern and eastern sideslopes of RMU-2 will receive the largest peak discharge during the 25-year, 24-hour storm event. Therefore, this surface water diversion berm and tributary watershed are used in this analysis because they represent worst-case conditions. The tributary watershed to this surface water diversion berm is based on Reference 6 and depicted on Figure 1 (included as Attachment 1 to this calculation). The following table (Table 1) summarizes the runoff characteristics for the tributary watershed draining to the design surface water diversion berm and the 25-year, 24-hour estimated peak discharges for both newly capped and vegetated cap conditions.

Table 1 – Runoff Characteristics of Tributary Area Draining to Diversion Berm

Watershed Condition	Watershed Area [acres]	Runoff Curve Number	Time of Concentration [min]	25-yr, 24-hr Estimated Peak Discharge [cfs]
Newly Capped	3.86	91	12.6	15.6
Vegetated Cap	3.86	79	67.4	3.7

Supporting output from HydroCAD for both conditions is included as Attachment 2 of this calculation.

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Calculation Sheet

2. Resulting Hydraulic Conditions

Based on the above estimated peak discharges, the following table (Table 2) summarizes the resulting hydraulic conditions within the surface water diversion berm for both newly capped and vegetated cap conditions.

Table 2 – Flow Characteristics Within Surface Water Diversion Berm

Watershed Condition	25-yr, 24-hr Estimated Peak Discharge [cfs]	Manning "n"	Flow Depth [ft]	Freeboard [ft]	Flow Velocity [ft/s]
Newly Capped	15.6	0.043	1.04	0.46	2.22
Vegetated Cap	3.7	0.230	1.13	0.37	0.44

As indicated in Table 2, the proposed cross section for the surface water diversion berm provides adequate hydraulic capacity to convey the 25-year, 24-hour estimated peak discharge. Additionally, the output from Reference 5 (included as Attachment 3 to this calculation) demonstrates the stability of the channel lining under newly capped conditions. The hydraulic analyses for the surface water diversion berm under both conditions are also included in Attachment 3.

SUMMARY:

The surface water diversion berm provides adequate hydraulic capacity to convey the 25-year, 24-hour estimated peak discharge for the worst-case watershed. Stable conditions exist in the surface water diversion berm for newly capped conditions.

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Attachment 1

Watershed Map

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SHEET TITLE: SURFACE WATER DIVERSION BERM WATERSHED MAP
PROJECT TITLE: RMU-2 PERMIT CALCULATION
CWM CHEMICAL SERVICES
PROJECT LOCATION: MODEL CITY, NEW YORK
PROJECT NO: B0023725.2009
DATE: AUGUST 2009 BY: PTO FILE NO.: 23725.PRO

Figure 1

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Attachment 2

HydroCAD Output

Summary for Subcatchment 1S: Newly Graded

Runoff = 15.58 cfs @ 12.04 hrs, Volume= 0.971 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.00"

	Area (ac)	CN	Description
*	3.860	91	Newly Capped
	3.860		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	75	0.0500	1.66		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	19	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	67	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
11.6	1,215	0.0100	1.74	25.24	**Channel Flow,** Area= 14.5 sf Perim= 34.4' r= 0.42' n= 0.048
12.6	1,376	Total			

Summary for Subcatchment 3S: Vegetated Cap

Runoff = 3.66 cfs @ 12.73 hrs, Volume= 0.632 af, Depth= 1.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.00"

	Area (ac)	CN	Description
*	3.860	79	Newly Capped
	3.860		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	75	0.0500	0.14		**Sheet Flow,** Grass: Dense n= 0.240 P2= 2.50"
0.2	19	0.0500	1.57		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	67	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
58.2	1,215	0.0100	0.35	5.05	**Channel Flow,** Area= 14.5 sf Perim= 34.4' r= 0.42' n= 0.240
67.4	1,376	Total			

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Attachment 3

Hydraulic Analysis

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Surface Water Diversion Berm - Vegetated Condition

Channel Design (Input)	
Flow Capacity (cfs)	3.66
Base Width (ft)	0.00
Left Side Slope (x:1)	10.00
Right Side Slope (x:1)	3.00
Bed Slope	0.010
Manning "n"	0.230

Design Flow Conditions (Output)	
Flowrate from Manning Equation (cfs)	3.66
Required Flow Depth (ft)	1.13
Resulting Flow Velocity (ft/s)	0.44
Resulting Flow Width at Top (ft)	14.73
Resulting Flow Area (ft^2)	8.34
Resulting Wetted Perimeter (ft)	14.97
Resulting Hydraulic Radius (ft)	0.56
Channel Dimensions	
Channel Depth (ft)	1.50
Resulting Freeboard (ft)	0.37

Project: RMU-2 Design
Project No.: B0023725.2009
Subject: Surface Water Diversion Berm Design

By: PTO Date: August 2009
Ckd By: BMS Date: August 2009

Surface Water Diversion Berm - Newly Capped Conditions with Erosion Control Mat

Channel Design (Input)	
Flow Capacity (cfs)	15.58
Base Width (ft)	0.00
Left Side Slope (x:1)	10.00
Right Side Slope (x:1)	3.00
Bed Slope	0.010
Manning "n"	0.043

Design Flow Conditions (Output)	
Flowrate from Manning Equation (cfs)	15.58
Required Flow Depth (ft)	1.04
Resulting Flow Velocity (ft/s)	2.22
Resulting Flow Width at Top (ft)	13.52
Resulting Flow Area (ft^2)	7.03
Resulting Wetted Perimeter (ft)	13.74
Resulting Hydraulic Radius (ft)	0.51
Channel Dimensions	
Channel Depth (ft)	1.50
Resulting Freeboard (ft)	0.46

North American Green - ECMDS Version 4.3 | 6/8/2009 | 03:04 PM | COMPUTED BY:

PROJECT NAME: | PROJECT NO.:

FROM STATION/REACH: | TO STATION/REACH: | DRAINAGE AREA: | DESIGN FREQUENCY:

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius(ft)	Normal Depth (ft)
7.3	6.0	1.69	4.32	0.40	0.82

Not to Scale

LINER RESULTS

Reach	Matting Type	Stability Analysis	Vegetation Characteristics				Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
	Staple Pattern		Phase	Class	Type	Density				
Straight	S75	Unvegetated					1.55	0.51	3.05	STABLE
	Staple D									

Back to Input Screen

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Attachment 4

References

NYSDEC OHMS Document No. 201469232-00007

channels" described at the end of the table clearly cover such a wide range of conditions that some field experience is desirable before a value of n can be estimated with reasonable confidence. However, the photographs given by Ven Te Chow [6] form a useful supplement to, or even substitute for, field experience.

The last entry in the table gives the result of Eq. (4–22), applicable mainly to alluvial channels of coarse noncohesive gravel or cobbles (known as *shingle* in British countries). The D-75 size may be taken as a good approximation to the value of d (larger than the median) with which the bed tends to become armored.

The reader will easily be able to verify that the values of k_s in Table 4–1 are generally consistent, via Eq. (4–22), with the above values of n.

When the channel bed and banks are thickly covered with vegetation an appreciable part of the flow takes place through the vegetation at low velocities. If the growth is of fine material such as grass the Reynolds number Re defined with respect to the stalk thickness will be low, and the resistance, and therefore the Manning n, will be dependent on Re. Since n will therefore depend on the velocity, it may possibly depend on Re defined with respect to the channel size as well as with respect to the stalk thickness. This has been shown to be true by the experiments of the U. S. Soil Conservation Service [3];

Figure 4-5. The Behavior of Manning's n in Grassed Channels

their results, for a number of North American grass species, are summarized in Fig. 4-5. The division into classes depends mainly on the length and the "stand"—i.e., the vigour and thickness of growth, according to the following table:

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TABLE 4-3

Average length of grass	*Class* Good stand	Fair stand
More than 30 in.	A	B
11–24 in.	B	C
6–10 in.	C	D
2–6 in.	D	D
less than 2 in.	E	E

Wide shallow grassed channels are a popular solution to the problem of passing large discharges down steep slopes without developing unduly high velocities.

4.3 Uniform Flow: Its Computation and Applications

Significance of Uniform Flow

Uniform flow has now been defined and a dynamic equation developed—the Manning equation—which adequately describes both uniform and non-uniform flow.

Uniform flow seldom occurs in nature, since natural channels are usually irregular. Even in artificial channels of uniform section, the occurrence of uniform flow may be relatively infrequent because of the existence of controls, such as weirs, sluice gates, etc., which dictate a depth-discharge relationship different from that appropriate to uniform flow.

However, uniform flow is a condition of such basic importance that it must be considered in all channel-design problems. For example, if it is proposed to instal certain controls in an irrigation canal it is necessary to compare their depth-discharge relation with those of uniform flow; as we shall see, the whole character of the flow in the canal will depend on the form this comparison takes. Again, if a canal is to be laid on a certain slope, is to have a lining of a certain coefficient n, and is to take a certain discharge, then the uniform-flow condition is the criterion governing the *minimum* cross-sectional area required. Other criteria may of course determine that the section must be greater than this minimum, but the section cannot conceivably be any smaller or the canal will be unable to take the required discharge.

Economical Design of a Channel Cross Section

A typical uniform-flow problem in the design of artificial canals is the economical proportioning of the cross section. A canal having a given Manning coefficient n and slope S_0 is to carry a certain discharge Q, and

Appendix H-2

Downchute Pipe Design

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Calculation Sheet

Client: **CWM Chemical Services, LLC**

Project Location: **Model City, New York**

Project: **RMU-2 Design Calculations** **Project No.:** **B0023725.2009**

Subject: **Appendix H-2: Downchute Pipe Design**

Prepared By: **BMS** **Date:** **August 2009**

Checked By: **BMS** **Date:** **August 2009**

Reviewed By: **PHB** **Date:** **August 2009**

OBJECTIVE:

Evaluate the ability of the downchute pipes on the RMU-2 final cover to convey the estimated peak discharge resulting from the 25-year, 24-hour design storm. Demonstrate that the lining in the receiving ditches is hydraulically stable when conveying the peak discharge from the design storm. Determine the planimetric extent of the ditch lining to be used at the downchute pipe discharge locations.

REFERENCES:

1. Technical Release 55 "Urban Hydrology for Small Watersheds," Soil Conservation Service, June 1986.

2. HydroCAD Software Solutions, LLC. HydroCAD Version 8.5. Computer Software, 2006.

3. RMU-2 Permit Drawing No. 7 entitled "Top of Vegetative Cover Grades," ARCADIS, August 2009.

4. Calculation sheet entitled "Surface Water Diversion Berm Design," contained in Appendix H-1 of the RMU-2 Engineering Report, ARCADIS, August 2009.

5. Manufacturer literature entitled "Channeling Works," Maccaferri Inc. (portions attached).

6. "New York State Standards and Specifications for Erosion and Sediment Control," New York State Department of Environmental Conservation, August 2005 (portions attached).

7. *Engineer-in-Training Reference Manual*, 8th Edition, Lindeburg, Michael R., P.E., pp. A-47, 1992 (attached).

8. Calculation sheet entitled "Perimeter Ditch Culvert Design," contained in Appendix H-5 of the RMU-2 Engineering Report, ARCADIS, August 2009.

ASSUMPTIONS:

1. A total of four downchute locations are proposed. At 3 of the 4 locations, a total of three downchute pipes will be installed. One of the three downchute pipes conveys flow from four surface water diversion berms. This pipe consists of a 26-inch-diameter DR 26 HDPE pipe (average inside diameter of 23.88 inches). The remaining two downchute pipes are perimeter ditch outlet pipes and are also DR 26 HDPE pipe with diameters ranging from 16 to 26 inches. The 4th downchute location consists of only the aforementioned perimeter ditch outlet pipes.

Calculation Sheet

2. The design storm is the 25-year, 24-hour storm, which produces 4.0 inches of rainfall. The peak flowrate for the evaluation of the downchute pipes is from the worst-case (i.e., largest flowrate) surface water diversion berm as presented in Reference 4 and assumes that at each downchute location, all four surface water diversion berms convey the same worst-case flowrate from Reference 4.

3. The downchute pipes are evaluated for two tributary watershed conditions. A newly capped condition is intended to represent the flowrate from an unvegetated watershed that would result immediately after final cover construction. This newly capped condition yields the largest flowrate. For completeness, a vegetated final cover condition, which yields a lower flowrate, is also included in the evaluation.

4. The ability of the downchute pipes to convey the peak discharge from the design event is assessed by comparing the required headwater depth at the downchute pipe inlets to the depth of the surface water diversion berms at the pipe inlets (maximum inlet depth is 2.5 feet). Required headwater depths are predicted using Reference 2, which accounts for both energy losses at the pipe inlets and barrel friction once the flow has entered the pipe.

5. At each downchute location, the three downchute pipes terminate in a common 34-inch-diameter DR 26 HDPE (average inside diameter of 31.23 inches) header pipe at the toe of the MSE wall. The purpose of the header pipe is to align the downchute flow with the receiving ditch. The receiving ditches will be lined with reno mattresses in the vicinity of the header pipe outlets to resist erosion. The stability of the reno mattresses is evaluated by comparing the critical velocity (maximum velocity at which no movement of the filling stones occurs) for the reno mattress (Reference 5) to predicted flow velocities at the header pipe outlet. For 12-inch-thick reno mattresses, Reference 5 indicates a critical velocity of 4.2 m/s (13.8 ft/s).

CALCULATIONS:

1. Peak Discharge and Required Headwater Depth at Pipe Inlet

As discussed in Assumption 2, the peak flowrate for the downchute pipes is obtained from Reference 4 and represents the largest peak discharge from any of the surface water diversion berms. The 25-year, 24-hour peak discharges from the worst-case surface water diversion berm are 15.6 and 3.7 cubic feet per second (cfs) for newly capped and vegetated cap conditions, respectively. Based on a stage-discharge relationship developed using Reference 2, required headwater depths (i.e., water surface elevation relative to inlet invert) for these two flowrates are 2.07 and 0.81 feet, respectively. Because the depth of the surface water diversion berms is 2.5 feet at the inlets to the downchute pipes, the downchute pipes are capable of conveying the peak discharge from the design storm. Supporting output from Reference 2 is included in Attachment 1.

Because a single pipe is used to convey flow from four surface water diversion berms at each downchute location, the flow depth in the pipe is assessed to determine whether a tailwater condition exists in the pipe that would affect the hydraulics of the inlets for the two downgradient surface water diversion berms. In general, final cover is installed starting at the landfill perimeter and proceeds upslope. Thus, it is assumed that the upper two surface water diversion berms are conveying flow from newly capped areas (i.e., each of the upper two surface water diversion berms are conveying the aforementioned peak discharge of 15.6 cfs). As the downchute pipe transitions to a 10 percent slope across the lower surface water diversion berm, it is conveying a total of 31.2 cfs (from the two upper surface water diversion berms carrying an assumed peak discharge of 15.6 cfs each). Based on the Manning equation, the pipe-full

Calculation Sheet

capacity of a 26-inch-diameter DR 26 HDPE pipe on a 10 percent slope is approximately 92 cfs. A flowrate of 31.2 cfs equates to a Q/Q_{full} ratio of 0.34. Using Reference 7, this ratio corresponds to a ratio of flow depth to pipe diameter, d/D, of approximately 0.42. Thus, the flow depth in the 10 percent slope segment is approximately 10 inches (0.42 x 23.88 inches = 10 inches). The invert of the 26-inch-diameter inlet pipes at the lower two surface water diversion pipes are approximately 2 feet above the invert of the downchute pipe at the point of connection between the inlet pipes and the downchute pipe. Thus, the 10 inch depth of flow in the downchute pipe is not expected to create a tailwater on the inlet pipes at the lower two surface water diversion berms and the predicted headwater depths at the inlets to the downchute pipe are accurate as calculated because the assumed free discharge condition for the downchute inlets is confirmed.

2. Ditch Lining Stability Analysis

At each downchute location, the single downchute pipe for the surface water diversion berms and the two perimeter ditch outlet pipes discharge into a common header pipe at the toe of the MSE wall. The ditches into which the header pipes outlet will be armored with rock-filled reno mattress in the vicinity of the header pipes.

Using the design peak discharges of 15.6 and 3.7 cfs for newly capped and vegetated cap conditions, respectively, and assuming two of the four surface water diversion berms receive flow from newly capped areas, a conservative estimate of the total combined flow from the surface water diversion berms to the header pipe is 38.6 cfs. Based on Reference 8, perimeter ditch outlet pipes OP-1 and OP-2 collectively convey the largest peak discharge to the header pipes. The HydroCAD model prepared for Reference 8 assumes the perimeter ditch watersheds are newly capped. However, for the purposes of this analysis, the watersheds draining to the two upper surface water diversion berms are assumed to be newly capped. Under this condition, the watersheds to the perimeter ditch would have been previously capped. Hence, the HydroCAD model from Reference 8 is revised to include a lower runoff curve number (79) for vegetated portions of the perimeter ditch watershed. The resulting combined peak discharge from perimeter ditch outlet pipes OP-1 and OP-2 is 16.7 cfs. Output from the HydroCAD model for the perimeter ditch outlet pipes is included in Attachment 2. The total combined flow to the header pipe is approximately 55.3 cfs (38.6 + 16.7 = 55.3).

A flowrate of 55.3 cfs corresponds to a flow velocity of approximately 10.4 ft/s. As stated in Assumption 5, the maximum allowable velocity for reno mattress is 13.8 ft/s. Therefore, the ditch lining is considered stable. The extent of the ditches to be armored with reno mattress is based on the “Standard and Specifications for Rock Outlet Protection” contained in Reference 6. According to design charts in this standard, the required apron length for a flowrate of 55.3 cfs and a nominal 30 inch pipe diameter is approximately 24 feet. The same design charts indicate an apron width of approximately 27 feet. However, the channels into which the header pipes discharge are generally not this wide. Thus, the reno mattress will extend to the top of the channel banks, as recommended in Reference 6. Excerpts from References 5 and 6 are included in Attachment 3.

SUMMARY:

The downchute pipes provide adequate hydraulic capacity to convey the worst-case peak discharge from the 25-year, 24-hour design storm. The flow velocity at the end of the header pipes is less than the maximum allowable velocity for the reno mattress ditch lining to be installed at the header pipe location and so the ditch lining is deemed stable. The reno mattress lining will extend a minimum of 24 feet downstream of the header pipe outlets and will be installed to the top of the channel banks.

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Attachment 1

HydroCAD Output for Conditions at Downchute Pipe Inlets

Summary for Pond 2P: Pipe Inlet

Inflow Area = 3.860 ac, 0.00% Impervious, Inflow Depth = 3.02" for 25 yr Model City event
Inflow = 15.58 cfs @ 12.04 hrs, Volume= 0.971 af
Outflow = 15.58 cfs @ 12.04 hrs, Volume= 0.971 af, Atten= 0%, Lag= 0.0 min
Primary = 15.58 cfs @ 12.04 hrs, Volume= 0.971 af

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 2.07' @ 12.04 hrs
Flood Elev= 2.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**23.9" x 20.0' long 26" Dia DR 26** CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 0.00' S= -0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

Primary OutFlow Max=15.32 cfs @ 12.04 hrs HW=2.04' (Free Discharge)
└─**1=26" Dia DR 26** (Inlet Controls 15.32 cfs @ 4.92 fps)

Summary for Pond 4P: Pipe Inlet

Inflow Area =	3.860 ac,	0.00% Impervious,	Inflow Depth =	1.96"	for 25 yr Model City event
Inflow =	3.66 cfs @	12.73 hrs,	Volume=	0.632 af	
Outflow =	3.66 cfs @	12.73 hrs,	Volume=	0.632 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.66 cfs @	12.73 hrs,	Volume=	0.632 af	

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Peak Elev= 0.81' @ 12.73 hrs
Flood Elev= 2.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**23.9" x 20.0' long 26" Dia. DR 26** CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 0.00' S= -0.1000 '/' Cc= 0.900 n= 0.010 PVC, smooth interior

Primary OutFlow Max=3.66 cfs @ 12.73 hrs HW=0.81' (Free Discharge)
└─**1=26" Dia. DR 26** (Inlet Controls 3.66 cfs @ 3.07 fps)

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Attachment 2

HydroCAD Output for Peak Flowrate from Perimeter Ditch Outlet Pipes OP-1 and OP-2

Summary for Pond 31P: Header Pipe

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.710 ac, 0.00% Impervious, Inflow Depth = 2.20" for 25 year event
Inflow = 16.66 cfs @ 11.97 hrs, Volume= 0.865 af
Primary = 16.66 cfs @ 11.97 hrs, Volume= 0.865 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs

Pond 31P: Header Pipe

ARCADIS

Attachment 3

References

APPENDIX 19.C
Circular Channel Ratios

Experiments have shown that n varies slightly with depth. This figure gives velocity and flow rate ratios for varying n (solid line) and constant n (broken line) assumptions.

APPENDICES

NYSDEC OHMS Document No. 201469232-00007

MACCAFERRI Gabions

Channeling works

■

Canalisations

■

Canalizaciones

«Critical velocity» is the velocity at which the revetment will remain stable without movement of the fill, while «limit velocit» is that which is still acceptable although there is some deformation of the Reno mattress due to movement of the stones within the compartments (table 2).
It is essential for the longevity of the revetment that the mesh be protected against corrosion: Reno mattresses and gabions are therefore manufactured from meshes with a heavy zinc coating which complies with the strictest international standards.
However, when the lining is subjected to polluted or aggressive water, the risk of corrosion is increased, and Reno mattress and/or gabions made from wire which has been coated with both zinc and PVC, offering high resistance to chemicals, abrasion and ageing, should be used.

On entend par «vitesse critique» la vitesse maximale supportable par le revêtement sans provoquer le déplacement de la pierraille de remplissage et par «vitesse limite» celle, encore acceptable, qui engendre de légères déformations dues à l'entassement de la pierraille dans le matelas Reno (tableau 2).
Nous fournissons ici aussi le tableau 3 qui montre quelques valeurs indicatives de la vitesse limite au fond des cours d'eau naturels.
La protection du grillage contre la corrosion est d'une importance vitale pour la durée du revêtement; c'est pourquoi les matelas Reno et les gabions sont constitués d'un grillage métallique galvanisé conformément aux plus sévères normes internationales.
Toutefois, nous conseillons en présence d'eaux polluées, ou de toute façon agressives, c'est-à-dire là où la corrosion est particulièrement forte, de recourir aux matelas Reno et/ou aux gabions galvanisés sous gaine PVC, insensibles aux attaques chimiques, aux phénomènes d'abrasion et à l'usure.

Por «velocidad crítica» se entiende la veloci máxima que puede soportar el revestimiento que se produzcan movimientos de las piec en el interior del colchón y, por «velocidad l te», la velocidad, aún aceptable, que determ deformaciones reducidas debido al amonto miento de las piedras en el colchón Re (tabla 2).
Para mayor comodidad, se agrega la tabla 3 algunos valores indicativos de la velocidad li te en el fondo de los cursos de agua natural
La protección de la red contra la corrosión de vital importancia para la duración del reve miento; por esta razón, los colchones Reno y gaviones están formados por una red metál fuertemente galvanizada, en conformidad con más rigurosas normas internacionales.
Sin embargo, en el caso de aguas contami das o corrosivas, es decir, donde el probler de la corrosión es más agudo, es aconsejat la utilización de colchones Reno y/o gavion galvanizados y revestidos con una capa de P altamente resistente a los agentes químicos, l fenómenos abrasivos y al envejecimiento.

***Tab. 2** - Indicative Reno mattress and gabion thicknesses in relation to water velocities*

***Tab. 2** - Epaisseurs approximatives des revêtements en matelas Reno et en gabions en fonction de la vitesse du courant*

***Tab. 2** - Espesores indicativos de los revestimientos en colchones Reno y en gaviones en función de la velocidad de la corriente*

Type Type Tipo	Thickness Epaisseur Espesor m	Filling stones Pierraille de remplissage Pedrisco de relleno		Critical velocity (*) Vitesse critique (*) Velocidad crítica (*) m/s	Limit velocity (*) Vitesse limite (*) Velocidad límite (*) m/s
		Stone size Granulométrie Dimensiones mm	d_{50}		
Reno mattresses Matelas Reno Colchones Reno	0.15-0.17	70-100	0.085	3.5	4.2
		70-150	0.110	4.2	4.5
	0.23-0.25	70-100	0.085	3.6	5.5
		70-150	0.120	4.5	6.1
	0.30 (12 IN)	70-120 (2 3/4 - 4 3/4 IN)	0.100 (4 IN)	4.2 (13.8 FT/S)	5.5
		100-150	0.125	5.0	6.4
Gabions Gabions Gaviones	0.50	100-200	0.150	5.8	7.6
		120-250	0.190	6.4	8.0

(*) The values of velocity reported were obtained experimentally for Froude numbers ≤1 (see pag. 33); values > have to be intended purely indicative and approximated.

(*) Les valeurs des vitesses indiquées sont tirées expérimentalement des nombres de Froude ≤1 (voir page 33); les valeurs >1 sont purement indicatives.

(*) Los valores de velocidad indicados han sido calculados experimentalmente para números de Froude ≤1 (pág. 33); para valores >1, deben considerarse como puramente indicativos y muy en general.

***Tab. 3** - Limiting velocities at bed level for various soils*

***Tab. 3** - Valeurs indicatives de vitesse limite au fond*

***Tab. 3** - Valores indicativos de la velocidad límite en el fondo*

Bed material / Matériaux constituant le lit / Material del cauce			Velocity / Vitesse / Velocidad m/s	
			A	B
Fine sand. (*)	Sable fin(*)	Arena fina	0.45	0.75
Sandy clay. (*)	Terrain argileux-sablonneux (*)	Terreno arcilloso-arenoso	0.55	0.75
Soft clays	Terrain argileux-vaseux	Terreno arcilloso-limoso	0.60	0.90
Muds	Limons normaux	Limos normales	0.75	1.05
Coarse sand	Gravier fin	Grava fina	0.75	1.50
Medium clay	Argile compacte	Arcilla compacta	1.15	1.50
Gravel	Gravier ordinaire	Grava gruesa	1.20	1.85
Shingle	Cailloux et galets	Guijarros y pedrisco	1.50	1.70
Hard clay	Schistes argileux	Arcillas-esquistosas	1.85	1.85

A = No material carried in suspension
B = Colloidal material carried in suspension
(*) = Non-colloidal

A = Courant sans transport de matériau colloïdal
B = Courant avec transport de matériau colloïdal en suspension
(*) = Non colloïdal

A = Sin transporte de material coloidal
B = Con transporte de material coloidal
(*) = No coloidal

Figure 5B.12
Outlet Protection Design—Minimum Tailwater Condition (Design of Outlet Protection from a Round Pipe Flowing Full, Minimum Tailwater Condition: $T_w < 0.5D_o$) (USDA - NRCS)

Appendix H-3

SLF 10 Diversion Channel Design

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Infrastructure, environment, buildings

Imagine the result

Calculation Sheet

Client: CWM Chemical Services, LLC

Project Location: Model City, New York

Project: RMU-2 Design Calculations **Project No.: B0023725.2009**

Subject: Appendix H-3: SLF 10 Diversion Channel Design

Prepared By: PDB **Date: August 2009**

Checked By: BMS **Date: August 2009**

Reviewed By: PHB **Date: August 2009**

OBJECTIVE:

Demonstrate that the proposed cross-sectional geometry of the SLF 10 diversion channel provides adequate hydraulic capacity to convey the estimated peak discharge from the 25-year, 25-hour storm. Demonstrate that stable hydraulic conditions exist in the SLF 10 diversion channel immediately after construction.

REFERENCES:

1. RMU-2 Permit Drawing No. 7 entitled "Top of Vegetative Cover Grades", ARCADIS, August 2009.
2. Technical Release 55 "Urban Hydrology for Small Watersheds," Soil Conservation Service, June 1986.
3. HydroCAD Software Solutions, LLC, HydroCAD. Version 8.5. Computer Software, 2006. (Output attached).
4. *Open Channel Flow*, Henderson, F.M., pp. 99-101, 1966 (attached).
5. North American Green Erosion Control Materials Design Software v. 4.31, 1998.
6. "New York Guidelines for Urban Erosion and Sediment Control," NYDEC, August 2005.
7. Hydraulic Engineering Circular No.15 (HEC15) "Design of Roadside Channels with Flexible Linings", U.S. Department of Transportation Federal Highway Administration, April 1988.

ASSUMPTIONS:

1. The SLF 10 diversion channel has a trapezoidal geometry with a 2-foot base width and sideslopes of 2H:1V and 10H:1V. The channel is located on the eastern, southern and western edges of SLF 10 and is utilized to divert stormwater runoff from SLF 10 to the RMU-2 perimeter drainage ditch and ultimately to the VO5 retention basin (Reference 1).
2. The invert slope of the SLF 10 diversion channel is 1.0%.
3. The design storm is the 25-year, 24-hour event, which produces 4.0 inches of rainfall.
4. To minimize the erosion of the final cover after construction of the diversion channel, a temporary

Calculation Sheet

erosion control mat will line the interior surface of the channel. The temporary erosion control mat will degrade over a period of approximately 1 year and is intended to protect the final cover until vegetation is established.

5. The runoff curve number for the tributary watershed to the SLF 10 diversion channel varies according to surface conditions. The runoff curve number for capped areas with established vegetation is assumed to be 79 (based on the value presented in Table 2-2a of Reference 2 for open spaces with 50-75% grass coverage and Hydrologic Soil Group "C"). The runoff curve number for gravel roads on the surface of SLF 10 is 89 based on Reference 2.

6. The Manning "n" for the diversion channel varies according to the condition of the cap vegetation. For the newly constructed condition, the Manning "n" is determined by the presence of the temporary erosion control mat and is based on Reference 5. For vegetated cap conditions, the Manning "n" is based on Reference 4 and assumes a good stand of 6- to 10-inch tall vegetation.

7. No minimum freeboard is required for the mid-slope swale under vegetated cap conditions due to the presence of grassed conditions adjacent to the edges of the SLF 10 diversion channel (Reference 6).

8. Shear stresses for newly constructed and vegetated conditions of the SLF 10 diversion channel are assessed using the allowable shear stress method. With this method, actual sheer stresses on the channel bed are calculated and compared to the allowable shear stresses for the channel lining. Allowable shear stresses for the newly constructed and vegetated conditions within the diversion channel are obtained from References 5 and 7, respectively. An actual shear stress less than the allowable shear stress produces a positive factor of safety and a stable condition within the diversion channel.

CALCULATIONS:

1. Estimated Peak Discharge

The tributary watershed that is used to design and evaluate the SLF 10 diversion channel is depicted on a watershed map included in Attachment 1. Table 1 summarizes the runoff characteristics for the tributary watershed draining to the diversion channel and the 25-year, 24-hour estimated peak discharge.

Table 1 – Watershed Characteristics

Watershed Area [acres]	Runoff Curve Number	Time of Concentration [min]	25-yr, 24-hr Estimated Peak Discharge [cfs]
4.57	80	30.2	8.0

Supporting output from HydroCAD is included as Attachment 2.

2. Resulting Hydraulic Conditions

Based on the above estimated peak discharge, the following table summarizes the resulting hydraulic conditions within the SLF 10 diversion channel.

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Imagine the result

Calculation Sheet

Table 2 – Flow Characteristics

Channel Condition	25-yr, 24-hr Estimated Peak Discharge [cfs]	Manning "n"	Channel Depth [in]	Flow Depth [in]	Freeboard [in]	Flow Velocity [cfs]
Newly Constructed	8.0	0.050	24	9	15	1.70
Vegetated	8.0	0.135	24	14	10	0.81

As indicated in Table 2, a channel depth of 24 inches for the SLF 10 diversion channel provides adequate hydraulic capacity in both the newly constructed and vegetated conditions to convey the 25-year, 24-hour estimated peak discharges. Supporting output is included as Attachment 3.

Table 3 – Shear Stresses

Channel Condition	Permissible Shear Stress [psf]	Calculated Shear Stress [psf]	Factor of Safety
Newly Constructed	1.55	0.46	3.38
Vegetated	1.00	0.71	1.42

As indicated in Table 3, the SLF 10 diversion channel is hydraulically stable in both the newly constructed and vegetated conditions. Supporting output is included as Attachment 3.

SUMMARY:

The proposed cross-sectional geometry of the SLF 10 diversion channel provides adequate hydraulic capacity to convey the estimated peak discharge from the 25-year, 24-hour storm. Conditions in the SLF 10 diversion channel immediately after construction and when vegetated are hydraulically stable.

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Attachment 1

Watershed Map

NYSDEC OHMS Document No. 201469232-00007

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SHEET TITLE: SLF 10 DIVERSION CHANNEL WATERSHED
PROJECT TITLE: RMU-2 PERMIT CALCULATION
CWM CHEMICAL SERVICES
PROJECT LOCATION: MODEL CITY, NEW YORK
PROJECT NO: B0023725.2009
DATE: AUGUST 2009 BY: PTO FILE NO.: 23725.PRO

Figure 1

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Attachment 2

HydroCAD Output

Summary for Subcatchment 1S: SLF-10 Diversion Ditch

Runoff = 8.00 cfs @ 12.25 hrs, Volume= 0.778 af, Depth= 2.04"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-year Rainfall=4.00"

Area (ac)	CN	Description
4.230	79	50-75% Grass cover, Fair, HSG C
0.340	89	Gravel roads, HSG C
4.570	80	Weighted Average
4.570		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	75	0.0600	0.22		**Sheet Flow,** Grass: Short n= 0.150 P2= 2.50"
0.5	152	0.1000	5.09		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
24.0	1,130	0.0100	0.78	15.20	**Channel Flow,** Area= 19.4 sf Perim= 32.3' r= 0.60' n= 0.135
30.2	1,357	Total			

ARCADIS

Attachment 3

Hydraulic Analysis

Project: RMU-2 Design By: PDB Date: August 2009
Project No.: B0023725.2009
Subject: SLF 10 Diversion Channel Design Ckd By: BMS Date: August 2009

Class C Turf (6" to 12")

Channel Design (Input)	
Flow Capacity (cfs)	8.00
Base Width (ft)	2.00
Left Side Slope (x:1)	2.00
Right Side Slope (x:1)	10.00
Bed Slope	0.010
Maximum Allowable Shear Stress on Bed (psf)	1.00
Maximum Allowable Shear Stress on Sideslopes (psf)	1.00
Manning "n"	0.135

Flow Conditions (Output)	
Flowrate from Manning Equation (cfs)	8.00
Required Flow Depth (ft)	1.13
Resulting Flow Velocity (ft/s)	0.81
Resulting Flow Width at Top (ft)	15.56
Resulting Flow Area (ft^2)	9.92
Resulting Wetted Perimeter (ft)	15.88
Resulting Hydraulic Radius (ft)	0.62
Resulting Shear Stress on Bed (psf)	0.71
Resulting Shear Stress on Sideslopes (psf)	0.53
Channel Dimensions	
Shear Stress Factor of Safety (Bed)	1.42
Shear Stress Factor of Safety (Sideslope)	1.89

North American Green - ECMDS Version 4.3	7/17/2009	03:32 PM	COMPUTED BY: PDB
PROJECT NAME: SLF 10 Diversion Channel	PROJECT NO.: B0023725.2009		
FROM STATION/REACH:	TO STATION/REACH:	DRAINAGE AREA: 4.57 acres	DESIGN FREQUENCY: 25-year

HYDRAULIC RESULTS

Discharge (cfs)	Peak Flow Period (hrs)	Velocity (fps)	Area (sq.ft)	Hydraulic Radius(ft)	Normal Depth (ft)
8.0	1.0	1.70	4.71	0.43	0.74

Not to Scale

BEND RESULTS

Bend Radius (ft)	Length Protection (ft)	Super Elevation Depth (ft)
30.0	4.5	0.8

LINER RESULTS

Reach	Matting Type / Staple Pattern	Stability Analysis	Vegetation Characteristics: Phase	Class	Type	Density	Permissible Shear Stress (psf)	Calculated Shear Stress (psf)	Safety Factor	Remarks
Straight	S75	Unvegetated					1.55	0.46	3.38	STABLE
	Staple D									
Bend	S75	Unvegetated					1.55	0.46	3.38	STABLE
	Staple D									

Back to Input Screen

ARCADIS

Attachment 4

References

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Open Channel Flow

F. M. HENDERSON

Professor of Civil Engineering
University of Canterbury
Christchurch, New Zealand

Prentice Hall
Upper Saddle River, NJ 07458

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channels" described at the end of the table clearly cover such a wide range of conditions that some field experience is desirable before a value of n can be estimated with reasonable confidence. However, the photographs given by Ven Te Chow [6] form a useful supplement to, or even substitute for, field experience.

The last entry in the table gives the result of Eq. (4–22), applicable mainly to alluvial channels of coarse noncohesive gravel or cobbles (known as *shingle* in British countries). The D-75 size may be taken as a good approximation to the value of d (larger than the median) with which the bed tends to become armored.

The reader will easily be able to verify that the values of k_s in Table 4–1 are generally consistent, via Eq. (4–22), with the above values of n.

When the channel bed and banks are thickly covered with vegetation an appreciable part of the flow takes place through the vegetation at low velocities. If the growth is of fine material such as grass the Reynolds number Re defined with respect to the stalk thickness will be low, and the resistance, and therefore the Manning n, will be dependent on Re. Since n will therefore depend on the velocity, it may possibly depend on Re defined with respect to the channel size as well as with respect to the stalk thickness. This has been shown to be true by the experiments of the U. S. Soil Conservation Service [3];

Figure 4-5. The Behavior of Manning's n in Grassed Channels

their results, for a number of North American grass species, are summarized in Fig. 4-5. The division into classes depends mainly on the length and the "stand"—i.e., the vigour and thickness of growth, according to the following table:

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TABLE 4-3

Average length of grass	*Class* Good stand	Fair stand
More than 30 in.	A	B
11–24 in.	B	C
6–10 in.	C	D
2–6 in.	D	D
less than 2 in.	E	E

Wide shallow grassed channels are a popular solution to the problem of passing large discharges down steep slopes without developing unduly high velocities.

4.3 Uniform Flow: Its Computation and Applications

Significance of Uniform Flow

Uniform flow has now been defined and a dynamic equation developed—the Manning equation—which adequately describes both uniform and non-uniform flow.

Uniform flow seldom occurs in nature, since natural channels are usually irregular. Even in artificial channels of uniform section, the occurrence of uniform flow may be relatively infrequent because of the existence of controls, such as weirs, sluice gates, etc., which dictate a depth-discharge relationship different from that appropriate to uniform flow.

However, uniform flow is a condition of such basic importance that it must be considered in all channel-design problems. For example, if it is proposed to instal certain controls in an irrigation canal it is necessary to compare their depth-discharge relation with those of uniform flow; as we shall see, the whole character of the flow in the canal will depend on the form this comparison takes. Again, if a canal is to be laid on a certain slope, is to have a lining of a certain coefficient n, and is to take a certain discharge, then the uniform-flow condition is the criterion governing the *minimum* cross-sectional area required. Other criteria may of course determine that the section must be greater than this minimum, but the section cannot conceivably be any smaller or the canal will be unable to take the required discharge.

Economical Design of a Channel Cross Section

A typical uniform-flow problem in the design of artificial canals is the economical proportioning of the cross section. A canal having a given Manning coefficient n and slope S_0 is to carry a certain discharge Q, and

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Hydraulic Engineering Circular No. 15

Publication No. FHWA-IP-87-7

April 1988

U.S. Department
of Transportation

**Federal Highway
Administration**

DESIGN OF ROADSIDE CHANNELS WITH FLEXIBLE LININGS

Research, Development, and Technology
Turner-Fairbank Highway Research Center
6300 Georgetown Pike
McLean, Virgina 22101-2296

NYSDEC OHMS Document No. 201469232-00007

Lining Category	Lining Type	Permissible Unit Shear Stress[1] (lb/ft^2)	(Kg/m^2)
Temporary*	Woven Paper Net	0.15	0.73
	Jute Net	0.45	2.20
	Fiberglass Roving:		
	Single	0.60	2.93
	Double	0.85	4.15
	Straw with Net	1.45	7.08
	Curled Wood Mat	1.55	7.57
	Synthetic Mat	2.00	9.76
Vegetative	Class A	3.70	18.06
	Class B	2.10	10.25
	Class C	1.00	4.88
	Class D	0.60	2.93
	Class E	0.35	1.71
Gravel Riprap	1-inch	0.33	1.61
	2-inch	0.67	3.22
Rock Riprap	6-inch	2.00	9.76
	12-inch	4.00	19.52
Bare Soil	Non-cohesive	See Chart 1	
	Cohesive	See Chart 2	

Appendix H-4

Perimeter Ditch Design

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Calculation Sheet

Client: **CWM Chemical Services, LLC**

Project Location: **Model City, New York**

Project: **RMU-2 Design Calculations** **Project No.:** **B0023725.2009**

Subject: **Appendix H-4: Perimeter Ditch Design**

Prepared By: **PTO** **Date:** **August 2009**

Reviewed By: **BMS** **Date:** **August 2009**

Checked By: **PHB** **Date:** **August 2009**

OBJECTIVE:

Demonstrate that the proposed cross-sectional geometry for the final cover perimeter ditch provides adequate hydraulic capacity to convey the estimated peak discharge from the 25-year, 24-hour storm. Demonstrate that stable hydraulic conditions exist in the perimeter ditch.

REFERENCES:

1. Technical Release 55 "Urban Hydrology for Small Watersheds," Soil Conservation Service, June 1986.

2. HydroCAD Software Solutions, LLC, HydroCAD. Version 8.5. Computer Software, 2006. (Output attached).

3. "New York Guidelines for Urban Erosion & Sediment Control," August 2005 (portions attached).

4. RMU-2 Permit Drawing No. 7 entitled "Top of Vegetative Cover Grades", ARCADIS, August 2009.

5. Design of Roadside Channels with Flexible Linings. Hydraulic Engineering circular No. 15 (HEC-15). US Department of Transportation Federal Highway Administration, April 1988.

ASSUMPTIONS:

1. The perimeter ditch has a V-notch geometry with varying depths and sideslopes. The reach depicted in this calculation was chosen because it receives the largest 25-year, 24-hour estimated peak discharge (see Attachment 1). For calculation purposes, the reach is divided into four channel segments (segment 1 most downstream segment) to account for the changes in channel depth and sideslopes that exist along the length of the ditch. The channel depth and sideslope characteristics for each segment are determined from Reference 4. The channel depths for Segments 1, 2, 3, and 4 are 3.35-ft, 2.82-ft, 2.05-ft, and 1.28-ft, respectively. The channel sideslopes for Segments 1, 2, 3, and 4 are 2.1H:1V, 2.7H:1V, 3.5H:1V, and 4.2H:1V, respectively.

2. The invert slope of the perimeter ditch is 0.3%.

3. The design storm is the 25-year, 24-hour event, which produces 4.0 inches of rainfall.

4. The runoff curve number for the tributary watershed to each perimeter ditch segment varies according to surface conditions. The runoff curve number for the gravel MSE Wall Access Road adjacent to the

Calculation Sheet

perimeter ditch is 89 based on Reference 1. The perimeter ditch is riprap lined with a runoff curve number of 89 also based on Reference 1. The runoff curve number for newly capped areas is assumed to be 91 (based on the value presented in Table 2-2a of Reference 1 for newly graded areas with Hydrologic Soil Group "C"). This runoff curve number represents bare soil with no vegetation. Due to the relatively small acreage of final cover draining into the design channel reach, it is assumed that the entire final cover area within the watershed can be capped in one season. Therefore a newly capped condition is assumed for the analysis.

5. The Manning "n" for the perimeter ditch is based on Reference 3 and assumes riprap whose D_{50} = 3-inches.

6. No minimum freeboard is required for the perimeter ditch due to the presence of riprap along the inboard edge. The outboard edge of the perimeter ditch is adjacent to a gravel roadway which is also erosion resistant. Based on Reference 3, no freeboard is required for a channel where erosion resistant materials such as riprap and gravel exist adjacent to the channel edge. Additionally, Reference 3 recommends that the channel design be based on the peak discharge from the 10-year, 24-hour storm. In contrast, the perimeter ditch design is based on the peak discharge from the 25-year, 24-hour storm and is therefore more conservative.

7. Riprap lining is evaluated for stability using the shear stress approach described in Reference 5. The maximum shear stress is compared to the permissible shear stress of the riprap lining to determine a factor of safety against failure. The lining material is considered to be stable when the factor of safety equals or exceeds 1.0.

CALCULATIONS:

1. Estimated Peak Discharge to the Perimeter Ditch

The following table (Table 1) summarizes the runoff characteristics for the tributary watershed draining to each perimeter ditch segment and the resultant 25-year, 24-hour estimated peak discharges.

Table 1 – Runoff Characteristics of Tributary Areas Draining to Perimeter Ditch Segments

Channel Segment	Cumulative Watershed Area [acres]	Composite Runoff Curve Number	Time of Concentration [min]	25-yr, 24-hr Estimated Peak Discharge [cfs]
1	2.54	90	16.2	9.0
2	1.94	91	14.0	7.5
3	1.30	91	10.0	5.7
4	0.61	91	6.4	2.9

Supporting output from HydroCAD is included as Attachment 2.

2. Resulting Hydraulic Conditions

Based on the above estimated peak discharges, the following table (Table 2) summarizes the resulting hydraulic conditions within each perimeter ditch segment.

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Calculation Sheet

Table 2 – Flow Characteristics within Perimeter Ditch

Channel Segment	25-yr, 24-hr Estimated Peak Discharge [cfs]	Manning "n"	Channel Depth [ft]	Flow Depth [ft]	Freeboard [ft]	Flow Velocity [ft/s]
1	9.0	0.035	3.35	1.53	1.82	1.82
2	7.5	0.035	2.82	1.29	1.53	1.67
3	5.7	0.037	2.05	1.07	0.98	1.42
4	2.9	0.039	1.28	0.79	0.49	1.11

As indicated in Table 2, the proposed cross sectional geometry for the perimeter ditch provides adequate hydraulic capacity to convey the 25-year, 24-hour estimated peak discharge (see Attachment 3).

3. Lining Stability Evaluation

The equation used to calculate the maximum applied shear stress, τ_b (in pounds per square foot [psf]), on the sideslopes of each channel segment is:

$$\tau_b\left(\frac{lb}{ft^2}\right) = .75(\gamma_w)(d)(S)$$ where,

γ_w = Unit weight of water (62.4 lb/ft^3)
d = Depth of flow (ft)
S = Bed slope (ft/ft)

To calculate the allowable shear stress, τ_s, on the sideslope of the channel using Reference 5:

$$\tau_s\left(\frac{lb}{ft^2}\right) = (\tau_c)\left(\sqrt{1-\frac{\sin^2\phi}{\sin^2\theta}}\right)$$

θ = side angle of the channel
ϕ = angle of repose = 40 degrees

The factor of safety is then determined as follows:

Factor of Safety = Permissible Shear Stress / Maximum Applied Shear Stress = $\frac{\tau_s}{\tau_b}$

The resulting shear stresses and factors of safety for each channel segment are summarized in Table 3, below.

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Table 3 – Stability Analysis of Perimeter Ditch

Channel Segment	Flow Depth (ft)	Maximum Shear Stress (lb/ft^2)	Permissible Shear Stress (lb/ft^2)	Factor of Safety
1	1.53	0.21	0.74	3.5
2	1.29	0.18	0.84	4.6
3	1.07	0.15	0.90	6.0
4	0.79	0.11	0.93	8.3

As indicated in Table 3, the proposed riprap lining for the perimeter ditch is stable when subjected to the fluid shear stresses resulting from the 25-year, 24-hour design storm.

SUMMARY:

The proposed perimeter ditch provides adequate hydraulic capacity to convey the 25-year, 24-hour estimated peak discharge for the worst-case watershed. Stable conditions exist in the perimeter ditch when subjected to the fluid shear stresses that result from the 25-year, 24-hour storm event.

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Attachment 1

Watershed Map

NYSDEC OHMS Document No. 201469232-00007

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SHEET TITLE: PERIMETER DITCHWATERSHED MAP
PROJECT TITLE: RMU-2 PERMIT CALCULATION
CWM CHEMICAL SERVICES
PROJECT LOCATION: MODEL CITY, NEW YORK
PROJECT NO: B0023725.2009
DATE: AUGUST 2009 BY: PTO FILE NO.: 23725.PRO

Figure 1

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Attachment 2

HydroCAD Output

Summary for Subcatchment 11S: Segment 1

Runoff = 8.95 cfs @ 12.08 hrs, Volume= 0.618 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.00"

	Area (ac)	CN	Description
	0.660	89	Gravel roads, HSG C
*	1.881	91	Newly Capped
	2.541	90	Weighted Average
	2.541		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.50"
0.2	79	0.2500	8.05		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
6.0	269	0.0030	0.74	7.44	**Channel Flow, Segment 4** Area= 10.0 sf Perim= 47.0' r= 0.21' n= 0.039
4.8	258	0.0030	0.89	6.26	**Channel Flow, Segment 3** Area= 7.0 sf Perim= 27.0' r= 0.26' n= 0.037
2.6	258	0.0030	1.64	26.25	**Channel Flow, Segment 2** Area= 16.0 sf Perim= 27.0' r= 0.59' n= 0.035
2.2	258	0.0030	1.96	47.06	**Channel Flow, Segment 1** Area= 24.0 sf Perim= 31.0' r= 0.77' n= 0.035
16.2	1,197	Total			

Summary for Subcatchment 9S: Segment 2

Runoff = 7.50 cfs @ 12.05 hrs, Volume= 0.488 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.00"

	Area (ac)	CN	Description
	0.480	89	Gravel roads, HSG C
*	1.460	91	Newly graded
	1.940	91	Weighted Average
	1.940		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.50"
0.2	79	0.2500	8.05		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
6.0	269	0.0030	0.74	7.44	**Channel Flow, Segment 4** Area= 10.0 sf Perim= 47.0' r= 0.21' n= 0.039
4.8	258	0.0030	0.89	6.26	**Channel Flow, Segment 3** Area= 7.0 sf Perim= 27.0' r= 0.26' n= 0.037
2.6	258	0.0030	1.64	26.25	**Channel Flow, Segment 2** Area= 16.0 sf Perim= 27.0' r= 0.59' n= 0.035
14.0	939	Total			

Summary for Subcatchment 7S: Segment 3

Runoff = 5.69 cfs @ 12.01 hrs, Volume= 0.327 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.00"

	Area (ac)	CN	Description
	0.311	89	Gravel roads, HSG C
*	0.990	91	Newly Capped
	1.301	91	Weighted Average
	1.301		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.50"
0.2	79	0.2500	8.05		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
5.8	258	0.0030	0.74	7.44	**Channel Flow, Segment 4** Area= 10.0 sf Perim= 47.0' r= 0.21' n= 0.039
3.6	258	0.0030	1.21	13.30	**Channel Flow, Segment 3** Area= 11.0 sf Perim= 27.0' r= 0.41' n= 0.037
10.0	670	Total			

Summary for Subcatchment 4S: Segment 4

Runoff = 2.94 cfs @ 11.97 hrs, Volume= 0.153 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
Type II 24-hr Rainfall=4.00"

	Area (ac)	CN	Description
	0.148	89	Gravel roads, HSG C
*	0.459	91	Newly Capped
	0.607	91	Weighted Average
	0.607		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow, Sheet Flow** Smooth surfaces n= 0.011 P2= 2.50"
0.2	79	0.2500	8.05		**Shallow Concentrated Flow, Shallow Concentrated** Unpaved Kv= 16.1 fps
5.8	258	0.0030	0.74	7.44	**Channel Flow, Channel Flow** Area= 10.0 sf Perim= 47.0' r= 0.21' n= 0.039
6.4	412	Total			

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Attachment 3

Hydraulic Analysis

Project: RMU-2 Design By: PTO Date: August 2009
Project No.: B0023725.2009
Subject: Perimeter Ditch Design Ckd By: BMS Date: August 2009

Perimeter Ditch - Segment 1

Channel Design (Input)	
Flow Capacity (cfs)	8.95
Base Width (ft)	0.00
Left Side Slope (x:1)	2.10
Right Side Slope (x:1)	2.10
Bed Slope	0.003
Maximum Allowable Shear Stress on Sideslopes (psf)	0.74
Manning "n"	0.035

Flow Conditions (Output)	
Flowrate from Manning Equation (cfs)	8.95
Required Flow Depth (ft)	1.53
Resulting Flow Velocity (ft/s)	1.82
Resulting Flow Width at Top (ft)	6.42
Resulting Flow Area (ft^2)	4.91
Resulting Wetted Perimeter (ft)	7.11
Resulting Hydraulic Radius (ft)	0.69
Resulting Shear Stress on Bed (psf)	0.29
Resulting Shear Stress on Sideslopes (psf)	0.21
Channel Dimensions	
Channel Depth (ft)	3.35
Resulting Freeboard (ft)	1.82
Shear Stress Factor of Safety (Sideslope)	3.45

Project: RMU-2 Design By: PTO Date: August 2009
Project No.: B0023725.2009
Subject: Perimeter Ditch Design Ckd By: BMS Date: August 2009

Perimeter Ditch - Segment 2

Channel Design (Input)	
Flow Capacity (cfs)	7.50
Base Width (ft)	0.00
Left Side Slope (x:1)	2.70
Right Side Slope (x:1)	2.70
Bed Slope	0.003
Maximum Allowable Shear Stress on Sideslopes (psf)	0.84
Manning "n"	0.035

Flow Conditions (Output)	
Flowrate from Manning Equation (cfs)	7.50
Required Flow Depth (ft)	1.29
Resulting Flow Velocity (ft/s)	1.67
Resulting Flow Width at Top (ft)	6.97
Resulting Flow Area (ft^2)	4.50
Resulting Wetted Perimeter (ft)	7.43
Resulting Hydraulic Radius (ft)	0.61
Resulting Shear Stress on Bed (psf)	0.24
Resulting Shear Stress on Sideslopes (psf)	0.18
Channel Dimensions	
Channel Depth (ft)	2.82
Resulting Freeboard (ft)	1.53
Shear Stress Factor of Safety (Sideslope)	4.64

Project: RMU-2 Design By: PTO Date: August 2009
Project No.: B0023725.2009
Subject: Perimeter Ditch Design Ckd By: BMS Date: August 2009

Perimeter Ditch - Segment 3

Channel Design (Input)	
Flow Capacity (cfs)	5.69
Base Width (ft)	0.00
Left Side Slope (x:1)	3.50
Right Side Slope (x:1)	3.50
Bed Slope	0.003
Maximum Allowable Shear Stress on Sideslopes (psf)	0.90
Manning "n"	0.037

Flow Conditions (Output)	
Flowrate from Manning Equation (cfs)	5.69
Required Flow Depth (ft)	1.07
Resulting Flow Velocity (ft/s)	1.42
Resulting Flow Width at Top (ft)	7.50
Resulting Flow Area (ft^2)	4.01
Resulting Wetted Perimeter (ft)	7.80
Resulting Hydraulic Radius (ft)	0.51
Resulting Shear Stress on Bed (psf)	0.20
Resulting Shear Stress on Sideslopes (psf)	0.15
Channel Dimensions	
Channel Depth (ft)	2.05
Resulting Freeboard (ft)	0.98
Shear Stress Factor of Safety (Sideslope)	5.99

Project: RMU-2 Design By: PTO Date: August 2009
Project No.: B0023725.2009
Subject: Perimeter Ditch Design Ckd By: BMS Date: August 2009

Perimeter Ditch - Segment 4

Channel Design (Input)	
Flow Capacity (cfs)	2.94
Base Width (ft)	0.00
Left Side Slope (x:1)	4.20
Right Side Slope (x:1)	4.20
Bed Slope	0.003
Maximum Allowable Shear Stress on Sideslopes (psf)	0.93
Manning "n"	0.039

Flow Conditions (Output)	
Flowrate from Manning Equation (cfs)	2.94
Required Flow Depth (ft)	0.79
Resulting Flow Velocity (ft/s)	1.11
Resulting Flow Width at Top (ft)	6.67
Resulting Flow Area (ft^2)	2.65
Resulting Wetted Perimeter (ft)	6.86
Resulting Hydraulic Radius (ft)	0.39
Resulting Shear Stress on Bed (psf)	0.15
Resulting Shear Stress on Sideslopes (psf)	0.11
Channel Dimensions	
Channel Depth (ft)	1.28
Resulting Freeboard (ft)	0.49
Shear Stress Factor of Safety (Sideslope)	8.34

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Attachment 4

References

Figure 5B.11
Determining "n" for Riprap Lined Channel using Depth of Flow
(USDA - NRCS)

Appendix H-5

Perimeter Ditch Culvert Design

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Calculation Sheet

Client: CWM Chemical Services, LLC

Project Location: Model City, New York

Project: RMU-2 Design Calculations **Project No.: B0023725.2009**

Subject: Appendix H-5: Perimeter Ditch Culvert Design

Prepared By: NWF **Date: February 2013**

Checked By: BMS **Date: February 2013**

Reviewed By: BMS **Date: February 2013**

OBJECTIVE:

Determine the required culvert configurations for the RMU-2 perimeter ditch based on the estimated peak discharge from the 25-year, 24-hour design storm.

REFERENCES:

1. RMU-2 Permit Drawing No. 7 entitled "Top of Vegetated Cover Grades," ARCADIS, February 2013.
2. Technical Release 55 "Urban Hydrology for Small Watersheds," Soil Conservation Service, June 1986.
3. HydroCAD Software Solutions, LLC. HydroCAD Version 8.5. Computer Software, 2006. (Output Attached).
4. Manufacturer Literature, Advanced Drainage Systems, Inc.
5. Appendix 17.D "Equivalent Length of Straight Pipe for Various Fittings". Engineer in Training Reference Manual 8th Edition, Michael R. Lindeburg, P.E., 1992. (Attached).

ASSUMPTIONS:

1. The RMU-2 perimeter ditch utilizes several culverts which, for the purpose of this calculation, are categorized into two types (bypass culverts and outlet culverts). Bypass culverts are used to convey ditch flow around RMU-2 leachate riser vaults. Outlet culverts are used to convey ditch flow out to the base of the MSE wall. Both culvert types are designed using the same methodology.
2. The required culvert configurations are based on the estimated peak discharge from the 25-year, 24-hour storm event, which produces 4.0 inches of rainfall. Each culvert configuration is deemed acceptable if the design can convey the 25-year, 24-hour estimated peak discharge without causing a headwater depth that exceeds the depth of the ditch in which the culverts are installed. The perimeter ditch depth varies depending on location. Perimeter ditch depths at the culvert locations are indicated herein.
3. The flow capacity of each culvert is modeled using Reference 3, which accounts for both pipe friction losses and energy losses at the culvert entrance and exit. The model also considers dynamic tailwater conditions due to downstream culverts where applicable.

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Calculation Sheet

4. The runoff curve number for the watersheds to the perimeter ditch varies according to surface conditions. The runoff curve number for newly capped areas is assumed to be 91 (based on the value presented in Table 2-2a of Reference 2 for newly graded areas with Hydrologic Soil Group "C"). This runoff curve number represents bare soil with no vegetation and was selected to model newly constructed final cover areas before the establishment of vegetation. The runoff curve number for gravel road areas and the riprap-lined perimeter ditch is 89 (based on the value presented in Table 2-2a of Reference 2 for gravel roads with Hydrologic Soil Group "C"). Although the final cover will become covered with vegetation over time, the assumption of newly capped conditions is conservative and accounts for the design storm occurring prior to the establishment of vegetation.

5. The bypass culvert pipes are smooth-bore corrugated HDPE pipes having Manning "n" value of 0.012 based on Reference 4. The inlet and outlet of each bypass culvert pipe are mitered to conform to the slope of the ditch to reduce entrance and exit energy losses. The same inlet and outlet condition can be obtained with a flared end section. The outlet pipes are DR-26 HDPE pipes having Manning "n" value of 0.010. The inlets to the outlet pipes are mitered to conform to the slope of the ditch to reduce entrance losses.

6. The minimum slope of all bypass culvert pipes is 0.3%.

7. Outlet culvert pipes are sloped at 3%.

8. Due to the locations of the bypass culvert pipes within the perimeter ditch, minimum cover requirements for H-20 loading on HDPE pipe (1 foot minimum) may not be attainable. However, these locations are parallel to the perimeter road on the MSE wall and so will not experience vehicle loads. A minimum of 1 foot of cover will be provided for the outlet pipes.

9. To account for entrance losses in the outlet pipe systems (i.e. two 45 degree bends), an equivalent length of straight pipe was used in the design per Reference 5 (attached).

CALCULATIONS:

1. Estimated Peak Discharges to the Culverts

The RMU-2 perimeter ditch requires the construction of one bypass culvert at each riser vault location (except where vaults coincide with ditch high points) and two outlet culverts at each designated low point within the ditch (one on each side of the downchute pipe draining the surface water diversion berms). The bypass culverts are identified as CV-1 through CV-5 and the outlet culverts are identified as OP-1 through OP-8 as indicated on Reference 1. Contributing watersheds to the various culverts are depicted on a watershed area map and included as Attachment 1.

The times of concentrations for all watersheds are calculated based on newly capped conditions for the final cover areas. A minimum time of concentration value of 5 minutes is used for the analysis. Table 1 summarizes the runoff characteristics for each tributary watershed and Table 2 summarizes the 25-year, 24-hour estimated peak discharges to the various culverts. The peak discharges to each culvert are determined within Reference 3 by graphical addition of contributing hydrographs. As such, the peak to a given culvert is not necessarily equal to the sum of the peaks of the contributing watersheds.

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Calculation Sheet

Table 1 – Contributing Watershed Characteristics

Watershed ID	Area [acres]	Runoff Curve Number	Time of Concentration [min]
Vault 15	0.80	90	5.0
Vault 16	0.93	90	5.0
Vault 17	0.80	90	5.0
Vault 18	0.95	90	5.0
Vault 19	0.73	90	5.0
LP-1N	2.17	90	9.2
LP-1S	0.06	90	5.0
LP-2E	2.29	90	8.8
LP-2W	0.62	90	5.0
LP-3E	2.38	90	8.9
LP-3W	2.04	91	6.8
LP-4E	1.30	90	5.1
LP-4W	1.31	90	5.7

Supporting output from HydroCAD is included as Attachment 2.

Table 2 – Resulting Peak Discharge To Culverts

Culvert ID	Contributing Watersheds	Total Watershed Area [acres]	Resulting Peak Discharge [cfs]
CV-1	Vault 15	0.80	4.0
CV-2	Vault 15 & Vault 16	1.73	8.6
CV-3	Vault 19	0.73	3.7
CV-4	Vault 18 & Vault 19	1.68	8.4
CV-5	Vault 17, Vault 18, & Vault 19	2.48	12.4
OP-1	Vault 17, Vault 18, Vault 19, & LP-1S	2.54	12.7
OP-2	LP-1N	2.17	9.5
OP-3	Vault 15, Vault 16, & LP-2W	2.35	11.7
OP-4	LP-2E	2.29	10.2
OP-5	LP-3E	2.38	10.6
OP-6	LP-3W	2.04	9.9
OP-7	LP-4E	1.30	6.5
OP-8	LP-4W	1.31	6.4

Supporting output from HydroCAD is included as Attachment 3.

ARCADIS
Infrastructure, environment, buildings

Imagine the result

Calculation Sheet

2. Required Culvert Configurations

The 25-year, 24-hour estimated peak discharge to each culvert is used to determine the required culvert configuration. The required culvert configuration (including diameter of pipes and invert slopes) and capacities are summarized in Table 3.

Table 3 – Culvert Configurations

Culvert ID	Required Flow Rate [cfs]	Culvert/Outlet Pipe Size [in]	Pipe Slope [%]	Perimeter Ditch Depth [ft]	Resulting Water Elevation in Ditch[1] [ft]	Culvert Capacity[2] [cfs]
CV-1	4.0	18	0.3	1.5	349.29	5.4
CV-2	8.6	24	0.3	2.6	348.65	15.3
CV-3	3.7	15	0.3	1.5	349.36	4.3
CV-4	8.4	24	0.3	2.5	348.77	14.8
CV-5	12.4	24	0.3	3.5	348.53	21.1
OP-1	12.7	26	3.0	3.6	347.85	21.4
OP-2	9.5	18	3.0	3.6	348.91	10.8
OP-3	11.7	26	3.0	3.4	347.93	20.5
OP-4	10.2	20	3.0	3.4	348.60	12.7
OP-5	10.6	20	3.0	3.7	348.33	13.7
OP-6	9.9	18	3.0	3.7	348.85	11.1
OP-7	6.5	16	3.0	3.7	348.13	8.8
OP-8	6.4	16	3.0	3.7	348.07	8.8

Notes:
1. Maximum water elevation within perimeter ditch without overtopping RMU-2 Access Road is 349.55.
2. Culvert capacities are based on the maximum depth of the perimeter ditch at the inlet to the respective culverts.

The rating curves for the culverts, as determined using Reference 3, are included in Attachment 3.

SUMMARY:

Based on the above calculations, each bypass and outlet culvert provides sufficient capacity to convey the estimated peak flowrate from the 25-year, 24-hour design storm. Since the peak discharge to each culvert is based on assumed newly capped conditions and the flowrate will decrease as the final cover areas become vegetated, the culvert sizes contained herein are conservative. It should be noted that alternate configurations exist for all culverts analyzed herein. The alternate configurations need to provide a capacity that equals or exceeds the required flowrate. Finally, as RMU-2 waste filling progresses, smaller culverts than those presented above may be acceptable depending on the establishment of vegetation (i.e., if lower runoff curve numbers and/or greater times of concentration can be justified for the tributary watersheds).

ARCADIS

Attachment 1

Watershed Map

ARCADIS

SHEET TITLE: RMU-1/RMU-2 CULVERT WATERSHED MAP
PROJECT TITLE: RMU-2 PERMIT CALCULATION
CWM CHEMICAL SERVICES
PROJECT LOCATION: MODEL CITY, NEW YORK
PROJECT NO: B0023725.2009
DATE: JULY 2009 BY: PDB FILE NO.: 23725.PRO

Figure

1

NYSDEC OHMS Document No. 201469232-00007

ARCADIS

Attachment 2

HydroCAD Output for Contributing Watersheds

Summary for Subcatchment 1S: Vault 15 WS

Runoff = 4.00 cfs @ 11.95 hrs, Volume= 0.195 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.590	91	Newly graded area, HSG C
	0.110	89	Gravel roads, HSG C
*	0.100	89	Perimeter ditch - riprap lined
	0.800	90	Weighted Average
	0.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	47	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.0	317	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
3.5	439	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 5S: Vault 16 WS

Runoff = 4.65 cfs @ 11.95 hrs, Volume= 0.226 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.680	91	Newly graded area, HSG C
	0.130	89	Gravel roads, HSG C
*	0.120	89	Perimeter ditch - riprap lined
	0.930	90	Weighted Average
	0.930		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.0	20	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.5	372	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
3.9	467	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 7S: Vault 17 WS

Runoff = 4.00 cfs @ 11.95 hrs, Volume= 0.195 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.560	91	Newly graded area, HSG C
	0.120	89	Gravel roads, HSG C
*	0.120	89	Perimeter ditch - riprap lined
	0.800	90	Weighted Average
	0.800		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.0	11	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.2	334	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
3.6	420	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 9S: Vault 18 WS

Runoff = 4.75 cfs @ 11.95 hrs, Volume= 0.231 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.710	91	Newly graded area, HSG C
	0.120	89	Gravel roads, HSG C
*	0.120	89	Perimeter ditch - riprap lined
	0.950	90	Weighted Average
	0.950		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.0	21	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
3.4	357	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
3.8	453	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 11S: Vault 19 WS

Runoff = 3.65 cfs @ 11.95 hrs, Volume= 0.178 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.530	91	Newly graded area, HSG C
	0.110	89	Gravel roads, HSG C
*	0.090	89	Perimeter ditch - riprap lined
	0.730	90	Weighted Average
	0.730		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	62	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.8	292	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
3.3	429	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 15S: LP-1N

Runoff = 9.52 cfs @ 12.00 hrs, Volume= 0.528 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	1.550	91	Newly graded area, HSG C
	0.320	89	Gravel roads, HSG C
*	0.300	89	Perimeter ditch - riprap lined
	2.170	90	Weighted Average
	2.170		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	50	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.7	915	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
9.2	1,040	Total			

Summary for Subcatchment 17S: LP-1S

Runoff = 0.30 cfs @ 11.95 hrs, Volume= 0.015 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.040	91	Newly graded area, HSG C
	0.010	89	Gravel roads, HSG C
*	0.010	89	Perimeter ditch - riprap lined
	0.060	90	Weighted Average
	0.060		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	74	0.3300	3.51		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.2	24	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
0.6	98	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 21S: LP-2E

Runoff = 10.19 cfs @ 12.00 hrs, Volume= 0.557 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	1.700	91	Newly graded area, HSG C
	0.300	89	Gravel roads, HSG C
*	0.290	89	Perimeter ditch - riprap lined
	2.290	90	Weighted Average
	2.290		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	31	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.3	870	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
8.8	976	Total			

Summary for Subcatchment 19S: LP-2W

Runoff = 3.10 cfs @ 11.95 hrs, Volume= 0.151 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.410	91	Newly graded area, HSG C
	0.110	89	Gravel roads, HSG C
*	0.100	89	Perimeter ditch - riprap lined
	0.620	90	Weighted Average
	0.620		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.0	8	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.8	295	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
3.2	378	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment 29S: LP-3E

Runoff = 10.55 cfs @ 12.00 hrs, Volume= 0.579 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	1.760	91	Newly graded area, HSG C
	0.320	89	Gravel roads, HSG C
*	0.300	89	Perimeter ditch - riprap lined
	2.380	90	Weighted Average
	2.380		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	31	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
8.4	880	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
8.9	986	Total			

Summary for Subcatchment 23S: LP-3W

Runoff = 9.86 cfs @ 11.98 hrs, Volume= 0.513 af, Depth= 3.02"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	1.590	91	Newly graded area, HSG C
	0.230	89	Gravel roads, HSG C
*	0.220	89	Perimeter ditch - riprap lined
	2.040	91	Weighted Average
	2.040		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.0	25	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
6.4	671	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
6.8	771	Total			

Summary for Subcatchment 25S: LP-4E

Runoff = 6.47 cfs @ 11.95 hrs, Volume= 0.316 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.970	91	Newly graded area, HSG C
	0.170	89	Gravel roads, HSG C
*	0.160	89	Perimeter ditch - riprap lined
	1.300	90	Weighted Average
	1.300		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.0	26	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
4.7	492	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
5.1	593	Total			

Summary for Subcatchment 27S: LP-4W

Runoff = 6.36 cfs @ 11.96 hrs, Volume= 0.319 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Type II 24-hr 25 year Rainfall=4.00"

	Area (ac)	CN	Description
	0.930	91	Newly graded area, HSG C
	0.200	89	Gravel roads, HSG C
*	0.180	89	Perimeter ditch - riprap lined
	1.310	90	Weighted Average
	1.310		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.2500	3.15		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	61	0.2500	8.05		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
5.2	550	0.0030	1.75	33.33	**Channel Flow,** Area= 19.0 sf Perim= 29.0' r= 0.66' n= 0.035
5.7	686	Total			

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Attachment 3

HydroCAD Output for Culvert Design

NYSDEC OHMS Document No. 201469232-00007

CV-1

Summary for Pond 4P: CV-1

Inflow Area =	0.800 ac,	0.00% Impervious,	Inflow Depth =	2.92"	for 25 year event
Inflow =	4.00 cfs @	11.95 hrs, Volume=	0.195 af		
Outflow =	4.00 cfs @	11.95 hrs, Volume=	0.195 af,	Atten= 0%,	Lag= 0.0 min
Primary =	4.00 cfs @	11.95 hrs, Volume=	0.195 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 349.29' @ 11.95 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	348.05'	**18.0" x 24.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 347.98' S= 0.0029 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=3.96 cfs @ 11.95 hrs HW=349.28' TW=348.64' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 3.96 cfs @ 3.47 fps)

Stage-Discharge for Pond 4P: CV-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
348.05	0.00	348.57	0.84	349.09	2.98
348.06	0.00	348.58	0.87	349.10	3.03
348.07	0.00	348.59	0.90	349.11	3.08
348.08	0.00	348.60	0.94	349.12	3.13
348.09	0.00	348.61	0.97	349.13	3.18
348.10	0.01	348.62	1.00	349.14	3.23
348.11	0.01	348.63	1.03	349.15	3.28
348.12	0.01	348.64	1.07	349.16	3.33
348.13	0.02	348.65	1.10	349.17	3.38
348.14	0.02	348.66	1.14	349.18	3.43
348.15	0.03	348.67	1.17	349.19	3.49
348.16	0.04	348.68	1.21	349.20	3.54
348.17	0.04	348.69	1.24	349.21	3.59
348.18	0.05	348.70	1.28	349.22	3.64
348.19	0.06	348.71	1.32	349.23	3.69
348.20	0.07	348.72	1.35	349.24	3.75
348.21	0.08	348.73	1.39	349.25	3.80
348.22	0.09	348.74	1.43	349.26	3.85
348.23	0.10	348.75	1.47	349.27	3.90
348.24	0.11	348.76	1.51	349.28	3.95
348.25	0.13	348.77	1.55	349.29	4.01
348.26	0.14	348.78	1.59	349.30	4.06
348.27	0.15	348.79	1.63	349.31	4.11
348.28	0.17	348.80	1.67	349.32	4.17
348.29	0.18	348.81	1.71	349.33	4.22
348.30	0.20	348.82	1.75	349.34	4.27
348.31	0.22	348.83	1.79	349.35	4.33
348.32	0.23	348.84	1.83	349.36	4.38
348.33	0.25	348.85	1.87	349.37	4.43
348.34	0.27	348.86	1.92	349.38	4.49
348.35	0.29	348.87	1.96	349.39	4.54
348.36	0.31	348.88	2.00	349.40	4.59
348.37	0.33	348.89	2.05	349.41	4.65
348.38	0.35	348.90	2.09	349.42	4.70
348.39	0.37	348.91	2.13	349.43	4.75
348.40	0.39	348.92	2.18	349.44	4.81
348.41	0.41	348.93	2.22	349.45	4.86
348.42	0.44	348.94	2.27	349.46	4.91
348.43	0.46	348.95	2.31	349.47	4.97
348.44	0.48	348.96	2.36	349.48	5.02
348.45	0.51	348.97	2.41	349.49	5.07
348.46	0.53	348.98	2.45	349.50	5.13
348.47	0.56	348.99	2.50	349.51	5.18
348.48	0.58	349.00	2.55	349.52	5.23
348.49	0.61	349.01	2.59	349.53	5.29
348.50	0.64	349.02	2.64	349.54	5.34
348.51	0.67	349.03	2.69	349.55	**5.39**
348.52	0.69	349.04	2.74		
348.53	0.72	349.05	2.79		
348.54	0.75	349.06	2.83		
348.55	0.78	349.07	2.88		
348.56	0.81	349.08	2.93		

CV-2

Summary for Pond 6P: CV-2

Inflow Area =	1.730 ac,	0.00% Impervious,	Inflow Depth =	2.92"	for 25 year event
Inflow =	8.64 cfs @	11.95 hrs, Volume=	0.421 af		
Outflow =	8.64 cfs @	11.95 hrs, Volume=	0.421 af,	Atten= 0%,	Lag= 0.0 min
Primary =	8.64 cfs @	11.95 hrs, Volume=	0.421 af		

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.65' @ 11.95 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	346.95'	**24.0" x 24.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 346.88' S= 0.0029 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=8.56 cfs @ 11.95 hrs HW=348.64' TW=347.91' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 8.56 cfs @ 4.07 fps)

Stage-Discharge for Pond 6P: CV-2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
346.95	0.00	347.99	3.68	349.03	11.77
346.97	0.00	348.01	3.81	349.05	11.93
346.99	0.00	348.03	3.94	349.07	12.09
347.01	0.01	348.05	4.07	349.09	12.25
347.03	0.02	348.07	4.21	349.11	12.41
347.05	0.04	348.09	4.34	349.13	12.57
347.07	0.05	348.11	4.48	349.15	12.72
347.09	0.07	348.13	4.62	349.17	12.88
347.11	0.09	348.15	4.76	349.19	13.03
347.13	0.12	348.17	4.90	349.21	13.18
347.15	0.15	348.19	5.04	349.23	13.33
347.17	0.18	348.21	5.19	349.25	13.48
347.19	0.22	348.23	5.33	349.27	13.63
347.21	0.25	348.25	5.48	349.29	13.77
347.23	0.30	348.27	5.63	349.31	13.91
347.25	0.34	348.29	5.78	349.33	14.05
347.27	0.39	348.31	5.93	349.35	14.19
347.29	0.44	348.33	6.08	349.37	14.32
347.31	0.49	348.35	6.23	349.39	14.45
347.33	0.54	348.37	6.38	349.41	14.58
347.35	0.60	348.39	6.54	349.43	14.70
347.37	0.66	348.41	6.70	349.45	14.82
347.39	0.72	348.43	6.85	349.47	14.93
347.41	0.79	348.45	7.01	349.49	15.04
347.43	0.86	348.47	7.17	349.51	15.14
347.45	0.93	348.49	7.33	349.53	15.24
347.47	1.00	348.51	7.49	349.55	**15.32**
347.49	1.08	348.53	7.65		
347.51	1.15	348.55	7.81		
347.53	1.23	348.57	7.97		
347.55	1.32	348.59	8.14		
347.57	1.40	348.61	8.30		
347.59	1.49	348.63	8.46		
347.61	1.58	348.65	8.63		
347.63	1.67	348.67	8.79		
347.65	1.77	348.69	8.96		
347.67	1.86	348.71	9.12		
347.69	1.96	348.73	9.29		
347.71	2.06	348.75	9.46		
347.73	2.16	348.77	9.62		
347.75	2.27	348.79	9.79		
347.77	2.38	348.81	9.95		
347.79	2.48	348.83	10.12		
347.81	2.60	348.85	10.29		
347.83	2.71	348.87	10.45		
347.85	2.82	348.89	10.62		
347.87	2.94	348.91	10.78		
347.89	3.06	348.93	10.95		
347.91	3.18	348.95	11.11		
347.93	3.30	348.97	11.28		
347.95	3.43	348.99	11.44		
347.97	3.55	349.01	11.60		

CV-3

Summary for Pond 12P: CV-3

Inflow Area =	0.730 ac,	0.00% Impervious,	Inflow Depth =	2.92"	for 25 year event
Inflow =	3.65 cfs @	11.95 hrs,	Volume=	0.178 af	
Outflow =	3.65 cfs @	11.95 hrs,	Volume=	0.178 af,	Atten= 0%, Lag= 0.0 min
Primary =	3.65 cfs @	11.95 hrs,	Volume=	0.178 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 349.36' @ 11.95 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	348.05'	**15.0" x 24.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 347.98' S= 0.0029 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=3.61 cfs @ 11.95 hrs HW=349.35' TW=348.72' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 3.61 cfs @ 3.51 fps)

Stage-Discharge for Pond 12P: CV-3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
348.05	0.00	348.57	0.75	349.09	2.56
348.06	0.00	348.58	0.78	349.10	2.60
348.07	0.00	348.59	0.80	349.11	2.64
348.08	0.00	348.60	0.83	349.12	2.68
348.09	0.00	348.61	0.86	349.13	2.72
348.10	0.01	348.62	0.89	349.14	2.76
348.11	0.01	348.63	0.92	349.15	2.80
348.12	0.01	348.64	0.95	349.16	2.84
348.13	0.02	348.65	0.98	349.17	2.88
348.14	0.02	348.66	1.01	349.18	2.92
348.15	0.03	348.67	1.04	349.19	2.96
348.16	0.03	348.68	1.07	349.20	3.00
348.17	0.04	348.69	1.10	349.21	3.04
348.18	0.05	348.70	1.13	349.22	3.08
348.19	0.06	348.71	1.16	349.23	3.12
348.20	0.06	348.72	1.19	349.24	3.16
348.21	0.07	348.73	1.23	349.25	3.20
348.22	0.08	348.74	1.26	349.26	3.24
348.23	0.09	348.75	1.29	349.27	3.28
348.24	0.10	348.76	1.33	349.28	3.32
348.25	0.12	348.77	1.36	349.29	3.36
348.26	0.13	348.78	1.39	349.30	3.40
348.27	0.14	348.79	1.43	349.31	3.44
348.28	0.15	348.80	1.46	349.32	3.48
348.29	0.17	348.81	1.50	349.33	3.52
348.30	0.18	348.82	1.53	349.34	3.56
348.31	0.20	348.83	1.57	349.35	3.60
348.32	0.21	348.84	1.60	349.36	3.64
348.33	0.23	348.85	1.64	349.37	3.68
348.34	0.24	348.86	1.68	349.38	3.72
348.35	0.26	348.87	1.71	349.39	3.76
348.36	0.28	348.88	1.75	349.40	3.79
348.37	0.29	348.89	1.79	349.41	3.83
348.38	0.31	348.90	1.82	349.42	3.87
348.39	0.33	348.91	1.86	349.43	3.91
348.40	0.35	348.92	1.90	349.44	3.94
348.41	0.37	348.93	1.93	349.45	3.98
348.42	0.39	348.94	1.97	349.46	4.02
348.43	0.41	348.95	2.01	349.47	4.05
348.44	0.43	348.96	2.05	349.48	4.09
348.45	0.45	348.97	2.09	349.49	4.12
348.46	0.48	348.98	2.13	349.50	4.16
348.47	0.50	348.99	2.16	349.51	4.19
348.48	0.52	349.00	2.20	349.52	4.22
348.49	0.55	349.01	2.24	349.53	4.26
348.50	0.57	349.02	2.28	349.54	4.29
348.51	0.59	349.03	2.32	349.55	**4.32**
348.52	0.62	349.04	2.36		
348.53	0.64	349.05	2.40		
348.54	0.67	349.06	2.44		
348.55	0.70	349.07	2.48		
348.56	0.72	349.08	2.52		

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CV-4

Summary for Pond 10P: CV-4

Inflow Area =	1.680 ac,	0.00% Impervious,	Inflow Depth =	2.92"	for 25 year event
Inflow =	8.39 cfs @	11.95 hrs,	Volume=	0.409 af	
Outflow =	8.39 cfs @	11.95 hrs,	Volume=	0.409 af,	Atten= 0%, Lag= 0.0 min
Primary =	8.39 cfs @	11.95 hrs,	Volume=	0.409 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.77' @ 11.98 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	347.05'	**24.0" x 24.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 346.98' S= 0.0029 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=6.55 cfs @ 11.95 hrs HW=348.72' TW=348.42' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 6.55 cfs @ 2.33 fps)

Stage-Discharge for Pond 10P: CV-4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
347.05	0.00	348.09	3.68	349.13	11.77
347.07	0.00	348.11	3.81	349.15	11.93
347.09	0.00	348.13	3.94	349.17	12.09
347.11	0.01	348.15	4.07	349.19	12.25
347.13	0.02	348.17	4.21	349.21	12.41
347.15	0.04	348.19	4.34	349.23	12.57
347.17	0.05	348.21	4.48	349.25	12.72
347.19	0.07	348.23	4.62	349.27	12.88
347.21	0.09	348.25	4.76	349.29	13.03
347.23	0.12	348.27	4.90	349.31	13.18
347.25	0.15	348.29	5.04	349.33	13.33
347.27	0.18	348.31	5.19	349.35	13.48
347.29	0.22	348.33	5.33	349.37	13.63
347.31	0.25	348.35	5.48	349.39	13.77
347.33	0.30	348.37	5.63	349.41	13.91
347.35	0.34	348.39	5.78	349.43	14.05
347.37	0.39	348.41	5.93	349.45	14.19
347.39	0.44	348.43	6.08	349.47	14.32
347.41	0.49	348.45	6.23	349.49	14.45
347.43	0.54	348.47	6.38	349.51	14.58
347.45	0.60	348.49	6.54	349.53	14.70
347.47	0.66	348.51	6.70	349.55	**14.82**
347.49	0.72	348.53	6.85		
347.51	0.79	348.55	7.01		
347.53	0.86	348.57	7.17		
347.55	0.93	348.59	7.33		
347.57	1.00	348.61	7.49		
347.59	1.08	348.63	7.65		
347.61	1.15	348.65	7.81		
347.63	1.23	348.67	7.97		
347.65	1.32	348.69	8.14		
347.67	1.40	348.71	8.30		
347.69	1.49	348.73	8.46		
347.71	1.58	348.75	8.63		
347.73	1.67	348.77	8.79		
347.75	1.77	348.79	8.96		
347.77	1.86	348.81	9.12		
347.79	1.96	348.83	9.29		
347.81	2.06	348.85	9.46		
347.83	2.16	348.87	9.62		
347.85	2.27	348.89	9.79		
347.87	2.38	348.91	9.95		
347.89	2.48	348.93	10.12		
347.91	2.60	348.95	10.29		
347.93	2.71	348.97	10.45		
347.95	2.82	348.99	10.62		
347.97	2.94	349.01	10.78		
347.99	3.06	349.03	10.95		
348.01	3.18	349.05	11.11		
348.03	3.30	349.07	11.28		
348.05	3.43	349.09	11.44		
348.07	3.55	349.11	11.60		

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CV-5

Summary for Pond 8P: CV-5

Inflow Area =	2.480 ac,	0.00% Impervious,	Inflow Depth =	2.92"	for 25 year event
Inflow =	12.39 cfs @	11.95 hrs,	Volume=	0.603 af	
Outflow =	12.39 cfs @	11.95 hrs,	Volume=	0.603 af,	Atten= 0%, Lag= 0.0 min
Primary =	12.39 cfs @	11.95 hrs,	Volume=	0.603 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.53' @ 11.98 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	346.05'	**24.0" x 24.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 345.98' S= 0.0029 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=10.22 cfs @ 11.95 hrs HW=348.42' TW=347.84' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 10.22 cfs @ 3.25 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
Prepared by ARCADIS Printed 9/10/2009
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Stage-Discharge for Pond 8P: CV-5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
346.05	0.00	347.09	3.68	348.13	11.77	349.17	19.43
346.07	0.00	347.11	3.81	348.15	11.93	349.19	19.53
346.09	0.00	347.13	3.94	348.17	12.09	349.21	19.62
346.11	0.01	347.15	4.07	348.19	12.25	349.23	19.71
346.13	0.02	347.17	4.21	348.21	12.41	349.25	19.80
346.15	0.04	347.19	4.34	348.23	12.57	349.27	19.89
346.17	0.05	347.21	4.48	348.25	12.72	349.29	19.98
346.19	0.07	347.23	4.62	348.27	12.88	349.31	20.07
346.21	0.09	347.25	4.76	348.29	13.03	349.33	20.15
346.23	0.12	347.27	4.90	348.31	13.18	349.35	20.24
346.25	0.15	347.29	5.04	348.33	13.33	349.37	20.33
346.27	0.18	347.31	5.19	348.35	13.48	349.39	20.42
346.29	0.22	347.33	5.33	348.37	13.63	349.41	20.50
346.31	0.25	347.35	5.48	348.39	13.77	349.43	20.59
346.33	0.30	347.37	5.63	348.41	13.91	349.45	20.68
346.35	0.34	347.39	5.78	348.43	14.05	349.47	20.76
346.37	0.39	347.41	5.93	348.45	14.19	349.49	20.85
346.39	0.44	347.43	6.08	348.47	14.32	349.51	20.93
346.41	0.49	347.45	6.23	348.49	14.45	349.53	21.02
346.43	0.54	347.47	6.38	348.51	14.58	349.55	**21.10**
346.45	0.60	347.49	6.54	348.53	14.70		
346.47	0.66	347.51	6.70	348.55	14.82		
346.49	0.72	347.53	6.85	348.57	14.93		
346.51	0.79	347.55	7.01	348.59	15.04		
346.53	0.86	347.57	7.17	348.61	15.14		
346.55	0.93	347.59	7.33	348.63	15.24		
346.57	1.00	347.61	7.49	348.65	15.32		
346.59	1.08	347.63	7.65	348.67	15.40		
346.61	1.15	347.65	7.81	348.69	15.46		
346.63	1.23	347.67	7.97	348.71	15.50		
346.65	1.32	347.69	8.14	348.73	15.62		
346.67	1.40	347.71	8.30	348.75	15.82		
346.69	1.49	347.73	8.46	348.77	16.03		
346.71	1.58	347.75	8.63	348.79	16.23		
346.73	1.67	347.77	8.79	348.81	16.43		
346.75	1.77	347.79	8.96	348.83	16.62		
346.77	1.86	347.81	9.12	348.85	16.82		
346.79	1.96	347.83	9.29	348.87	17.01		
346.81	2.06	347.85	9.46	348.89	17.20		
346.83	2.16	347.87	9.62	348.91	17.39		
346.85	2.27	347.89	9.79	348.93	17.58		
346.87	2.38	347.91	9.95	348.95	17.76		
346.89	2.48	347.93	10.12	348.97	17.94		
346.91	2.60	347.95	10.29	348.99	18.12		
346.93	2.71	347.97	10.45	349.01	18.30		
346.95	2.82	347.99	10.62	349.03	18.48		
346.97	2.94	348.01	10.78	349.05	18.65		
346.99	3.06	348.03	10.95	349.07	18.83		
347.01	3.18	348.05	11.11	349.09	19.00		
347.03	3.30	348.07	11.28	349.11	19.16		
347.05	3.43	348.09	11.44	349.13	19.25		
347.07	3.55	348.11	11.60	349.15	19.34		

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OP-1

Summary for Pond 18P: OP-1

Inflow Area = 2.540 ac, 0.00% Impervious, Inflow Depth = 2.92" for 25 year event
Inflow = 12.69 cfs @ 11.95 hrs, Volume= 0.618 af
Outflow = 12.69 cfs @ 11.95 hrs, Volume= 0.618 af, Atten= 0%, Lag= 0.0 min
Primary = 12.69 cfs @ 11.95 hrs, Volume= 0.618 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 347.85' @ 11.95 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	345.95'	**23.9" x 64.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.03' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=12.59 cfs @ 11.95 hrs HW=347.84' (Free Discharge)
└─**1=Culvert** (Inlet Controls 12.59 cfs @ 4.12 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
Prepared by NWF Printed 2/22/2013
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Stage-Discharge for Pond 18P: OP-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
345.95	0.00	347.01	5.21	348.07	14.03	349.13	19.56
345.97	0.00	347.03	5.39	348.09	14.16	349.15	19.65
345.99	0.01	347.05	5.56	348.11	14.28	349.17	19.74
346.01	0.02	347.07	5.74	348.13	14.40	349.19	19.83
346.03	0.04	347.09	5.91	348.15	14.52	349.21	19.92
346.05	0.06	347.11	6.09	348.17	14.64	349.23	20.00
346.07	0.08	347.13	6.27	348.19	14.76	349.25	20.09
346.09	0.11	347.15	6.46	348.21	14.88	349.27	20.18
346.11	0.14	347.17	6.64	348.23	15.00	349.29	20.27
346.13	0.18	347.19	6.82	348.25	15.12	349.31	20.35
346.15	0.22	347.21	7.01	348.27	15.23	349.33	20.44
346.17	0.26	347.23	7.19	348.29	15.35	349.35	20.52
346.19	0.31	347.25	7.38	348.31	15.46	349.37	20.61
346.21	0.37	347.27	7.56	348.33	15.57	349.39	20.69
346.23	0.42	347.29	7.75	348.35	15.68	349.41	20.78
346.25	0.49	347.31	7.94	348.37	15.80	349.43	20.86
346.27	0.55	347.33	8.13	348.39	15.91	349.45	20.95
346.29	0.62	347.35	8.32	348.41	16.02	349.47	21.03
346.31	0.69	347.37	8.51	348.43	16.13	349.49	21.11
346.33	0.77	347.39	8.70	348.45	16.23	349.51	21.19
346.35	0.85	347.41	8.88	348.47	16.34	349.53	21.28
346.37	0.93	347.43	9.07	348.49	16.45	349.55	**21.36**
346.39	1.02	347.45	9.26	348.51	16.55		
346.41	1.11	347.47	9.45	348.53	16.66		
346.43	1.20	347.49	9.64	348.55	16.76		
346.45	1.30	347.51	9.82	348.57	16.87		
346.47	1.40	347.53	10.01	348.59	16.97		
346.49	1.51	347.55	10.19	348.61	17.07		
346.51	1.61	347.57	10.38	348.63	17.18		
346.53	1.73	347.59	10.56	348.65	17.28		
346.55	1.84	347.61	10.74	348.67	17.38		
346.57	1.96	347.63	10.92	348.69	17.48		
346.59	2.08	347.65	11.09	348.71	17.58		
346.61	2.20	347.67	11.27	348.73	17.68		
346.63	2.33	347.69	11.44	348.75	17.78		
346.65	2.46	347.71	11.61	348.77	17.88		
346.67	2.59	347.73	11.78	348.79	17.97		
346.69	2.72	347.75	11.94	348.81	18.07		
346.71	2.86	347.77	12.10	348.83	18.17		
346.73	3.00	347.79	12.25	348.85	18.26		
346.75	3.14	347.81	12.40	348.87	18.36		
346.77	3.29	347.83	12.55	348.89	18.46		
346.79	3.44	347.85	12.69	348.91	18.55		
346.81	3.59	347.87	12.82	348.93	18.64		
346.83	3.74	347.89	12.94	348.95	18.74		
346.85	3.90	347.91	13.06	348.97	18.83		
346.87	4.05	347.93	13.16	348.99	18.92		
346.89	4.21	347.95	13.26	349.01	19.02		
346.91	4.38	347.97	13.40	349.03	19.11		
346.93	4.54	347.99	13.53	349.05	19.20		
346.95	4.70	348.01	13.65	349.07	19.29		
346.97	4.87	348.03	13.78	349.09	19.38		
346.99	5.04	348.05	13.91	349.11	19.47		

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OP-2

Summary for Pond 16P: OP-2

Inflow Area = 2.170 ac, 0.00% Impervious, Inflow Depth = 2.92" for 25 year event
Inflow = 9.52 cfs @ 12.00 hrs, Volume= 0.528 af
Outflow = 9.52 cfs @ 12.00 hrs, Volume= 0.528 af, Atten= 0%, Lag= 0.0 min
Primary = 9.52 cfs @ 12.00 hrs, Volume= 0.528 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.91' @ 12.00 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	345.95'	**16.5" x 52.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.39' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=9.48 cfs @ 12.00 hrs HW=348.89' (Free Discharge)
└─**1=Culvert** (Inlet Controls 9.48 cfs @ 6.38 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Stage-Discharge for Pond 16P: OP-2

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
345.95	0.00	347.01	3.80	348.07	7.55	349.13	9.96
345.97	0.00	347.03	3.91	348.09	7.60	349.15	10.00
345.99	0.01	347.05	4.01	348.11	7.66	349.17	10.04
346.01	0.02	347.07	4.12	348.13	7.71	349.19	10.08
346.03	0.03	347.09	4.22	348.15	7.76	349.21	10.12
346.05	0.05	347.11	4.32	348.17	7.81	349.23	10.16
346.07	0.07	347.13	4.43	348.19	7.86	349.25	10.20
346.09	0.09	347.15	4.52	348.21	7.91	349.27	10.24
346.11	0.12	347.17	4.62	348.23	7.96	349.29	10.27
346.13	0.15	347.19	4.72	348.25	8.01	349.31	10.31
346.15	0.18	347.21	4.81	348.27	8.06	349.33	10.35
346.17	0.22	347.23	4.89	348.29	8.11	349.35	10.39
346.19	0.26	347.25	4.98	348.31	8.16	349.37	10.43
346.21	0.30	347.27	5.06	348.33	8.21	349.39	10.47
346.23	0.34	347.29	5.13	348.35	8.26	349.41	10.50
346.25	0.39	347.31	5.19	348.37	8.30	349.43	10.54
346.27	0.45	347.33	5.25	348.39	8.35	349.45	10.58
346.29	0.50	347.35	5.33	348.41	8.40	349.47	10.62
346.31	0.56	347.37	5.40	348.43	8.45	349.49	10.65
346.33	0.62	347.39	5.47	348.45	8.49	349.51	10.69
346.35	0.68	347.41	5.54	348.47	8.54	349.53	10.73
346.37	0.75	347.43	5.62	348.49	8.59	349.55	**10.77**
346.39	0.82	347.45	5.69	348.51	8.63		
346.41	0.89	347.47	5.76	348.53	8.68		
346.43	0.96	347.49	5.82	348.55	8.72		
346.45	1.04	347.51	5.89	348.57	8.77		
346.47	1.11	347.53	5.96	348.59	8.82		
346.49	1.19	347.55	6.03	348.61	8.86		
346.51	1.28	347.57	6.09	348.63	8.90		
346.53	1.36	347.59	6.16	348.65	8.95		
346.55	1.45	347.61	6.22	348.67	8.99		
346.57	1.54	347.63	6.28	348.69	9.04		
346.59	1.63	347.65	6.35	348.71	9.08		
346.61	1.72	347.67	6.41	348.73	9.13		
346.63	1.81	347.69	6.47	348.75	9.17		
346.65	1.91	347.71	6.53	348.77	9.21		
346.67	2.01	347.73	6.59	348.79	9.26		
346.69	2.11	347.75	6.65	348.81	9.30		
346.71	2.21	347.77	6.71	348.83	9.34		
346.73	2.31	347.79	6.77	348.85	9.38		
346.75	2.41	347.81	6.83	348.87	9.43		
346.77	2.51	347.83	6.89	348.89	9.47		
346.79	2.62	347.85	6.95	348.91	9.51		
346.81	2.72	347.87	7.00	348.93	9.55		
346.83	2.83	347.89	7.06	348.95	9.59		
346.85	2.94	347.91	7.12	348.97	9.63		
346.87	3.04	347.93	7.17	348.99	9.68		
346.89	3.15	347.95	7.23	349.01	9.72		
346.91	3.26	347.97	7.28	349.03	9.76		
346.93	3.37	347.99	7.34	349.05	9.80		
346.95	3.48	348.01	7.39	349.07	9.84		
346.97	3.58	348.03	7.44	349.09	9.88		
346.99	3.69	348.05	7.50	349.11	9.92		

OP-3

Summary for Pond 20P: OP-3

Inflow Area = 2.350 ac, 0.00% Impervious, Inflow Depth = 2.92" for 25 year event
Inflow = 11.74 cfs @ 11.95 hrs, Volume= 0.572 af
Outflow = 11.74 cfs @ 11.95 hrs, Volume= 0.572 af, Atten= 0%, Lag= 0.0 min
Primary = 11.74 cfs @ 11.95 hrs, Volume= 0.572 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 347.93' @ 11.95 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	346.15'	**23.9" x 52.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.59' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=11.64 cfs @ 11.95 hrs HW=347.91' (Free Discharge)
└─**1=Culvert** (Inlet Controls 11.64 cfs @ 3.99 fps)

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Stage-Discharge for Pond 20P: OP-3

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
346.15	0.00	347.21	5.21	348.27	14.03	349.33	19.56
346.17	0.00	347.23	5.39	348.29	14.16	349.35	19.65
346.19	0.01	347.25	5.56	348.31	14.28	349.37	19.74
346.21	0.02	347.27	5.74	348.33	14.40	349.39	19.83
346.23	0.04	347.29	5.91	348.35	14.52	349.41	19.92
346.25	0.06	347.31	6.09	348.37	14.64	349.43	20.00
346.27	0.08	347.33	6.27	348.39	14.76	349.45	20.09
346.29	0.11	347.35	6.46	348.41	14.88	349.47	20.18
346.31	0.14	347.37	6.64	348.43	15.00	349.49	20.27
346.33	0.18	347.39	6.82	348.45	15.12	349.51	20.35
346.35	0.22	347.41	7.01	348.47	15.23	349.53	20.44
346.37	0.26	347.43	7.19	348.49	15.35	349.55	**20.52**
346.39	0.31	347.45	7.38	348.51	15.46		
346.41	0.37	347.47	7.56	348.53	15.57		
346.43	0.42	347.49	7.75	348.55	15.68		
346.45	0.49	347.51	7.94	348.57	15.80		
346.47	0.55	347.53	8.13	348.59	15.91		
346.49	0.62	347.55	8.32	348.61	16.02		
346.51	0.69	347.57	8.51	348.63	16.13		
346.53	0.77	347.59	8.70	348.65	16.23		
346.55	0.85	347.61	8.88	348.67	16.34		
346.57	0.93	347.63	9.07	348.69	16.45		
346.59	1.02	347.65	9.26	348.71	16.55		
346.61	1.11	347.67	9.45	348.73	16.66		
346.63	1.20	347.69	9.64	348.75	16.76		
346.65	1.30	347.71	9.82	348.77	16.87		
346.67	1.40	347.73	10.01	348.79	16.97		
346.69	1.51	347.75	10.19	348.81	17.07		
346.71	1.61	347.77	10.38	348.83	17.18		
346.73	1.73	347.79	10.56	348.85	17.28		
346.75	1.84	347.81	10.74	348.87	17.38		
346.77	1.96	347.83	10.92	348.89	17.48		
346.79	2.08	347.85	11.09	348.91	17.58		
346.81	2.20	347.87	11.27	348.93	17.68		
346.83	2.33	347.89	11.44	348.95	17.78		
346.85	2.46	347.91	11.61	348.97	17.88		
346.87	2.59	347.93	11.78	348.99	17.97		
346.89	2.72	347.95	11.94	349.01	18.07		
346.91	2.86	347.97	12.10	349.03	18.17		
346.93	3.00	347.99	12.25	349.05	18.26		
346.95	3.14	348.01	12.40	349.07	18.36		
346.97	3.29	348.03	12.55	349.09	18.46		
346.99	3.44	348.05	12.69	349.11	18.55		
347.01	3.59	348.07	12.82	349.13	18.64		
347.03	3.74	348.09	12.94	349.15	18.74		
347.05	3.90	348.11	13.06	349.17	18.83		
347.07	4.05	348.13	13.16	349.19	18.92		
347.09	4.21	348.15	13.26	349.21	19.02		
347.11	4.38	348.17	13.40	349.23	19.11		
347.13	4.54	348.19	13.53	349.25	19.20		
347.15	4.70	348.21	13.65	349.27	19.29		
347.17	4.87	348.23	13.78	349.29	19.38		
347.19	5.04	348.25	13.91	349.31	19.47		

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OP-4

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Summary for Pond 22P: OP-4

Inflow Area = 2.290 ac, 0.00% Impervious, Inflow Depth = 2.92" for 25 year event
Inflow = 10.19 cfs @ 12.00 hrs, Volume= 0.557 af
Outflow = 10.19 cfs @ 12.00 hrs, Volume= 0.557 af, Atten= 0%, Lag= 0.0 min
Primary = 10.19 cfs @ 12.00 hrs, Volume= 0.557 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.60' @ 12.00 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	346.15'	**18.4" x 52.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.59' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=10.13 cfs @ 12.00 hrs HW=348.59' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.13 cfs @ 5.49 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Stage-Discharge for Pond 22P: OP-4

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
346.15	0.00	347.21	4.21	348.27	9.13	349.33	12.19
346.17	0.00	347.23	4.34	348.29	9.19	349.35	12.24
346.19	0.01	347.25	4.47	348.31	9.26	349.37	12.29
346.21	0.02	347.27	4.59	348.33	9.33	349.39	12.34
346.23	0.03	347.29	4.72	348.35	9.39	349.41	12.39
346.25	0.05	347.31	4.85	348.37	9.46	349.43	12.44
346.27	0.07	347.33	4.98	348.39	9.52	349.45	12.49
346.29	0.09	347.35	5.10	348.41	9.59	349.47	12.54
346.31	0.12	347.37	5.23	348.43	9.65	349.49	12.58
346.33	0.15	347.39	5.35	348.45	9.71	349.51	12.63
346.35	0.19	347.41	5.48	348.47	9.78	349.53	12.68
346.37	0.23	347.43	5.60	348.49	9.84	349.55	**12.73**
346.39	0.27	347.45	5.72	348.51	9.90		
346.41	0.32	347.47	5.84	348.53	9.96		
346.43	0.37	347.49	5.95	348.55	10.03		
346.45	0.42	347.51	6.07	348.57	10.09		
346.47	0.47	347.53	6.18	348.59	10.15		
346.49	0.53	347.55	6.29	348.61	10.21		
346.51	0.60	347.57	6.39	348.63	10.27		
346.53	0.66	347.59	6.49	348.65	10.33		
346.55	0.73	347.61	6.59	348.67	10.39		
346.57	0.80	347.63	6.68	348.69	10.45		
346.59	0.87	347.65	6.76	348.71	10.51		
346.61	0.95	347.67	6.83	348.73	10.56		
346.63	1.03	347.69	6.90	348.75	10.62		
346.65	1.11	347.71	6.99	348.77	10.68		
346.67	1.20	347.73	7.08	348.79	10.74		
346.69	1.28	347.75	7.16	348.81	10.79		
346.71	1.37	347.77	7.25	348.83	10.85		
346.73	1.46	347.79	7.33	348.85	10.91		
346.75	1.56	347.81	7.41	348.87	10.96		
346.77	1.66	347.83	7.50	348.89	11.02		
346.79	1.75	347.85	7.58	348.91	11.08		
346.81	1.86	347.87	7.66	348.93	11.13		
346.83	1.96	347.89	7.74	348.95	11.19		
346.85	2.06	347.91	7.82	348.97	11.24		
346.87	2.17	347.93	7.90	348.99	11.30		
346.89	2.28	347.95	7.97	349.01	11.35		
346.91	2.39	347.97	8.05	349.03	11.40		
346.93	2.50	347.99	8.13	349.05	11.46		
346.95	2.62	348.01	8.20	349.07	11.51		
346.97	2.73	348.03	8.28	349.09	11.57		
346.99	2.85	348.05	8.35	349.11	11.62		
347.01	2.97	348.07	8.43	349.13	11.67		
347.03	3.09	348.09	8.50	349.15	11.72		
347.05	3.21	348.11	8.57	349.17	11.78		
347.07	3.33	348.13	8.64	349.19	11.83		
347.09	3.46	348.15	8.71	349.21	11.88		
347.11	3.58	348.17	8.78	349.23	11.93		
347.13	3.71	348.19	8.85	349.25	11.98		
347.15	3.83	348.21	8.92	349.27	12.03		
347.17	3.96	348.23	8.99	349.29	12.09		
347.19	4.08	348.25	9.06	349.31	12.14		

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OP-5

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Summary for Pond 30P: OP-5

Inflow Area = 2.380 ac, 0.00% Impervious, Inflow Depth = 2.92" for 25 year event
Inflow = 10.55 cfs @ 12.00 hrs, Volume= 0.579 af
Outflow = 10.55 cfs @ 12.00 hrs, Volume= 0.579 af, Atten= 0%, Lag= 0.0 min
Primary = 10.55 cfs @ 12.00 hrs, Volume= 0.579 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.33' @ 12.00 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	345.75'	**18.4" x 52.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.19' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=10.52 cfs @ 12.00 hrs HW=348.31' (Free Discharge)
└─**1=Culvert** (Inlet Controls 10.52 cfs @ 5.70 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Stage-Discharge for Pond 30P: OP-5

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
345.75	0.00	346.81	4.21	347.87	9.13	348.93	12.19
345.77	0.00	346.83	4.34	347.89	9.19	348.95	12.24
345.79	0.01	346.85	4.47	347.91	9.26	348.97	12.29
345.81	0.02	346.87	4.59	347.93	9.33	348.99	12.34
345.83	0.03	346.89	4.72	347.95	9.39	349.01	12.39
345.85	0.05	346.91	4.85	347.97	9.46	349.03	12.44
345.87	0.07	346.93	4.98	347.99	9.52	349.05	12.49
345.89	0.09	346.95	5.10	348.01	9.59	349.07	12.54
345.91	0.12	346.97	5.23	348.03	9.65	349.09	12.58
345.93	0.15	346.99	5.35	348.05	9.71	349.11	12.63
345.95	0.19	347.01	5.48	348.07	9.78	349.13	12.68
345.97	0.23	347.03	5.60	348.09	9.84	349.15	12.73
345.99	0.27	347.05	5.72	348.11	9.90	349.17	12.78
346.01	0.32	347.07	5.84	348.13	9.96	349.19	12.83
346.03	0.37	347.09	5.95	348.15	10.03	349.21	12.87
346.05	0.42	347.11	6.07	348.17	10.09	349.23	12.92
346.07	0.47	347.13	6.18	348.19	10.15	349.25	12.97
346.09	0.53	347.15	6.29	348.21	10.21	349.27	13.02
346.11	0.60	347.17	6.39	348.23	10.27	349.29	13.06
346.13	0.66	347.19	6.49	348.25	10.33	349.31	13.11
346.15	0.73	347.21	6.59	348.27	10.39	349.33	13.16
346.17	0.80	347.23	6.68	348.29	10.45	349.35	13.21
346.19	0.87	347.25	6.76	348.31	10.51	349.37	13.25
346.21	0.95	347.27	6.83	348.33	10.56	349.39	13.30
346.23	1.03	347.29	6.90	348.35	10.62	349.41	13.34
346.25	1.11	347.31	6.99	348.37	10.68	349.43	13.39
346.27	1.20	347.33	7.08	348.39	10.74	349.45	13.44
346.29	1.28	347.35	7.16	348.41	10.79	349.47	13.48
346.31	1.37	347.37	7.25	348.43	10.85	349.49	13.53
346.33	1.46	347.39	7.33	348.45	10.91	349.51	13.57
346.35	1.56	347.41	7.41	348.47	10.96	349.53	13.62
346.37	1.66	347.43	7.50	348.49	11.02	349.55	**13.66**
346.39	1.75	347.45	7.58	348.51	11.08		
346.41	1.86	347.47	7.66	348.53	11.13		
346.43	1.96	347.49	7.74	348.55	11.19		
346.45	2.06	347.51	7.82	348.57	11.24		
346.47	2.17	347.53	7.90	348.59	11.30		
346.49	2.28	347.55	7.97	348.61	11.35		
346.51	2.39	347.57	8.05	348.63	11.40		
346.53	2.50	347.59	8.13	348.65	11.46		
346.55	2.62	347.61	8.20	348.67	11.51		
346.57	2.73	347.63	8.28	348.69	11.57		
346.59	2.85	347.65	8.35	348.71	11.62		
346.61	2.97	347.67	8.43	348.73	11.67		
346.63	3.09	347.69	8.50	348.75	11.72		
346.65	3.21	347.71	8.57	348.77	11.78		
346.67	3.33	347.73	8.64	348.79	11.83		
346.69	3.46	347.75	8.71	348.81	11.88		
346.71	3.58	347.77	8.78	348.83	11.93		
346.73	3.71	347.79	8.85	348.85	11.98		
346.75	3.83	347.81	8.92	348.87	12.03		
346.77	3.96	347.83	8.99	348.89	12.09		
346.79	4.08	347.85	9.06	348.91	12.14		

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OP-6

Summary for Pond 24P: OP-6

Inflow Area = 2.040 ac, 0.00% Impervious, Inflow Depth = 3.02" for 25 year event
Inflow = 9.86 cfs @ 11.98 hrs, Volume= 0.513 af
Outflow = 9.86 cfs @ 11.98 hrs, Volume= 0.513 af, Atten= 0%, Lag= 0.0 min
Primary = 9.86 cfs @ 11.98 hrs, Volume= 0.513 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.85' @ 11.98 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	345.75'	**16.5" x 52.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.19' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=9.49 cfs @ 11.98 hrs HW=348.70' (Free Discharge)
└─**1=Culvert** (Inlet Controls 9.49 cfs @ 6.39 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Stage-Discharge for Pond 24P: OP-6

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
345.75	0.00	346.81	3.80	347.87	7.55	348.93	9.96
345.77	0.00	346.83	3.91	347.89	7.60	348.95	10.00
345.79	0.01	346.85	4.01	347.91	7.66	348.97	10.04
345.81	0.02	346.87	4.12	347.93	7.71	348.99	10.08
345.83	0.03	346.89	4.22	347.95	7.76	349.01	10.12
345.85	0.05	346.91	4.32	347.97	7.81	349.03	10.16
345.87	0.07	346.93	4.43	347.99	7.86	349.05	10.20
345.89	0.09	346.95	4.52	348.01	7.91	349.07	10.24
345.91	0.12	346.97	4.62	348.03	7.96	349.09	10.27
345.93	0.15	346.99	4.72	348.05	8.01	349.11	10.31
345.95	0.18	347.01	4.81	348.07	8.06	349.13	10.35
345.97	0.22	347.03	4.89	348.09	8.11	349.15	10.39
345.99	0.26	347.05	4.98	348.11	8.16	349.17	10.43
346.01	0.30	347.07	5.06	348.13	8.21	349.19	10.47
346.03	0.34	347.09	5.13	348.15	8.26	349.21	10.50
346.05	0.39	347.11	5.19	348.17	8.30	349.23	10.54
346.07	0.45	347.13	5.25	348.19	8.35	349.25	10.58
346.09	0.50	347.15	5.33	348.21	8.40	349.27	10.62
346.11	0.56	347.17	5.40	348.23	8.45	349.29	10.65
346.13	0.62	347.19	5.47	348.25	8.49	349.31	10.69
346.15	0.68	347.21	5.54	348.27	8.54	349.33	10.73
346.17	0.75	347.23	5.62	348.29	8.59	349.35	10.77
346.19	0.82	347.25	5.69	348.31	8.63	349.37	10.80
346.21	0.89	347.27	5.76	348.33	8.68	349.39	10.84
346.23	0.96	347.29	5.82	348.35	8.72	349.41	10.88
346.25	1.04	347.31	5.89	348.37	8.77	349.43	10.91
346.27	1.11	347.33	5.96	348.39	8.82	349.45	10.95
346.29	1.19	347.35	6.03	348.41	8.86	349.47	10.99
346.31	1.28	347.37	6.09	348.43	8.90	349.49	11.02
346.33	1.36	347.39	6.16	348.45	8.95	349.51	11.06
346.35	1.45	347.41	6.22	348.47	8.99	349.53	11.09
346.37	1.54	347.43	6.28	348.49	9.04	349.55	**11.13**
346.39	1.63	347.45	6.35	348.51	9.08		
346.41	1.72	347.47	6.41	348.53	9.13		
346.43	1.81	347.49	6.47	348.55	9.17		
346.45	1.91	347.51	6.53	348.57	9.21		
346.47	2.01	347.53	6.59	348.59	9.26		
346.49	2.11	347.55	6.65	348.61	9.30		
346.51	2.21	347.57	6.71	348.63	9.34		
346.53	2.31	347.59	6.77	348.65	9.38		
346.55	2.41	347.61	6.83	348.67	9.43		
346.57	2.51	347.63	6.89	348.69	9.47		
346.59	2.62	347.65	6.95	348.71	9.51		
346.61	2.72	347.67	7.00	348.73	9.55		
346.63	2.83	347.69	7.06	348.75	9.59		
346.65	2.94	347.71	7.12	348.77	9.63		
346.67	3.04	347.73	7.17	348.79	9.68		
346.69	3.15	347.75	7.23	348.81	9.72		
346.71	3.26	347.77	7.28	348.83	9.76		
346.73	3.37	347.79	7.34	348.85	9.80		
346.75	3.48	347.81	7.39	348.87	9.84		
346.77	3.58	347.83	7.44	348.89	9.88		
346.79	3.69	347.85	7.50	348.91	9.92		

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OP-7

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Summary for Pond 26P: OP-7

Inflow Area = 1.300 ac, 0.00% Impervious, Inflow Depth = 2.92" for 25 year event
Inflow = 6.47 cfs @ 11.95 hrs, Volume= 0.316 af
Outflow = 6.47 cfs @ 11.95 hrs, Volume= 0.316 af, Atten= 0%, Lag= 0.0 min
Primary = 6.47 cfs @ 11.95 hrs, Volume= 0.316 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.13' @ 11.95 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	345.85'	**14.7" x 48.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.41' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=6.39 cfs @ 11.95 hrs HW=348.09' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.39 cfs @ 5.42 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Stage-Discharge for Pond 26P: OP-7

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
345.85	0.00	346.91	3.35	347.97	6.15	349.03	8.02
345.87	0.00	346.93	3.43	347.99	6.19	349.05	8.05
345.89	0.01	346.95	3.51	348.01	6.23	349.07	8.09
345.91	0.02	346.97	3.59	348.03	6.27	349.09	8.12
345.93	0.03	346.99	3.67	348.05	6.31	349.11	8.15
345.95	0.04	347.01	3.74	348.07	6.35	349.13	8.18
345.97	0.06	347.03	3.80	348.09	6.39	349.15	8.21
345.99	0.08	347.05	3.86	348.11	6.43	349.17	8.24
346.01	0.11	347.07	3.91	348.13	6.47	349.19	8.27
346.03	0.14	347.09	3.97	348.15	6.50	349.21	8.30
346.05	0.17	347.11	4.03	348.17	6.54	349.23	8.33
346.07	0.20	347.13	4.09	348.19	6.58	349.25	8.36
346.09	0.24	347.15	4.15	348.21	6.62	349.27	8.39
346.11	0.28	347.17	4.21	348.23	6.66	349.29	8.42
346.13	0.32	347.19	4.27	348.25	6.69	349.31	8.45
346.15	0.37	347.21	4.33	348.27	6.73	349.33	8.48
346.17	0.42	347.23	4.39	348.29	6.77	349.35	8.51
346.19	0.47	347.25	4.44	348.31	6.81	349.37	8.54
346.21	0.52	347.27	4.50	348.33	6.84	349.39	8.57
346.23	0.58	347.29	4.55	348.35	6.88	349.41	8.60
346.25	0.64	347.31	4.61	348.37	6.92	349.43	8.63
346.27	0.70	347.33	4.66	348.39	6.95	349.45	8.65
346.29	0.76	347.35	4.72	348.41	6.99	349.47	8.68
346.31	0.82	347.37	4.77	348.43	7.02	349.49	8.71
346.33	0.89	347.39	4.82	348.45	7.06	349.51	8.74
346.35	0.96	347.41	4.87	348.47	7.09	349.53	8.77
346.37	1.03	347.43	4.93	348.49	7.13	349.55	**8.80**
346.39	1.11	347.45	4.98	348.51	7.16		
346.41	1.18	347.47	5.03	348.53	7.20		
346.43	1.26	347.49	5.08	348.55	7.23		
346.45	1.34	347.51	5.12	348.57	7.27		
346.47	1.42	347.53	5.17	348.59	7.30		
346.49	1.50	347.55	5.22	348.61	7.34		
346.51	1.58	347.57	5.27	348.63	7.37		
346.53	1.66	347.59	5.32	348.65	7.41		
346.55	1.75	347.61	5.36	348.67	7.44		
346.57	1.84	347.63	5.41	348.69	7.47		
346.59	1.92	347.65	5.46	348.71	7.51		
346.61	2.01	347.67	5.50	348.73	7.54		
346.63	2.10	347.69	5.55	348.75	7.57		
346.65	2.19	347.71	5.59	348.77	7.61		
346.67	2.28	347.73	5.64	348.79	7.64		
346.69	2.37	347.75	5.68	348.81	7.67		
346.71	2.46	347.77	5.73	348.83	7.70		
346.73	2.55	347.79	5.77	348.85	7.74		
346.75	2.65	347.81	5.81	348.87	7.77		
346.77	2.74	347.83	5.86	348.89	7.80		
346.79	2.83	347.85	5.90	348.91	7.83		
346.81	2.92	347.87	5.94	348.93	7.87		
346.83	3.01	347.89	5.98	348.95	7.90		
346.85	3.09	347.91	6.02	348.97	7.93		
346.87	3.18	347.93	6.07	348.99	7.96		
346.89	3.27	347.95	6.11	349.01	7.99		

OP-8

Summary for Pond 28P: OP-8

Inflow Area = 1.310 ac, 0.00% Impervious, Inflow Depth = 2.92" for 25 year event
Inflow = 6.36 cfs @ 11.96 hrs, Volume= 0.319 af
Outflow = 6.36 cfs @ 11.96 hrs, Volume= 0.319 af, Atten= 0%, Lag= 0.0 min
Primary = 6.36 cfs @ 11.96 hrs, Volume= 0.319 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.05 hrs
Peak Elev= 348.07' @ 11.96 hrs
Flood Elev= 349.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	345.85'	**14.7" x 48.0' long Culvert** CPP, mitered to conform to fill, Ke= 0.700 Outlet Invert= 344.41' S= 0.0300 '/' Cc= 0.900 n= 0.010

Primary OutFlow Max=6.20 cfs @ 11.96 hrs HW=348.00' (Free Discharge)
└─**1=Culvert** (Inlet Controls 6.20 cfs @ 5.26 fps)

RMU-2 Culverts *Type II 24-hr 25 year Rainfall=4.00"*
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Stage-Discharge for Pond 28P: OP-8

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
345.85	0.00	346.91	3.35	347.97	6.15	349.03	8.02
345.87	0.00	346.93	3.43	347.99	6.19	349.05	8.05
345.89	0.01	346.95	3.51	348.01	6.23	349.07	8.09
345.91	0.02	346.97	3.59	348.03	6.27	349.09	8.12
345.93	0.03	346.99	3.67	348.05	6.31	349.11	8.15
345.95	0.04	347.01	3.74	348.07	6.35	349.13	8.18
345.97	0.06	347.03	3.80	348.09	6.39	349.15	8.21
345.99	0.08	347.05	3.86	348.11	6.43	349.17	8.24
346.01	0.11	347.07	3.91	348.13	6.47	349.19	8.27
346.03	0.14	347.09	3.97	348.15	6.50	349.21	8.30
346.05	0.17	347.11	4.03	348.17	6.54	349.23	8.33
346.07	0.20	347.13	4.09	348.19	6.58	349.25	8.36
346.09	0.24	347.15	4.15	348.21	6.62	349.27	8.39
346.11	0.28	347.17	4.21	348.23	6.66	349.29	8.42
346.13	0.32	347.19	4.27	348.25	6.69	349.31	8.45
346.15	0.37	347.21	4.33	348.27	6.73	349.33	8.48
346.17	0.42	347.23	4.39	348.29	6.77	349.35	8.51
346.19	0.47	347.25	4.44	348.31	6.81	349.37	8.54
346.21	0.52	347.27	4.50	348.33	6.84	349.39	8.57
346.23	0.58	347.29	4.55	348.35	6.88	349.41	8.60
346.25	0.64	347.31	4.61	348.37	6.92	349.43	8.63
346.27	0.70	347.33	4.66	348.39	6.95	349.45	8.65
346.29	0.76	347.35	4.72	348.41	6.99	349.47	8.68
346.31	0.82	347.37	4.77	348.43	7.02	349.49	8.71
346.33	0.89	347.39	4.82	348.45	7.06	349.51	8.74
346.35	0.96	347.41	4.87	348.47	7.09	349.53	8.77
346.37	1.03	347.43	4.93	348.49	7.13	349.55	**8.80**
346.39	1.11	347.45	4.98	348.51	7.16		
346.41	1.18	347.47	5.03	348.53	7.20		
346.43	1.26	347.49	5.08	348.55	7.23		
346.45	1.34	347.51	5.12	348.57	7.27		
346.47	1.42	347.53	5.17	348.59	7.30		
346.49	1.50	347.55	5.22	348.61	7.34		
346.51	1.58	347.57	5.27	348.63	7.37		
346.53	1.66	347.59	5.32	348.65	7.41		
346.55	1.75	347.61	5.36	348.67	7.44		
346.57	1.84	347.63	5.41	348.69	7.47		
346.59	1.92	347.65	5.46	348.71	7.51		
346.61	2.01	347.67	5.50	348.73	7.54		
346.63	2.10	347.69	5.55	348.75	7.57		
346.65	2.19	347.71	5.59	348.77	7.61		
346.67	2.28	347.73	5.64	348.79	7.64		
346.69	2.37	347.75	5.68	348.81	7.67		
346.71	2.46	347.77	5.73	348.83	7.70		
346.73	2.55	347.79	5.77	348.85	7.74		
346.75	2.65	347.81	5.81	348.87	7.77		
346.77	2.74	347.83	5.86	348.89	7.80		
346.79	2.83	347.85	5.90	348.91	7.83		
346.81	2.92	347.87	5.94	348.93	7.87		
346.83	3.01	347.89	5.98	348.95	7.90		
346.85	3.09	347.91	6.02	348.97	7.93		
346.87	3.18	347.93	6.07	348.99	7.96		
346.89	3.27	347.95	6.11	349.01	7.99		

NYSDEC OHMS Document No. 201469232-00007

ARCADIS

Attachment 4

Reference 5

NYSDEC OHMS Document No. 201469232-00007

APPENDIX 17.D

Equivalent Length of Straight Pipe for Various Fittings (feet)

(turbulent flow only, for any fluid)

fittings			pipe size																				
			1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
regular 90° ell	screwed	steel	2.3	3.1	3.6	4.4	5.2	6.6	7.4	8.5	9.3	11.0	13.0										
		c.i.										9.0	11.0										
	flanged	steel			0.92	1.2	1.6	2.1	2.4	3.1	3.6	4.4	5.9	7.3	8.9	12.0	14.0	17.0	18.0	21.0	23.0	25.0	30.0
		c.i.										3.6	4.8		7.2	9.8	12.0	15.0	17.0	19.0	22.0	24.0	28.0
long radius 90° ell	screwed	steel	1.5	2.0	2.2	2.3	2.7	3.2	3.4	3.6	3.6	4.0	4.6										
		c.i.										3.3	3.7										
	flanged	steel			1.1	1.3	1.6	2.0	2.3	2.7	2.9	3.4	4.2	5.0	5.7	7.0	8.0	9.0	9.4	10.0	11.0	12.0	14.0
		c.i.										2.8	3.4		4.7	5.7	6.8	7.8	8.6	9.6	11.0	11.0	13.0
regular 45° ell	screwed	steel	0.34	0.52	0.71	0.92	1.3	1.7	2.1	2.7	3.2	4.0	5.5										
		c.i.										3.3	4.5										
	flanged	steel			0.45	0.59	0.81	1.1	1.3	1.7	2.0	2.6	3.5	4.5	5.6	7.7	9.0	11.0	13.0	15.0	16.0	18.0	22.0
		c.i.										2.1	2.9		4.5	6.3	8.1	9.7	12.0	13.0	15.0	17.0	20.0
tee-line flow	screwed	steel	0.79	1.2	1.7	2.4	3.2	4.6	5.6	7.7	9.3	12.0	17.0										
		c.i.										9.9	14.0										
	flanged	steel			0.69	0.82	1.0	1.3	1.5	1.8	1.9	2.2	2.8	3.3	3.8	4.7	5.2	6.0	6.4	7.2	7.6	8.2	9.6
		c.i.										1.9	2.2		3.1	3.9	4.6	5.2	5.9	6.5	7.2	7.7	8.8
tee-branch flow	screwed	steel	2.4	3.5	4.2	5.3	6.6	8.7	9.9	12.0	13.0	17.0	21.0										
		c.i.										14.0	17.0										
	flanged	steel			2.0	2.6	3.3	4.4	5.2	6.6	7.5	9.4	12.0	15.0	18.0	24.0	30.0	34.0	37.0	43.0	47.0	52.0	62.0
		c.i.										7.7	10.0		15.0	20.0	25.0	30.0	35.0	39.0	44.0	49.0	57.0
180° return bend	screwed	steel	2.3	3.1	3.6	4.4	5.2	6.6	7.4	8.5	9.3	11.0	13.0										
		c.i.										9.0	11.0										
	reg. flanged	steel			0.92	1.2	1.6	2.1	2.4	3.1	3.6	4.4	5.9	7.3	8.9	12.0	14.0	17.0	18.0	21.0	23.0	25.0	30.0
		c.i.										3.6	4.8		7.2	9.8	12.0	15.0	17.0	19.0	22.0	24.0	28.0
	long rad. flanged	steel			1.1	1.3	1.6	2.0	2.3	2.7	2.9	3.4	4.2	5.0	5.7	7.0	8.0	9.0	9.4	10.0	11.0	12.0	14.0
		c.i.										2.8	3.4		4.7	5.7	6.8	7.8	8.6	9.6	11.0	11.0	13.0
globe valve	screwed	steel	21.0	22.0	22.0	24.0	29.0	37.0	42.0	54.0	62.0	79.0	110.0										
		c.i.										65.0	86.0										
	flanged	steel			38.0	40.0	45.0	54.0	59.0	70.0	77.0	94.0	120.0	150.0	190.0	260.0	310.0	390.0					
		c.i.										77.0	99.0		150.0	210.0	270.0	330.0					
gate valve	screwed	steel	0.32	0.45	0.56	0.67	0.84	1.1	1.2	1.5	1.7	1.9	2.5										
		c.i.										1.6	2.0										
	flanged	steel								2.6	2.7	2.8	2.9	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
		c.i.										2.3	2.4		2.6	2.7	2.8	2.9	2.9	3.0	3.0	3.0	3.0
angle valve	screwed	steel	12.8	15.0	15.0	15.0	17.0	18.0	18.0	18.0	18.0	18.0	18.0										
		c.i.										15.0	15.0										
	flanged	steel			15.0	15.0	17.0	18.0	18.0	21.0	22.0	28.0	38.0	50.0	63.0	90.0	120.0	140.0	160.0	190.0	210.0	240.0	300.0
		c.i.										23.0	31.0		52.0	74.0	98.0	120.0	150.0	170.0	200.0	230.0	280.0
swing check valve	screwed	steel	7.2	7.3	8.0	8.8	11.0	13.0	15.0	19.0	22.0	27.0	38.0										
		c.i.										22.0	31.0										
	flanged	steel			3.8	5.3	7.2	10.0	12.0	17.0	21.0	27.0	38.0	50.0	63.0	90.0	120.0	140.0					
		c.i.										22.0	31.0		52.0	74.0	98.0	120.0					
coupling or union	screwed	steel	0.14	0.18	0.21	0.24	0.29	0.36	0.39	0.45	0.47	0.53	0.65										
		c.i.										0.44	0.52										
inlets	bell mouth inlet	steel	0.04	0.07	0.10	0.13	0.18	0.26	0.31	0.43	0.52	0.67	0.95	1.3	1.6	2.3	2.9	3.5	4.0	4.7	5.3	6.1	7.6
		c.i.										0.55	0.77		1.3	1.9	2.4	3.0	3.6	4.3	5.0	5.7	7.0
	square mouth inlet	steel	0.44	0.68	0.96	1.3	1.8	2.6	3.1	4.3	5.2	6.7	9.5	13.0	16.0	23.0	29.0	35.0	40.0	47.0	53.0	61.0	76.0
		c.i.										5.5	7.7		13.0	19.0	24.0	30.0	36.0	43.0	50.0	57.0	70.0
	re-entrant pipe	steel	0.88	1.4	1.9	2.6	3.6	5.1	6.2	8.5	10.0	13.0	19.0	25.0	32.0	45.0	58.0	70.0	80.0	95.0	110.0	120.0	150.0
		c.i.										11.0	15.0		26.0	37.0	49.0	61.0	73.0	86.0	100.0	110.0	140.0

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APPENDICES

Appendix H-6

RMU-1/RMU-2 Culvert Design

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Imagine the result

Calculation Sheet

Client: **CWM Chemical Services, LLC**

Project Location: **Model City, New York**

Project: **RMU-2 Design Calculations** **Project No.:** **B0023725.2009**

Subject: **Appendix H-6: RMU-1/RMU-2 Culvert Design**

Prepared By: **PDB** **Date:** **August 2009**

Checked By: **BMS** **Date:** **August 2009**

Reviewed By: **PHB** **Date:** **August 2009**

OBJECTIVE:

Evaluate the ability of the culvert system between RMU-1 and RMU-2 to convey the estimated peak discharge resulting from the 25-year, 24-hour design storm.

REFERENCES:

1. Technical Release 55 "Urban Hydrology for Small Watersheds," Soil Conservation Service, June 1986.

2. HydroCAD Software Solutions, LLC. HydroCAD Version 8.5. Computer Software, 2006.

3. Manufacturer literature, Advanced Drainage Systems, Inc. (attached).

4. RMU-2 Permit Drawing No. 25 entitled "RMU-1/RMU-2 Culvert System Plan and Profile," ARCADIS, August 2009.

5. "Engineering Report for CWM Chemical Services, LLC, Model City Facility, Residuals Management Unit 1," Earth Tech.

ASSUMPTIONS:

1. The required pipe diameters and hydraulic conditions within the culvert system are based on the anticipated peak discharge to the system during the 25-year, 24-hour storm, which produces 4.0 inches of rainfall.

2. The culvert system must convey the 25-year, 24-hour peak discharge without causing the water elevation to overtop the RMU-1/RMU-2 drainage ditch or to reach the rim elevation of any manhole along the length of the culvert system. The culvert pipe is a 36-inch diameter smooth-bore corrugated high-density polyethylene (HDPE) pipe with a Manning "n" of 0.012. Pipe inverts, manhole rim elevations, and drainage ditch bank elevations are obtained from Reference 4.

3. The estimated peak discharge to the culvert system is determined using Reference 2.

4. The capped portions of the RMU-2 drainage area are assumed to be newly capped (i.e., un-vegetated) and have a runoff curve number of 91. A vegetated condition is not considered in this calculation because the newly capped condition results in a larger peak discharge to the system and is therefore more conservative. The RMU-2 access road is assumed to be gravel and the MSE wall is assumed to be rock/riprap both having a curve number of 89. The RMU-1/RMU-2 drainage ditch is

Calculation Sheet

lined with a geomembrane liner and riprap and is therefore assumed to be impervious, having a curve number of 98. Curve numbers are from Reference 1 assuming Hydrologic Soil Group "C".

5. The tributary drainage acreage and time of concentration in RMU-1 is based on Reference 5. The curve numbers for the RMU-1 drainage area include 89 for the perimeter road and 79 for vegetated final cover areas.

6. The hydraulic conditions within the culvert system are determined from a computer model of the system created using Reference 2.

CALCULATIONS:

1. Drainage Area and Peak Discharge

The culvert consists of an open-ended pipe with precast concrete manholes located periodically along the culvert length. The culvert inlet is within the RMU-1/RMU-2 drainage ditch and the outlet is at the northwest corner of RMU-1 as depicted on Reference 4. Runoff entering the stormwater culvert system will be routed to an existing drainage ditch located northeast of RMU-2 which ultimately flows to the V01 retention basin. The total area draining to the culvert system from RMU-1 and RMU-2 is 9.86 acres and is summarized below.

The RMU-1 drainage area consists of 0.57 acres of the RMU-1 perimeter road with a curve number of 89 and 3.75 acres of RMU-1 final cover with a curve number of 79. The resulting composite curve number for RMU-1of 80 was calculated using Reference 2.

The RMU-2 drainage area consists of 0.54 acres of the RMU-2 perimeter access road with a curve number of 89, 3.83 acres of newly graded RMU-2 final cover (non-vegetated) with a curve number of 91, 0.18 acres of the RMU-2 MSE wall (rock/riprap) with a curve number of 89, and 0.16 acres of the geomembrane/riprap lined drainage ditch with a curve number of 98. Additionally 0.83 acres of the SLF-10 final cover (curve number of 79) drains to the culvert. The resulting composite curve number for RMU-2 and SLF 10 drainage areas of 89 was calculated using Reference 2.

Time of concentration for the RMU-1 drainage area is 11 minutes (Reference 5). The calculated time of concentration for the RMU-2 drainage area was calculated using Reference 2 and is 11 minutes. The resulting peak discharge to the stormwater culvert system is 35.3 cfs.

Supporting output from Reference 2 is included as Attachment 2.

2. Culvert System Hydraulic Conditions

Hydraulic conditions within the culvert system are calculated using Reference 2 based on the peak discharge of 35.3 cfs conveyed by the system during the 25-year, 24-hour storm. The following table (Table 1) presents the peak discharge in each pipe segment of the culvert system, the pipe inverts and diameter, the peak water elevation in each manhole, and the rim elevation of each manhole in the system.

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Calculation Sheet

Table 1 – Culvert System Hydraulic Conditions

Pipe Segment	25-year, 24-hour Peak Discharge [cfs]	Pipe Diameter [in]	Upstream Pipe Invert Elevation [ft]	Peak Upstream Water Surface Elevation [ft]	Maximum Allowable Upstream Elevation [ft]
Inlet to DMH-1 (upstream)	35.3	36	327.65	330.73	331.05 (Ditch Bank)
DMH-1 to DMH-2	35.3	36	326.15	329.52 (DMH-1)	333.02 (DMH-1 Rim)
DMH-2 to DMH-3	35.3	36	325.12	328.78 (DMH-2)	333.98 (DMH-2 Rim)
DMH-3 to DMH-4	35.3	36	324.94	327.93 (DMH-3)	333.93 (DMH-3 Rim)
DMH-4 to DMH-5	35.3	36	322.80	326.31 (DMH-4)	331.97 (DMH-4 Rim)
DMH-5 to OUTLET (downstream)	35.3	36	322.32	325.33 (DMH-5)	331.47 (DMH-5 Rim)

As indicated in Table 1, the peak water surface elevation in the RMU-1/RMU-2 ditch and in each manhole of the culvert system is below the maximum allowable elevation. It is noted that the hydraulic conditions presented in Table 1 are based on a dynamic tailwater analysis for the system. A dynamic tailwater analysis considers the effect of downstream water surface elevations on upstream hydraulics.

Supporting output from Reference 2 is included as Attachment 2.

SUMMARY:

Based on the above calculations, the culvert provides sufficient capacity to convey the estimated peak flowrate from the 25-year, 24-hour design storm. Since the peak discharge to the culvert is based on assumed newly capped conditions and the flowrate will decrease as the final cover areas become vegetated, the culvert sizes contained herein are conservative.

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Attachment 1

Watershed Map

N
DMH-5
DMH-4
NEW RMU-1/RMU-2
CULVERT SYSTEM
DMH-3
DMH-2
DMH-1
CULVERT
INLET
RMU-1 WATERSHED
TOTAL AREA = 4.32 AC
RMU-2 WATERSHED
TOTAL AREA = 5.54 AC
180 EXISTING CONTOUR
190 PROPOSED CONTOUR
PROPOSED GRADE BREAK
WATERSHED BOUNDARY
SCALE IN FEET
0
240
480
ARCADIS
SHEET TITLE: RMU-1/RMU-2 CULVERT WATERSHED MAP
PROJECT TITLE: RMU-2 PERMIT CALCULATION
CWM CHEMICAL SERVICES
PROJECT LOCATION: MODEL CITY, NEW YORK
PROJECT NO: B0023725.2009
DATE: JULY 2009 BY: PDB
FILE NO.: 23725.PRO
Figure
1

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Attachment 2

HydroCAD Output

Drainage Diagram for RMU-1 & RMU-2 Culvert Design
Prepared by ARCADIS, Printed 7/17/2009
HydroCAD® 8.50 s/n 005595 © 2007 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.580	79	50-75% Grass cover, Fair, HSG C (1S,4S)
1.110	89	Gravel roads, HSG C (1S,4S)
0.180	89	Rock wall, HSG C (4S)
3.830	91	Newly graded area, HSG C (4S)
0.160	98	Geomembrane lined channel (4S)
9.860		**TOTAL AREA**

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

Subcatchment 1S: RMU-1 Runoff Area=4.320 ac 0.00% Impervious Runoff Depth>1.88"
Tc=11.0 min CN=80 Runoff=12.92 cfs 0.676 af

Subcatchment 4S: RMU-2 Runoff Area=5.540 ac 2.89% Impervious Runoff Depth>2.64"
Flow Length=1,479' Slope=0.3300 '/' Tc=10.6 min CN=89 Runoff=22.51 cfs 1.217 af

Pond 2P: Culvert Inlet Peak Elev=330.73' Inflow=35.34 cfs 1.893 af
36.0" x 301.0' Culvert Outflow=35.34 cfs 1.893 af

Pond 5P: DMH-1 Peak Elev=329.52' Inflow=35.34 cfs 1.893 af
36.0" x 206.0' Culvert Outflow=35.34 cfs 1.893 af

Pond 6P: DMH-2 Peak Elev=328.78' Inflow=35.34 cfs 1.893 af
36.0" x 39.0' Culvert Outflow=35.34 cfs 1.893 af

Pond 7P: DMH-3 Peak Elev=327.93' Inflow=35.34 cfs 1.893 af
36.0" x 426.0' Culvert Outflow=35.34 cfs 1.893 af

Pond 8P: DMH-4 Peak Elev=326.31' Inflow=35.34 cfs 1.893 af
36.0" x 95.0' Culvert Outflow=35.34 cfs 1.893 af

Pond 9P: DMH-5 Peak Elev=325.33' Inflow=35.34 cfs 1.893 af
36.0" x 61.0' Culvert Outflow=35.34 cfs 1.893 af

Total Runoff Area = 9.860 ac Runoff Volume = 1.893 af Average Runoff Depth = 2.30"
98.38% Pervious = 9.700 ac 1.62% Impervious = 0.160 ac

Summary for Subcatchment 1S: RMU-1

Runoff = 12.92 cfs @ 12.03 hrs, Volume= 0.676 af, Depth> 1.88"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-year Rainfall=4.00"

Area (ac)	CN	Description
0.570	89	Gravel roads, HSG C
3.750	79	50-75% Grass cover, Fair, HSG C
4.320	80	Weighted Average
4.320		Pervious Area

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

Summary for Subcatchment 4S: RMU-2

Runoff = 22.51 cfs @ 12.02 hrs, Volume= 1.217 af, Depth> 2.64"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-year Rainfall=4.00"

	Area (ac)	CN	Description
	3.830	91	Newly graded area, HSG C
	0.540	89	Gravel roads, HSG C
*	0.180	89	Rock wall, HSG C
*	0.160	98	Geomembrane lined channel
	0.830	79	50-75% Grass cover, Fair, HSG C
	5.540	89	Weighted Average
	5.380		Pervious Area
	0.160		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	75	0.3300	3.52		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.50"
0.1	42	0.3300	9.25		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
7.7	692		1.50		**Direct Entry, RMU-2 Perimeter Ditch Flow**
2.4	670		4.60		**Direct Entry, RMU-1/RMU-2 Ditch Flow**
10.6	1,479	Total			

Summary for Pond 2P: Culvert Inlet

Inflow Area =	9.860 ac,	1.62% Impervious,	Inflow Depth >	2.30"	for 25-year event
Inflow =	35.34 cfs @	12.02 hrs,	Volume=	1.893 af	
Outflow =	35.34 cfs @	12.02 hrs,	Volume=	1.893 af,	Atten= 0%, Lag= 0.0 min
Primary =	35.34 cfs @	12.02 hrs,	Volume=	1.893 af	

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 330.73' @ 12.05 hrs
Flood Elev= 331.05'

Device	Routing	Invert	Outlet Devices
#1	Primary	327.65'	**36.0" x 301.0' long Culvert** CPP, end-section conforming to fill, Ke= 0.500 Outlet Invert= 326.15' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=30.14 cfs @ 12.02 hrs HW=330.62' TW=329.31' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 30.14 cfs @ 5.35 fps)

Summary for Pond 5P: DMH-1

Inflow Area = 9.860 ac, 1.62% Impervious, Inflow Depth > 2.30" for 25-year event
Inflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af
Outflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af, Atten= 0%, Lag= 0.0 min
Primary = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 329.52' @ 12.07 hrs
Flood Elev= 333.02'

Device	Routing	Invert	Outlet Devices
#1	Primary	326.15'	**36.0" x 206.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 325.12' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=26.81 cfs @ 12.02 hrs HW=329.31' TW=328.54' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 26.81 cfs @ 4.47 fps)

Summary for Pond 6P: DMH-2

Inflow Area = 9.860 ac, 1.62% Impervious, Inflow Depth > 2.30" for 25-year event
Inflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af
Outflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af, Atten= 0%, Lag= 0.0 min
Primary = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 328.78' @ 12.06 hrs
Flood Elev= 333.98'

Device	Routing	Invert	Outlet Devices
#1	Primary	325.12'	**36.0" x 39.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 324.93' S= 0.0049 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=28.55 cfs @ 12.02 hrs HW=328.54' TW=327.84' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 28.55 cfs @ 4.04 fps)

Summary for Pond 7P: DMH-3

Inflow Area = 9.860 ac, 1.62% Impervious, Inflow Depth > 2.30" for 25-year event
Inflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af
Outflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af, Atten= 0%, Lag= 0.0 min
Primary = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 327.93' @ 12.05 hrs
Flood Elev= 333.93'

Device	Routing	Invert	Outlet Devices
#1	Primary	324.93'	**36.0" x 426.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 322.80' S= 0.0050 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=30.80 cfs @ 12.02 hrs HW=327.84' TW=326.10' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 30.80 cfs @ 5.60 fps)

Summary for Pond 8P: DMH-4

Inflow Area = 9.860 ac, 1.62% Impervious, Inflow Depth > 2.30" for 25-year event
Inflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af
Outflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af, Atten= 0%, Lag= 0.0 min
Primary = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 326.31' @ 12.05 hrs
Flood Elev= 331.97'

Device	Routing	Invert	Outlet Devices
#1	Primary	322.80'	**36.0" x 95.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 322.32' S= 0.0051 '/' Cc= 0.900 n= 0.012

Primary OutFlow Max=30.70 cfs @ 12.02 hrs HW=326.10' TW=325.28' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 30.70 cfs @ 4.34 fps)

Summary for Pond 9P: DMH-5

Inflow Area = 9.860 ac, 1.62% Impervious, Inflow Depth > 2.30" for 25-year event
Inflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af
Outflow = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af, Atten= 0%, Lag= 0.0 min
Primary = 35.34 cfs @ 12.02 hrs, Volume= 1.893 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 325.33' @ 12.02 hrs
Flood Elev= 331.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	322.32'	**36.0" x 61.0' long Culvert** CPP, square edge headwall, Ke= 0.500 Outlet Invert= 322.01' S= 0.0051 '/' Cc= 0.900 n= 0.012 HDPE smooth bore

Primary OutFlow Max=34.46 cfs @ 12.02 hrs HW=325.28' (Free Discharge)
└─**1=Culvert** (Barrel Controls 34.46 cfs @ 6.14 fps)

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Attachment 3

References

Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

NYSDEC OHMS Document No. 201469232-00007

Technical Notes

ADS
ADVANCED DRAINAGE SYSTEMS, INC.

Technical Note 2.109
Re: Flow Capacity
Date: March 1, 1995

It is the intent of this Technical Note to provide current hydraulic performance data for use by the engineering community. A bibliography is included for the engineer's use if further information or guidance is needed.

Manning's "n" values are offered for design purposes based on the best available data assembled from a variety of sources as indicated. Table 1 presents the Manning's "n" values recommended by the A.D.S. engineering staff for use in design.

Table 1
Manning's "n" Value For Design
(Storm & Sanitary Sewer and Culverts)

Pipe Type	"n"
A.D.S. Corrugated Polyethylene Pipe	
3" - 6" Diameter	0.015
8" Diameter	0.016
10" Diameter	0.017
12" - 15" Diameter	0.018
18" - 36" Diameter	0.020
A.D.S. N-12	0.012
Concrete Pipe	0.013
Corrugated Metal Pipe (2 2/3" x 1/2" corrugation)	
Annular	
Plain	0.024
Paved Invert	0.020
Fully Paved (smooth lined)	0.013
Helical	
Plain 15" Diameter	0.013
Plain 18" Diameter	0.015
Plain 24" Diameter	0.018
Plain 36" Diameter	0.021
Spiral-Rib	0.012
Plastic Pipe (SDR, S&D, Etc.)	0.011
Vitrified Clay	0.013

3300 RIVERSIDE DRIVE COLUMBUS, OH 43221 (614) 457-3051 http://www.ADS-pipe.com