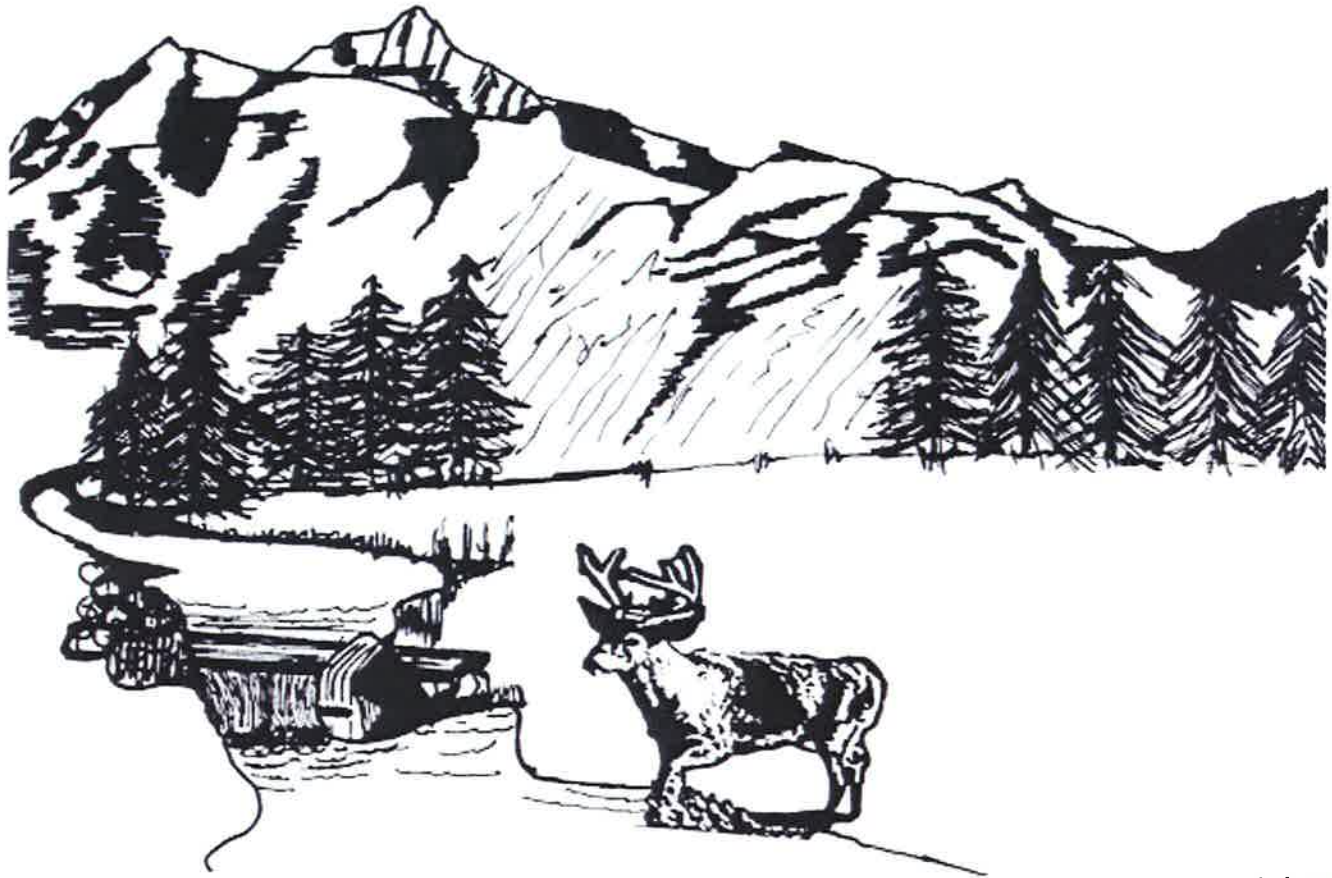

Conceptual Drainage Report for:

5-Lot Short Plat for Grandview North, Inc. — File Number: Z-07-

March 30, 2007



RECEIVED
APR 16 2007
Utilities Div.



EXPIRES: 06/22/07

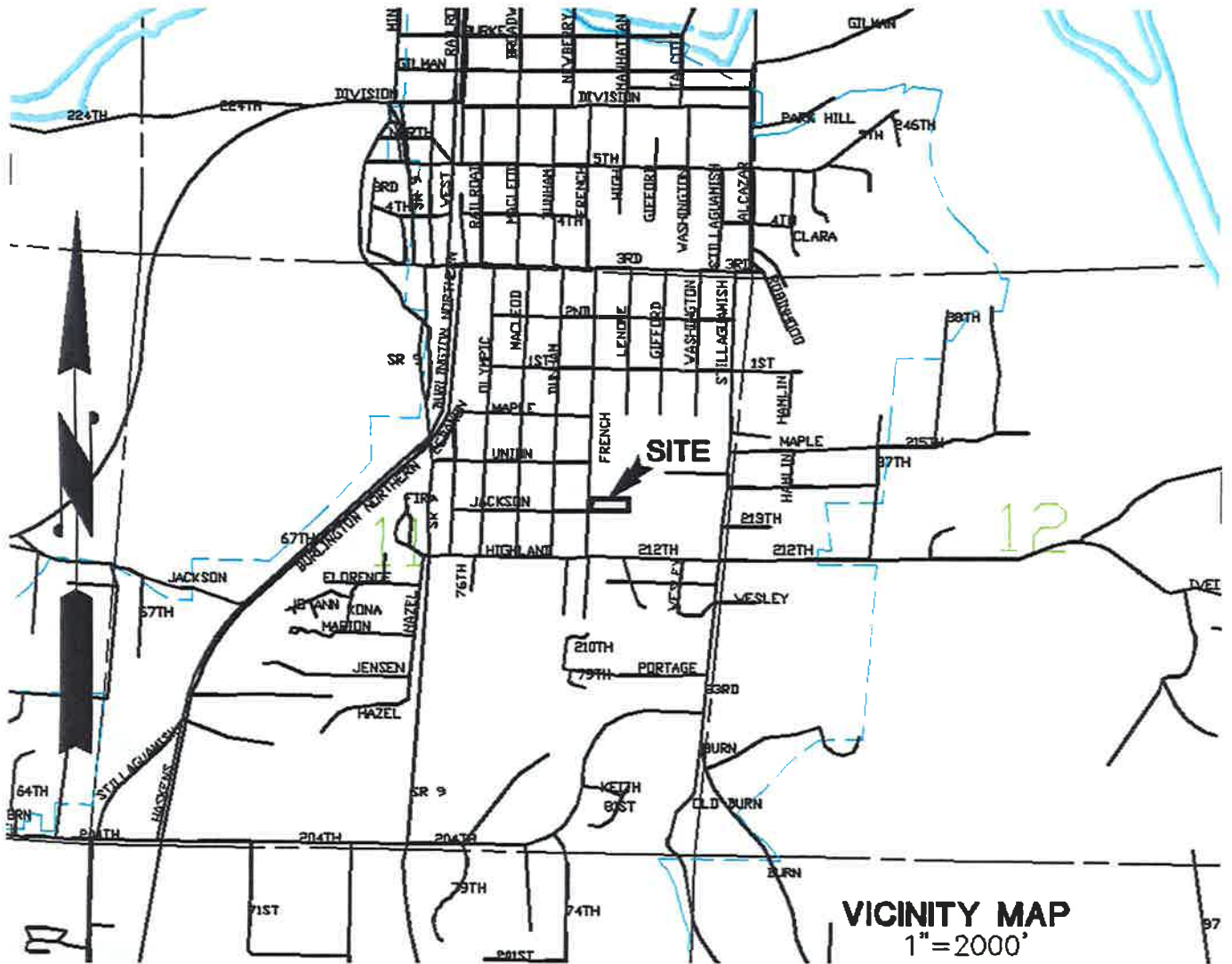
Prepared by:
Cascade Surveying & Engineering, Inc.

Job #17485

Project Summary

PROPERTY DESCRIPTION

The site of proposed development is located in the NE ¼ of Section 11, Township 31 N, Range 5 E, W.M. The property is 0.81-acre in size and is located at the NE corner of the intersection of Jackson Street and French Avenue. The project site is identified by tax account number 005383-000-002-00. (See vicinity map below).

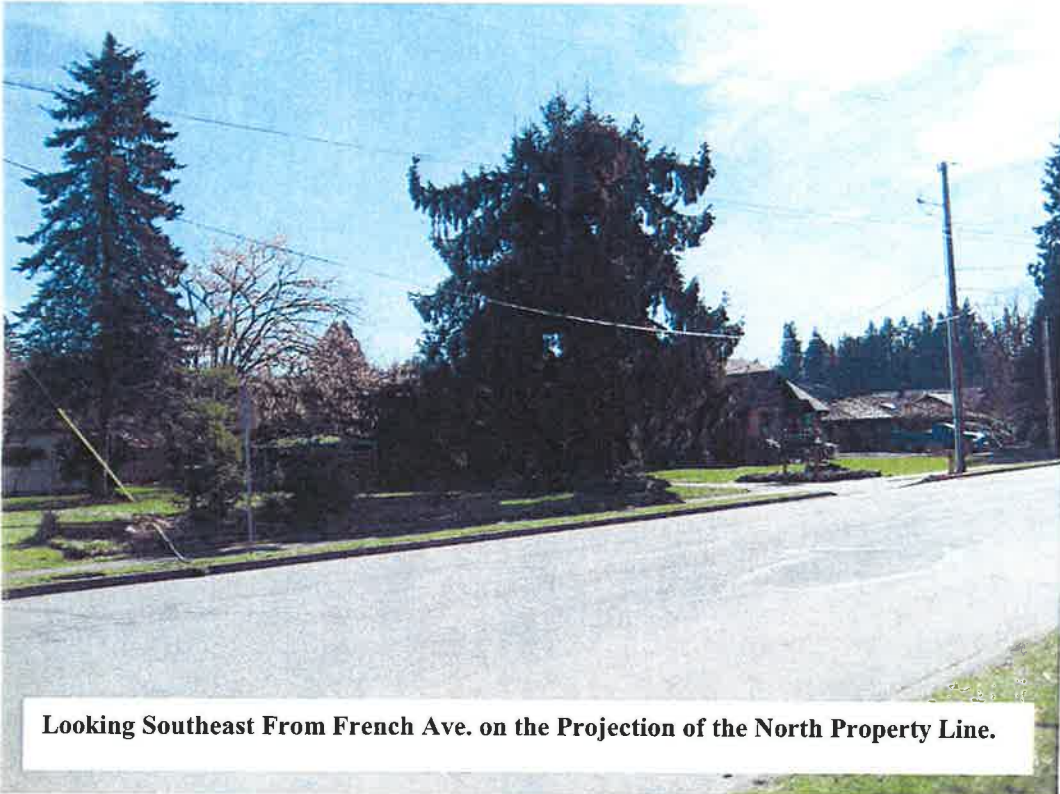
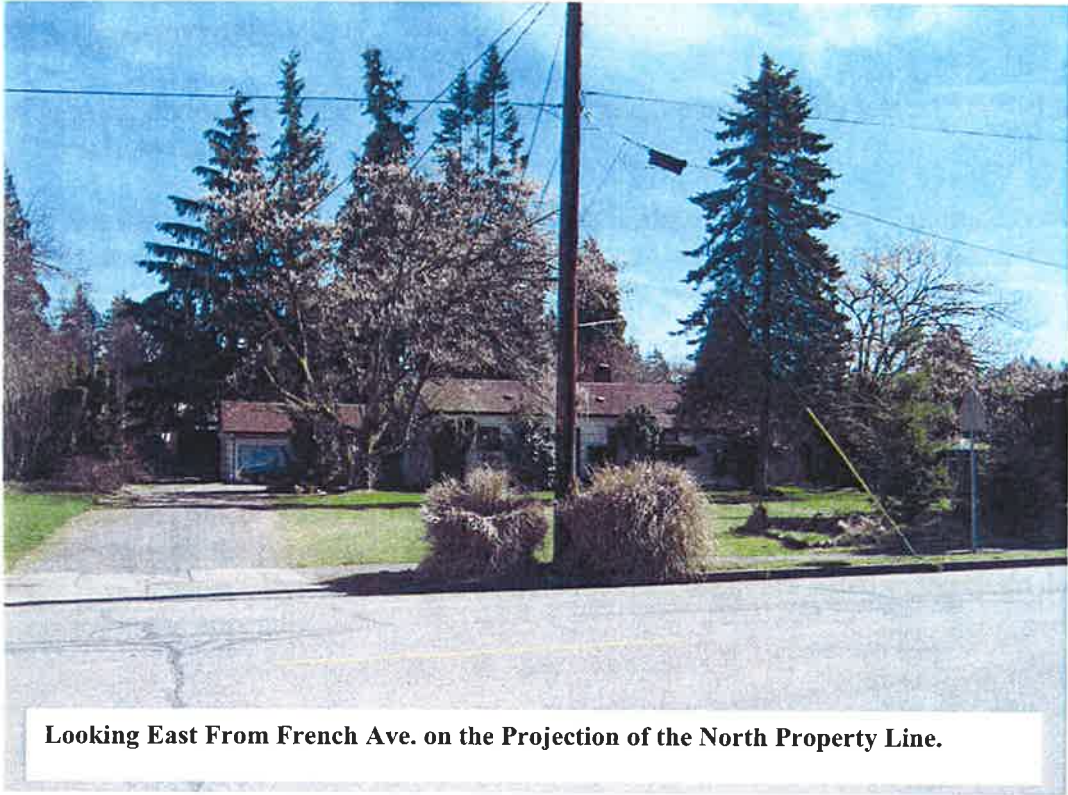


EXISTING CONDITIONS

The subject property has a 990-sf house, 800-sf apartment, and a 900-sf barn. Only the barn will be removed. This parcel fronts and currently takes access from French Avenue. The area of development is vegetated with lawn and some trees. Site topography is generally flat, slightly falling off to the west at an overall grade of 1.5%. A soils investigation performed on October 10, 2006 revealed an upper soil layer of loamy sand, which is intermittently covered with a sandy loam layer, and layers of medium sand downward. This soil information is more specifically described below. See Figure 1, page 13 for soil log locations.

SOIL LOG 1.	0-12"	Dark Brown sandy loam
	12-28"	Tan loamy sand
	28-72"	Tan gravelly loamy sand
	72-90"	Tan/Gray tight gravelly medium sand
	90-144+"	Gray gravelly medium sand
		Roots at 72" No Water No Hard Pan
SOIL LOG 2.	0-48"	Tan loamy sand
	48-72"	Tan gravelly medium sand
	72-144+"	Gray gravelly medium sand
		Roots at 84" No Water No Hard Pan
SOIL LOG 3.	0-12"	Brown sandy loam
	12-30"	Tan loamy sand
	30-80"	Tan gray medium sand
	80-145+"	Gray gravelly medium sand
		Roots at 72" No Water No Hard Pan
SOIL LOG 4.	0-12"	Brown loamy sand
	12-48"	Tan loamy sand
	48-144+"	Gray gravelly medium sand
		Roots at 67" No Water No Hard Pan

No drainage facilities and or conveyance systems are located onsite. Site drainage consists of surface infiltration to groundwater. The photographs on the following page show the project site from French Avenue.



DEVELOPED CONDITIONS

The proposal is to subdivide the parcel into 2 duplex lots and 3 single family lots which will take their access off of French Avenue.

Lot drainage will utilize infiltration to groundwater. Each infiltration system will include both a water quality trench, lined with a minimum 18 inches of loamy sand and sized to handle a 6-month storm event, and an unlined infiltration trench sized to handle a 100-year storm event.

The infiltration system for Lot 2 and Lot 3 is sized to handle the entire area of the lots, in addition to the 25 ft. wide easement through Lot 1 and the gravel drive which extends over the parcel's north property line. The infiltration system for Lot 1 is located in Tract 999, and is sized to handle runoff from the remainder of the area of Lot 1 and the west 180 ft. of Tract 999. Runoff from the remainder of Tract 999, as well as the entire area of Lot 3 and Lot 4 will flow to a separate infiltration system located in Tract 999. For design purposes, the percentage impervious areas for Lot 1, 2, 3, 4, and 5 were 65%, 56%, 37%, 47%, and 59%, respectively. The measurements for each basin are listed in the basin definitions, which are included in the appendix.

Risk Assessment Analysis and Erosion Control

Slope: Site slopes are 0-1.50 %, risk is low

Critical Areas: None

Soils: Soils consist of sandy loam and/or loamy sand at the surface and gravelly medium sands below.

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. construction plan)

After Construction: Seeding and planting of exposed soils

Nearest Downstream body of water other than road ditches: Unnamed tributary to Portage Creek (1/4-mile south)

Nearest fish bearing water: Unnamed tributary to Portage Creek (1/4-mile south)

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

1. Flat site with high infiltrating soils.

Erosion Sedimentation Control Notes

Although the risk of erosion is low, erosion control should be taken seriously. The following list is an example of typical erosion control notes.

- (a) Erosion On-and Off-Site. During and after construction, all persons engaging in developing activities shall prevent or minimize erosion and sedimentation on-site and shall protect properties and water courses downstream from the site from erosion due to increases, in the volume, velocity and peak flow rate of storm water runoff from the site:
- (b) Transport of Sediment onto Adjacent Properties. The applicant shall prevent the transport of sediment onto adjacent properties.
- (c) Transport of Sediment onto Paved Surfaces. The applicant shall apply BMP's from the City of Arlington Construction Standards or as approved by the City, to prevent or minimize the transport of sediment onto paved surfaces during construction. If sediment is transported onto a paved surface the contractor is to clean the paved surface at the end of each day.
- (d) Stabilizing Exposed soil. The applicant shall stabilize denuded areas and soil stockpiles as follows:
 - (i) From October 1 to April 30, no soil may remain exposed for more than 2 days. From May 1 to September 30, no soil may remain exposed for more than 7 days. On portions of the site where active grading is in progress, the City may extend the deadline for soil stabilization upon determining that the likelihood of erosion impacts is low. Reasons for this determination may include, but are not limited to the following, the type and amount of soil exposed, site topography, or the potential for discharge to critical areas and lakes. Upon finding a risk of erosion, the applicant shall immediately apply soil stabilization, regardless of any previously established deadline, and the City may require immediate stabilization at any time for this purpose. The applicant shall keep materials, equipment, and other resources on site at all times, in adequate quantities to immediately stabilize all soil.
 - (ii) Denuded areas shall be covered with mulch, sod, plastic, or other BMP's described in City of Arlington Construction Standard G-4 or as approved by the City.
 - (iii) Soil stockpiles shall be stabilized or protected with sediment retention BMPs within 24 hours of formation to prevent soil loss; and
 - (iv) Grading and construction shall be timed and conducted in stages to minimize soil exposure.
- (e) Removal of Temporary Erosion and Sedimentation Control Measures. The applicant may remove all temporary erosion and sedimentation control BMPs within 30 days after final site stabilization or after they are no longer necessary.
- (f) Permanent Vegetative Cover. Before construction acceptance by the City, the applicant shall establish a permanent vegetative ground cover to control soil erosion and to survive severe weather conditions on all areas of land disturbance not otherwise permanently stabilized by impervious surfaces or other means.
- (g) Maintenance and Repair of Erosion and Sedimentation Control Measures. The applicant shall maintain and repair as necessary all temporary and permanent erosion and sedimentation control BMPs to assure their continued performance through construction acceptance and the potential for on site erosion has passed.
- (h) Field Marking. Before performing any grading or clearing, the applicant shall mark, in the field, the limits of all proposed clearing and grading, critical areas and their buffers, trees to be retained, and drainage courses.

- (i) Protecting Storm Sewer Inlets. The applicant shall protect storm sewer inlets receiving storm water runoff during construction so that water will not enter the inlet without first being filtered or otherwise treated to minimize the amount of sediment entering the inlet.
- (j) Sediment Retention. The applicant shall route storm water runoff from disturbed areas of the site through sediment ponds, traps or other sediment retention BMPs prior to discharge from the site. The BMPs shall be installed as the first step in grading, and shall be in operation before any other site disturbance occurs. The applicant shall stabilize temporary earth structures within the time period specified in subparagraph (d)(i). If site conditions warrant, the City may require additional sediment controls, including but not limited to, preserving a vegetated buffer strip around the lower perimeter of the site.
- (k) Temporary Sediment Ponds and Traps shall be constructed per City of Arlington Construction Standard (G-5). Periodic removal of trapped sediments shall be performed as necessary, however trapped sediment may also be permanently stabilized onsite.
- (l) The applicant shall design and construct temporary and permanent BMPs adequate to prevent erosion of outlets, adjacent stream banks, slopes and downstream reaches.
- (m) The installation of underground utility lines shall be subject to the following additional requirements.
 - (i) Between October 1 and March 31, no more than 500 feet of continuous trench may remain open at one time unless check dams to reduce flow velocities and prevent erosion are installed.
 - (ii) Excavated material shall be placed on the uphill side of trenches, unless inconsistent with safety or site constraints.
- (n) Water from a de-watering device shall discharge into a sediment-retention BMP.

The applicant shall implement fully the erosion and sedimentation control plan at each stage of site development.

Upstream & Downstream Analysis

UPSTREAM ANALYSIS

Because the surrounding area is relatively flat and has good infiltrating soils, no stormwater runoff drains onto the project site from the upstream.

DOWNSTREAM ANALYSIS

Since infiltration is being proposed for this site there is no downstream receiving water. If any system fails, excess water will either infiltrate into the surrounding soil, or flow into an existing storm water collection system within the right-of-way.

Stormwater Quantity Control & Water Quality B.M.P.'s

STORMWATER QUANTITY CONTROL BMP

The stormwater quantity control BMP specified for this site is infiltration to groundwater. Each infiltration system will include both a water quality trench, lined with a minimum 18 inches of loamy sand and sized to handle a 6-month storm event, and an unlined infiltration trench sized to handle a 100-year storm event. Runoff from rooftops in Lot 3 and 4 is considered clean water and will be routed directly to the unlined infiltration trench east of CB #5. The other 2 infiltration systems, however, are sized to handle all runoff (6-month) through the water quality trench.

The infiltration system for Lot 2 and Lot 3 is sized to handle the entire area of the lots, in addition to the 25 ft. wide easement through Lot 1 and the gravel drive which extends over the parcel's north property line. The infiltration system for Lot 1 is located in Tract 999, and is sized to handle runoff from the remainder of the area of Lot 1 and the west 180 ft. of Tract 999. Runoff from the remainder of Tract 999, as well as the entire area of Lot 3 and Lot 4 will flow to a separate infiltration system located in Tract 999. For design purposes, the percentage impervious areas for Lot 1, 2, 3, 4, and 5 were 65%, 56%, 37%, 47%, and 59%, respectively. The measurements for each basin are listed in the basin definitions, which are included in the appendix.

Each lined (water quality) trench will be 5-ft wide by 2.5-ft deep with StormTech's SC-310 Chambers, or an approved equivalent. Water quality trenches to the west of CB #2, CB #4, and CB #5 are 36 ft., 33 ft., and 28 ft., respectively. The trenches are sized to retain the 6-month (water quality) storm event. The trenches will be backfilled with drain rock. A void space of 40% was calculated for the trench designs assuming 30% voids for drain rock and 100% for the Chambers. The trench bottoms range from approximately 164.0 ft. to 167.3 ft. in elevation, as shown in Figure 2 on page 14.

Each infiltration trench will be 5-ft wide by 2.5-ft. deep with StormTech's SC-310 Chambers, or an approved equivalent. Infiltration trenches to the east of CB #2, CB #4, and CB #5 are 48 ft., 38 ft., and 74 ft., respectively. The trenches are sized to retain the 100-yr storm event. The trenches will be backfilled with drain rock. A void space of 40% was calculated for the trench designs assuming 30% voids for drain rock and 100% for the Chambers. The trenches must be installed within the gravelly medium sand soil layer. The trench bottoms range from approximately 165.5 ft. to 168.8 ft. in elevation, as shown in Figure 2 on page 14.

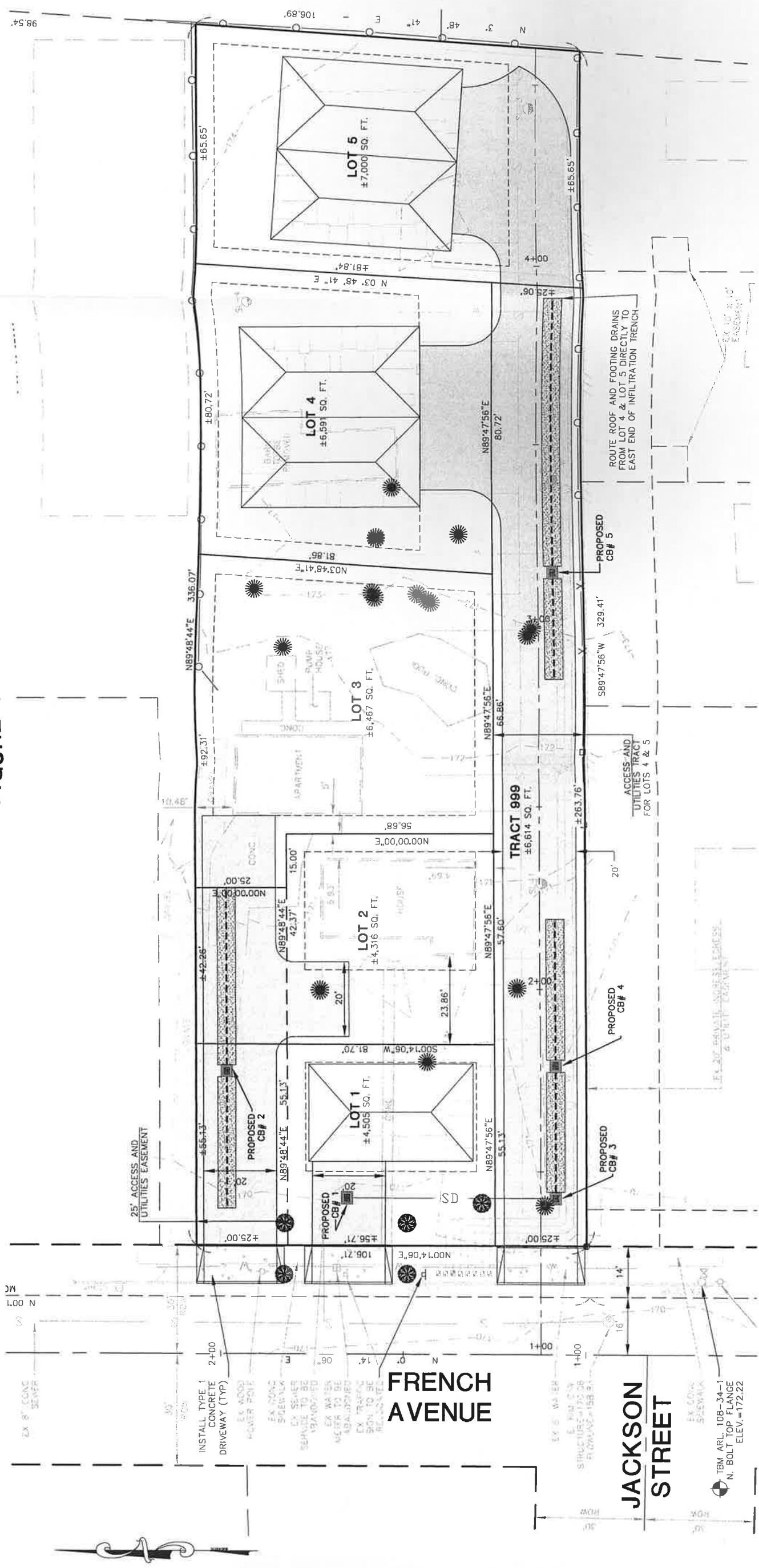
In modeling the storm drainage facility, an infiltration rate of 10.00 in/hr (half the D.O.E. rate for coarse sand, 20.0 in/hr) was used for the native soils and an infiltration rate of 1.205 in/hr (half the D.O.E. rate for loamy sand, 2.41 in/hr) was used for the on site loamy sand soils.

WATER QUALITY BMP

The water quality BMP proposed for this site is infiltration. Each water quality trench will provide water quality treatment via infiltration through a minimum of 18-inches of loamy sand placed in the bottom of the water quality trenches. Since loamy sand has a cation exchange capacity of 5 milliequivalents / 100 grams, each infiltration system will be capable of providing water quality treatment.

Appendix

INFILTRATION PLAN FIGURE 1

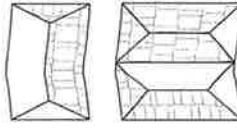


GRAPHIC SCALE



LEGEND

- PROPERTY LINE
- ROW
- ADJACENT LINE
- PROPOSED LOT LINE
- PROPOSED STORM LINE
- SD



PROPOSED SINGLE FAMILY

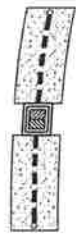
PROPOSED DUPLEX



EX BUILDING

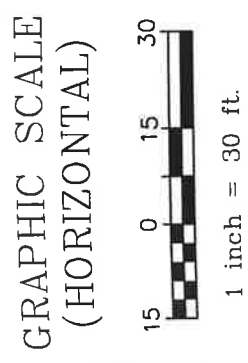
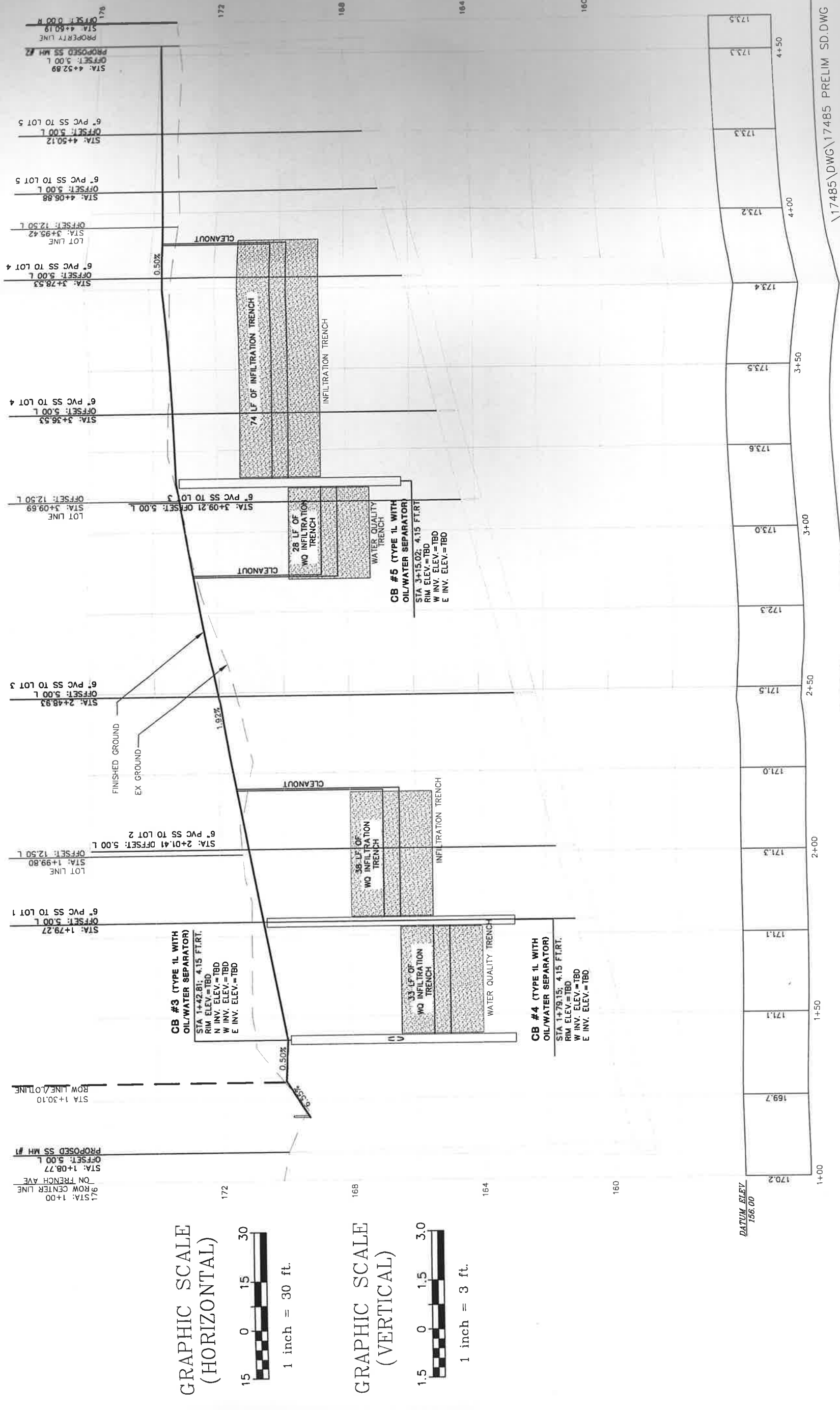


SOIL LOG



PROPOSED CB & INFILTRATION SYSTEM

PARTIAL INFILTRATION PROFILE (ALONG C.L. TRACT 999) FIGURE 2



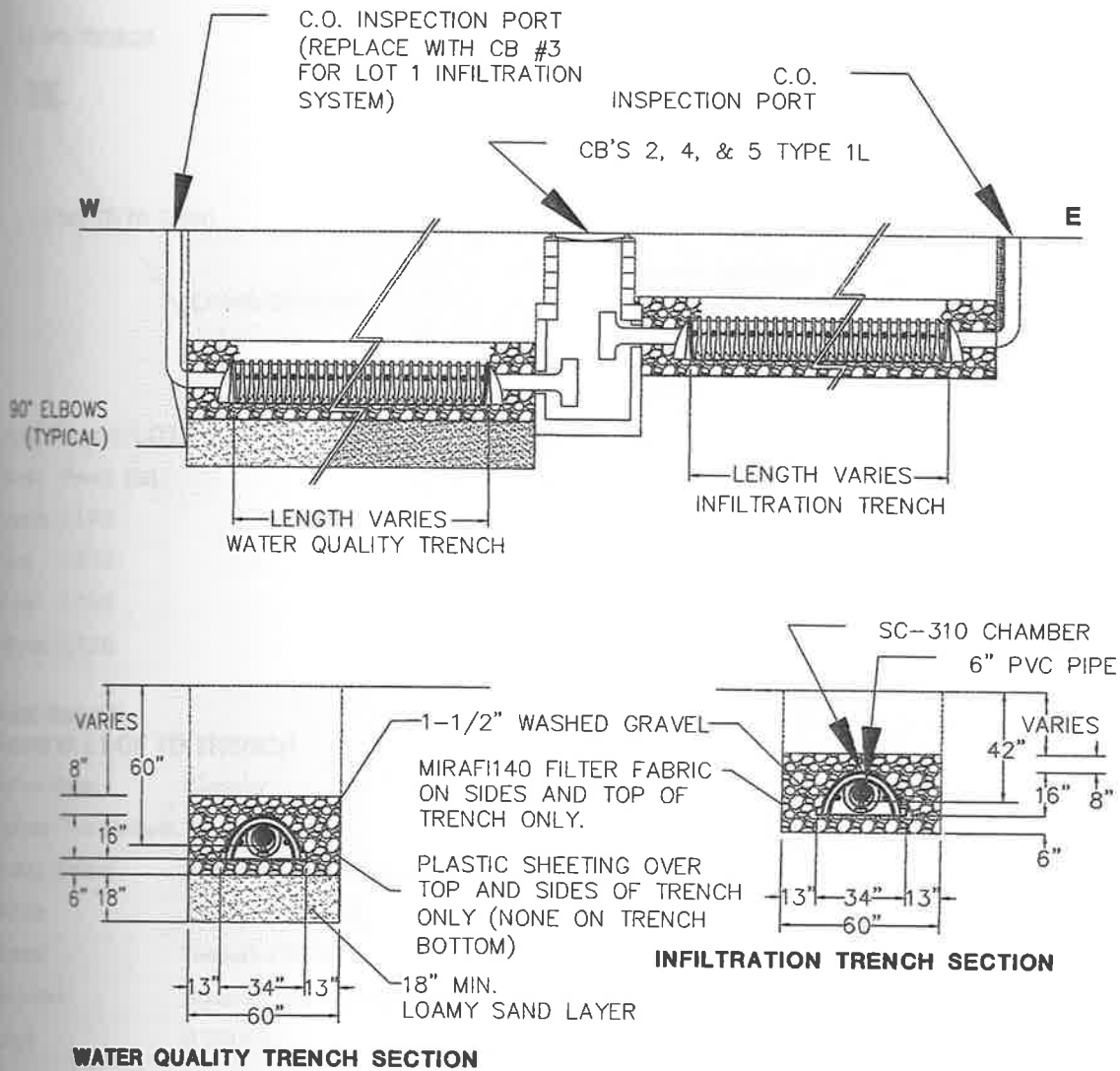
DATUM ELEV
158.00

INFILTRATION TRENCH DETAIL

FIGURE 3 (NTS)

INFILTRATION SYSTEM
SPECIFICATIONS

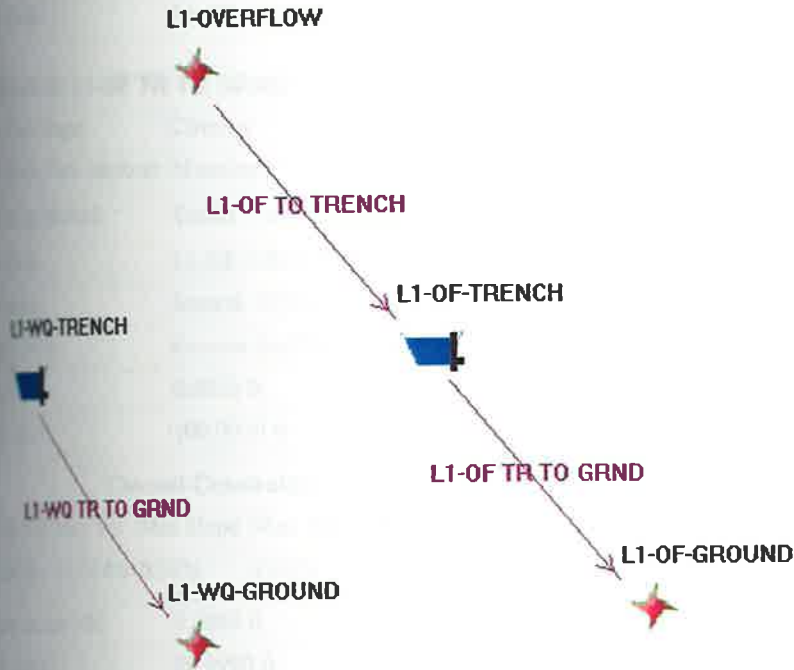
CB #	W.Q. TRENCH LENGTH (FT)	INF. TRENCH LENGTH (FT)
2	36	48
4	33	38
5	28	74



DRAINAGE CALCULATIONS

LOT 1 INFILTRATION

(EXCLUDES EASEMENT THROUGH LOT 1 & INCLUDES W. PORTION OF TRACT 999)



Layout Report: LOT 1 ETC

Event	Precip (in)
1 month	1.1500
2 year	1.8000
10 year	2.7500
100 year	3.7500

Reach Records

Record Id: L1-OF TO TRENCH

Section Shape:	Circular		
Uniform Flow Method:	Manning's	Coefficient:	0.0120
Routing Method:	Travel Time Translation	Contributing Hyd	L1-OVERFLOW
UpNode	L1-OF-TRENCH	UpNode	L1-OVERFLOW
Material	Smooth CDEP	Size	6" Diam
Exit Losses	Square Edge w/Headwall		
Length	0.0010 ft	Slope	100.00%
Up Invert	113.0000 ft	Dn Invert	112.9990 ft

Conduit Constraints				
Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft
Drop across MH	0.0000 ft		Ex/Infil Rate	0.0000 in/hr
Up Invert	112.9990 ft		Dn Invert	113.0000 ft
Match inverts.				
DnNode	L1-OF-TRENCH		UpNode	L1-OVERFLOW

Record Id: L1-OF TR TO GRND

Section Shape:	Circular			
Uniform Flow Method:	Manning's	Coefficient:	0.0120	
Routing Method:	Travel Time Translation			
DnNode	L1-OF-GROUND	UpNode	L1-OF-TRENCH	
Material	Smooth CDEP	Size	48" Diam	
Ent Losses	Groove End Projecting			
Length	0.0010 ft	Slope	100.00%	
Up Invert	100.0000 ft	Dn Invert	99.9990 ft	

Conduit Constraints				
Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft
Drop across MH	0.0000 ft		Ex/Infil Rate	0.0000 in/hr
Up Invert	99.9990 ft		Dn Invert	100.0000 ft
Match inverts.				
DnNode	L1-OF-GROUND		UpNode	L1-OF-TRENCH

Record Id: L1-WQ TR TO GRND

Section Shape:	Circular			
Uniform Flow Method:	Manning's	Coefficient:	0.0120	
Routing Method:	Travel Time Translation			
DnNode	L1-WQ-GROUND	UpNode	L1-WQ-TRENCH	
Material	Smooth CDEP	Size	48" Diam	
Ent Losses	Groove End Projecting			
Length	0.0010 ft	Slope	100.00%	
Up Invert	110.0000 ft	Dn Invert	109.9990 ft	

Conduit Constraints				
Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft
Drop across MH	0.0000 ft		Ex/Infil Rate	0.0000 in/hr
Up Invert	109.9990 ft		Dn Invert	110.0000 ft

Match inverts.

DnNode	L1-WQ-GROUND	UpNode	L1-WQ-TRENCH
--------	--------------	--------	--------------

Node Records

Record Id: L1-OF-GROUND

Descrip:	bottom of of trench	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Dummy Type Node			

Record Id: L1-OF-TRENCH

Descrip:	of trench/vault	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Storage Node	L1-OF-STORAGE	Discharge Node	L1-OF-MED-SAND

Record Id: L1-OF-STORAGE

Descrip:		Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Length	38.0000 ft	Width	5.0000 ft
Catch	40.0000	Consider Bottom Only	

Record Id: L1-OF-MED-SAND

Descrip:	medium sand layer	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	105.0000 ft
Infiltration rate	10.0000 in/hr	WP Multiplier	1.00

Record Id: L1-OVERFLOW

Descrip:	overflow from wq trench	Increment	0.10 ft
Start El.	166.5000 ft	Max El.	167.0000 ft
Dummy Type Node			

Record Id: L1-WQ-GROUND

Descrip:	bottom of wq trench	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	166.5000 ft
Dummy Type Node			

Record Id: L1-WQ-TRENCH

Descrip:	wq trench/vault	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	167.0000 ft
Storage Node	L1-WQ-STORAGE	Discharge Node	L1-COMBO

Record Id: L1-WQ-STORAGE

Descrip:		Increment	0.10 ft
Start El.	164.0000 ft	Max El.	166.5000 ft

Length	33.0000 ft	Width	5.0000 ft
Catch	40.0000	Consider Bottom Only	

Record Id: L1-COMBO

Descrip:		Increment	0.10 ft
Start El.	164.0000 ft	Max El.	167.0000 ft
List of Discharge Structures:	L1-WQ-LOAMY-SAND L1-OVERFLOW		

Record Id: L1-WQ-LOAMY-SAND

Descrip:	loamy sand layer	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	105.0000 ft
Infiltration rate	1.2050 in/hr	WP Multiplier	1.00

Record Id: L1-OVERFLOW

Descrip:		Increment	0.10 ft
Start El.	166.5000 ft	Max El.	167.0000 ft
Weir Area	0.1963 sf	Weir Coeff	0.6100

Contributing Drainage Areas

LOT 1 EXC EASMT Event Summary

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method	Raintype
6 month	0.0100	7.83	0.0031	0.0800	SBUH	TYPE1A
2 year	0.0168	7.83	0.0057	0.0800	SBUH	TYPE1A
10 year	0.0267	7.83	0.0101	0.0800	SBUH	TYPE1A
100 year	0.0400	7.83	0.0152	0.0800	SBUH	TYPE1A

Record Id: LOT 1 EXC EASMT

Design Method	SBUH	Rainfall type	TYPE1A
Hyd Intv	10.00 min	Peaking Factor	484.00
		Abstraction Coeff	0.20
Pervious Area (AMC 2)	0.04 ac	DCIA	0.04 ac
Pervious CN	68.00	DC CN	98.00
Pervious TC	13.48 min	DC TC	1.18 min

Pervious CN Calc

Description	SubArea	Sub cn
Open spaces, lawns,parks (>75% grass)	0.04 ac	68.00
Pervious Compositied CN (AMC 2)		68.00

Pervious TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet	Short prairie grass and lawns.: 0.15	50.00 ft	0.50%	0.1500	1.80 in	13.06 min

Channel (interm)	Other	75.00 ft	0.50%	0.0120		0.42 min
Pervious TC						13.48 min
Directly Connected CN Calc						
Description		SubArea		Sub cn		
Impervious surfaces (roofs)		0.03 ac		98.00		
Impervious surfaces (pavements)		0.01 ac		98.00		
DC Compositd CN (AMC 2)				98.00		
Directly Connected TC Calc						
Type	Description	Length	Slope	Coeff	Misc	TT
Sheet	Smooth Surfaces.: 0.011	50.00 ft	30.00%	0.0110	1.80 in	0.31 min
Sheet	Smooth Surfaces.: 0.011	10.00 ft	0.50%	0.0110	1.80 in	0.45 min
Channel (interm)	Other	75.00 ft	0.50%	0.0120		0.42 min
Directly Connected TC						1.18min

TR 999 W Event Summary

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method	Raintype
6 month	0.0235	8.00	0.0078	0.1100	SBUH	TYPE1A
2 year	0.0410	8.00	0.0135	0.1100	SBUH	TYPE1A
10 year	0.0665	7.83	0.0221	0.1100	SBUH	TYPE1A
100 year	0.0932	7.83	0.0312	0.1100	SBUH	TYPE1A

Record Id: TR 999 W

Design Method	SBUH	Rainfall type	TYPE1A
Hyd Intv	10.00 min	Peaking Factor	484.00
		Abstraction Coeff	0.20
Pervious Area (AMC 2)	0.11 ac	DCIA	0.00 ac
Pervious CN	97.01	DC CN	0.00
Pervious TC	4.54 min	DC TC	0.00 min

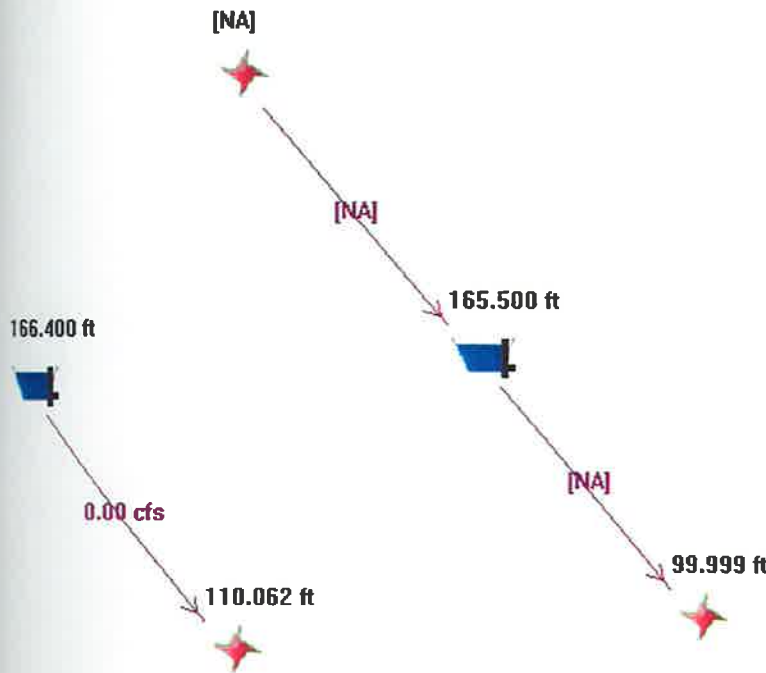
Pervious CN Calc

Description	SubArea	Sub cn
Open spaces, lawns,parks (>75% grass)	0.02 ac	68.00
Impervious surfaces (pavements)	0.09 ac	98.00
Pervious Compositd CN (AMC 2)		92.55

Pervious TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet	Short prairie grass and lawns.: 0.15	5.00 ft	0.50%	0.1500	1.80 in	2.07 min
Sheet	Smooth Surfaces.: 0.011	170.00 ft	2.00%	0.0110	1.80 in	2.47 min
Pervious TC						4.54 min

6-MONTH DRAINAGE CALCULATIONS



ROUTEHYD [] THRU [LOT 1 ETC] USING TYPE1A AND [6 month] NOTZERO RELATIVE SCS:SBUH

Routing split hyd [6 month-L1-OVERFLOW-OutHyd] through L1-OF TO TRENCH

Reach ID	Area (ac)	Flow (cfs)	Full Q (cfs)	Full ratio	nDepth (ft)	Size	nVel (ft/s)	fVel (ft/s)	C'Basin / Hyd
L1-OF TO TRENCH	0.0000	0.0000	6.0950	0.00	0.0000	6" Diam	0.0000	31.0417	

LPOOLCOMPUTE [L1-OF-TRENCH] SUMMARY using Puls

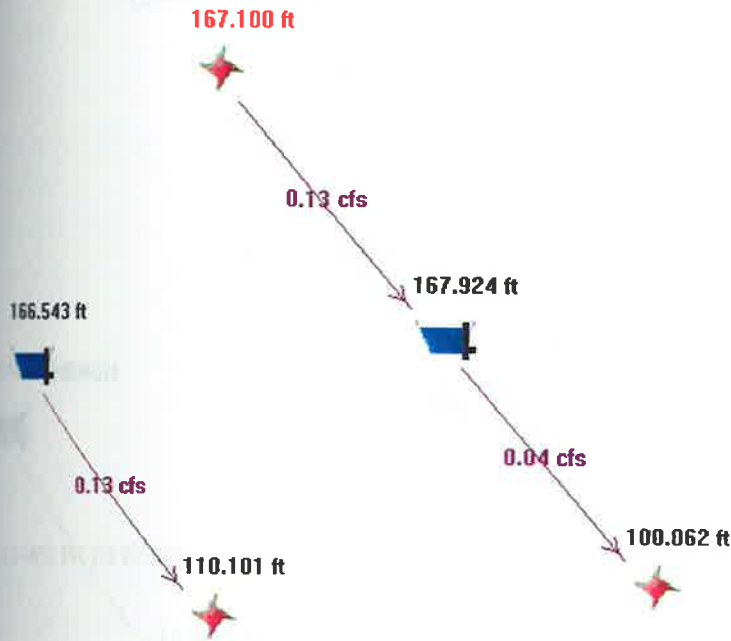
Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
6 month	0.0000	0.0000	165.5000	0.00	0.0000	33.67
L1-OF TR TO GRND	0.0000	0.0000	1560.32	0.00	0.0000	48" Diam 0.0000 124.1667

LPOOLCOMPUTE [L1-WQ-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
6 month	0.0330	0.0046	166.4000	158.40	0.0036	33.67
L1-WQ TR TO GRND	0.1900	0.0046	1560.32	0.00	0.0063	48" Diam 3.4143 124.1667 LOT 1 EXC EASMT TR 999 W

From Node	To Node	Rech Loss (ft)	App (ft)	Bend (ft)	Junct Loss (ft)	HW Loss Elev (ft)	Max El (ft)
							99.9990
L1-OF-TRENCH	L1-OF-GROUND	0.0000	--na--	--na--	--na--	165.5000	168.0000
L1-OVERFLOW	L1-OF-TRENCH	0.0000	--na--	--na--	--na--	0.0000	167.0000
L1-WQ-TRENCH	L1-WQ-GROUND	108.0627	--na--	--na--	--na--	166.4000	167.0000

100-YEAR DRAINAGE CALCULATIONS



ROUTEHYD [] THRU [LOT 1 ETC] USING TYPE1A AND [100 year] NOTZERO RELATIVE SCS-SBUH

Routing split hyd [100 year-L1-OVERFLOW-OutHyd] through L1-OF TO TRENCH

Reach ID	Area (ac)	Flow (cfs)	Full Q (cfs)	Full ratio	nDepth (ft)	Size	nVel (ft/s)	fVel (ft/s)	CBasin / Hyd
L1-OF TO TRENCH	0.0000	0.1301	6.0950	0.02	0.0503	6" Diam	12.6188	31.0417	

LPOOLCOMPUTE [L1-OF-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
100 year	0.1301	0.0440	167.9237	184.20	0.0042	35.00

L1-OF TR TO GRND	0.0000	0.0440	1560.32	0.00	0.0181	48" Diam	6.8012	124.1667
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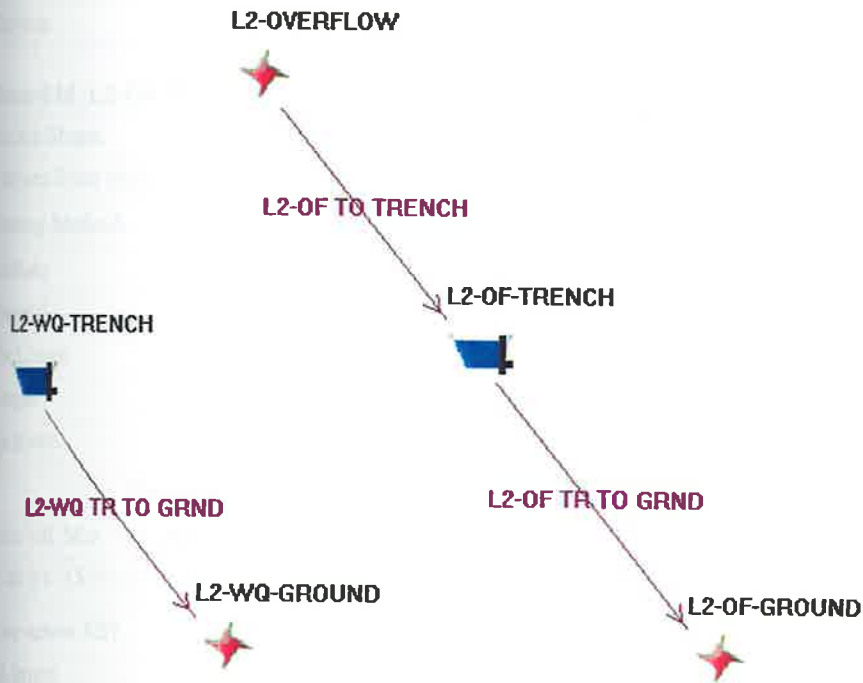
LPOOLCOMPUTE [L1-WQ-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
100 year	0.1332	0.1347	166.5428	167.82	0.0039	35.00

L1-WQ TR TO GRND	0.1900	0.1347	1560.32	0.00	0.0308	48" Diam	9.3814	124.1667	LOT 1 EXC EASMT TR 999 W
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From Node	To Node	Rel Loss (ft)	App (ft)	Bend (ft)	Junct Loss (ft)	HW Loss Elev (ft)	Max El (ft)
							100.0615
L1-OF-TRENCH	L1-OF-GROUND	98.0800	--na--	--na--	--na--	167.9237	168.0000
L1-OVERFLOW	L1-OF-TRENCH	167.9339	--na--	--na--	--na--	167.1000	167.0000
L1-WQ-TRENCH	L1-WQ-GROUND	108.1399	--na--	--na--	--na--	166.5428	167.0000

LOT 2 INFILTRATION (INCLUDES LOT 3 & EASEMENT THROUGH LOT 1)



Layout Report: LOT 2 ETC

Event	Precip (in)
6 month	1.1500
2 year	1.8000
10 year	2.7500
100 year	3.7500

Reach Records

Record Id: L2-OF TO TRENCH

Section Shape:	Circular		
Uniform Flow Method:	Manning's	Coefficient:	0.0120
Routing Method:	Travel Time Translation	Contributing Hyd	L2-OVERFLOW
DnNode	L2-OF-TRENCH	UpNode	L2-OVERFLOW
Material	Smooth CDEP	Size	6" Diam
Ent Losses	Square Edge w/Headwall		
Length	0.0010 ft	Slope	100.00%
Up Invert	113.0000 ft	Dn Invert	112.9990 ft

Conduit Constraints

Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft

Drop across MH	0.0000 ft	Ex/Infil Rate	0.0000 in/hr
Up Invert	112.9990 ft	Dn Invert	113.0000 ft
Match inverts.			
DnNode	L2-OF-TRENCH	UpNode	L2-OVERFLOW

Record Id: L2-OF TR TO GRND

Section Shape:	Circular		
Uniform Flow Method:	Manning's	Coefficient:	0.0120
Routing Method:	Travel Time Translation		
DnNode	L2-OF-GROUND	UpNode	L2-OF-TRENCH
Material	Smooth CDEP	Size	48" Diam
Ent Losses	Groove End Projecting		
Length	0.0010 ft	Slope	100.00%
Up Invert	100.0000 ft	Dn Invert	99.9990 ft

Conduit Constraints

Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft

Drop across MH	0.0000 ft	Ex/Infil Rate	0.0000 in/hr
Up Invert	99.9990 ft	Dn Invert	100.0000 ft
Match inverts.			
DnNode	L2-OF-GROUND	UpNode	L2-OF-TRENCH

Record Id: L2-WQ TR TO GRND

Section Shape:	Circular		
Uniform Flow Method:	Manning's	Coefficient:	0.0120
Routing Method:	Travel Time Translation		
DnNode	L2-WQ-GROUND	UpNode	L2-WQ-TRENCH
Material	Smooth CDEP	Size	48" Diam
Ent Losses	Groove End Projecting		
Length	0.0010 ft	Slope	100.00%
Up Invert	110.0000 ft	Dn Invert	109.9990 ft

Conduit Constraints

Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft

Drop across MH	0.0000 ft	Ex/Infil Rate	0.0000 in/hr
Up Invert	109.9990 ft	Dn Invert	110.0000 ft
Match inverts.			
DnNode	L2-WQ-GROUND	UpNode	L2-WQ-TRENCH

Node Records

Record Id: **L2-OF-GROUND**

Descrip:	bottom of of trench	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Dummy Type Node			

Record Id: **L2-OF-TRENCH**

Descrip:	of trench/vault	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Storage Node	L2-OF-STORAGE	Discharge Node	L2-OF-MED-SAND

Record Id: **L2-OF-STORAGE**

Descrip:		Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Length	48.0000 ft	Width	5.0000 ft
Catch	40.0000	Consider Bottom Only	

Record Id: **L2-OF-MED-SAND**

Descrip:	medium sand layer	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	105.0000 ft
Infiltration rate	10.0000 in/hr	WP Multiplier	1.00

Record Id: **L2-OVERFLOW**

Descrip:	overflow from wq trench	Increment	0.10 ft
Start El.	166.5000 ft	Max El.	167.0000 ft
Dummy Type Node			

Record Id: **L2-WQ-GROUND**

Descrip:	bottom of wq trench	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	166.5000 ft
Dummy Type Node			

Record Id: **L2-WQ-TRENCH**

Descrip:	wq trench/vault	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	167.0000 ft
Storage Node	L2-WQ-STORAGE	Discharge Node	L2-COMBO

Record Id: **L2-WQ-STORAGE**

Descrip:		Increment	0.10 ft
Start El.	164.0000 ft	Max El.	166.5000 ft
Length	36.0000 ft	Width	5.0000 ft
Catch	40.0000	Consider Bottom Only	

Record Id: L2-COMBO

Descrip:		Increment	0.10 ft
Start El.	164.0000 ft	Max El.	167.0000 ft
List of Discharge Structures:	L2-OVERFLOW L2-WQ-LOAMY-SAND		

Record Id: L2-OVERFLOW

Descrip:		Increment	0.10 ft
Start El.	166.5000 ft	Max El.	167.0000 ft
Weir Area	0.1963 sf	Weir Coeff	0.6100

Record Id: L2-WQ-LOAMY-SAND

Descrip:	loamy sand layer	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	105.0000 ft
Infiltration rate	1.2050 in/hr	WP Multiplier	1.00

Contributing Drainage Areas

LOT 2 ETC Event Summary

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method	Raintype
6 month	0.0373	7.83	0.0123	0.3000	SBUH	TYPE1A
2 year	0.0627	7.83	0.0229	0.3000	SBUH	TYPE1A
10 year	0.1059	7.83	0.0408	0.3000	SBUH	TYPE1A
100 year	0.1588	7.83	0.0614	0.3000	SBUH	TYPE1A

Record Id: LOT 2 ETC

Design Method	SBUH	Rainfall type	TYPE1A
Hyd Intv	10.00 min	Peaking Factor	484.00
		Abstraction Coeff	0.20
Pervious Area (AMC 2)	0.15 ac	DCIA	0.15 ac
Pervious CN	73.73	DC CN	98.00
Pervious TC	19.37 min	DC TC	2.45 min

Pervious CN Calc

Description	SubArea	Sub cn
Open spaces, lawns, parks (>75% grass)	0.13 ac	68.00
Impervious surfaces (pool, etc)	0.02 ac	98.00
Pervious Compositied CN (AMC 2)		72.00

Pervious TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet	Short prairie grass and lawns.: 0.15	100.00 ft	1.00%	0.1500	1.80 in	17.24 min
Sheet	Smooth Surfaces.: 0.011	100.00 ft	1.00%	0.0110	1.80 in	2.13 min
Pervious TC						19.37 min

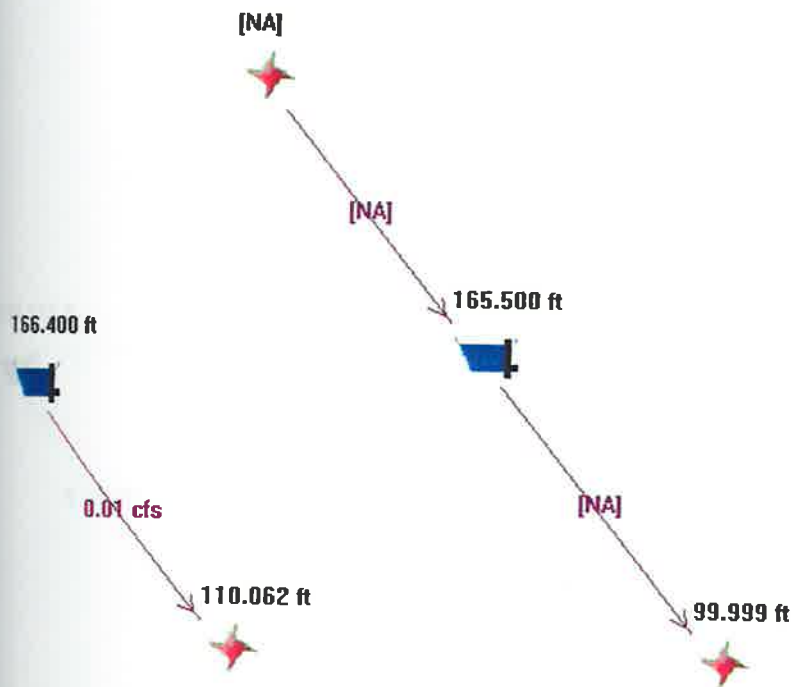
Directly Connected CN Calc

Description	SubArea	Sub cn
Impervious surfaces (pavements)	0.10 ac	98.00
Impervious surfaces (roofs.)	0.05 ac	98.00
DC Compositd CN (AMC 2)		98.00

Directly Connected TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet	Smooth Surfaces.: 0.011	50.00 ft	30.00%	0.0110	1.80 in	0.31 min
Sheet	Smooth Surfaces.: 0.011	100.00 ft	1.00%	0.0110	1.80 in	2.13 min
Directly Connected TC						2.45min

6-MONTH DRAINAGE CALCULATIONS



ROUTEHYD [] THRU [LOT 2 ETC] USING TYPE1A AND [6 month] NOTZERO RELATIVE SCS:SBUH

Routing split hyd [6 month-L2-OVERFLOW-OutHyd] through L2-OF TO TRENCH

Reach ID	Area (ac)	Flow (cfs)	Full Q (cfs)	Full ratio	nDepth (ft)	Size	nVel (ft/s)	fVel (ft/s)	CBasin / Hyd
L2-OF TO TRENCH	0.0000	0.0000	6.0950	0.00	0.0000	6" Diam	0.0000	31.0417	

LPOOLC'OMPUTE [L2-OF-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
6 month	0.0000	0.0000	165.5000	0.00	0.0000	34.17

L2-OF TR TO GRND	0.0000	0.0000	1560.32	0.00	0.0000	48" Diam	0.0000	124.1667
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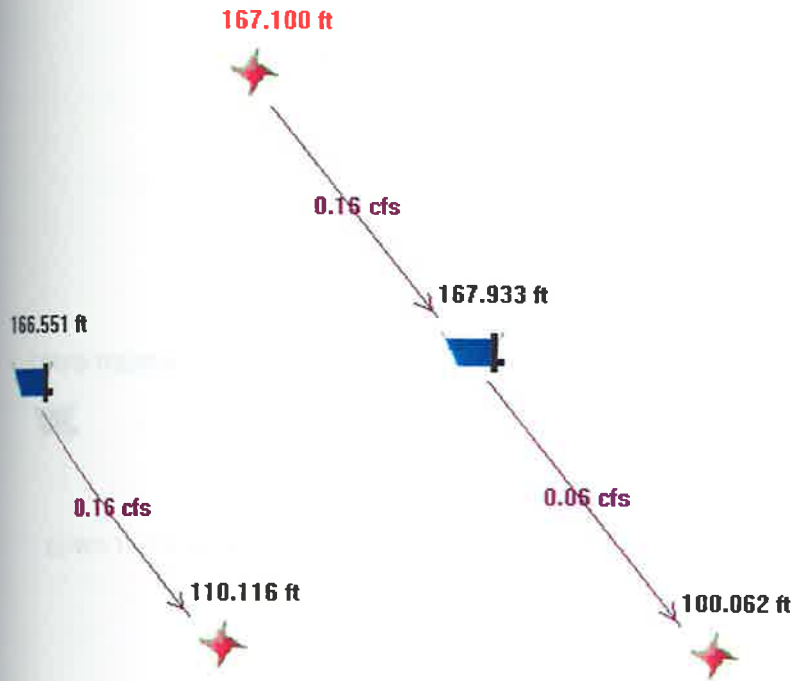
LPOOLC'OMPUTE [L2-WQ-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
6 month	0.0373	0.0050	166.4000	172.80	0.0040	34.17

L2-WQ TR TO GRND	0.3000	0.0050	1560.32	0.00	0.0063	48" Diam	3.7247	124.1667 LOT 2 ETC
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From Node	To Node	Rch Loss (ft)	App (ft)	Bend (ft)	Junct Loss (ft)	HW Loss Elev (ft)	Max El (ft)
							99.9990
L2-OF-TRENCH	L2-OF-GROUND	0.0000	--na--	--na--	--na--	165.5000	168.0000
L2-OVERFLOW	L2-OF-TRENCH	0.0000	--na--	--na--	--na--	0.0000	167.0000
L2-WQ-TRENCH	L2-WQ-GROUND	108.0627	--na--	--na--	--na--	166.4000	167.0000

100-YEAR DRAINAGE CALCULATIONS



ROUTEHYD [] THRU [LOT 2 ETC] USING TYPE1A AND [100 year] NOTZERO RELATIVE SCS:SBUH

Routing split hyd [100 year-L2-OVERFLOW-OutHyd] through L2-OF TO TRENCH

Reach ID	Area (ac)	Flow (cfs)	Full Q (cfs)	Full ratio	nDepth (ft)	Size	nVel (ft/s)	fVel (ft/s)	CBasin / Hyd
L2-OF TO TRENCH	0.0000	0.1560	6.0950	0.03	0.0552	6" Diam	13.2125	31.0417	

LPOOLCOMPUTE [L2-OF-TRENCH] SUMMARY using Puls

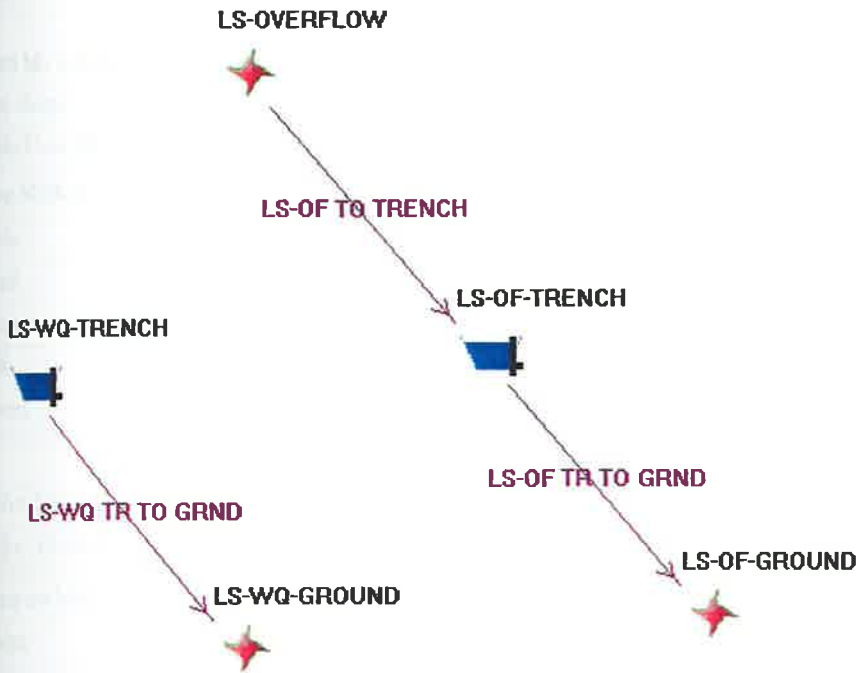
Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
100 year	0.1560	0.0556	167.9326	233.53	0.0054	35.33
L2-OF TR TO GRND	0.0000	0.0556	1560.32	0.00	0.0210	48" Diam 6.8586 124.1667

LPOOLCOMPUTE [L2-WQ-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
100 year	0.1588	0.1610	166.5513	183.70	0.0042	35.33
L2-WQ TR TO GRND	0.3000	0.1610	1560.32	0.00	0.0337	48" Diam 9.7885 124.1667 LOT 2 ETC

From Node	To Node	Rch Loss (ft)	App (ft)	Bend (ft)	Junct Loss (ft)	HW Loss Elev (ft)	Max El (ft)
							100.0615
L2-OF-TRENCH	L2-OF-GROUND	98.0904	--na--	--na--	--na--	167.9326	168.0000
L2-OVERFLOW	L2-OF-TRENCH	167.9473	--na--	--na--	--na--	167.1000	167.0000
L2-WQ-TRENCH	L2-WQ-GROUND	108.1530	--na--	--na--	--na--	166.5513	167.0000

LOT 3 & 4 INFILTRATION (INCLUDES E. PORTION OF TRACT 999)



Layout Report: LOTS

Event	Precip (in)
6 month	1.1500
2 year	1.8000
10 year	2.7500
100 year	3.7500

Reach Records

Record Id: LS-OF TO TRENCH

Section Shape:	Circular		
Uniform Flow Method:	Manning's	Coefficient:	0.0120
Routing Method:	Travel Time Translation	Contributing Hyd	LS-OVERFLOW
DnNode:	LS-OF-TRENCH	UpNode	LS-OVERFLOW
Material:	Smooth CDEP	Size	6" Diam
Ent Losses	Square Edge w/Headwall		
Length	0.0010 ft	Slope	100.00%
Up Invert	113.0000 ft	Dn Invert	112.9990 ft

Conduit Constraints

Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft
Drop across MH	0.0000 ft		Ex/Infil Rate	0.0000 in/hr

Up Invert	112.9990 ft	Dn Invert	113.0000 ft
Match inverts.			
DnNode	LS-OF-TRENCH	UpNode	LS-OVERFLOW

Record Id: LS-OF TR TO GRND

Section Shape:	Circular		
Uniform Flow Method:	Manning's	Coefficient:	0.0120
Routing Method:	Travel Time Translation		
DnNode	LS-OF-GROUND	UpNode	LS-OF-TRENCH
Material	Smooth CDEP	Size	48" Diam
Ent Losses	Groove End Projecting		
Length	0.0010 ft	Slope	100.00%
Up Invert	100.0000 ft	Dn Invert	99.9990 ft

Conduit Constraints

Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft
Drop across MH	0.0000 ft		Ex/Infil Rate	0.0000 in/hr
Up Invert	99.9990 ft		Dn Invert	100.0000 ft
Match inverts.				
DnNode	LS-OF-GROUND	UpNode	LS-OF-TRENCH	

Record Id: LS-WQ TR TO GRND

Section Shape:	Circular		
Uniform Flow Method:	Manning's	Coefficient:	0.0120
Routing Method:	Travel Time Translation		
DnNode	LS-WQ-GROUND	UpNode	LS-WQ-TRENCH
Material	Smooth CDEP	Size	48" Diam
Ent Losses	Groove End Projecting		
Length	0.0010 ft	Slope	100.00%
Up Invert	110.0000 ft	Dn Invert	109.9990 ft

Conduit Constraints

Min Vel	Max Vel	Min Slope	Max Slope	Min Cover
2.00 ft/s	15.00 ft/s	0.50%	2.00%	3.00 ft
Drop across MH	0.0000 ft		Ex/Infil Rate	0.0000 in/hr
Up Invert	109.9990 ft		Dn Invert	110.0000 ft
Match inverts.				
DnNode	LS-WQ-GROUND	UpNode	LS-WQ-TRENCH	

Node Records**Record Id: LS-OF-GROUND**

Descrip:	bottom of of trench	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Dummy Type Node			

Record Id: LS-OF-TRENCH

Descrip:	of trench/vault	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Storage Node	LS-OF-STORAGE	Discharge Node	LS-OF-MED-SAND

Record Id: LS-OF-STORAGE

Descrip:		Increment	0.10 ft
Start El.	165.5000 ft	Max El.	168.0000 ft
Length	74.0000 ft	Width	5.0000 ft
Catch	40.0000	Consider Bottom Only	

Record Id: LS-OF-MED-SAND

Descrip:	medium sand layer	Increment	0.10 ft
Start El.	165.5000 ft	Max El.	105.0000 ft
Infiltration rate	10.0000 in/hr	WP Multiplier	1.00

Record Id: LS-OVERFLOW

Descrip:	overflow from wq trench	Increment	0.10 ft
Start El.	166.5000 ft	Max El.	167.0000 ft
Dummy Type Node			

Record Id: LS-WQ-GROUND

Descrip:	bottom of wq trench	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	166.5000 ft
Dummy Type Node			

Record Id: LS-WQ-TRENCH

Descrip:	wq trench/vault	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	167.0000 ft
Storage Node	LS-WQ-STORAGE	Discharge Node	LS-COMBO

Record Id: LS-WQ-STORAGE

Descrip:		Increment	0.10 ft
Start El.	164.0000 ft	Max El.	166.5000 ft
Length	28.0000 ft	Width	5.0000 ft
Catch	40.0000	Consider Bottom Only	

Record Id: LS-COMBO

Descrip:		Increment	0.10 ft
Start El.	164.0000 ft	Max El.	167.0000 ft
List of Discharge Structures:	LS-WQ-LOAMY-SAND LS-OVERFLOW		

Record Id: LS-WQ-LOAMY-SAND

Descrip:	loamy sand layer	Increment	0.10 ft
Start El.	164.0000 ft	Max El.	105.0000 ft
Infiltration rate	1.2050 in/hr	WP Multiplier	1.00

Record Id: LS-OVERFLOW

Descrip:		Increment	0.10 ft
Start El.	166.5000 ft	Max El.	167.0000 ft
Weir Area	0.1963 sf	Weir Coeff	0.6100

**Contributing Drainage Areas
LOTS TO WQ Event Summary**

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method	Raintype
6 month	0.0134	8.17	0.0088	0.2400	SBUH	TYPE1A
2 year	0.0352	8.17	0.0190	0.2400	SBUH	TYPE1A
10 year	0.0719	8.17	0.0358	0.2400	SBUH	TYPE1A
100 year	0.1127	8.17	0.0544	0.2400	SBUH	TYPE1A

Record Id: LOTS TO WQ

Design Method	SBUH	Rainfall type	TYPE1A
Hyd Intv	10.00 min	Peaking Factor	484.00
		Abstraction Coeff	0.20
Pervious Area (AMC 2)	0.24 ac	DCIA	0.00 ac
Pervious CN	90.42	DC CN	0.00
Pervious TC	31.80 min	DC TC	0.00 min

Pervious CN Calc

Description	SubArea	Sub cn
Impervious surfaces (pavements)	0.10 ac	98.00
Open spaces, lawns,parks (>75% grass)	0.05 ac	68.00
Open spaces, lawns,parks (>75% grass)	0.09 ac	80.00
Pervious Compositd CN (AMC 2)		85.00

Pervious TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet	Short prairie grass and lawns.: 0.15	150.00 ft	0.50%	0.1500	1.80 in	31.46 min
Sheet	Smooth Surfaces.: 0.011	10.00 ft	1.00%	0.0110	1.80 in	0.34 min
Pervious TC						31.80 min

LOTS TO OF Event Summary

Event	Peak Q (cfs)	Peak T (hrs)	Hyd Vol (acft)	Area (ac)	Method	Raintype
6 month	0.0300	7.83	0.0094	0.1200	SBUH	TYPE1A
2 year	0.0503	7.83	0.0158	0.1200	SBUH	TYPE1A
10 year	0.0795	7.83	0.0252	0.1200	SBUH	TYPE1A
100 year	0.1099	7.83	0.0352	0.1200	SBUH	TYPE1A

Record Id: LOTS TO OF

Design Method	SBUH	Rainfall type	TYPE1A
Hyd Intv	10.00 min	Peaking Factor	484.00
		Abstraction Coeff	0.20
Pervious Area (AMC 2)	0.12 ac	DCIA	0.00 ac
Pervious CN	98.00	DC CN	0.00
Pervious TC	1.15 min	DC TC	0.00 min

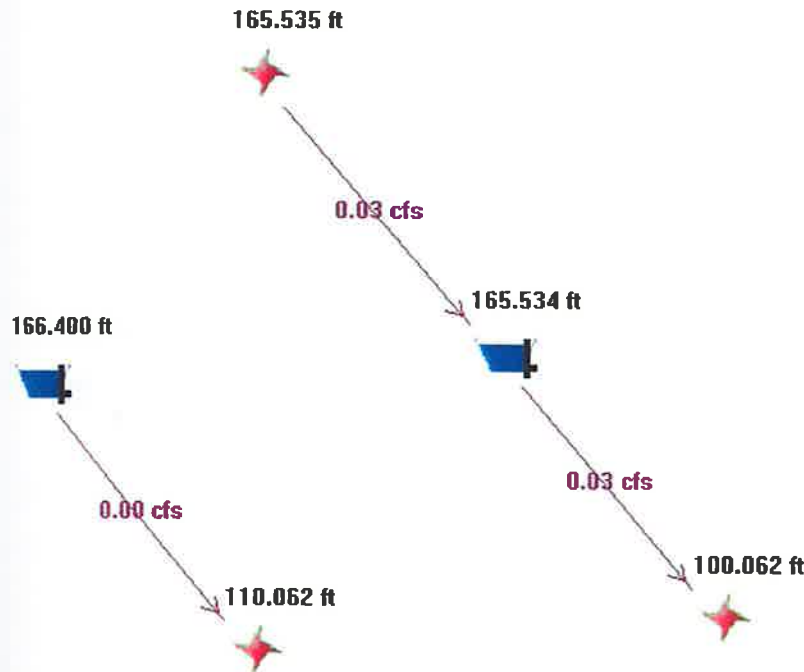
Pervious CN Calc

Description	SubArea	Sub cn
Impervious surfaces (roofs)	0.12 ac	98.00
Pervious Composited CN (AMC 2)		98.00

Pervious TC Calc

Type	Description	Length	Slope	Coeff	Misc	TT
Sheet	Smooth Surfaces.: 0.011	50.00 ft	30.00%	0.0110	1.80 in	0.31 min
Channel (interm)	Other	150.00 ft	0.50%	0.0120		0.83 min
Pervious TC						1.15 min

6-MONTH DRAINAGE CALCULATIONS



ROUTEHYD [] THRU [LOTS] USING TYPELA AND [6 month] NOTZERO RELATIVE SCS/SBUH

Routing split hyd [6 month-LS-OVERFLOW-OutHyd] through LS-OF TO TRENCH

Reach ID	Area (ac)	Flow (cfs)	Full Q (cfs)	Full ratio	nDepth (ft)	Size	nVel (ft/s)	fVel (ft/s)	CBasin / Hyd
LS-OF TO TRENCH	0.1200	0.0300	6.0950	0.00	0.0249	6" Diam	8.2243	31.0417	LOTS TO OF

LPOOLCOMPUTE [LS-OF-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
6 month	0.0300	0.0293	165.5342	5.07	0.0001	34.83

LS-OF TR TO GRND	0.1200	0.0293	1560.32	0.00	0.0151	48" Diam	5.9132	124.1667
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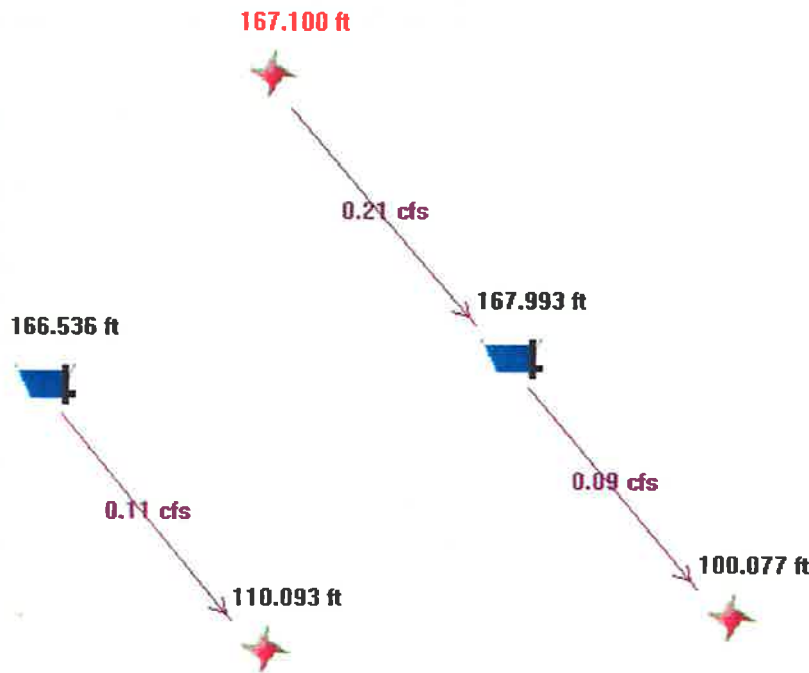
LPOOLCOMPUTE [LS-WQ-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
6 month	0.0134	0.0039	166.4000	134.40	0.0031	34.83

LS-WQ TR TO GRND	0.2400	0.0039	1560.32	0.00	0.0063	48" Diam	2.8970	124.1667	LOTS TO WQ
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From Node	To Node	Rel Loss (ft)	App (ft)	Bend (ft)	Junct Loss (ft)	HW Loss Elev (ft)	Max El (ft)
							100.0615
LS-OF-TRENCH	LS-OF-GROUND	98.0703	--na--	--na--	--na--	165.5342	168.0000
LS-OVERFLOW	LS-OF-TRENCH	165.5348	--na--	--na--	--na--	165.5348	167.0000
LS-WQ-TRENCH	LS-WQ-GROUND	108.0626	--na--	--na--	--na--	166.4000	167.0000

100-YEAR DRAINAGE CALCULATIONS



ROUTEHYD [] THRU [LOTS] USING TYPE1A AND [100 year] NOTZERO RELATIVE SCS/SBUH

Routing split hyd [100 year-LS-OVERFLOW-OutHyd] through LS-OF TO TRENCH

Reach ID	Area (ac)	Flow (cfs)	Full Q (cfs)	Full ratio	nDepth (ft)	Size	nVel (ft/s)	fVel (ft/s)	CBasin / Hyd
LS-OF TO TRENCH	0.1200	0.2077	6.0950	0.03	0.0630	6" Diam	14.4952	31.0417	LOTS TO OF

LPOOLCOMPUTE [LS-OF-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
100 year	0.2077	0.0856	167.9934	369.02	0.0085	36.00

LS-OF TR TO GRND	0.1200	0.0856	1560.32	0.00	0.0249	48" Diam	8.1884	124.1667
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LPOOLCOMPUTE [LS-WQ-TRENCH] SUMMARY using Puls

Event	Match Q (cfs)	Peak Q (cfs)	Peak Stg (ft)	Vol (cf)	Vol (acft)	Time to Empty
100 year	0.1127	0.1134	166.5360	142.02	0.0033	36.00

LS-WQ TR TO GRND	0.2400	0.1134	1560.32	0.00	0.0288	48" Diam	8.7186	124.1667	LOTS TO WQ
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From Node	To Node	Rch Loss (ft)	App (ft)	Bend (ft)	Junct Loss (ft)	HW Loss Elev (ft)	Max El (ft)
							100.0771
LS-OF-TRENCH	LS-OF-GROUND	98.1121	--na--	--na--	--na--	167.9934	168.0000
LS-OVERFLOW	LS-OF-TRENCH	168.0195	--na--	--na--	--na--	167.1000	167.0000
LS-WQ-TRENCH	LS-WQ-GROUND	108.1283	--na--	--na--	--na--	166.5360	167.0000

Maintenance Plan for Privately Maintained Drainage Facilities

Drainage System 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.

		MAINTENANCE COMPONENT	
		CATCH BASIN	
GENERAL	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
	TRASH & DEBRIS	TRASH OR DEBRIS WHICH IS LOCATED IMMEDIATELY IN FRONT OF THE CATCH BASIN OPENING OR IS BLOCKING INLETTING CAPACITY OF THE BASIN BY MORE THAN 10%. TRASH OR DEBRIS IN THE BASIN THAT EXCEEDS 60% OF THE SUMP DEPTH AS MEASURED FROM THE BOTTOM OF BASIN TO INVERT OF THE LOWEST PIPE INTO OR OUT OF THE BASIN, BUT IN NO CASE LESS THAN A MINIMUM OF SIX INCHES CLEARANCE FROM THE DEBRIS SURFACE TO THE INVERT OF THE LOWEST PIPE. TRASH OR DEBRIS IN ANY INLET OR OUTLET PIPE BLOCKING MORE THAN 1/3 OF ITS HEIGHT. DEAD ANIMALS OR VEGETATION THAT COULD GENERATE ODORS THAT COULD CAUSE COMPLAINTS OR DANGEROUS GASES (E.G., METHANE).	NO TRASH OR DEBRIS LOCATED IMMEDIATELY IN FRONT OF CATCH BASIN OR ON GRATE OPENING. NO TRASH OR DEBRIS IN THE CATCH BASIN. INLET AND OUTLET PIPES FREE OF TRASH OR DEBRIS. NO DEAD ANIMALS OR VEGETATION PRESENT WITHIN THE CATCH BASIN.
	SEDIMENT	SEDIMENT (IN THE BASIN) THAT EXCEEDS 60% OF THE SUMP DEPTH AS MEASURED FROM THE BOTTOM OF BASIN TO INVERT OF THE LOWEST PIPE INTO OR OUT OF THE BASIN, BUT IN NO CASE LESS THAN A MINIMUM OF 6 INCHES CLEARANCE FROM THE SEDIMENT SURFACE OT THE INVERT OF THE LOWEST PIPE.	NO SEDIMENT IN THE CATCH BASIN
	STRUCTURE DAMAGE TO FRAME AND OR TOP SLAB	TOP SLAB HAS HOLES LARGER THAN 2 SQUARE INCHES OR CRACKS WIDER THAN 1/4 INCH (INTENT IS TO MAKE SURE NO MATERIAL IS RUNNING INTO 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 NOT SECURELY ATTACHED.	FRAME IS SITTING FLUSH ON THE RISER RINGS OR TOP SLAB AND FIRMLY ATTACHED.

	FRACTURES OR CRACKS IN BASIN WALLS / BOTTOM	MAINTENANCE PERSON JUDGES THAT STRUCTURE IS UNSOUND.	BASIN REPLACED OR REPAIRED TO DESIGN STANDARDS
		GROUT FILLET HAS SEPARATED OR CRACKED 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.	PIPE IS REGROUTED AND SECURE AT THE BASE OF THE WALL
	SETTLEMENT / MISALIGNMENT	IF FAILURE OF BASIN HAS CREATED A SAFETY, FUNCTION, OR DESIGN PROBLEM.	BASIN REPLACED OR REPAIRED TO DESIGN STANDARDS.
	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.
CONTAMINATION AND POLLUTION	ANY EVIDENCE OF OIL, GASOLINE, OR OTHER CONTAMINANTS OR POLLUTANTS. (COORDINATE REMOVAL/CLEANUP WITH LOCAL WATER QUALITY RESPONSE AGENCY).	NO CONTAMINANTS OR POLLUTANTS PRESENT. (COORDINATION WITH HEALTH DEPARTMENT).	
CATCH BASIN COVER	COVER NOT IN PLACE	COVER IS MISSING OR ONLY PARTIALLY IN PLACE. ANY OPEN CATCH BASIN REQUIRES 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 NORMAL LIFTING PRESSURE. (INTENT IS KEEP COVER FROM SEALING OFF ACCESS TO MAINTENANCE.)	COVER CAN BE REMOVED BY ONE MAINTENANCE PERSON.
LADDER	LADDER RUNGS UNSAFE	LADDER IS UNSAFE DUE TO MISSING RUNGS, NOT SECURELY ATTACHED TO BASIN WALL, MISALIGNMENT, RUST, CRACKS, OR SHARP EDGES.	LADDER MEETS DESIGN STANDARDS AND ALLOWS MAINTENANCE PERSON SAFE ACCESS.
METAL GRATES (IF APPLICABLE)	GRATE OPENING UNSAFE	GRATE WITH OPENING WIDER THAN 7/8 INCH.	GRATE OPENING MEETS DESIGN STANDARDS.
	TRASH AND DEBRIS	TRASH AND DEBRIS THAT IS BLOCKING MORE THAN 20% OF GRATE SURFACE INLETING CAPACITY.	GRATE FREE OF TRASH AND DEBRIS.
	DAMAGED OR MISSING.	GRATE MISSING OR BROKEN MEMBER(S) OF THE GRATE.	GRATE IS IN PLACE AND MEETS DESIGN STANDARDS.

MAINTENANCE COMPONENT			
		CONVEYANCE SYSTEM (PIPES & DITCHES)	
GENERAL	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
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.
OPEN DITCHES	SEDIMENT	ACCUMULATED SEDIMENT THAT EXCEEDS 20% OF THE DESIGN DEPTH.	DITCH CLEANED/ FLUSHED OF ALL SEDIMENT AND DEBRIS SO THAT IT MATCHES DESIGN.
	VEGETATION	VEGETATION THAT REDUCES FREE MOVEMENT OF WATER THROUGH DITCHES.	WATER FLOWS FREELY THROUGH DITCHES.
	EROSION DAMAGE TO SLOPES	SEE "PONDS" STANDARD NO. 1	SEE "PONDS" STANDARD NO. 1
	ROCK LINING OUT OF PLACE OR MISSING (IF APPLICABLE)	MAINTENANCE PERSON CAN SEE NATIVE SOIL BENEATH THE ROCK LINING.	REPLACE ROCKS TO DESIGN STANDARD.
CATCH BASINS		SEE "CATCH BASINS" STANDARD NO. 5	SEE "CATCH BASINS" STANDARD NO. 5
DEBRIS BARRIER E.G. TRASH RACK		SEE "DEBRIS BARRIERS" STANDARD NO. 6	

MAINTENANCE COMPONENT			
GROUNDS (LANDSCAPING)			
GENERAL	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
	WEEDS (NONPOISONOUS)	WEEDS GROWING IN MORE THAN 20% OF THE LAND-SCAPED AREA (TREES AND SHRUBS ONLY).	WEEDS PRESENT IN LESS THAN 5% OF THE LANDSCAPED AREA.
	SAFETY HAZARD	ANY PRESENCE OF POISON IVY OR OTHER POISONOUS VEGETATION.	NO POISONOUS VEGETATION PRESENT IN A LANDSCAPED AREA.
	TRASH OR LITTER	PAPER, CAN, BOTTLES, TOTALING MORE THAN 1 CUBIC FOOT WITHIN A LANDSCAPED AREA (TREES AND SHRUBS ONLY) OF 1,000 SQUARE FEET.	AREA CLEAR OF LITTER.
	DAMAGE	LIMBS OR PARTS OF TREES OR SHRUBS THAT ARE SPLIT OR BROKEN WHICH AFFECT MORE THAN 25% OF THE TOTAL FOLIAGE OF THE TREE OR SHRUB.	TREES AND SHRUBS WITH LESS THAN 5% OF THE TOTAL FOLIAGE WITH SPLIT OR BROKEN LIMBS.
	TREES & SHRUBS	TREES OR SHRUBS THAT HAVE BEEN BLOWN DOWN OR KNOCKED OVER.	TREE OR SHRUB IN PLACE FREE OF INJURY.

	TREES OR SHRUBS WHICH ARE NOT ADEQUATELY SUPPORTED OR ARE LEANING OVER, CAUSING EXPOSURE OF THE ROOTS.	TREE OR SHRUB IN PLACE AND ADEQUATELY SUPPORTED; REMOVE ANY DEAD OR DISEASED TREES.
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MAINTENANCE COMPONENT

ACCESS ROADS (EASEMENTS)

GENERAL	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
	TRASH AND DEBRIS	TRASH AND DEBRIS EXCEEDS 1 CUBIC FOOT PER 1,000 FEET, I.E., TRASH AND DEBRIS WOULD FILL UP ONE STANDARD SIZE GARBAGE CAN.	TRASH AND DEBRIS CLEARED FROM SITE.
	BLOCKED ROADWAY	DEBRIS WHICH COULD DAMAGE VEHICLE TIRES (GLASS OR METAL).	ROADWAY FREE OF DEBRIS WHICH COULD DAMAGE TIRES.
		ANY OBSTRUCTIONS WHICH REDUCE CLEARANCE ABOVE ROAD SURFACE TO LESS THAN 14 FEET.	ROADWAY OVERHEAD CLEAR TO 14 FEET HIGH.
		ANY OBSTRUCTIONS RESTRICTING THE ACCESS TO A 10 TO 12 FOOT WIDTH FOR A DISTANCE OF MORE THAN 12 FEET OR ANY POINT RESTRICTING ACCESS TO LESS THAN A 10 FOOT WIDTH.	OBSTRUCTION REMOVED TO ALLOW AT LEAST A 12 FOOT ACCESS.
ROAD SURFACE	SETTLEMENT, POTHOLES, MUSH SPOTS, RUTS	WHEN ANY SURFACE DEFECT EXCEEDS 6 INCHES IN DEPTH AND 6 SQUARE FEET IN AREA. IN GENERAL, ANY SURFACE DEFECT WHICH HINDERS OR PREVENTS MAINTENANCE ACCESS.	ROAD SURFACE UNIFORMLY SMOOTH WITH NO EVIDENCE OF SETTLEMENT, POTHOLES, MUSH SPOTS, OR RUTS.
	VEGETATION IN ROAD SURFACE	WEEDS GROWING IN THE ROAD SURFACE THAT ARE MORE THAN 6 INCHES TALL AND LESS THAN 6 INCHES APART WITHIN A 400 SQUARE FOOT AREA.	ROAD SURFACE FREE OF WEEDS TALLER THAN 2 INCHES.
	EROSION DAMAGE	EROSION WITHIN 1 FOOT OF THE ROADWAY MORE THAN 8 INCHES WIDE AND 6 INCHES DEEP.	SHOULDER FREE OF EROSION AND MATCHING THE SURROUNDING ROAD.

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
INFILTRATION TRENCH			
CATCH BASIN	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.
	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 FOOT IN VOLUME.	NO CONDITION 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 MAINTENANCE.	COVER CAN BE REMOVED BY ONE MAINTENANCE PERSON.
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.