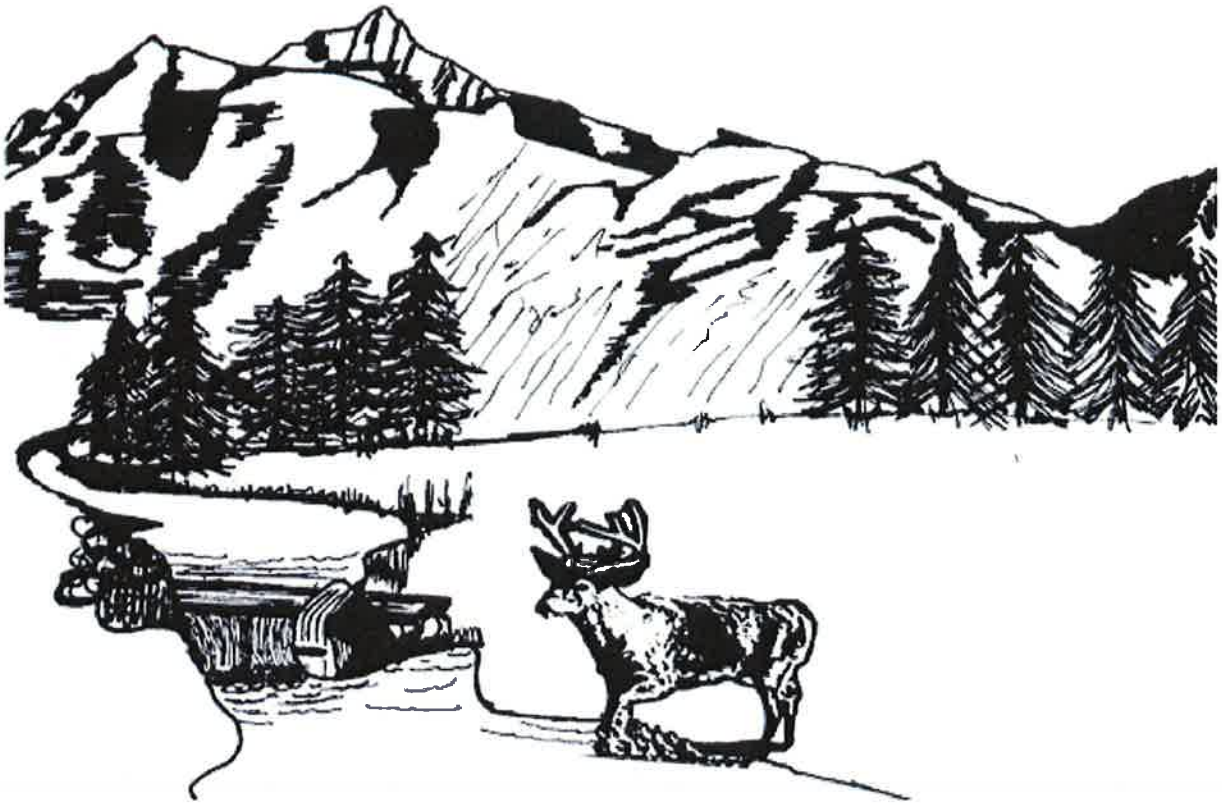
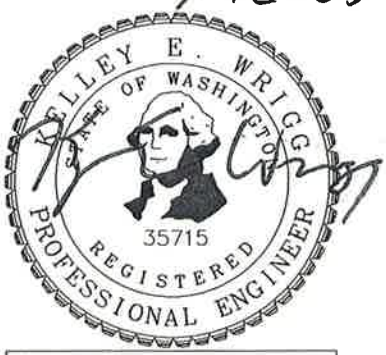
Drainage Report For:

Site Civil
All Seasons Spa and Stove – File Number:

July 11, 2005



7-12-05



EXPIRES: 01/01/06

Prepared by:

Job #16232

Project Summary

Erosion Control Risk Assessment

Upstream & Downstream Analysis

Stream Bank Erosion Control & Water Quality BMP's

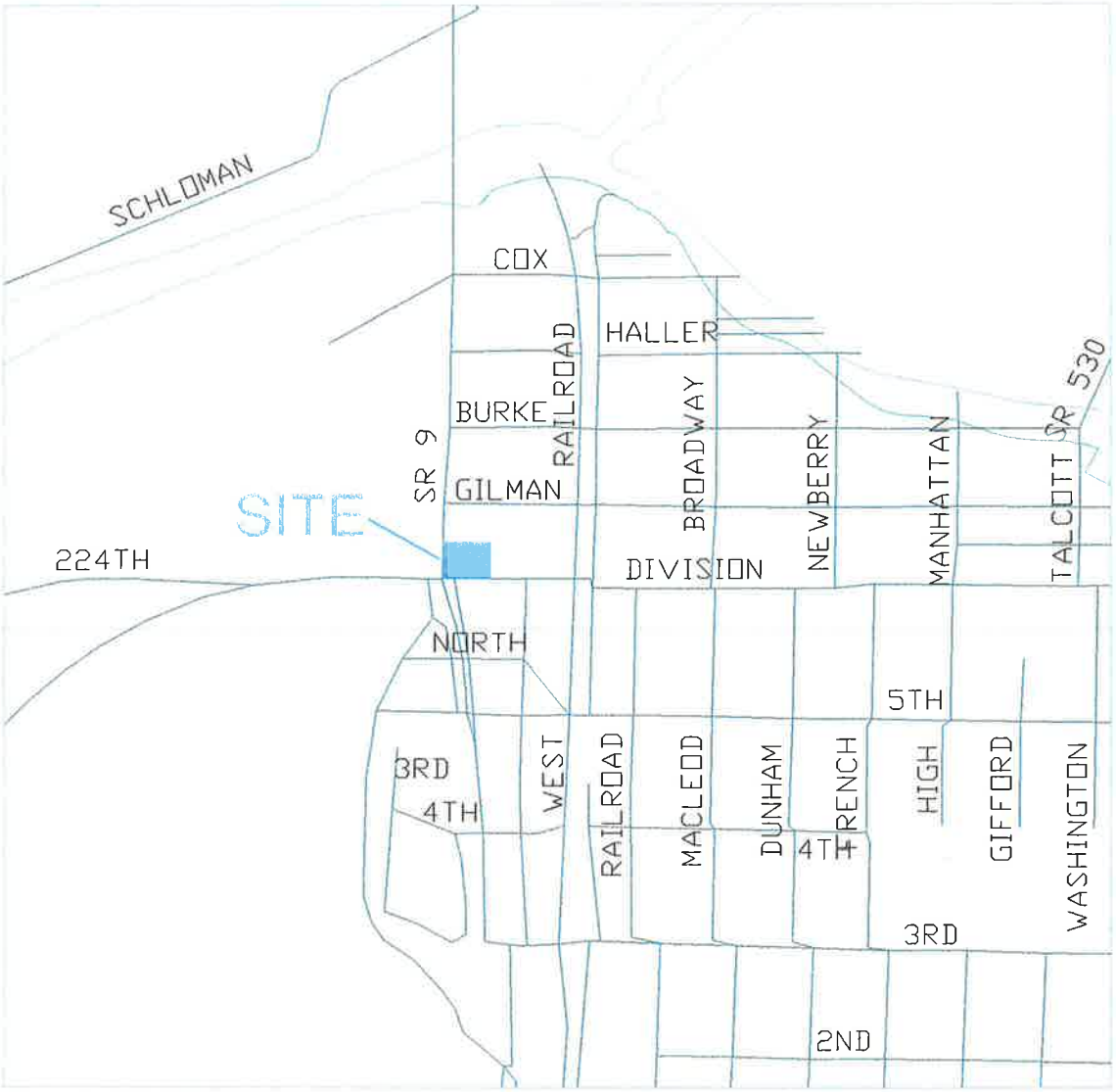
Appendix

Basin & Soil Log Map
Infiltration Trench Detail
Drainage Calculations
Maintenance Requirements

PROPERTY DESCRIPTION

The site of proposed development is located in Section 2, Township 31 N, Range 5E, W.M. The properties tax number is 004618-006-012-00. The property is 0.28 acres in size (See Vicinity Map below).

Figure 1: **Vicinity Map**



NOT TO SCALE

EXISTING CONDITIONS

The property currently has no impervious areas. The property consists of grasses and a deciduous tree. The property is bounded on the North by a gravel alley way, on the East by gravel parking lot and to the West and South by public right of way (State Route 9 and Division Street). The property slopes gently from a 100 foot elevation in the south east portion of the site to a 98 foot elevation in the extreme north-west corner. According to the Snohomish County SCC, the site has very deep gravels and sands (Everett gravelly sandy loam). Two soil log test pits where dug on April 22, 2005 at the locations shown on Figure 2, page 9. The soil logs confirm that the soils are gravelly sandy loam with roots not encountered and a water table in excess of 10-12 feet. Rain water infiltrates directly into the ground with no significant lateral movement expected.

VIEW 1: Looking south-west from alley.

VIEW 2: Looking south-west at existing SS stub.

VIEW 3: Looking west from parking lot to east

VIEW 4: north-west from parking lot to east.

PROPOSED DEVELOPMENT

The proposal is to combine the three lots into one and to build a retail store with landscaping, walkways, hard surfaced display areas and parking lot. Access will come off of the gravel alley way. For the purposes of this report the entire site, all 12,336 square feet, is being considered as impervious. Water Quality and Water Quantity control will be provided by infiltration. The site will have infiltration trenches sized to support runoff generated by the sites impervious area. Due to the sandy soil conditions, the site will have two trenches. All driving surfaces will be graded to two catch basins, one on either end of a water quality trench that will be lined with a minimum 18 inches of loamy sand for stormwater treatment during the infiltration process. The water quality trench will be sized to handle the six month storm event. Any additional run off from the driving surfaces will overflow the water quality trench and flow directly into the infiltration trench. Roof downspouts will be piped directly to the infiltration trench. See Infiltration Trench Plan, Figure 2, Page 9, and Infiltration Detail, Figure 3, Page 10.

SOIL LOGS:

SL-1:

0-2'	Brown loamy gravelly sand
2-4'	Tan loamy gravelly sand
4-12'	Gray gravelly medium sand

SL-2:

0-1'	Brown loamy gravelly sand
1-4'	Tan gravelly medium sand
4-10.5'	Gray gravelly coarse sand

RISK ASSESSMENT ANALYSIS AND REOSION CONTROL

Slope: Site slopes are 0-1%, risk is low.

Critical Areas: None.

Soils: Soils consist of:
Everett Gravelly Sandy Loam, 0 to 8%

Ground Movement Potential: None

Source of Water Erosion: Rainfall.

Measures Proposed to Prevent/Minimize Erosion:

During Construction: Temporary construction BMP's (see T.E.S.C. plan)
After Construction: Seeding and planting of exposed soils

Nearest Downstream body of water other than road ditches: Stillaguamish River ±1/4 mile

Nearest fish bearing water: Stillaguamish River

Conclusion: Potential for significant erosion/siltation impact onsite is **LOW**.
Because of the following reasons:

1. Site slopes are nearly flat in the area of proposed development.
2. Soil permeability is good.
3. Available water capacity of the soil is good.

UPSTREAM ANALYSIS

The Everett gravelly sandy loam soils group is good for building sites. The site is relatively flat with about a 1% slope. The contours of the adjacent properties are parallel to the site and do not allow any upstream water to run onto the property in a concentrated flow. All onsite water is from rainfall.

DOWNSTREAM ANALYSIS

Since infiltration is being proposed for this site, there is no downstream receiving water. Therefore, a downstream analysis is not necessary.

In the event of trench failure, stormwater will back up in the trench, into the catch basin and out the top. The stormwater will then infiltrate into the ground through the native soils.

STREAMBANK EROSION CONTROL AND WATER QUALITY BMP'S

The streambank erosion control and water quality BMP's proposed for this site is infiltration. The site will have two trenches, a trench to treat runoff in need of water quality treatment and a straight infiltration trench for all other runoff. The water quality trench is only sized to treat the 6-month runoff volume. During larger storm events, what water that cannot be infiltrated by the water quality trench will be directed to the other trench where the infiltration rate of the native sandy soils is much more rapid. The water quality trench will be 3 x 50-ft. x 3.5-ft deep. The water quality trench will be lined on the bottom with a minimum of 18" of loamy sand. The infiltration trench will be 4.2 x 50-ft. x 3.5-ft. deep. All trenches will be back filled with drain rock. 30% voids (32% with piping factored in for infiltration trenches and 33% for water quality trenches) were assumed in modeling the systems. The infiltration trenches have been sized to retain the 100-yr storm runoff generated by the drainage basin. In modeling the storm drainage facility, an infiltration rate of 10.00 in/hr (half the D.O.E. rate for gravely medium sand, 20.0 in/hr) was used for the native soils and an infiltration rate of 1.205 in/hr (half the D.O.E. rate for loamy sand, 2.41 in/hr) was used for the lined trenches.

DRAINAGE MODEL SUMMARY

The storm drainage modeling software used is StormSHED Release 6.1.6.8.
Key elevations are shown on the Elevation Chart on page 10.

APPENDIX

GRAPHIC SCALE

20 0 10 20 40

1 inch = 20 ft.

STATE ROUTE 9

MAGNETIC

MH# 98
RIM= 98.65
INV= 92.04

8" SEWER PIPE

SEWER STUB

20 LF 6" PVC @ 2.00% MIN.

EX. SEWER C.O. (TO BE REMOVED)

EXIST. CHAIN LINK FENCE

PP

MTR POLE

N90°00'00"E 150.00'

N90°00'0
400.0C

PROPOSED BUILDING LOCATION

11

13

SL-2

SL-1

CB #1

CB #2

CB #3

HIGH

N00°04'00"W 100.00'

N00°04'00"W 89.64'

53.71'

22 LF @ 2.00% MIN.

80 LF TYPE 1 INFILTRATION TRENCH

N60°20'38"W 73.65'

N00°04'00"W 46.29'

S08°56'38"E 160.96'

N89°39'22"E 86.04'

N90°00'00"E 150.00'

N00°20'38"W 49.00'

N89°39'22"E 114.37'

HIGHWAY MON.

CONCRETE SIDEWALK

GRASS

ASPHALT WALKWAY

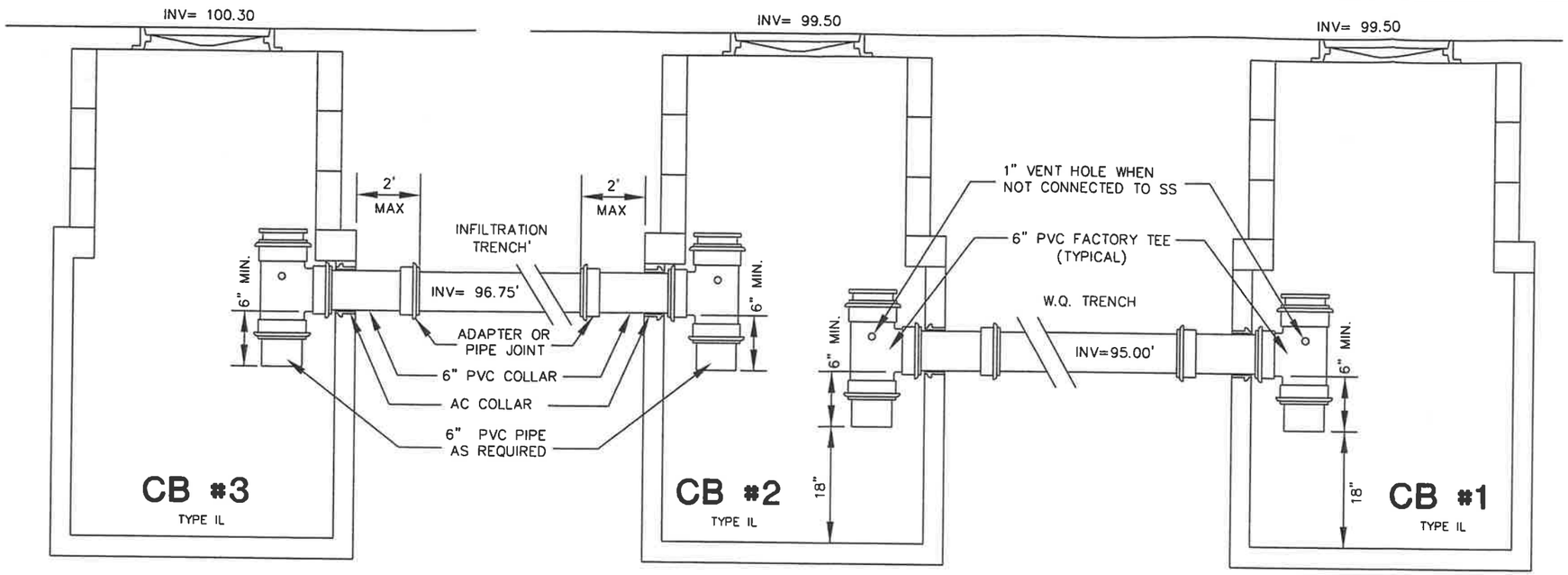
STEEL LIGHT POLE

DIVISION STREET

INFILTRATION PLAN
FIGURE 2

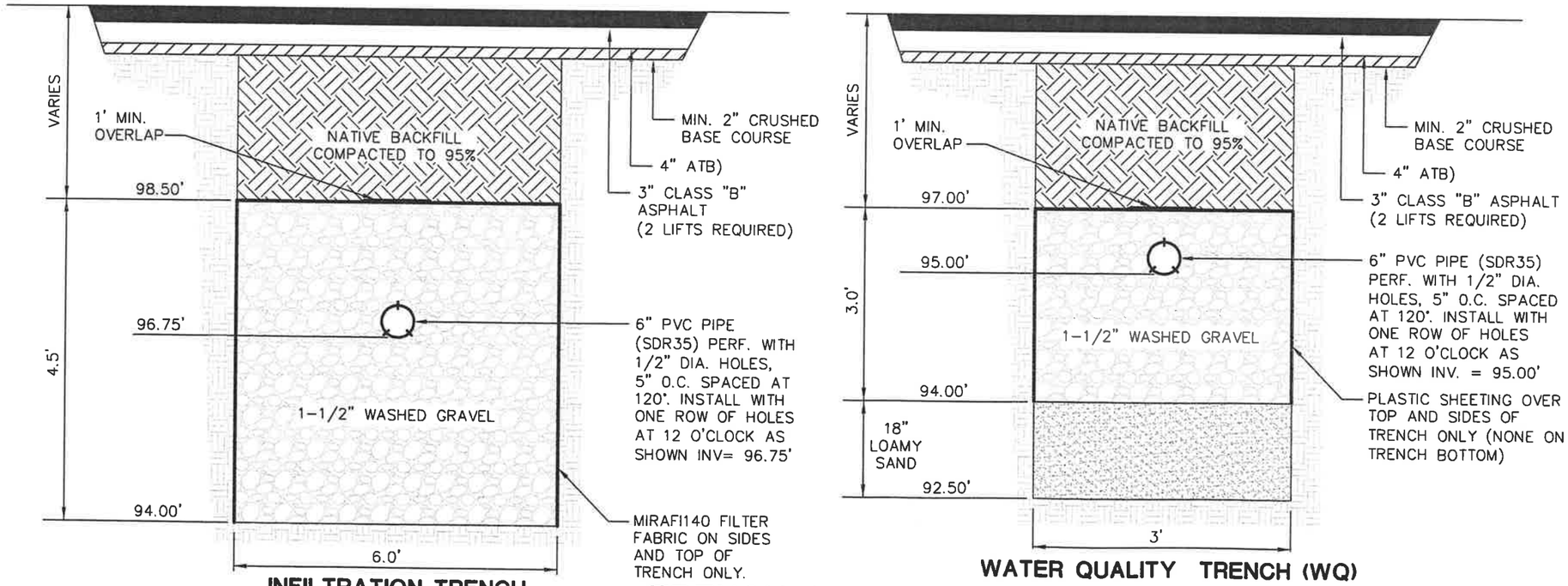
9

I:\LNDPRJ\16232\DWG\16232GEN.DWG (FIG2)



TYPICAL OIL/WATER SEPARATOR

NO SCALE



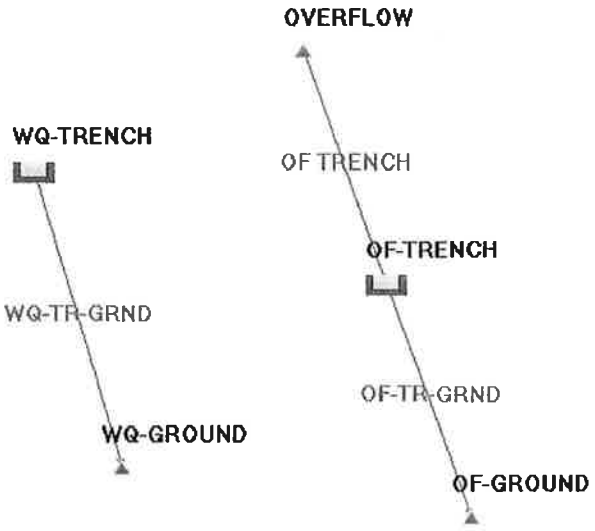
TRENCH SECTIONS

NO SCALE

INFILTRATION TRENCH DETAIL

FIGURE 3

I:\LNDPRJ\16232\DWG\16232GEN.DWG (FIG3)



Project Precips

[6 mo]	1.15 in
[2 yr]	1.80 in
[10 yr]	2.75 in
[100 yr]	3.75 in
[0]	0.00 in
[0]	0.00 in

Reach Records

Reach ID: OF TRENCH

Section Properties:

Shape:	Circular		Routing Method:	Travel Time Translation
Size	Material	Mannings n	Hyd params By	
6" Diam	Smooth CDEP	0.0120	Mannings Formula	
Length	Slope	Entrance Loss		
0.0010 ft	100.00 %	Square Edge w/Headwall		
Diam				
0.5000 ft				
Up Node	Dn Node	Up Invert	Dn Invert	
OVERFLOW	OF-TRENCH	96.7500 ft	96.7490 ft	

Conduit Constraints:

Min Vel	Max Vel	Min Cov	Min Slope	Max Slope	Min drop
2.0000 ft	15.0000 ft	3.0000 ft	0.5000 ft	2.0000 ft	0.0000 ft
In/Exfil	Hold Up	Hold Dn	Match Inv	Allow Smaller	
0.0000 in/hr	NO	NO	YES	NO	

Conduit Summary:

Trib Area	Flow	Capacity	Velocity	Normal Depth
0.0899 ac	0.1040 cf	6.0950 cf	11.7269 ft/s	0.0454 ft
Ent Loss	Exit Loss	Frict Loss	Start TW	
0.002179 ft	0.004358 ft	0.000000 ft	98.4914 ft	

Reach ID: OF-TR-GRND

Section Properties:

Shape:	Circular		Routing Method:	Travel Time Translation	
Size	Material	Mannings n	Hyd params By		
48" Diam	Smooth CDEP	0.0120	Mannings Formula		
Length	Slope	Entrance Loss			
0.0010 ft	100.00 %	Groove End Projecting			
Diam					
4.0000 ft					
Up Node	Dn Node	Up Invert	Dn Invert		
OF-TRENCH	OF-GROUND	94.0000 ft	93.9990 ft		

Conduit Constraints:

Min Vel	Max Vel	Min Cov	Min Slope	Max Slope	Min drop
2.0000 ft	15.0000 ft	3.0000 ft	0.5000 ft	2.0000 ft	0.0000 ft
In/Exfil	Hold Up	Hold Dn	Match Inv	Allow Smaller	
0.0000 in/hr	NO	NO	YES	NO	

Conduit Summary:

Trib Area	Flow	Capacity	Velocity	Normal Depth
0.2499 ac	0.0694 cf	1560.3243 cf	7.6247 ft/s	0.0227 ft
Ent Loss	Exit Loss	Frict Loss	Start TW	
0.180549 ft	0.902744 ft	0.000000 ft	94.0732 ft	

Reach ID: WQ-TR-GRND

Section Properties:

Shape:	Circular		Routing Method:	Travel Time Translation	
Size	Material	Mannings n	Hyd params By		
48" Diam	Smooth CDEP	0.0120	Mannings Formula		
Length	Slope	Entrance Loss			
0.0010 ft	100.00 %	Groove End Projecting			
Diam					
4.0000 ft					
Up Node	Dn Node	Up Invert	Dn Invert		
WQ-TRENCH	WQ-GROUND	94.0000 ft	93.9990 ft		

Conduit Constraints:

Min Vel	Max Vel	Min Cov	Min Slope	Max Slope	Min drop
2.0000 ft	15.0000 ft	3.0000 ft	0.5000 ft	2.0000 ft	0.0000 ft
In/Exfil	Hold Up	Hold Dn	Match Inv	Allow Smaller	
0.0000 in/hr	NO	NO	YES	NO	

Conduit Summary:

Trib Area	Flow	Capacity	Velocity	Normal Depth
0.0301 ac	0.0042 cf	1560.3243 cf	3.4998 ft/s	0.0059 ft
Ent Loss	Exit Loss	Frict Loss	Start TW	
0.038039 ft	0.190193 ft	0.000000 ft	94.0303 ft	

Node Records

Node ID: OF-GROUND

Desc:	OVERFLOW TRENCH TO GROUND		
Start El:	94.0000 ft	Max El:	98.5000 ft
Contrib Basin:		Contrib Hyd:	
Hgl Elev:	94.0732 ft		

Node ID: OF-TRENCH

Desc:	OVERFLOW TRENCH			
Start El:	94.0000 ft		Max El:	98.5000 ft
Contrib Basin:	SITE		Contrib Hyd:	
Hgl Elev:	98.4914 ft			
Storage Id:	OF-STORAGE	Discharge Id:	OF-MED SAND	

Node ID: OF-STORAGE

Desc:	OVERFLOW TRENCH STORAGE		
Start El:	94.0000 ft	Max El:	98.5000 ft
Contrib Basin:		Contrib Hyd:	
	Length	Width	Void Ratio
	50.0000 ft	6.0000 ft	32.00
	Bottom area only with infiltration		

Control Structure ID: OF-MED SAND - Infiltration control structure

Descrip:	MEDIUM SAND LAYER			
Start El	Max El	Increment		
94.0000 ft	105.0000 ft	0.10		
Infil:	10.00 in/hr		Multiplier:	1.00

Node ID: OVERFLOW

Start El:	96.7500 ft	Max El:	108.0000 ft
Contrib Basin:		Contrib Hyd:	
Hgl Elev:	98.4979 ft		

Node ID: WQ-GROUND

Desc:	BOTTOM OF WQ TRENCH		
Start El:	94.0000 ft	Max El:	96.5000 ft
Contrib Basin:		Contrib Hyd:	
Hgl Elev:	94.0303 ft		

Node ID: WQ-TRENCH

Desc:	WQ TRENCH			
Start El:	94.0000 ft		Max El:	97.5000 ft
Contrib Basin:	PARKING LOT		Contrib Hyd:	
Hgl Elev:	96.7670 ft			
Storage Id:	WQ-STORAGE	Discharge Id:	COMBO	

Node ID: WQ-STORAGE

Desc:	WATER QUALITY TRENCH			
Start El:	94.0000 ft		Max El:	97.0000 ft
Contrib Basin:			Contrib Hyd:	
	Length	Width	Void Ratio	
	50.0000 ft	3.0000 ft	33.00	
	Bottom area only with infiltration			

Control Structure ID: COMBO - Combination Control Structure

Start El	Max El	Increment	
94.0000 ft	105.0000 ft	0.10	
ID List:	WQ-LOAMY SAND		OVERFLOW
Split:	Split OutHyd into component hydrographs.		

Control Structure ID: WQ-LOAMY SAND - Infiltration control structure

Descrip:	LOAMY SAND LAYER			
Start El	Max El	Increment		
94.0000 ft	105.0000 ft	0.10		
Infil:	1.21 in/hr		Multiplier:	1.00

Control Structure ID: OVERFLOW - Vertical oriented orifice

Start El	Max El	Increment		
96.7500 ft	97.2500 ft	0.10		
Weir Area:	0.1963 sf		Coefficient:	0.6100

Contributing Drainage Areas

Drainage Area: PARKING LOT

Hyd Method:	SBUH Hyd		Loss Method:	SCS CN Number
Peak Factor:	484.00		SCS Abs:	0.20
Storm Dur:	24.00 hrs		Intv:	10.00 min
	Area	CN	TC	
Pervious	0.0000 ac	77.00	0.00 hrs	
Impervious	0.1200 ac	98.00	0.02 hrs	
Total	0.1200 ac			

Supporting Data:

Impervious CN Data:

DRIVEWAY	98.00	0.1200 ac

Impervious TC Data:

Flow type:	Description:	Length:	Slope:	Coeff:	Travel Time
Sheet	ACROSS DRIVEWAY	45.00 ft	1.00%	0.0110	1.13 min

Drainage Area: SITE

Hyd Method:	SBUH Hyd		Loss Method:	SCS CN Number
Peak Factor:	484.00		SCS Abs:	0.20
Storm Dur:	24.00 hrs		Intv:	10.00 min
	Area	CN	TC	
Pervious	0.0000 ac	68.00	0.00 hrs	
Impervious	0.1600 ac	98.00	0.02 hrs	
Total	0.1600 ac			

Supporting Data:

Impervious CN Data:

BUILDING, WALKS & DISPLAY AREAS	98.00	0.1600 ac

Impervious TC Data:

Flow type:	Description:	Length:	Slope:	Coeff:	Travel Time
Sheet	ACROSS BUILDING ROOF	60.00 ft	1.00%	0.0110	1.42 min

Layout Hydrographs

Hydrograph ID: OF-GROUND - 100 yr

Area:	0.2499 ac	Hyd Int:	10.00 min	Base Flow:	
Pending tt translation:	0.00 min				
Peak Flow:	0.0694 cfs	Peak Time:	1.83 hrs	Hyd Vol:	0.0727 acft

Time hr	Flow cfs	Time hr	Flow cfs	Time hr	Flow cfs
0.83	0.0000	8.83	0.0694	16.67	0.0694
1.00	0.0000	9.00	0.0694	16.83	0.0000
1.17	0.0000	9.17	0.0694	17.00	0.0694
1.33	0.0000	9.33	0.0694	17.17	0.0000
1.50	0.0000	9.50	0.0694	17.33	0.0000
1.67	0.0000	9.67	0.0694	17.50	0.0694
1.83	0.0694	9.83	0.0694	17.67	0.0000
2.00	0.0000	10.00	0.0694	17.83	0.0000
2.17	0.0000	10.17	0.0694	18.00	0.0694
2.33	0.0000	10.33	0.0694	18.17	0.0000
2.50	0.0694	10.50	0.0694	18.33	0.0694
2.67	0.0000	10.67	0.0694	18.50	0.0000
2.83	0.0000	10.83	0.0694	18.67	0.0000
3.00	0.0000	11.00	0.0694	18.83	0.0694
3.17	0.0694	11.17	0.0694	19.00	0.0000
3.33	0.0000	11.33	0.0694	19.17	0.0000
3.50	0.0000	11.50	0.0694	19.33	0.0694
3.67	0.0000	11.67	0.0694	19.50	0.0000
3.83	0.0694	11.83	0.0694	19.67	0.0000
4.00	0.0000	12.00	0.0694	19.83	0.0694
4.17	0.0000	12.17	0.0694	20.00	0.0000
4.33	0.0694	12.33	0.0694	20.17	0.0000
4.50	0.0000	12.50	0.0694	20.33	0.0694
4.67	0.0000	12.67	0.0694	20.50	0.0000
4.83	0.0694	12.83	0.0694	20.67	0.0000
5.00	0.0000	13.00	0.0694	20.83	0.0694
5.17	0.0000	13.17	0.0694	21.00	0.0000
5.33	0.0694	13.33	0.0694	21.17	0.0000
5.50	0.0000	13.50	0.0694	21.33	0.0694
5.67	0.0694	13.67	0.0000	21.50	0.0000
5.83	0.0000	13.83	0.0694	21.67	0.0000
6.00	0.0694	14.00	0.0000	21.83	0.0694
6.17	0.0694	14.17	0.0694	22.00	0.0000
6.33	0.0000	14.33	0.0000	22.17	0.0000
6.50	0.0694	14.50	0.0000	22.33	0.0694
6.67	0.0694	14.67	0.0694	22.50	0.0000
6.83	0.0694	14.83	0.0000	22.67	0.0000
7.00	0.0694	15.00	0.0694	22.83	0.0694
7.17	0.0694	15.17	0.0000	23.00	0.0000
7.33	0.0694	15.33	0.0694	23.17	0.0000
7.50	0.0694	15.50	0.0000	23.33	0.0694
7.67	0.0694	15.67	0.0000	23.50	0.0000
7.83	0.0694	15.83	0.0694	23.67	0.0000
8.00	0.0694	16.00	0.0000	23.83	0.0694
8.17	0.0694	16.17	0.0694	24.00	0.0000
8.33	0.0694	16.33	0.0000	24.17	0.0000
8.50	0.0694	16.50	0.0000	24.33	0.0000
8.67	0.0694	16.67	0.0694	24.50	0.0000

Hydrograph ID: OF-GROUND - 6 mo

Area:	0.1600 ac	Hyd Int:	10.00 min	Base Flow:	
Pending tt translation:	0.00 min				
Peak Flow:	0.0694 cfs	Peak Time:	4.50 hrs	Hyd Vol:	0.0182 acft
Time	Flow	Time	Flow	Time	Flow
hr	cfs	hr	cfs	hr	cfs
1.83	0.0000	9.50	0.0000	16.83	0.0000
2.00	0.0000	9.67	0.0000	17.00	0.0000
2.17	0.0000	9.83	0.0000	17.17	0.0694
2.33	0.0000	10.00	0.0000	17.33	0.0000
2.50	0.0000	10.17	0.0694	17.50	0.0000
2.67	0.0000	10.33	0.0000	17.67	0.0000
2.83	0.0000	10.50	0.0000	17.83	0.0000
3.00	0.0000	10.67	0.0000	18.00	0.0000
3.17	0.0000	10.83	0.0000	18.17	0.0000
3.33	0.0000	11.00	0.0000	18.33	0.0000
3.50	0.0000	11.17	0.0694	18.50	0.0687
3.67	0.0000	11.33	0.0000	18.67	0.0000
3.83	0.0000	11.50	0.0000	18.83	0.0000
4.00	0.0000	11.67	0.0000	19.00	0.0000
4.17	0.0000	11.83	0.0000	19.17	0.0000
4.33	0.0000	12.00	0.0000	19.33	0.0000
4.50	0.0694	12.17	0.0694	19.50	0.0000
4.67	0.0000	12.33	0.0000	19.67	0.0000
4.83	0.0000	12.50	0.0000	19.83	0.0000
5.00	0.0000	12.67	0.0000	20.00	0.0694
5.17	0.0000	12.83	0.0000	20.17	0.0000
5.33	0.0000	13.00	0.0000	20.33	0.0000
5.50	0.0000	13.17	0.0000	20.50	0.0000
5.67	0.0000	13.33	0.0694	20.67	0.0000
5.83	0.0694	13.50	0.0000	20.83	0.0000
6.00	0.0000	13.67	0.0000	21.00	0.0000
6.17	0.0000	13.83	0.0000	21.17	0.0000
6.33	0.0000	14.00	0.0000	21.33	0.0000
6.50	0.0000	14.17	0.0000	21.50	0.0693
6.67	0.0000	14.33	0.0000	21.67	0.0000
6.83	0.0694	14.50	0.0694	21.83	0.0000
7.00	0.0000	14.67	0.0000	22.00	0.0000
7.17	0.0000	14.83	0.0000	22.17	0.0000
7.33	0.0000	15.00	0.0000	22.33	0.0000
7.50	0.0694	15.17	0.0000	22.50	0.0000
7.67	0.0000	15.33	0.0000	22.67	0.0000
7.83	0.0694	15.50	0.0000	22.83	0.0000
8.00	0.0000	15.67	0.0000	23.00	0.0000
8.17	0.0694	15.83	0.0694	23.17	0.0694
8.33	0.0000	16.00	0.0000	23.33	0.0000
8.50	0.0000	16.17	0.0000	23.50	0.0000
8.67	0.0694	16.33	0.0000	23.67	0.0000
8.83	0.0000	16.50	0.0000	23.83	0.0000
9.00	0.0000	16.67	0.0000	24.00	0.0000
9.17	0.0000	16.83	0.0000	24.17	0.0000
9.33	0.0694	17.00	0.0000	24.33	0.0000

Hydrograph ID: WQ-GROUND - 6 mo

Area:	0.1200 ac	Hyd Int:	10.00 min	Base Flow:	
Pending tt translation:	0.00 min				
Peak Flow:	0.0042 cfs	Peak Time:	2.33 hrs	Hyd Vol:	0.0072 acft

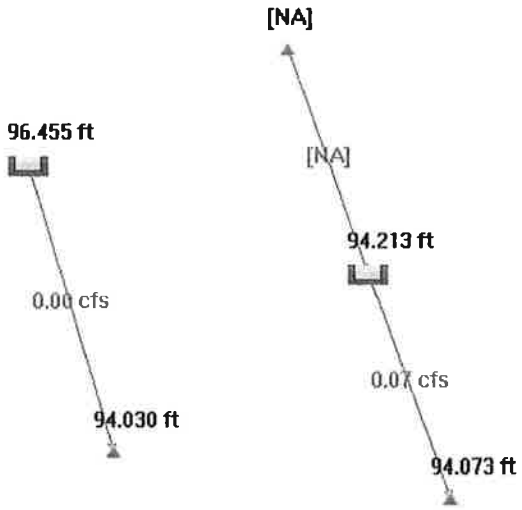
Time	Flow	Time	Flow	Time	Flow
hr	cfs	hr	cfs	hr	cfs
1.83	0.0000	9.50	0.0042	16.83	0.0042
2.00	0.0000	9.67	0.0042	17.00	0.0042
2.17	0.0000	9.83	0.0042	17.17	0.0042
2.33	0.0042	10.00	0.0042	17.33	0.0042
2.50	0.0000	10.17	0.0042	17.50	0.0042
2.67	0.0000	10.33	0.0042	17.67	0.0042
2.83	0.0042	10.50	0.0042	17.83	0.0042
3.00	0.0000	10.67	0.0042	18.00	0.0042
3.17	0.0033	10.83	0.0042	18.17	0.0042
3.33	0.0000	11.00	0.0042	18.33	0.0042
3.50	0.0041	11.17	0.0042	18.50	0.0042
3.67	0.0000	11.33	0.0042	18.67	0.0042
3.83	0.0042	11.50	0.0042	18.83	0.0042
4.00	0.0000	11.67	0.0042	19.00	0.0042
4.17	0.0042	11.83	0.0042	19.17	0.0042
4.33	0.0036	12.00	0.0042	19.33	0.0042
4.50	0.0000	12.17	0.0042	19.50	0.0042
4.67	0.0042	12.33	0.0042	19.67	0.0042
4.83	0.0042	12.50	0.0042	19.83	0.0042
5.00	0.0042	12.67	0.0042	20.00	0.0042
5.17	0.0042	12.83	0.0042	20.17	0.0042
5.33	0.0042	13.00	0.0042	20.33	0.0042
5.50	0.0042	13.17	0.0042	20.50	0.0042
5.67	0.0042	13.33	0.0042	20.67	0.0042
5.83	0.0042	13.50	0.0042	20.83	0.0042
6.00	0.0042	13.67	0.0042	21.00	0.0042
6.17	0.0042	13.83	0.0042	21.17	0.0042
6.33	0.0042	14.00	0.0042	21.33	0.0042
6.50	0.0042	14.17	0.0042	21.50	0.0042
6.67	0.0042	14.33	0.0042	21.67	0.0042
6.83	0.0042	14.50	0.0042	21.83	0.0042
7.00	0.0042	14.67	0.0042	22.00	0.0042
7.17	0.0042	14.83	0.0042	22.17	0.0042
7.33	0.0042	15.00	0.0042	22.33	0.0042
7.50	0.0042	15.17	0.0042	22.50	0.0042
7.67	0.0042	15.33	0.0042	22.67	0.0042
7.83	0.0042	15.50	0.0042	22.83	0.0042
8.00	0.0042	15.67	0.0042	23.00	0.0042
8.17	0.0042	15.83	0.0042	23.17	0.0042
8.33	0.0042	16.00	0.0042	23.33	0.0042
8.50	0.0042	16.17	0.0042	23.50	0.0042
8.67	0.0042	16.33	0.0042	23.67	0.0042
8.83	0.0042	16.50	0.0042	23.83	0.0042
9.00	0.0042	16.67	0.0042	24.00	0.0042
9.17	0.0042	16.83	0.0042	24.17	0.0042
9.33	0.0042	17.00	0.0042	24.33	0.0000

Hydrograph ID: WQ-GROUND - 100 yr

Area:	0.0301 ac	Hyd Int:	10.00 min	Base Flow:	
Pending tt translation:	0.00 min				
Peak Flow:	0.0042 cfs	Peak Time:	1.00 hrs	Hyd Vol:	0.0081 acft

Time	Flow	Time	Flow	Time	Flow
hr	cfs	hr	cfs	hr	cfs
0.83	0.0000	8.83	0.0042	16.50	0.0042
1.00	0.0042	9.00	0.0042	16.67	0.0042
1.17	0.0042	9.17	0.0042	16.83	0.0042
1.33	0.0042	9.33	0.0042	17.00	0.0042
1.50	0.0042	9.50	0.0042	17.17	0.0042
1.67	0.0042	9.67	0.0042	17.33	0.0042
1.83	0.0042	9.83	0.0042	17.50	0.0042
2.00	0.0042	10.00	0.0042	17.67	0.0042
2.17	0.0042	10.17	0.0042	17.83	0.0042
2.33	0.0042	10.33	0.0042	18.00	0.0042
2.50	0.0042	10.50	0.0042	18.17	0.0042
2.67	0.0042	10.67	0.0042	18.33	0.0042
2.83	0.0042	10.83	0.0042	18.50	0.0042
3.00	0.0042	11.00	0.0042	18.67	0.0042
3.17	0.0042	11.17	0.0042	18.83	0.0042
3.33	0.0042	11.33	0.0042	19.00	0.0042
3.50	0.0042	11.50	0.0042	19.17	0.0042
3.67	0.0042	11.67	0.0042	19.33	0.0042
3.83	0.0042	11.83	0.0042	19.50	0.0042
4.00	0.0042	12.00	0.0042	19.67	0.0042
4.17	0.0042	12.17	0.0042	19.83	0.0042
4.33	0.0042	12.33	0.0042	20.00	0.0042
4.50	0.0042	12.50	0.0042	20.17	0.0042
4.67	0.0042	12.67	0.0042	20.33	0.0042
4.83	0.0042	12.83	0.0042	20.50	0.0042
5.00	0.0042	13.00	0.0042	20.67	0.0042
5.17	0.0042	13.17	0.0042	20.83	0.0042
5.33	0.0042	13.33	0.0042	21.00	0.0042
5.50	0.0042	13.50	0.0042	21.17	0.0042
5.67	0.0042	13.67	0.0042	21.33	0.0042
5.83	0.0042	13.83	0.0042	21.50	0.0042
6.00	0.0042	14.00	0.0042	21.67	0.0042
6.17	0.0042	14.17	0.0042	21.83	0.0042
6.33	0.0042	14.33	0.0042	22.00	0.0042
6.50	0.0042	14.50	0.0042	22.17	0.0042
6.67	0.0042	14.67	0.0042	22.33	0.0042
6.83	0.0042	14.83	0.0042	22.50	0.0042
7.00	0.0042	15.00	0.0042	22.67	0.0042
7.17	0.0042	15.17	0.0042	22.83	0.0042
7.33	0.0042	15.33	0.0042	23.00	0.0042
7.50	0.0042	15.50	0.0042	23.17	0.0042
7.67	0.0042	15.67	0.0042	23.33	0.0042
7.83	0.0042	15.83	0.0042	23.50	0.0042
8.00	0.0042	16.00	0.0042	23.67	0.0042
8.17	0.0042	16.17	0.0042	23.83	0.0042
8.33	0.0042	16.33	0.0042	24.00	0.0042
8.50	0.0042	16.50	0.0042	24.17	0.0042
8.67	0.0042	16.67	0.0042	24.33	0.0000

6-MONTH CALCULATIONS

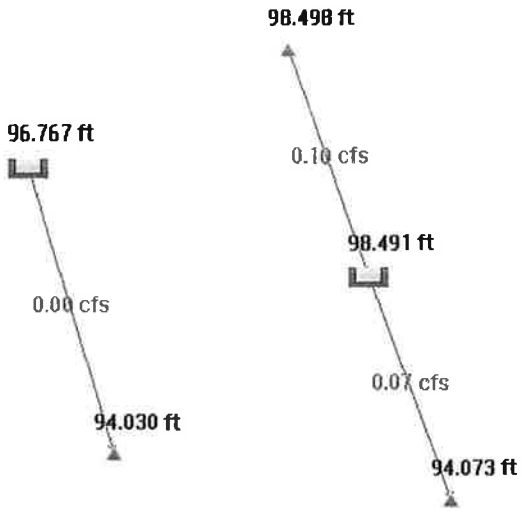


ROUTEHYD [] THRU [PARKING LOT] USING TYPE1A AND [6 mo] NOTZERO RELATIVE

Reach	Area	Flow	Full Q	% Full	nDepth	Size	nVel	fVel	CBasin / Hyd
----	ac	cfs	cfs	ratio	ft	----	ft/s	ft/s	----------
Routing spit hyd [6 mo-OVERFLOW-OutHyd] through OF TRENCH									
OF TRENCH	0.0000	0.0000	6.0950	0.00	0.0000	6" Diam	11.7269	31.0416	
Routing thru RLPool Node OF-TRENCH; 6 mo event									
6 mo	Match Q: 0.0000 cfs Peak Out Q: 0.0694 cfs - Peak Stg: 94.21 ft - Active Vol: 20.49 cf								
OF-TR-GRND	0.1600	0.0694	1560.32	0.00	0.0227	48" Diam	7.6247	124.1667	SITE
Routing thru RLPool Node WQ-TRENCH; 6 mo event									
6 mo	Match Q: 0.0000 cfs Peak Out Q: 0.0042 cfs - Peak Stg: 96.45 ft - Active Vol: 121.51 cf								
Routing spit hyd [6 mo-WQ-LOAMY SAND-OutHyd] through WQ-TR-GRND									
WQ-TR-GRND	0.1200	0.0042	1560.32	0.00	0.0059	48" Diam	3.4998	124.1667	PARKING LOT

-----	----	Rch	App	Bend	Junct	HW	Max El/
----	----	Loss	Head	Loss	Loss	Elev	Rim El
From Node	To Node	ft	ft	ft	ft	ft	ft
	OF-GROUND					94.0732	
OF-TRENCH	OF-GROUND	92.1003	--na--	--na--	--na--	94.2134	98.5000
OVERFLOW	OF-TRENCH	0.0000	--na--	--na--	--na--	0.0000	108.0000
	WQ-TRENCH	WQ-GROUND	92.0325	--na--	--na--	--na--	96.4548

100-YEAR CALCULATIONS



ROUTEHYD [] THRU [PARKING LOT] USING TYPE1A AND [100 yr] NOTZERO RELATIVE

Reach	Area	Flow	Full Q	% Full	nDepth	Size	nVel	fVel	CBasin / Hyd
----	ac	cfs	cfs	ratio	ft	---	ft/s	ft/s	----------
Routing spit hyd [100 yr-OVERFLOW-OutHyd] through OF TRENCH									
OF TRENCH	0.0899	0.1040	6.0950	0.02	0.0454	6" Diam	11.7269	31.0416	
Routing thru RLPool Node OF-TRENCH; 100 yr event									
100 yr	Match Q: 0.0000 cfs Peak Out Q: 0.0694 cfs - Peak Stg: 98.49 ft - Active Vol: 431.17 cf								
OF-TR-GRND	0.2499	0.0694	1560.32	0.00	0.0227	48" Diam	7.6247	124.1667	SITE
Routing thru RLPool Node WQ-TRENCH; 100 yr event									
100 yr	Match Q: 0.0000 cfs Peak Out Q: 0.1082 cfs - Peak Stg: 96.77 ft - Active Vol: 136.97 cf								
Routing spit hyd [100 yr-WQ-LOAMY SAND-OutHyd] through WQ-TR-GRND									
WQ-TR-GRND	0.0301	0.0042	1560.32	0.00	0.0059	48" Diam	3.4998	124.1667	PARKING LOT

-----	----	Rch	App	Bend	Junct	HW	Max El/
-----	----	Loss	Head	Loss	Loss	Elev	Rim El
From Node	To Node	ft	ft	ft	ft	ft	ft
	OF-GROUND					94.0732	
OF-TRENCH	OF-GROUND	92.1003	--na--	--na--	--na--	98.4914	98.5000
OVERFLOW	OF-TRENCH	98.4979	--na--	--na--	--na--	98.4979	108.0000
WQ-TRENCH	WQ-GROUND	92.0325	--na--	--na--	--na--	96.7670	97.5000

Infiltration Trench Inspection Schedule:

The drainage system should be monitored periodically. For the first year after completion of construction, the system should be monitored after every large storm event (> 1-in in 24-hrs), and, during the period Oct. 1- Mar. 31 inspections should be conducted monthly. From April 1-Sept. 30, the facility should be monitored on a quarterly basis. Once the performance characteristics of the facility have been verified, the monitoring schedule can be reduced to an annual basis unless the performance data indicate that a more frequent schedule is required.

Sediment Removal:

Sediment buildup in the top foot of stone aggregate or the surface inlet should be monitored on the same schedule as the system. Sediment deposits shall not be allowed to build up to the point where it will reduce the rate of infiltration into the trench.

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
INFILTRATOIN TRENCH	SEDIMENT	A PERCOLATION TEST PIT OR TEST OF FACILITY INDICATES FACILITY IS ONLY WORKING AT 90% OF ITS DESIGNED CAPABILITIES. IF TWO INCHES OR MORE SEDIMENT IS PRESENT, REMOVE.	SEDIMENT IS REMOVED AND/OR FACILITY IS CLEANED SO THAT INFILTRATION SYSTEM WORKS ACCORDING TO DESIGN.
CATCH BASIN	COVER NOT IN PLACE	COVER IS MISSING OR ONLY PARTIALLY IN PLACE. ANY OPEN MANHOLE REQUIRED MAINTENANCE.	MANHOLE IS CLOSED.
	TRASH & DEBRIS (INCLUDES SEDIMENT)	TRASH OR DEBRIS OF MORE THAN 1/2 CUBIC FOOT WHICH IS LOCATED IMMEDIATELY IN FRONT OF THE CATCH BASIN OPENING OR IS BLOCKING CAPACITY OF BASIN BY MORE THAN 10%.	NO TRASH OR DEBRIS LOCATED IMMEDIATELY IN FRONT OF CATCH BASIN OPENING.
		TRASH OR DEBRIS (IN THE BASIN) THAT EXCEEDS 1/3 THE DEPTH FROM THE BOTTOM OF BASIN TO INVERT T OF THE LOWEST PIPE INTO OR OUT OF THE BASIN.	NO TRASH OR DEBRIS IN THE CATCH BASIN.
		TRASH OR DEBRIS IN ANY INLET OR OUTLET PIPE BLOCKING MORE THAN 1/3 OF ITS HEIGHT.	INLET AND OUTLET PIPES FREE OF TRASH OR DEBRIS.
		DEAD ANIMALS OR VEGETATION THAT COULD GENERATE ODORS THAT WOULD CAUSE COMPLAINTS OR DANGEROUS GASES (E.G., METHANE).	NO DEAD ANIMALS OR VEGETATION PRESENT WITHIN THE CATCH BASIN.
		DEPOSITS OF GARBAGE EXCEEDING 1 CUBIC	NO CONDITION

		FOOT IN VOLUME.	PRESENT WHICH WOULD ATTRACT OR SUPPORT THE BREEDING OF INSECTS OR RODENTS.
	STRUCTURAL DAMAGE TO FRAME AND/OR TOP SLAB	CORNER OF FRAME EXTENDS MORE THAN 3/4 INCH PAST CURB FACE INTO THE STREET (IF APPLICABLE).	FRAME IS EVEN WITH CURB.
		TOP SLAB HAS HOLES LARGER THAN 2 SQUARE INCHES OR CRACKS WIDER THAN 1/4 INCH (INTENT IS TO MAKE SURE ALL MATERIAL IS RUNNING INTO THE BASIN).	TOP SLAB IS FREE OF HOLES AND CRACKS.
		FRAME NOT SITTING FLUSH ON TOP SLAB, I. E., SEPARATION OF MORE THAN 3/4 INCH OF THE FRAME FROM THE TOP SLAB.	FRAME IS SITTING FLUSH ON TOP SLAB.
	CRACKS IN BASIN WALLS/BOTTOM	CRACKS WIDER THAN 1/2 INCH AND LONGER THAN 3 FEET, ANY EVIDENCE OF SOIL PARTICLES ENTERING CATCH BASIN THROUGH CRACKS, OR MAINTENANCE PERSON JUDGES THAT STRUCTURE IS UNSOUND.	BASIN REPLACED OR REPAIRED TO DESIGN STANDARDS.
		CRACKS WIDER THAN 1/2 INCH AND LONGER THAN 1 FOOT AT THE JOINT OF ANY INLET/OUTLET PIPE OR ANY EVIDENCE OF SOIL PARTICLES ENTERING CATCH BASIN THROUGH CRACKS.	NO CRACKS MORE THAN 1/4 INCH WIDE AT THE JOINT OF INLET/OUTLET PIPE.
	SETTLEMENT/ MISALIGNMENT	BASIN HAS SETTLED MORE THAN 1 INCH OR HAS ROTATED MORE THAN 2 INCHES OUT OF ALIGNMENT.	BASIN REPLACED OR REPAIRED TO DESIGN STANDARDS.
	FIRE HAZARD	PRESENCE OF CHEMICALS SUCH AS NATURAL GAS. OIL, GASOLINE.	NO FLAMMABLE CHEMICALS PRESENT.
	VEGETATION	VEGETATION GROWING ACROSS AND BLOCKING MORE THAN 10% OF THE BASIN OPENING.	NO VEGETATION BLOCKING OPENING TO BASIN.
		VEGETATION GROWING IN INLET/OUTLET PIPE JOINTS THAT IS MORE THAN SIX INCHES TALL AND LESS THAN SIX INCHES APART.	NO VEGETATION OR ROOT GROWTH PRESENT.
	POLLUTION	NONFLAMMABLE CHEMICALS OF MORE THAN 1/2 CUBIC FOOT PER THREE FEET OF BASIN LENGTH.	NO POLLUTION PRESENT OTHER THAN SURFACE FILM.
CATCH BASIN COVER	COVER NOT IN PLACE	COVER IS MISSING OR ONLY PARTIALLY IN PLACE. ANY OPEN CATCH BASIN REQUIRED MAINTENANCE.	CATCH BASIN COVER IS CLOSED.
	LOCKING MECHANISM NOT WORKING	MECHANISM CANNOT BE OPENED BY ONE MAINTENANCE PERSON WITH PROPER TOOLS. BOLTS INTO FRAME HAVE LESS THAN 1/2 INCH OF THREAD.	MECHANISM OPENS WITH PROPER TOOLS.
	COVER DIFFICULT TO REMOVE	ONE MAINTENANCE PERSON CANNOT REMOVE LID AFTER APPLYING 80 LBS. OF LIFT; INTENT IS KEEP COVER FROM SEALING OFF ACCESS TO	COVER CAN BE REMOVED BY ONE MAINTENANCE PERSON.

		MAINTENANCE.	
PIPES	SEDIMENT & DEBRIS	ACCUMULATED SEDIMENT THAT EXCEEDS 20% OF THE DIAMETER OF THE PIPE.	PIPE CLEANED OF ALL SEDIMENT AND DEBRIS.
	VEGETATION	VEGETATION THAT REDUCES FREE MOVEMENT OF WATER THROUGH PIPES.	ALL VEGETATION REMOVED SO WATER FLOWS FREELY THROUGH PIPES.
	DAMAGED	PROTECTIVE COATING IS DAMAGED; RUST IS CAUSING MORE THAN 50% DETERIORATION TO ANY PART OF PIPE.	PIPE REPAIRED OR REPLACED.
		ANY DENT THAT DECREASES THE CROSS SECTION AREA OF PIPE BY MORE THAN 20%.	PIPE REPAIRED OR REPLACED.
	TRASH & DEBRIS	TRASH AND DEBRIS EXCEEDS 1 CUBIC FOOT PER 1,000 SQUARE FEET OF DITCH AND SLOPES.	TRASH AND DEBRIS CLEARED FROM DITCHES.